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**Vol. 5, No. 24, November 2014**

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1  
2  
3  
4  
5  
6  
7  
8  
9  
10

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2	<i>University of Bordeaux, France</i>	40	<i>CIRPS Sapienza University / CIT University,</i>
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37		75	
38		76	

77	<b>Murthy CSHN</b>	126	<b>Gerhard Berchtold</b>
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111			
112			
113			
114			
115			
116			
117			
118			
119			
120			
121			
122			
123			
124			
125			

## TABLE OF CONTENTS

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
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21  
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25  
26  
27  
28  
29  
30  
31  
32  
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34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53

<b>Risk-Oriented Technique of Real Investments Management: Concepts</b>	<b>11</b>
<i>Filippova I.A., Khairullin I.G., Usanova D.S.</i>	
<b>Relationship between Financial Indicators of a Company and the ERP-System Implementation Costs</b>	<b>15</b>
<i>Strelnik E.U., Usanova D.S., Ushakova T.V.</i>	
<b>Organization of Innovative Project Management on the Base of Multimode Modeling of Probabilities Mixture of Labor Processes</b>	<b>20</b>
<i>Usanov A.I., Usanova D.S.</i>	
<b>Regional Aspect of Value Added Use in Assessing Competitiveness of Economic Districts</b>	<b>24</b>
<i>Kamalova A.A., Polovkina E.A.</i>	
<b>Some Aspects of the Formation a Financial Strategy in Emerging Markets</b>	<b>28</b>
<i>Pochitaev A.Y., Yarovinskaya M.S., Filippova I.A.</i>	
<b>International Financial Reporting Standards Implementation into the Russian Accounting System</b>	<b>33</b>
<i>Aletkin P.A.</i>	
<b>Development of Financial Reporting Principles</b>	<b>38</b>
<i>Kulikova L.I., Gafieva G.M.</i>	
<b>Falsification of Financial Statements: Historical and Evolutionary Aspect</b>	<b>41</b>
<i>Kulikova L.I., Gafieva G.M.</i>	
<b>Human Capital Accounting in Professional Sport: Evidence from Youth Professional Football</b>	<b>44</b>
<i>Kulikova L.I., Goshunova A.V.</i>	
<b>Science of Balance Preparation: Substance and Stages of Development in Russia</b>	<b>49</b>
<i>Kulikova L.I., Goshunova A.V.</i>	
<b>The Problem of Accounting for the Costs Incurred after the Initial Recognition of an Intangible Asset</b>	<b>52</b>
<i>Vetoshkina E.Yu., Tukhvatullin R.Sh.</i>	
<b>Budgeting System in Construction Organizations in Conditions of Process-Oriented Normative Model of Cost Accounting</b>	<b>56</b>
<i>Tukhvatullin R.S., Pratchenko O.V.</i>	
<b>The Interrelation between the Professional Judgment of the Accountant and the Quality of Financial Reporting</b>	<b>61</b>
<i>Kulikova L.I., Grigoryeva L.L., Gubaidullina A.R.</i>	
<b>The Need of Professional Judgement of the Accountant in Accounting Assets of Exploration and Evaluation of Mineral Resources</b>	<b>65</b>
<i>Kulikova L.I., Gubaidullina A.R., Arzhantseva N.V.</i>	
<b>Efficiency Analysis of Taking out Real Estate Loans for Profit-Making Organizations</b>	<b>70</b>
<i>Kulikova L.I., Ivanovskaya A.V., Antonova N.V.</i>	
<b>Accounting of Reserves for Impairment of Inventory</b>	<b>75</b>
<i>Khamidullina G.I., Arzhantseva N.V.</i>	
<b>Budget Efficiency for Cost Control Purposes in Management Accounting System</b>	<b>79</b>
<i>Klychova G.S., Faskhutdinova M.S., Sadrieva E.R.</i>	
<b>Organization of Accounting in Fur Farming according to IAS</b>	<b>84</b>
<i>Klychova G.S., Kulikova L.I., Mavlieva L.M., Klychova A.S.</i>	
<b>Special Aspects of Horse Husbandry Production Costs Calculation</b>	<b>91</b>
<i>Klychova G.S., Zakirova A.R., Khametova M.V., Sadrieva E.R.</i>	
<b>Functions Accounting at the Enterprises of Dairy Cattle Breeding in the Context of Cost Pool According to Physiological Groups</b>	<b>98</b>
<i>Klychova G.S., Iskhakov A.T., Valieva G.R., Klychova A.S.</i>	
<b>Management Reporting and Its Use for Information Ensuring of Agriculture Organization Management</b>	<b>104</b>
<i>Klychova G.S., Zakirova A.R., Mukhamedzyanov K.Z., Faskhutdinova M.S.</i>	
<b>Accountancy in Horsebreeding Organization in Compliance with International Accountancy Standards</b>	<b>111</b>
<i>Faizrakhmanov Dz. I., Klychova G.S., Khametova M.V.</i>	

54	<b>The Influence of Forms of Insurance Coverage Organization on Population's Life Quality</b>	<b>118</b>
55	<i>Kaigorodova G.N., Mustafina A.A.</i>	
56	<b>Peculiarities of Organization of the Foreign Mortgages and Mortgage-Backed Securities Market</b>	<b>124</b>
57	<i>Bazhanova G., Shakiryanova A.</i>	
58	<b>Institutional Traps of Human Capital Consumption: Public Goods Production Problems</b>	<b>131</b>
59	<i>Alekseeva L.V., Nikonova T.V., Yusupova L.M.</i>	
60	<b>Methodology for Rating of Insurance Portfolio</b>	<b>137</b>
61	<i>Alyakina D.P., Khisamova G.F.</i>	
62	<b>Russia's Anti-Offshore Policy in the Global Economic System</b>	<b>141</b>
63	<i>Alekseeva L.V., Nikonova T.V., Yusupova L.M.</i>	
64	<b>Economic Bases of Formation and Development of Financial Engineering in Financial Innovation</b>	<b>148</b>
65	<i>A.A. Ajupov, Artamonov A.B., Kurilov K.U., Kurilova A.A.</i>	
66	<b>Method of Valuation of Financial Factors Influencing the Implementation of Liquidity Risk for Leasing Companies</b>	<b>154</b>
67	<i>A.A. Ajupov, Mishina M.S., Ivanov M.E.</i>	
68	<b>Application of Optimization Models in Prediction of Inland Water Transport Organizations' Profit</b>	<b>160</b>
69	<i>Nesterov V.N., Neizvestnaya D.V.</i>	
70	<b>Small and Medium Businesses Informatization Management: Main Trends of Development in Russia</b>	<b>165</b>
71	<i>Ushakova T.V., Safiullin A.R., Strelnik E.U.</i>	
72	<b>Effective Internal Audit Service Organisation in Health Clinics</b>	<b>170</b>
73	<i>Naumova N.A., Kharisova F.I.</i>	
74	<b>Methodological Approaches to the Assessing of the Quality of Audit Sampling</b>	<b>176</b>
75	<i>Meleshenko S.S., Usanova D.S.</i>	
76	<b>Applying the Category of «Assertions (or Preconditions)» In Audit of Financial Statement</b>	<b>180</b>
77	<i>Kharisova F.I., Kozlova N.N.</i>	
78	<b>Income Distribution and Market Demand: The Case of Heterogeneous Preferences</b>	<b>185</b>
79	<i>Ibragimov M., Tufetulov A.M.</i>	
80	<b>Legal Status of an Appraiser in the Russian Federation under Globalization</b>	<b>188</b>
81	<i>Abdreev T.I., Tufetulov A.M.</i>	
82	<b>Mechanism of State Tax Regulation in the Global Economy</b>	<b>193</b>
83	<i>Adigamova Farida F., Safiullin Marat A., Tufetulov Aidar M.</i>	
84	<b>Assessment of Pension Coverage in the Russian Federation</b>	<b>200</b>
85	<i>Sabitova N.M., Jourkina N.S.</i>	
86	<b>Issue Activity of Subjects of the Russian Federation and Municipalities:</b>	
87	<b>Tendencies of the Beginning of the XXI Century</b>	<b>204</b>
88	<i>Sharafutdinova I.R., Kulakova S. A., Nikonova E. N.</i>	
89	<b>Financial Risks of Constituents of the Russian Federation</b>	<b>209</b>
90	<i>Sabitova Nadia, Shavaleyeva Chulpan</i>	
91	<b>Debt Burden of Constituents of the Russian Federation and Its Determinant Factors</b>	<b>216</b>
92	<i>Sabitova Nadia, Nikonova Elena</i>	
93	<b>Assesment of the Impact of Assets Value on Financial Statuses of Regions</b>	<b>222</b>
94	<i>Efremova M.J., Sabitova N.M.</i>	
95	<b>Small Business Innovation in Russian Universities</b>	<b>227</b>
96	<i>Kaspina R.G., Yerina T.V.</i>	
97	<b>Revisiting the Application of the Abc System in the Packaging Industry Companies</b>	<b>231</b>
98	<i>Nurmuhametov I.F., Kaspina R.G., Davletshina N.N.</i>	
99	<b>Fuzzy Forecasting of the Cash Flow Statement Based on Accounting Data</b>	<b>237</b>
100	<i>Kaspina R.G., Molotov L.A.</i>	
101	<b>Features of Russian Companies Real Estate Appraisal in the Accounting System</b>	<b>242</b>
102	<i>Azmitov R.R., Ivanovskiy I.A., Korabelnikova L.L.</i>	
103	<b>Analysis of Using Capital Asset Pricing Model for Assessing Companies Return</b>	<b>246</b>
104	<i>Burganova R. A., Novak V. V., Salahieva M. F.</i>	
105	<b>Methodological Approaches of Formation of Evaluative Indicators of Quality of Life</b>	<b>251</b>
106	<i>Fakhrutdinova L.R., Eidelman B.M., Rozhko M.V., Pratchenko O.V.</i>	

107	<b>The Role of Meteorological Factor in Long-Term Variability of the River Streamflow of the Territory of North of the Russian (East European) Plain</b>	256
108		
109	<i>Rysaeva I.A., Dvinskikh A.P., Pratchenko O.V.</i>	
110	<b>Positioning of the Republic of Tatarstan in the Volga Federal District</b>	263
111	<i>Rozhko M.V., Maklakova N.V.</i>	
112	<b>Peculiar Features of the Tatar People Migration on the Territory of Tatarstan</b>	267
113	<i>Biktimirov N., Gabdrakhmanov N., Rubtsov V., Mustaphin M., Arzhantseva N.</i>	
114	<b>Analysis of Life Expectancy Rate at Birth in the Republic of Tatarstan</b>	272
115	<i>Gabdrakhmanov N.K., Rubtsov V.A., Mustafin M.R., Antonova N.V.</i>	
116	<b>Geodemographic Potential of the Republic of Tatarstan: Analysis, Evaluation, Territorial Differences</b>	278
117	<i>Gabdrakhmanov N.K., Rubtsov V.A., Mustafin M.R., O.V. Pratchenko</i>	
118	<b>Modern Principles of Financial Services Markets Regulation as a Response to the Financial and Economic Crisis of 2008</b>	285
119		
120	<i>Valitov S.M., Nigmatzyanov A.A.</i>	
121	<b>New Requirements of the Basel Committee on Banking Supervision to Capital as a Measure to Ensure the Stability of the Banking Sector</b>	294
122		
123	<i>Valitov S.M., Nigmatzyanov A.A.</i>	
124	<b>Structural Analysis of the Dynamics of Petrochemical Cluster of Republic Tatarstan</b>	300
125	<i>Safiullin M.R., Safiullin A.R.</i>	
126	<b>Multisectoral Integrated Structures Key Competences. Regional Aspect</b>	307
127	<i>Khairullin Algis</i>	
128	<b>Directions of the Region Transport Infrastructure Development in the Context of Its Competitiveness</b>	313
129	<i>Vakhitova T.M., Gadelshina L.A.</i>	
130	<b>Factor Analysis of the Interest in the Work of Socially Important Institution</b>	317
131	<i>Rudaleva I.A., Kabasheva I.A.</i>	
132	<b>Government Regulation of the Financial Market in Russia</b>	321
133	<i>Ramazanov A.V., Grigoryan K.A.</i>	
134	<b>Methodology of Innovative Economics</b>	327
135	<i>Kundakchyan R.M., Mokichev S.D.</i>	
136	<b>Socioeconomic Processes in the Cis Countries</b>	331
137	<i>Battalova A.R., Abdullin I.A.</i>	
138	<b>Tendencies of Small Business Development in the Russian Information Economy</b>	336
139	<i>Garitova L.F.</i>	
140	<b>Theoretical Aspects of Public Goods Guardianship</b>	341
141	<i>Gotsulyak I.F., Ignatjeva O.A.</i>	
142	<b>Inequality and Economic Growth in the Russian Economy</b>	346
143	<i>Malaev V.V., Nizamutdinov I.K.</i>	
144	<b>Integrated Eco-Economic Evaluation of Factors in the Regional Model "Environment-Human Health-Quality of Life"</b>	351
145		
146	<i>Kundakchyan R.M., Zulfakarova L.F.</i>	
147	<b>Sustainable Urban Development: Urban Green Spaces and Water Bodies in the City of Kazan, Russia</b>	356
148	<i>Asiya Galeeva, Nafisa Mingazova, Iskander Gilmanshin</i>	
149	<b>Assessing Economic Losses of Lake Kaban (Kazan, Russia) Ecosystem and Developing of Compensation Measures within the Framework of Sports Facilities Construction</b>	361
150		
151	<i>Derevenskaya O. Yu., Mingazova N.M., Mingaliev R.R., Pavlova L.R.</i>	
152	<b>Labor Productivity as a Factor for Increasing Public Production Efficiency</b>	366
153	<i>Polovkina E. A., Badrieva L. D.</i>	
154	<b>Ensuring Environmental Safety Based on the Modeling of Biological Process of Oily Sewage</b>	372
155	<i>Azimov Yu. I., Savdur S.N., Fesina E.L.</i>	
156	<b>Measurement of Cognitive Growth Factors of Regional Economy Based on Panel Data</b>	377
157	<i>Kadochnikova, E. I., Ismigilov I.I.</i>	
158	<b>The Use of Regional Accounts System when Analyzing Economic Development of the Region</b>	383
159	<i>Kadochnikova E.I., Khisamova E.D.</i>	

160	<b>Application of Linear Programming in Budgeting Costs for the Compensation of Employees</b>	<b>388</b>
161	<i>Sungatullina L.B.</i>	
162	<b>Model of Sustainable Development of the Region</b>	<b>393</b>
163	<i>Gabdrakhmanov N.K., Rubtsov V.A., Mustafin M.R., Pratchenko O.V.</i>	
164	<b>Differentiation of the Territory of Tatarstan Republic into Zones Due to their Significance for</b>	
165	<b>Domestic and National and International Tourism</b>	<b>398</b>
166	<i>Shabalina S.A., Rubtsov V.A., Pratchenko O.V.</i>	
167	<b>Calculation of Product Costs of Dairy Cattle Breeding in Russia</b>	<b>403</b>
168	<i>Musallyamova M.F., Antonova N.V.</i>	
169	<b>The Necessity for Taxable Capacity Assessment for the Segments of the Insurance Market</b>	<b>407</b>
170	<i>Galimardanova Y. M., Khafizova A.R., Salmina S.V.</i>	
171	<b>Tax Debt Individual Customers in the Russian Federation</b>	<b>412</b>
172	<i>Salmina S.V., Galimardanova Y.M., Khafizova A.R.</i>	
173	<b>Effect of License Holder's Cost-Flow on Long-Term Development of Oil Industry</b>	<b>417</b>
174	<i>Yartiev A.F., Tufetulov A.M.</i>	
175	<b>Tax Regulation of Activity of Agricultural Commodity Producers</b>	<b>421</b>
176	<i>Khafizova A.R., Galimardanova Yu.M., Salmina S.V.</i>	
177	<b>Ecological Damage at Pollution by Oil Products on the Example of R. Shava, Nizhny Novgorod Region</b>	<b>426</b>
178	<i>Nabeeva E.G., Mingazova N.M., Mingaliyev R.R.</i>	
179	<b>Banking Capital in Russia: Sufficiency, Adequacy of Market Value Evaluation</b>	<b>432</b>
180	<i>Bondarenko V.D.</i>	
181	<b>Special Role of Credit Institutions in the Russian National AML/CFT System</b>	<b>438</b>
182	<i>Lebedeva M.E., Molova L.A.</i>	
183	<b>Standard Regulation of Corporate Management</b>	<b>442</b>
184	<i>Bushuyev A.N., Gugelev A.V., Yashin N. S.</i>	
185	<b>Experience of Field Geomorphological Research Study on the Territory of the Volzhsko-Kamsky Natural Reserve</b>	<b>448</b>
186	<i>Gasanov I.M., Kurbanova S.G., Pratchenko O.V.</i>	
187	<b>Typology of Export Specialization of the Russian Regions</b>	<b>453</b>
188	<i>Kashbrasiev R.V., Stepin A.G., Shtanchaeva M.R., Maklakova N.V.</i>	
189	<b>Modelling of Economic Growth in Russian Agriculture</b>	<b>458</b>
190	<i>Tolmachev M.N., Yashin N.S., Grigoryeva L.L.</i>	
191	<b>Trends in the Development of Labour Rights in the Beginning of the XXI Century</b>	<b>463</b>
192	<i>Bikeev Askhat Ahatovich, Lushnikov Andrey Mikhailovich</i>	
193	<b>Human Rights in a Globalized Modern World</b>	<b>468</b>
194	<i>Golubev Stanislav Igorevich</i>	
195	<b>Violated Copyright Protection in the Russian Federation</b>	<b>471</b>
196	<i>Roza Iosifovna Sitdikova, Ruslan Borisovich Sitdikov</i>	
197	<b>"The Roman Spirit" of the Code of Napoleon</b>	<b>477</b>
198	<i>Liliya T. Bakulina</i>	
199	<b>Unity and Differentiation of Legal Regulation of Entrepreneurial Relations in the Civil Law</b>	<b>480</b>
200	<i>Ainur G. Demieva</i>	
201	<b>Gender in Multidimensional Peacekeeping Operations: Sexual Violence in Conflict</b>	<b>483</b>
202	<i>Kayumova Alfiya Revolevna</i>	
203	<b>Genesis of Competences of Local Government of Federal Subjects in Russia</b>	<b>488</b>
204	<i>Igor G. Nikitenko</i>	
205	<b>Legal Status of the Embryo in Legislation of the Republic of Yemen:</b>	
206	<b>Comparative Research on Provisions of the Islamic and International Law</b>	<b>492</b>
207	<i>Tarhanov Ildar Abdulhakovich, Fadhl Enghadh Ahmed</i>	
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## Risk-Oriented Technique of Real Investments Management: Concepts

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### Abstract

One of the main objectives of real investment management is increasing in company's revenues and market value. Long time lag of income from investments, the scale of investments, and a high level of uncertainty in their implementation makes the questions of project risk management actual. We focused on systematization of methods to measure, report and manage project risks. The paper suggests the concepts of risk-oriented methodology of project risk management. We assumed similar results ranking of investment projects in terms of risks, using Monte Carlo simulation and the fuzzy sets theory for risk assessment. In this study, was formed the empirical base, including investment projects of Russian pharmaceutical companies. The obtained results confirmed our hypothesis.

**Keywords:** investment risks, project risks, simulation modeling, Monte Carlo simulation, fuzzy sets, pharmaceutical companies

### 1. Introduction

Efficiency of the investments is the essential condition to provide stable activity of the company. As for Russian companies such financial value drivers as profitability, financial policy and level of risk are positively related to shareholder value creation [1], so it is rather important to search for and implement new effective methods and tools of real investments management, that on the one hand could led to increase company value, and on the other hand could provide more accurate forecast and evaluation of project risks.

High complexity of investment projects that include multiplicity of project solutions regarding technical, technological, organizational, human resource, financial and other aspects as well as impact of uncertainty factors in the process of implementation of investment project requires a high level of expertise on the part of managers. Real investment management not only calls for evaluation of chances to increase business income and company value but also should take into account the level of project risks and develop effective measures to reduce them. This highlighted the clear need for risk evaluation prior to implementation. So, it's important to understand management's view of risk, identify methods adopted to highlight potential risk, and explore possible risk assessment in project management [2].

### 2. Risk-Oriented Approach

International financial institutions like the World Bank, the European Bank for Reconstruction and Development and the Asian Bank widely employ principles of project approach to investment activity management.

Project approach consists in a combination of various functions, aspects and methods of management aimed at the achievement of effective results and search of compromise solutions between objectives, expenses, efficiency and other investment project features.

In the framework of risk-oriented technique, Russian companies should resolve a number of tasks i.e. to evaluate implementation of a certain investment project in terms of its reasonable practicability, evaluate project expected efficiency and level of risks, optimize a complex of real investment projects in the context of portfolio-balance approach and reasonable compromise between risk and profitability, review and evaluate investment project as a source company value increase.

Risk-oriented approach under real investments management is based upon high status of management function of project risks. Among the phases of investment risks management we singled out the following: qualitative and



quantitative analysis, assessment of risks under the evaluation of expected efficiency and choice of alternative variants of investment projects, choice of methods to influence project risks, monitoring and control of further project implementation considering current efficiency and the actual level of risks.

### 3. Qualitative and Quantitative Analysis of Risks

The main objective of qualitative analysis of risks is to discover a total number of real investment projects and analysis of risks interrelation; and also to discover factors for each identified type of risks that make sufficient impact in a general level of risk.

Understanding of the risk management entails understanding of the underlying factors that contribute to project risks. These risks are often the same, regardless of the nature of a project. The first step in risk assessment is risk identification [3,4].

In this study, all real investment projects risks are grouped into general and specific risks. Group of general risks includes risks that are the same for all participants of investment activity and investment forms. Level of these risks is determined by the impact of external factors and does not depend on a quality of company's management. According to the experience of Russian companies, the most important types of general risks include the following: external-economic, internal-economic, political, social, inflation, conjuncture and legislative risks. Level of system's risks does not depend on quality of company's management. Group of specific risks consists of the following: country, regional, sector, revocable, operational, credit and market liquidity risks. Certain types of the risks that belong to this group require detailed description in practice. Among operational risks could be distinguished the following: engineering, legal, marketing risks and risks of non-effective management.

As part of specific risks portfolio investment risks include risks of imbalance in investment portfolio, risks of insufficient diversification, capital and selective risks.

One of the most challenging tasks at the stage of quantitative analysis of project risks is to search for and apply such methods and tools that could evaluate possibility to achieve expected result, evaluate all possible approaches including possible failures in the context of uncertainty. The primary task of this stage consists in qualitative assessment of risk factors influence on efficiency of investment project.

It is reasonable to apply statistic and probability methods, decision trees, interval method of risks evaluation, marginal analysis, correlation and regression analysis, deterministic factor analysis and optimization models among qualitative methods of investment risks evaluation.

Authors assume that in the framework of the risk-oriented technique and according to the results obtained from the analysis of investment project it is quite reasonable to create a map of risks that can be presented in the form of three-dimensional matrix with the following measurements: list of sufficient risks; life-cycle phase of investment project that is correlated with risks; scope of possible damage.

Selection and application of relevant methods and tools of quantitative evaluation of uncertainty of investment projects is more challenging task to perform. In order to solve this problem company management may use expert methods, game theory methods, simulation modeling and fuzzy-set theory methods.

### 4. Method

We have formed empiric base that includes investment projects of companies dealing with pharmaceutical products. One of the tasks set by Russian government for the near future is to increase a rate of medical product consumer and bring it up to average European level. So, it is reasonable to describe pharmaceutical branch as one of most advanced industrial sectors in Russia.

Working on this paper we have analyzed investment projects of Russian pharmaceutical companies working in the following areas: production of powder for injection (Biosynthes PLC), production of solid medicinal agents (Pharmaceutical Plant No.1 of Kaliningrad), expansion of production volume and promotion of sales of 'Polysorb' sorbent (Polysorb LTD), industrial production of national phospholipid medications (Pharmasyntes PLC), ointment production (Nizhpharm PLC).

The Monte Carlo simulation widely applied in financial decisions [5,6,7,8,9,10]. During implementation of the Monte Carlo simulation we have evaluated the expected efficiency of each investment project under conditions of 30% of variable expenses and sales volatility; number of quantitative indexes, representing risks was calculated and cumulative profile of project risk was designed.

Some studies contain discussion and practical application of the fuzzy set theory in decision-making



[11,12,13,14,15]. Next, we tried to reduce the uncertainty to the situation of risk using fuzzy-set theory. Results achieved in the course of application of simulation modeling of net discounting value of investment projects are displayed in the form of symmetric three-corner fuzzy set i.e.  $[NPV_{\min}; NPV_{av}; NPV_{\max}]$ .

Then we calculated the value of stability coefficient for each investment project ( $\lambda$ ) using the formula 1:

$$\lambda = \frac{NPV_{av}}{\Delta} \quad (1)$$

Where:  $NPV_{av}$  is expected average value of NPV of the project;

$\Delta$  - a range of NPV values of expected average value or  $NPV_{av} \pm \Delta$ .

Further we used the risk-function that makes it possible to proceed from evaluation of uncertainty to the situation of risk (formula 2):

$$RI = \frac{1}{2} + \frac{\lambda}{2} (\ln \lambda - 1) \quad (2)$$

Where: RI is risk-function.

## 5. Results

Results we have gained by Monte Carlo simulation made it possible to reduce the situation of uncertainty to the situation of risk and range analyzed investment projects with respect to the level of risk. Results of ranging of investment projects are shown in the Table 1.

**Table 1:** Monte Carlo simulation results of investment projects ranking

Investment project	NPV variation coefficient, %	Rank
production of solid medicinal agents	15,1	1
industrial production of national phospholipid medications	11,4	2
production of powder for injection	9,0	3
expansion of production volume and sales promotion of 'Polysorb' sorbent	7,2	4
organization of ointment production	5,3	5

Results of calculation of stability coefficient value ( $\lambda$ ) and variability for each of the investment projects are displayed in the Table 2.

**Table 2:** Results of investment projects ranging achieved by using fuzzy-set theory

Investment project	Risk coefficient value lambda	Rank
production of solid medicinal agents	0,45	1
industrial production of national phospholipid medications	0,23	2
production of powder for injection	0,18	3
expansion of production volume and sales promotion of 'Polysorb' sorbent	0,08	4
ointment production	0,01	5

Sometimes various qualitative risk analyses of the same problem can reach significantly different conclusions [16]. Comparison of investment project ranks in the Table 1 and the Table 2 shows that there are no fundamental differences between two methods of uncertainty rank evaluation.

## 6. Conclusion

At the stage of investment risks management it is reasonable to use such methods as diversification, risk aversion, risk sharing, compensation and localization.

Risk insurance belongs to the methods of risk aversion. Foreign insurance practice uses complete insurance of investment risks. However, Russian legislation allows only partial insurance of a project: property, plant, equipment, personnel and some emergency risks.

Methods of risk compensation imply creation of certain reserves i.e. financial, material, information reserves. Financial reserves can be created through allocation of additional funds to cover unexpected expenses. Material reserves

mean creation of special insurance reserve, for instance, raw materials.

Localization of risk is regarded as creation of separate companies to carry out high-risk activity types.

Companies should make a wide practical use of all the range of legal, financial, insurance and organizational tools to decrease the risk level of real investments. The following measures can be recommended: involve companies and experts with expertise in similar projects to develop and implement projects; receive financial guarantees from the third parties for other project participants; use highly liquid liabilities; creation and analysis of different scenarios in adverse situations.

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## Relationship between Financial Indicators of a Company and the ERP-System Implementation Costs

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### Abstract

The article investigates the issues of implementation of ERP-systems in large Russian companies. The authors put forward and substantiated the hypothesis about the positive impact of implementation of ERP-systems in the company's growth. For the purposes of this study, 30 large Russian companies that had implemented SAP R/3 or SAP ERP modules have been observed. Obtained result shows, that implementation of the ERP-system or its individual modules makes a positive impact in the company's growth, measured by the total assets indicator.

**Keywords:** enterprise resource planning systems, financial indicators, ERP-system, SAP, total cost of implementation, regression analysis, Russia

### 1. Introduction

Corporate governance standards require automation of the entire process of management of a company, which involves combining various administrative, accounting, technical, and other information in a single database. ERP-system provides a unification of control functions for companies and a flexible instrument for real time monitoring of business processes.

Enterprise resource planning (ERP) is a business management software - usually a suite of integrated applications - that a company can use to collect, store, manage and interpret data from many business activities, including: product planning, cost and development manufacturing, marketing and sales, inventory management, payment, human resource management, etc.

In emerging markets is an active implementation of traditional ERP products, and the further growth could be expected.

In order to be more efficient, many companies rely on extensive use of IT, often by installing enterprise resource planning (ERP) systems [1]. The results of Liane Elbertsen, Rik Van Reekum empirical study show that ERP adoption by MEs is most significantly explained by competitive pressure and the compatibility of the software configuration with the firm's business processes [2]. Thus, the implementation of ERP-systems becomes one of the key success factors of company's performance.

The research was conducted in Russia. In this paper we considered large Russian companies, which use SAP ERP software products.

### 2. ERP Vendors

According to Panorama Consulting independent research [3], market leaders are the SAP AG, Oracle Corp. and Microsoft Corp. The share of other companies in the market of corporate information systems is less than 50% in aggregate. SAP AG is a leader among major international corporations. In Russia Oracle Corp. is the leader in the development of databases, Microsoft Corp. takes a preferential position in software products for small and medium-size enterprises (SMEs), and 1C Company is leader among small enterprises.

SAP AG, Oracle, Microsoft's and 1C's products strengths and weaknesses comparing is summarized in the Table 1.

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**Table 1:** Comparison of SAP, Oracle, Microsoft's and 1C's ERP software products

Comparison parameters	SAP	Oracle	Microsoft	1C
Market share	The leader	Second	Third	Fourth
Implementation costs	Highest costs	Medium costs	Lowest costs	Lowest costs
Deviation of the actual budget from the planned	The smallest	Medium	The biggest	The smallest
Implementation period	Medium	The smallest	The biggest	The smallest
Payback period	Medium	The longest	The smallest	Medium
Customer satisfaction	Good	Excellent	Good	Good

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SAP software can be installed in large (multinational) corporations and in SMEs, while Microsoft's and 1C's ERP software mainly implemented in SMEs. The major competitive weakness of SAP ERP software is a very high implementation costs - this factor had a significant influence on the formation of a sample for this study.

### 3. Implementation of ERP

An indispensable part of total cost of ERP implementation (TCI) is software licenses. TCI could be three to five times the purchase price of the software [5]. The actual implementation cost of the Enterprise Resource Planning (ERP) was found to be approximately double the initial SAP costs. The real costs involve time for, among other things, process reengineering, strategic decision making, software add-ons, staff-training, project-management and software maintenance [6].

Analysis of variance, made by Bjorn Johansson, Frantisek Sudzina, Mike Newman, [7] shows actual percentages of ERP systems TCI (table 2).

**Table 2:** ERP System TCI Structure (in %)

		Average
Software license	Small	43,15 %
	Medium	45,00 %
	Large	33,42 %
Programming of changes		20,85 %
Organizational implementation		18,54 %
Hardware costs	With CIO (chief information officer or alike director for IT represented at the board level)	25,65 %
	Without CIO	18,31 %

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Studies on the ERP system TCI structure for the Russia were not conducted. In this study we assume, that TCI of SAP ERP software for Russian companies four times higher than software license costs. TCI is, for purpose of this paper, split into the following two parts: Software Licenses and Other costs, including project management, technical implementation costs and miscellaneous costs.

So, implementation of ERP is costly undertaking, thus all companies are interested in the successful and rapid implementation of the system. According to Irma Becerra-Fernandez, Kenneth E. Murphy, Joyce Elam results [7] just six factors led to successful SAP's R/3 implementation: top management commitment (1); strong project management (2); team member skills (3); team member motivation and dedication (4); effective communication with users (5); an effectively planned and implemented change management strategy (6).

The issues for successful implementation of ERP after extracting from Pareto (80-20 rule) analysis can be listed as follows [10]: education & training (1), support from top management (2), Properly defined goals & objective (3), project team competence (4), project management (5), change management (6), proper selection of package (7) and effective communication (8).

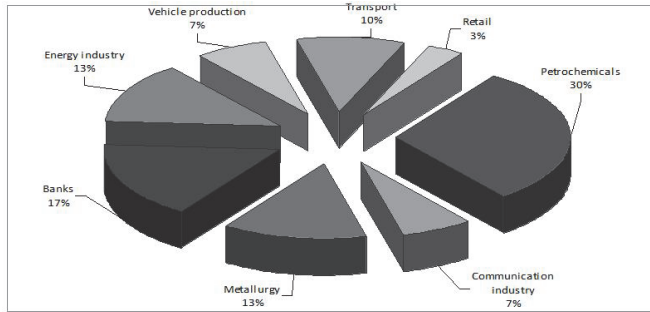
Ali Azadeh, Masoud Afshari-Mofrad, Masoud Khalojini study results [11] proved that at 95% confidence level, infrastructure variable plays a moderating role in the relationship between critical success factors and ERP performance. Also, results show that organisational infrastructure has the most important effect on ERP performance and 'strategic goals' is the most important critical success factor.

High total cost of implementation (TCI) of ERP makes the decision-making process of its adoption complex. Profitability has the most significant impact on the incremental investments of Russian companies [12]. For the purposes

of this study, we sampled large public Russian companies that have enough financial, technical, human and other recourse to implement SAP ERP successfully.

**4. Data and Methodology**

In our study we observed 30 large Russian companies that had implemented SAP R/3 or SAP ERP modules. Sampling includes the petrochemical industry, communications industry, metallurgy, vehicle production, energy, banks, transport, and retailing (Fig. 1).



**Figure 1.** Companies sampling

Hypothesis: investments in SAP ERP (SAP/3) are positively correlated with the size of a company. The growth of company is explained, among other factors, by investments in SAP ERP (SAP/3).

For our research we have selected the following financial indicators that could be calculated using financial statements: total assets (TA), liabilities to equity ratio (L/E), EBIT, interest expenses, ROA, ROS, ROE. The SAP ERP (SAP/3) implementation costs were counted by ERP ROI Calculator (Panorama Consulting method).

In this study we used the regression analysis method. On the first stage we have got a correlation matrix to identify the relationship between the indicators (Pearson criterion). It allowed excluding from the model irrelevant factors and cross-correlated indicators. On the second stage we have received several regression models in which each of the financial indicators had been nominated as the dependent variable. We have chosen one regression model based on coefficient of determination and Fisher's exact test. Then we excluded insignificant variables based on T-Statistics criteria from the model.

**5. Results**

The regression analysis results are summarized in the Table 3.

**Table 3:** Regression analysis results

	coefficients	t- statistics
Y-crossing	6,4898	6,12
Average TCI (Ln)	0,1528	1,80
ROE	-1,1081	-2,59
Interest expense (Ln)	0,3365	4,29
Ebit (Ln)	0,3009	5,48
Critical t-statistics		1, 7

Dependent variable is total assets (TA).

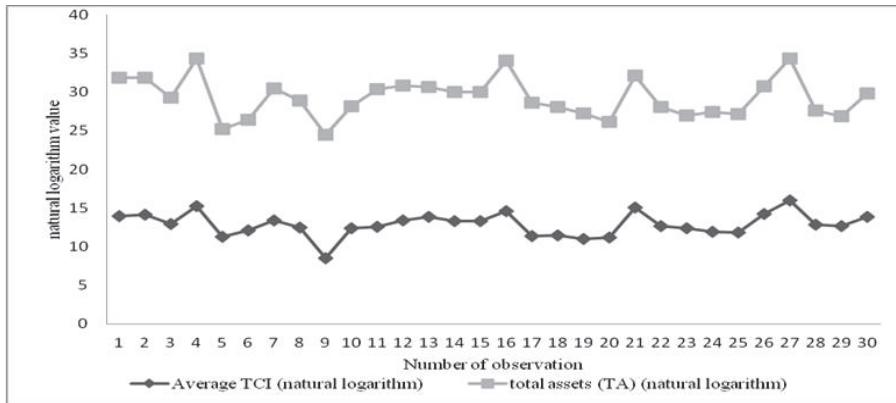
Independent variables are liabilities to equity ratio (L/E), EBIT, interest expenses, ROA, ROS, ROE, TCI<sub>average</sub>.

After excluding the insignificant variables, we have got the following equation (Formula 1), determination coefficient (R<sup>2</sup>) is 0,84:

$$y = 6,49 + 0,15x_1 - 1,11x_2 + 0,34x_3 + 0,3x_7, (1)$$

133 where:  $y$  - total assets (TA),  $x_1$  – average TCI (natural logarithm);  $x_2$  - ROE (coefficient);  $x_3$  - interest expenses  
134 (natural logarithm);  $x_4$  - EBIT (natural logarithm).

135 Figure 2 illustrates fluctuation of the total assets (TA) and the total cost of implementation (TCI<sub>average</sub>).



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139 **Figure 2.** Fluctuation of the total assets and the total cost of implementation

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141 Figure 2 shows, that the size of a company (the total assets) is correlated with the investment activity (total cost of  
142 implementation of SAP ERP, SAP R/3), the correlation coefficient is 0,58.

## 143 144 **6. Conclusion**

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146 Enterprises recently tend to implement their new enterprise information systems like the Enterprise Resource Planning  
147 (ERP) system in order to gain their competitive advantages and bring up their business efficiency, but the efficiency  
148 gained from this new implementation is not quite clear and is difficult to be identified [11].

149 The empirical results, obtained by Huang Shao-Yan, Lin Ching-Wen, Wong Seng-Lee, Tsai Ming-Chun, show that  
150 ERP implementation can positively affect the process capital of Intellectual Capital (IC); process capital can positively  
151 affect customer capital and customer capital ultimately affects business performance. Companies implementing ERP can  
152 build process capital to meet the challenges of the competitive market environment [12].

153 The results of this study show that investments in SAP ERP (SAP/3) are positively correlated with the size of a  
154 company. This conclusion is confirmed by the regression and correlation analysis. The growth of company is explained,  
155 among other factors, by investments in SAP ERP (SAP/3), because we obtained positive relationship between the total  
156 costs of implementation of SAP ERP, SAP R/3 and the total assets of a company, where total assets indicator was  
157 calculated with the time lag. The time lag was determined on the base of payback period.

158 In our feather studies we propose to increase the size of the sample and thus to observe not only large companies,  
159 that have an advantage in terms of economic competitiveness due to their size and the financial benefits they enjoy on  
160 the global market [13], but also Small and Medium Enterprises (SMEs).

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# Organization of Innovative Project Management on the Base of Multimode Modeling of Probabilities Mixture of Labor Processes

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## Abstract

*In this study we suggest an approach to the organization of innovative projects management based on multimode modeling of probabilities mixture of labor processes. The proposed model allows managers to optimize the control actions influence on separate labor processes for achieving the innovative project result in the minimum time. Organization of management on the basis of the proposed model minimizes the risks of management bureaucracy and labor processes uncontrollability.*

**Keywords:** innovative projects management, multimode modeling, probabilities mixture, labor, labor collective management

## 1. Introduction

A labor collective management in the area of innovative industries requires a coordination of plurality of heterogeneous labor processes [1] that often leads to the uncertain result. Innovative labor processes succeeds only with a certain probability over a certain time. Well as, the innovative labor process may negate positive result - failure. In this case, all associated labor processes will also be doomed to a negative result.

Innovative production process is complex because labor processes have the following properties:

- they are stochastic relative to the labor results;
- they are heterogeneous, but their effectiveness depends on the results of other labor processes;
- the results of individual innovative work processes is difficult to estimate in economic terms;
- speed and quality of work in a complex manner dependent on the amount of allocated resources, this means, that the allocation of additional resources does not necessarily lead to a proportional increase in the efficiency of the labor process.

Specified features of work on innovative projects require using the probability theory methods and the fuzzy sets theory [2], [3], [4], [5], [6], [7] for the effective organization of innovative projects management.

## 2. Methods for Efficient Management of Labor Processes in the Performance of Innovative Projects

The purpose of the work is to develop methods for efficient management of labor processes in the performance of innovative projects.

The main objective of the innovative project effective management is to achieve results in the minimum time while limiting on resources.

It should be noted that the achievement of the result (negative conclusion is the result too) on an infinite time interval is the certain event [9].

The control action is to allocate resources between labor processes. All industrial resources will be considered as costs. The distribution of costs between the salaries, equipment and production facilities will be considered optimal.

For innovative production, it is important to consider the impact of external influences. The main external influences should include scientific and technical progress and socio-economic environment. If necessary, a list of external influences can be expanded. External influences lead to the appearance of fluctuations that govern the innovative production process [10] regardless of an enterprise organizational structure. For example, fluctuations due to external



56 influences may lead to faster result reception due to scientific and technological progress, or, conversely, slow down due  
57 to staff socio-economic problems diversion.

58 To achieve the main objectives of management, stated above, it is necessary to provide a "responsive" operative  
59 diagnostics of the labor processes. When interpreting the results of such a diagnosis, it should take into account the  
60 inertia of the production process, that is, an additional allocation of resources would increase the efficiency of the labor  
61 process, but after a while. Inertia increases in proportion to the complexity of the organizational structure and ranges from  
62 a few weeks for independent working groups, to several months for companies with multi-level management hierarchy.

63 Diagnosis should provide management bodies with sufficient information to manage an innovative project: time  
64 coordination of various work processes of results obtaining, qualitative and quantitative agreement between the results,  
65 ensuring the continuity of the results of various labor processes and so.

66 At the bifurcation points the labor process is at a crossroads and fairly the slightest control action to change the  
67 "direction" of the work. If the at the bifurcation point there is no impact of management bodies, the choice is based on the  
68 fluctuations, as a result of external influences. It should be noted that this "self-government" is not always a bad thing. For  
69 example, a bifurcation based on the achievements of scientific and technological progress is more preferable than  
70 running management "material" preferences.

71 Redundancy of diagnostic information usually reduces production efficiency on the one hand, increases the  
72 complexity reporting and enterprise resources diverted from the main production, and on the other hand management  
73 bodies can not cope with large volumes of data. Both effects lead to inadequate management, i.e. management without  
74 the production inertia considering and the workflows bifurcation points skipping.

75 If management bodies do not take into account the labor process inertia, then, as a rule, there is a "bureaucratic  
76 response" in the management structure. In this case, the control develops approximately in the following sequence:

- 77 – control actions become greater and more powerful;  
78 – labor processes do not have to respond to control actions and form the inner resources to interact with  
79 management;  
80 – increases the labor processes inertia and reporting is no longer reflect the real situation of labor processes and  
81 formed "in favor of" superiors;  
82 – at a management occurs a mismatch in representations about the labor process and observed results;  
83 – to resolve this contradiction control actions become greater and more powerful;  
84 – etc.

85 As a result of this process, the organizational structure of the company plunges "in itself" and begins to manage  
86 itself. Production processes at the same time become virtually unmanageable. This means that labor processes are  
87 controlled by "informal" leaders [9] and evolve according to the fluctuations caused by external influences, which now  
88 also include enterprise management bodies. The main disadvantage of this model is inadequate distribution of resources  
89 that concentrated without considering to the innovative project main goal. This leads to the closure of labor processes  
90 and a lack of continuity results because the results usefulness for the results generating labor process, and not to the  
91 entire innovation project, comes to the forefront. For example, departments refuse to transmit information to each other,  
92 the responsibility is shifted to each other, the results are made in uncomfortable for other consumers way.

93 Unfortunately, this model is a major attractor of large innovative enterprises. Exit from this state is a structural  
94 separation of a large production into smaller, or the management structure reorganization based on the innovative  
95 production features. Is why for effective innovative project management is necessary to provide the required state and  
96 development of the labor process, and not by the management of labor processes.

### 97 98 **3. Method (Multimode Models)** 99

100 One of the most promising approaches to the description of complex systems, allowing to identify the type and  
101 parameters of external stabilizing effects, is based on a multimode models [13]. Multimode models allow us to highlight  
102 system modes of state and behavior based on it's functional tasks and structural interactions [14]. Structure of the  
103 multimode model remains the same in different types of system architecture at accepted level of functional specification.  
104 In this case, the task is to optimize the characteristics of the modes of state and behavior.

105 In other words, the construction of a multi-mode model of innovative project management allows managers to  
106 focus on the labor process functionality and development. This does not require the study and control of internal  
107 mechanisms of the labor process.

108 Description of the state and behavior of complex systems in the framework of multimode models involves an

109 allocation of "the modes of state" and "the modes of behavior" in the complex system. Each  $m$ -th modes of state  
 110 ensemble corresponds the time  $\Delta\tau_m$ , during which the structure of the modes of state remains unchanged or changes in  
 111 this structure are negligible. Each  $m$ -th modes of behavior corresponds the time  $\Delta T_m$ , during which the changing in the  
 112 structure of modes of state occurs. For management system the time  $\Delta\tau_m$  determines by the labor processes inertia.  
 113 Time  $\Delta T_m$  determines by the time, during which the system can adapted to a control action. It is clear that it is pointless to  
 114 affect the labor processes more often. A large number of uncoordinated control actions during the time  $\Delta T_m$  would lead to  
 115 unpredictable changes in the state of labor processes. However, lack of control during the time  $\Delta T_m$  can cause  
 116 unpredictable state, formed under the influence of external fluctuations.

117 Thus, an effective management system should provide itself with diagnostic information during the time  $\Delta\tau_m$ , and  
 118 realize control action during the time  $\Delta T_m$ . Control action can be directed to the preservation of state, i.e. to the resistance  
 119 to external influences. Or, conversely, to overcome the "stagnation" management can lead the labor processes out of  
 120 equilibrium state for forming a new efficient structure under external influences.

121 In multimode model external effects may be divided into two types: random fluctuations  $\gamma(\Delta T_m)$  and deterministic  
 122 control  $\varphi(\Delta T_m)$ . The process of developing an innovative project can be described as a function of the probability of  
 123 achieving the result  $F = F(t, \varphi, \gamma)$ . Probability of achieving results in the selected  $m$ -th ensemble of the state of modes  
 124 can be described by a probability density:

$$F = F(\chi_j, \varphi(\Delta T_m), \gamma(\Delta T_m), \Delta\tau_m)$$

125 here  $\chi_j$  – set of parameters describing the state of an innovative project in the interval  $\Delta\tau_m$ ,  $\gamma(\Delta T_m)$  – random  
 126 fluctuations,  $\varphi(\Delta T_m)$  – deterministic control.

127 Each state is determined by the state of the labor process. Thus, the function of the probability of achieving the  
 128 result is a mixture of the probability of result achievement in separate labor processes:

$$F(\chi_j, \varphi(\Delta T_m), \gamma(\Delta T_m), \Delta\tau_m) = \sum_{i=1}^N \rho_i(\chi_j, \varphi(\Delta T_m), \gamma(\Delta T_m), \Delta\tau_m)$$

129 where  $\rho_i(\chi_j, \varphi(\Delta T_m), \gamma(\Delta T_m), \tau_m)$  – the probability of achieving parameters  $\chi_j$  in  $i$ -th labor process during the  
 130 time  $\Delta\tau_m$ ,  $N$  – the number of functionally separate labor processes.

#### 134 4. Result

135  
 136 The resulting probability mixture determined by the structure of enterprise and the functional needs of the innovation  
 137 project. The allocation of resources is optimized by control actions  $\varphi(\Delta T_m)$ . Generalized control function can be  
 138 represented as the cost of the labor process implementing. Resources limits are imposed on the realization of the entire  
 139 innovation project:

$$140 \sum_{i=1}^N \varphi_i = C$$

$$141 \sum_{i=1}^N \varphi_i(\Delta T_m) = C(\Delta T_m)$$

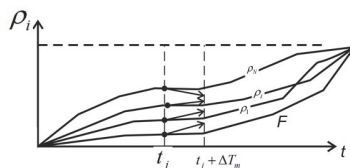
142 where  $C$  – an amount of resources allocated to the project.

143 Selection of deterministic control functions  $\varphi_i(\Delta T_m)$  allows to get required set of probabilities  $\rho_i$  of the labor  
 144 process implementing. Amount of resources determines the ability to manage the change in the probability distribution in  
 145 the mixture  $\sum_{i=1}^N \rho_i(\chi_j, \varphi(\Delta T_m), \gamma(\Delta T_m), \Delta\tau_m)$ .

146 The evolution of the work on the innovative project in time involves the growth of the total probability of achieving  
 147 results  $F = F(t, \varphi, \gamma)$ . As a result, an infinite time interval receiving the result becomes certain event:

$$148 F(t, \varphi, \gamma) = 1.$$

149 Figure 1 shows the evolution of the mixture of probabilities  $\rho_i$  in time.



151  
 152  
 153 **Fig. 1** The distribution function of the random time point of completion of the innovative project, which reflects the

154 evolution of the innovative project

155

156 When such a management model is implemented, concrete state depends on the values of probability of obtaining results  
157 with parameters  $\chi_j$  for each of the labor process.

158

159 Labor process does not have the Markov property and develops under the influence of random and deterministic  
160 effects from state with parameters  $\chi_j$ . It is obvious that at least a deterministic control determined on the basis of the  
161 experience of previous states. Is why the following implementation of the ensemble of the modes of state (new  
162 probabilistic mixture) is determined by an appropriate vector of effects. The control problem is reduced to control of the  
163 speed of change of the probabilities  $\rho_i$ , so as to ensure the maximum growth of likelihood of achieving the the result of  
the innovative project:  $\frac{dF}{dt} \xrightarrow{t \rightarrow \min} \max$ .

164

165 Diagnosis should allow to evaluate the state of the system during the time  $\Delta\tau_m$ , and during the time  $\Delta T_m$   
166 accumulate statistics allowing to form an adequate set of control actions  $\varphi(\Delta T_m)$ . The next set of control actions should  
167 be ready for the next period  $\Delta T_m$ , etc.

168

## 169 5. Conclusion

170

171 The proposed multi-mode model for the probabilistic mixture of labor processes:

172

- 173 1) to optimize the control action to achieve the result of the innovative project in the shortest possible time;
- 174 2) takes into account the labor processes inertia and avoids bureaucratization of management;
- 175 3) allows to develop a management strategy based on random external influences;
- 176 4) allows to control not by the labor processes, but their states and development what has a positive effect on the  
177 creative atmosphere in the team and reduces the load on the top level of management.

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## Regional Aspect of Value Added Use in Assessing Competitiveness of Economic Districts

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### Abstract

*The article focuses on the methodology for assessing the competitiveness ranking of economic regions. Based on measuring the effectiveness of creating added value, methodological approaches to rating assessment of economic entities' competitiveness are also investigated. Here, it is important to identify the factors that influence competitiveness level of the economic regions. We calculated competitiveness ranking of districts of the Republic of Tatarstan on the basis of value added using the method of regression and analysis of variance.*

**Keywords:** economic value added, competitiveness, competitiveness factors, the system of economic indicators, regression analysis.

### 1. Introduction

The system of indicators that characterize the company's activities in the framework of cost management is constantly updated [3]. With the introduction of modern information technologies and new ideas indicators are becoming more objective and complex.

Implementation of an economic value added (EVA) can improve the quality of the current economic analysis of economic entities, improve the system of business valuation and improve the management of enterprises as a whole [4].

At the corporate level, EVA is used for management decisions related to the formation of the capital structure of the company; determination of the optimal number of units and the products types; distribution of cash flow between departments (to maximize return to shareholders) [5].

At the departmental level EVA is used as a tool to set goals, formulate strategy and increase the responsibility of managers for those EVA elements, which are under their control [6].

EVA can help to assess the quality of management decisions [McIntyre E.,1999]. Positive dynamics of this indicator means that the company operates more efficiently than the market as a whole, that is, it is more attractive for investors, therefore, the market value of a company increases [7].

Value added can be used to assess the competitiveness of the economies of the territories [8].

Evaluation of competitiveness of economies territories entails a comprehensive and systemic nature of the study [9]. Comprehensive and systematic approach to the problem is a consistent solution of the following questions:

- 1) definition of aggregate economies of the territories in relation to which competitiveness ranking will be calculated;
- 2) selection of the factors affecting the competitiveness level of the economies of the territories;
- 3) collection of statistical data and their processing;
- 4) conducting regression analysis;
- 5) economic evaluation of the results.

The study to assess the competitiveness of the economies of the territories was carried out at the micro and macro levels using data from the statistical reporting of economic entities and district consolidated statistical reporting of the region.

56 **2. Methods**

57  
58 To calculate the competitiveness of the economies of the territories most applicable is the following method based on the  
59 value added for the first time used by Kresl P.K. and Singh B. [10]. They used a group of indicators summing which they  
60 determine the level of competitiveness of the city, namely the change in the total value added in industry, retail trade and  
61 the total cost of business services.

62 Kresl P.K. and Singh B proposed the concept of added value for the assessment of the competitiveness and the  
63 development of a rating for 24 largest American metropolitan statistical areas (excluding the special case of Washington,  
64 DC). The task was to explain this rating through testing the hypotheses and analyzing by regression methods.

65 With the help of this methodology it was possible to describe each city's economy in terms of its competitiveness  
66 and weak points, as compared with 23 other large urban economies of the United States, to assess the strategic  
67 indicators of the city and urban planning, and even suggest items that should be included in its strategic plan.

68 Competitiveness is not the aspect that can be measured directly; all you can do is to determine its nature and the  
69 extent of the shadow it, so to speak, casts [11]. With this in mind, the authors used an approach consisting in choosing a  
70 small set of variables that could be taken as indicators of the competitiveness of the city.

71 Kresl P.K. and Singh B proposed the following concept:

72 City competitiveness ranking = ( $\Delta$  manufacturing value added,  $\Delta$  retail sales and  $\Delta$  revenue from business  
73 services) (1)

74 In analyzing the concept, the authors concluded that the competitiveness of the economic region is influenced by  
75 other factors, and came to the following conclusions: the competitiveness of the city is determined by both economic and  
76 strategic determinants.

77 Economic determinants are quantitative in nature, and the data can be obtained from a variety of statistical  
78 sources, strategic determinants are qualitative in nature and can only be obtained through the surveys and study of  
79 relevant local documentation. The authors were unable to collect data on the latter. However, they managed to present  
80 an analysis of the determinants of economic competitiveness of cities by the following equation:

81  $CC = - 10,8 + 3,41x_1 + 0,0112x_2 + 4,24x_3 - 0,00175x_4 + 0,594x_5 + 0,288x_6 + 0,513x_7 + 0,000094x_8$  (2)

82 where CC - competitiveness of the city;

83  $x_1$  - the growth of cash income per capital;

84  $x_2$  - research centers / surplus market value;

85  $x_3$  - increase in the share of firms with a staff of over 100 employees;

86  $x_4$  - labor force with the degree higher than Bachelor of Science / Arts;

87  $x_5$  - the share of engineering, administrative, research and management personnel in the total labor force;

88  $x_6$  - increase in the number of cultural institutions;

89  $x_7$  - growth of fixed capital for the state;

90  $x_8$  - exports as a share of total production.

91 The obvious advantage of Kresl P.K. and Singh B approach is that the management of the economic region may  
92 obtain empirically informed, objective understanding of their competitive advantages and disadvantages, and that the  
93 urban economy can be evaluated in comparison to other urban economies with which it may compete for carrying out  
94 various economic activities.

95 **3. Discussion**

96  
97  
98 As for the assessment of economic competitiveness of the territory (city, district, region) currently a number of techniques  
99 based on the measurement of different factors and different systems of economic indicators operates. For example, as  
100 the main factors determining the competitiveness of an economic entity, M. Porter (monograph "Competition", 2002) calls  
101 parameters of factors (natural resources, skills, capital, infrastructure, etc.), demand conditions (level of income, elasticity  
102 of demand, demanding customers, etc.), related and supporting industries (level of education, banking, information,  
103 insurance services and other industries), strategy, structure and rivalry between firms (the level of competition between  
104 enterprises and industries) [12].

105 C.Jensen-Butler's concept, for example, highlights the factors such as the sectoral structure of the economy of the  
106 territory, the level of innovation, the value of the territory from the decision-making point of view, the level of skilled labor,  
107 the class structure and the degree of social well-being, the role of the territory as a cultural, educational and tourist  
108 center, the development of means of communication, the level of income and employment [13].

109 The concept of productivity by I. Begg considers gain in productivity, employment (use of human resources), the

standard of living [10]. When evaluating competitiveness Huovari J., Kangasharju A., Alanen A. offer to analyze the level of human capital, innovation factors, local factors, factors of accessibility [14].

M. Parkinson's concept is based on factors such as economic diversification, workforce skills, the relationship of industry, education, science and politics, living standards, social and cultural environment, communication networks, the level of control [11].

There are also other approaches. L. Van den Berg, in particular, uses the following indicators: economic efficiency indicators, indicators of organizational capacity, local performance [15]. Concept by I. Bramezza involves the study of structural factors (effective infrastructure, municipal services, quality of life, effective urban policy) and functional factors (functions of the city as a center of competence) [16].

Many scholars point out that the territory can not be competitive in all sectors of the economy. Its wealth depends on its ability to attract or create sufficiently profitable economic activities. No territory may be most attractive for all kinds of economic activities, and the success in the competition is connected with the development of those where a specific city (district, region) has a competitive advantage. This suggests the need for some degree of territorial specialization in certain economic functions and their complementarity.

It should be noted that other researchers (Peter Morici, 1988.; Michael Porter, 1990.; Bruce Scott and George Lodge, 1985) have focused on the nation as the object of analysis and placed success of international trade in the center of their analysis [18], [19], [20]. Data on international trade for the cities are often not available, but, what is more important in the study of urban (regional) economy is that internal competitiveness is as important as international one.

#### 4. Results

Based on the methodology by Kresl P.K. and Singh B we calculated competitiveness ranking of districts of the Republic of Tatarstan, a part of the Russian Federation, on the basis of value added by the method of regression and analysis of variance. It should be noted at once that identification of all indicators that are listed in the methodology by Kresl P.K. and Singh B turned out to be impossible due to the lack of complete statistical data on competitiveness factors of the republic's regions [9]. Therefore, available information was analyzed, which enabled to make certain conclusions about competitiveness ranking of the districts of the Republic of Tatarstan and about the influence of factors which determine the dynamics of competitiveness.

The method of regression analysis was applied for calculations, which is based on the establishment of relationships between variables in estimated parameters. To calculate the parameters of the multiple regression, Multiple Regression procedure with SPT Statgraphics was used.

As the parameters of competitiveness (Y) were considered data on actual cash income (X1), the number of cultural institutions (X2) (number of libraries, institutions, culture and leisure, and film projectors), and investments in fixed assets (X3) in the districts of the RT for 2007-2013.

Data analysis allowed us to establish competitiveness ranking of the districts of the Republic of Tatarstan and its dynamics from 2007 to 2013. First of all, it should be noted that a number of districts observe the same tendency as in the study by Kresl P.K. and Singh B. concerning the regions of the United States, namely in the selected areas with the highest rating for 2007 - 2013 it decreases, while in the cities with the lowest rating it increases [9].

Stable first three places belong to Tukaevsky, Almetyevsk and Nizhnekamsk regions of RT. A number of districts have a relatively constant position in the ranking of competitiveness. The rating of individual RT districts changed during the calculation period significantly. So, in 2007 Aznakaevsky district had a rating of 4, while in 2010 and 2011 - 23, in 2012 - 9, in 2013 - 12. These results suggest that the competitiveness of the regional economy has been affected by the factors that are not included in the range of design variables, and fixed investment, growth of real monetary income and the change in the number of cultural institutions, which were considered in the study, are irrelevant competitiveness factors in the district. This is evidenced by the value of  $F = 0,193104604$ , and  $t$ , which in the variables X1, X2 and X3 has a very small value (-0.446243882, 0.548822561 and -0.181252971 respectively), which characterizes the small correlation ratio between these variables and the final value of the region's competitiveness. This suggests that for a more reliable calculation of the competitiveness ranking it is necessary to expand the number of factors studied.

This method makes it possible to identify those factors that have the most influence on the competitiveness of the region. T-statistics indicates the degree of influence of factors X1, X2 and X3 on the final value of the competitiveness Y. For each district of the RT one can determine which factor has the greatest value and, accordingly, which - the least.



## 5. Conclusion

Detailed analysis of the data allows us to represent the situation of the combined effect of economic factors when creating added value in the districts of the republic. Such an analysis can be used further by district heads and their subordinates to make decisions in setting out priorities in social and economic development of regions. This requires improving the statistical base, which would allow for a more complete analysis of the competitiveness of the regions and cities of the country, taking into account the whole range of factors.

The notion of competitiveness which is traditionally reserved for use in connection with either national economy, or companies, is appropriate in relation to the economic regions, and their leaders can use this concept to guide the development of specific local economies [21, 23]. This can be done most effectively if the approach is both empirical and comparative. Management may determine the competitiveness of their economic region in relation to other competing economic ones and can also reveal its comparative strengths and weaknesses with a relatively objective methodology. Using the methods of regression and analysis of variance it is revealed which factors discussed in the research literature and in the popular press, in fact, are important to determine the competitiveness of the economic region. The result has been to show how the leaders of the economic region can use all this information when it is time to evaluate their past planning work and time to develop a strategic plan to improve the competitiveness of the economic region.

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## Some Aspects of the Formation a Financial Strategy in Emerging Markets

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### Abstract

The article describes the main problems of formation and implementation of financial strategies of companies in emerging capital markets. The authors propose a methodological basis to resolve the identified problems - the use of both classical matrix of financial strategies, and developed and tested on the Russian market of the matrix of optimal capital structure. In today's globalized markets, the presence of a financial strategy is a prerequisite not only to maximize the company's market value, but also to improve its competitiveness and sustainability.

**Keywords:** emerging markets, financial strategy, classical model of financial strategies, matrix of optimal capital structure, cost indicators

### 1. Introduction

The growth of economic practice and financial system is characterized by the increasing role of strategic management in the area of finance that is determined by such trends as globalization, an increase in the amplitude of the fluctuations in the world financial market, an increase in energy prices, growth of the share of innovation in sectors of the economy, inefficient management practices in the current activity.

In such circumstances, it is of special importance to develop a realistic financial strategy which should effectively integrate into the overall strategy of the company and act as a flexible tool to achieve their goals, as the basis for strengthening the competitive position of the company. In this light, the financial strategy of the company becomes a necessary condition for competitiveness and sustainable growth.

Poor drafting of the provisions of the modern theory of financial management in relation to the characteristics of the formation of a competitive position within the financial, strategic management and the absence of such an assessment as strategy development in emerging markets, lead to the situation when it is necessary to examine the issue from the perspective of the problems of the formation process of the financial strategy. Financial strategy thus comes out to be a process of managing its capital structure through the relationship of its main components: the dividend, investment strategy and funding strategy.

The development of a financial strategy in emerging markets has a number of features. The researchers raise a question of whether this type of markets has any specific factors and concepts, or it is possible to apply to the capital structure of companies in developing countries theoretical concepts used by companies in developed countries. In addition, the study of the structure of capital in emerging markets allows to look at the processes of capital structure adjustments that occur as a result of changes in the factors in the development of markets [13].

The study of emerging markets is largely confined to the analysis of financial markets, the availability of funding and forms of political and legal constraints.

Chakraborty says that the capital market in India began to develop only after 1992. Further, in the period from 1995 to 2008 there were reforms in the banking sector in India. As a result, the empirical data confirm significant changes in the company's capital structure [2].

Delcours, exploring the transition economies such as Russia, Slovakia, Poland, Czech Republic, says that in these countries the ratio of stock market capitalization to GDP ratio is below 3%, which is significantly lower than in developed countries [5].

Wu and Yue - based on the study of the capital market of China, conclude that there is almost no corporate bond market in China (less than 1% of GDP), there are significant restrictions on the admission of companies to the IPO, the



57 demand for bank loans is much higher than supply [14].

58 Cspedes, Gonzalez and Molina notice that, compared to the United States, companies of Latin America have less  
59 benefit from tax shields [4].

60 In most developing countries, accounting policies and disclosure requirements remain low. In addition, the number  
61 of analysts covering the company, in developing countries is substantially less than in developed countries. So,  
62 Rajagopal notes insufficient analytical service banks in India and high levels of information asymmetry [10]. Lopez and de  
63 Alencar say about an uneven level of disclosure of information by companies in Brazil [8].

64 In emerging markets, there is a negative relationship between profitability and debt, a positive between debt and  
65 growth opportunity, at the same time the theory of the pecking order is put in practice [3].

66 Thus, it is possible to identify the characteristic features of imperfect markets that have a significant impact on the  
67 company's financial strategy:

- 68 – limited access to the capital;
- 69 – high information asymmetry and agency costs;
- 70 – high macroeconomic risks for investors;
- 71 – inefficient ownership structure of the company (a large share of public participation, a problem of a high  
72 concentration of ownership);
- 73 – low level of corporate governance.

74 Financial market in developing countries is significantly different from the market of developed countries. Many  
75 managers argue that the implementation of forecasting and long-term planning (as a fundamental part of the financial  
76 strategy) under underdeveloped financial market is very difficult. The reason lies in the lack of efficiency of the market  
77 and a high level of risk.

78

## 79 2. Theory

80

81 Obviously, the development of financial strategy should be carried out in full accordance with the strategic objective of  
82 maximizing the market value of the business and in conjunction with the corporate strategy of the company, which it is a  
83 part of.

84 Structural-quality contours of the economy, that have come out after the crisis of 2008, are a strong evidence in  
85 favor of the thesis about the maintaining of the priority of the financial sector, what actualizes the problem of the formation  
86 and implementation of the financial strategy of large corporations necessarily taking into account the following aspects  
87 [1]:

- 88 – Financial strategy is closely correlated with the general and determines its timing.
- 89 – The formation of a financial strategy for the post-crisis stage of development of the global economy is shifting  
90 from purely Instrumentation field into the methodological.
- 91 – Financial strategy determines the production of value, and therefore must take into account its partial absence  
92 of the object and shift towards innovative technologies.

93 Key and typical issues of the main stages in the formation of the financial strategy in emerging markets are shown  
94 in Table 1.

95

96 **Table 1:** Issues in the formation of the financial strategy in emerging markets

Stage characteristics	Typical issues of companies in emerging markets
Defining the strategy period	- Lack of clear relation between general and operational financial strategy; - The period of the financial strategy is not correlated with the terms of an overall corporate strategy; - Current financial management is carried out without the strategic planning of these activities;
Formation of strategic financial goals	- Lack of alignment of goals and justification of targeted strategic standards that are being used; - Weak association of corporate and financial strategy; - Every top manager of the structural unit sees different phenomena and consequences speaking about financial strategy and interim goals;
Identification of the most important financial indicators	- Lack of distinction of scorecard and regulations, without regard to the specific type of business and the specific features of the company
Development of financial policies	- Unjustified use of improved indicators - The predominance of qualitative analysis, what makes it difficult to justify certain decisions; - Improper separation of planning and management in multi-level nature of the strategic financial activities;
Monitoring of the implementation of the financial strategy	- Excessive congestion of controlling system because of the lack of transparency in internal and external reporting - Lack of skills for proper analysis of the numerical data

In addition to the problems identified in the stages of development of financial strategy, not of a less importance are the typical problems of implementation of financial strategies in emerging markets, which generally include:

- The incompetence of the staff and management: resistance to change, due to the implementation of the financial strategy, a lack of understanding of its importance and an inability to structure the strategic objectives, as well as the lack of necessary skills.
- Implementation of financial strategies in isolation from anti-crisis activities. In the face of uncertainty in emerging markets companies, as part of establishing the strategy should insure themselves against the risk of insolvency and financial instability.
- Presence of agency conflict, when the leaders prefer to maintain control over the company to the detriment of its strategic development [7].
- Focusing on short-term results rather than long-term financial goals.

Specific integrated problem of implementing financial strategy is the need to select strategy respectively in the field of dividends, investment and financing, that would ensure maximum capitalization.

### 3. Results

The solution of described problems largely depends on the specifics of the company and its strengths and weaknesses. Nevertheless, certain universal methods to improve the competitive position of the company in a strategic aspect can be used in the emerging markets as a compromise that has significant positive impact on the company's capitalization. In the context of the application of such models there are two possibilities there: either partially and simultaneously mitigate problems on the stages of development of financial strategy, or partially compensate them. However, it does not negate the need for a comprehensive work to overcome the above problems of formation of financial strategy in emerging markets.

The classical model of financial strategies is the matrix of J. Franshon and I. Romance, that defines the ratio of investment opportunities the company has and its available (used) debt financing in the dynamics of the natural development of the company. The matrix of High School Financial Management reflects the ratio of the rate of sustainable growth of the company and the value creation process in the long run.

As an option of a model of formation of financial strategy in conjunction with the integrated assessment of the competitive position, was developed and tested a new type of three-dimensional matrix showing the relationship of the financial strategy of investment, financing and dividend policy, fully taking into account, in contrast to the classical models, industry-specific activities (Figure 1).

The formation of an optimal capital structure is possible, but only for a particular company. Recommendations for some universal capital structure are far from reality [9]. At the same time, the use of models of financial strategies just means that there is an individual approach to each company and the ability to model the optimal capital structure.

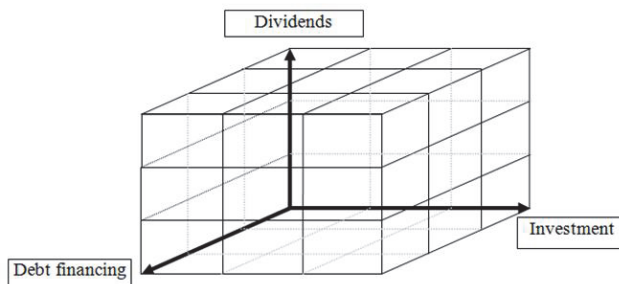


Fig. 1. Matrix of Optimal Capital Structure

There can be two options to form this matrix there: either to do an econometric research and designation of the normative values of these parameters of the matrix on the basis of certain reasons and theories for the purpose of distribution companies by quadrants, or, to compare the results of companies that are competitors with each other and caught in one sample.

The sensor was tested in the chemical and petrochemical sectors of the Russian economy. In 2007 and 2008, 11

companies out of 17 had a favorable position; in 2009, only 8 companies in 2010 - 10, 2011 - 9, 2012 - 10: even in comparison with each other companies and their distribution in terms of Equiprobable matrix, there are deviations from the average value of a favorable position, depending on the situation prevailing in the emerging market. 2009 was marked by the largest decline in production and the stagnation of the Russian market for the entire period of the global financial crisis, the beginning of which took place in 2008.

You can also consider the relationship between the parameters underlying the matrix we proposed, with three indicators of value (Table 2). The selection of matrix parameters in relation to different value parameters and further qualitative assessment contributes towards a more accurate assessment of the competitive position of a public company through the prism of financial management.

It should be noted that the rate of MBR 1, based on the accounting estimate, is calculated by the formula 1:

$$MBR 1 = \frac{\text{Market capitalization}}{\text{Undistributed profit} + \text{Equity capital}} \quad (1)$$

Indicator MBR 2, reflecting the ratio of market and book value, is calculated in the following way (formula 2):

$$MBR 2 = \frac{\text{Market capitalization}}{\text{Book value}} \quad (2)$$

Where: MBR (Market-to-Book Ratio) is a company's market price in relation to its book value.

**Table 2:** Relation of matrix parameters and cost indicators

Cost indicators	MBR 1	MBR 2	Economic value added
Take into account	Negative impact of net financial leverage on the cost of the company. Positive impact of the growth of debt capital in relation to net income. Positive impact of dividend payments of all classes of shares.	Negative impact of the net and the balance financial leverage on the cost of the company. Positive impact of dividend payments.	Positive impact of net financial leverage on the cost of the company. Positive impact of efficiency and size of investments on the market assessment.
Do not take into account	The influence of the investment strategy on the cost of the company	The influence of the investment strategy on the cost of the company	The influence of the dividend payments on the cost of the company

#### 4. Conclusions

Thus, the development of financial strategies in modern conditions is a prerequisite for the competitiveness of companies and the long-term sustainable growth. The process of developing a financial strategy in emerging markets is characterized by the absence of a comprehensive strategic analysis and preliminary assessment of the expected effectiveness of the implementation of the strategy; an integrated assessment and modeling of the competitive position of companies in the areas of financial management are almost never used, what cannot be fully compensated by the systematization of certain financial ratios; often there are no mechanisms to support implementation of the strategy there.

In our work we propose to add to the standard process of formation of financial strategy in emerging markets such stage as a comprehensive assessment of the strategic competitive position of companies in the area of finance (in the developed matrix of optimal capital structure). Such an assessment does not only diagnose the current situation, but also gives you the opportunity to shape the future position of the company.

Further study of the problems of development and implementation of financial strategies of companies in emerging markets are seen promising and may be based on the development and testing of new strategic financial models that can have: an assessment of ratio «risk-liquidity», an analysis of financial security, an assessment of the impact of market share on the main areas of financial management, a study of the relationship of derivative financial instruments and the value of the company in a strategic aspect, a definition of the place of a strategy to improve financial management in the hierarchy of financial strategy, an analysis of the strategic implications of structural reforms.

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# International Financial Reporting Standards Implementation into the Russian Accounting System

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## Abstract

*This study illustrates the process of implementing IFRS in Russia. The article deals with the description of the system of statutory regulation and its development through the process of International Financial Reporting Standards implementation. The problematic issues concerning the current state of the system of statutory regulation are systemized. The practical application of different accounting systems by Russian companies during the transition to International Financial Reporting Standards followed. The specifics of the financial statements performance are analyzed.*

**Keywords:** implementation of International Financial Reporting Standards, accounting system, statutory regulation, voluntary adoption, financial results

## 1. Introduction

From the beginning of the transition to market economy the Russian accounting system undergoes substantial changes. As in many European countries financial reporting in Russia is regulated by state authorities. Taking into consideration scarce investment resources in the country the Government sets a goal of fast implementation of International Financial Reporting Standards into the Russian accounting system. The issues of introduction of international standards such as the necessity of statutory regulation reform, the development of high quality accounting standards by professional organizations are still a challenge so far.

The regulatory system of accounting where the Federal Law "On Accounting" is on the top of the regulatory hierarchy, is supplemented and completed by the number of other rules, issued by the Ministry of Finance. For the reason of low quality financial information disclosure the Government has to intervene to oblige the companies to publish financial reporting in compliance not only with Russian Accounting Standards but also with International Financial Reporting Standards (IFRS). Most of the biggest companies of the country are already performing financial reporting in compliance with IFRS on a voluntarily basis.

The analysis of International Financial Reporting Standards implementation into the Russian accounting system facilitates better understanding of what has to be done to improve this system.

## 2. Background and Theoretical Development

With the worldwide adoption of IFRS the number of studies considering the issues of international financial reporting standards implementation is growing exponentially. Reforms of corporate governance and accounting standards can increase the attractiveness of emerging markets by providing a more favourable environment for foreign investment, although typically these reforms are based on systems developed in advanced economies, and the reform process itself needs to be understood [1].

Many existing studies provide different aspects of IFRS implementation from EU perspective (Pope, P.F., McLeay, S.J. Rózsa, I.B.) or from a country-specific perspective as UK and Italy (Fox, A., Hannah, G., Helliard, C., Veneziani, M.), Iraq (Hassan, E.A., Rankin, M., Lu, W.), Czech Republic (Paseková, M., Crhová, Z., Strouhal, J., Řezanková, H.) Romania (Albu, N., Albu, C.N.). Some researchers state that is very important from the perspective of developing global accounting standards that the selected accounting regulation is applicable and plausible not only from technical perspectives, including recognition, measurement, presentation and disclosure assertions, but also from user perspectives to make standards friendly for everyone [9]. Others imply that it is still an open question to what extent positive capital-market effects around mandatory IFRS adoption are indeed attributable to arguably improved and globally harmonized accounting standards [3]. The consequences of IFRS implementation into the Russian accounting system in

56 these studies are underexplored.

57 Alon, A indicates that in Russia, institutional change related to IFRS adoption was not revolutionary as IFRS did  
58 not replace Russian Accounting Standards (RAS) but both standards coexist [2].

59 Historically several attempts were made by the Russian accounting regulatory body - the Ministry of Finance  
60 aiming to reform the accounting system in the country. For the first time ever the Government decided to implement  
61 international accounting and statistics standards in 1992. From our point of view three periods of transition to International  
62 Financial Reporting Standards (IFRS) can be distinguished.

63 In the period covering 1992 – 2004 a number of several Acts by the Ministry of Finance was issued. According to  
64 the Program of Accounting System Reform endorsed by the Ministry of Finance in 1994 the transition to International  
65 Financial Reporting Standards had to be finished by 2000.

66 In addition Conceptual Framework for Accounting in market economy (1994), Program for the Reform of  
67 Accounting in Accordance with International Financial Reporting Standards (1998) and Conceptual Framework for  
68 Accounting and Reporting Development for Medium-term Perspective (2004) followed.

69 Indicated regulatory acts imported into the Russian accounting system conceptual framework for financial reporting  
70 based on international standards. Most of the accounting principles such as accrual-basis of accounting, accounting  
71 policies, materiality, substance over form appeared to be new for Russian practitioners.

72 In the period covering 2004 – 2010 a number of Russian Accounting Standards underwent abrupt changes by the  
73 Ministry of Finance in order to bring them in line with International Financial Reporting Standards. In the critical 2004 a  
74 part of economic entities of the country was obliged to comply with IFRS. This happened as Central Bank ruled to  
75 prepare reporting in compliance with International Financial Reporting Standards for all banking institutions.

76 In the period covering 2010 – 2014 some Russian companies started to prepare financial reporting in compliance  
77 with IFRS on a voluntarily basis but in 2010 the scope of economic entities obliged to prepare financial reporting was  
78 broadened as the Federal law "On consolidated financial statements" has been endorsed. According to the Federal law  
79 only the consolidated statements had to be presented in compliance with International Financial Reporting Standards for  
80 such businesses as:

- 81 a) Banking institutions;
- 82 b) Insurance companies;
- 83 c) Listed companies.

84 According to new provision a listed company is exempted from preparing the consolidated statements in  
85 compliance with International Financial Reporting Standards if its publishes the consolidated financial statements with  
86 other internationally accepted accounting rules, for instance, US GAAP. These specified companies will have to comply  
87 with International Financial Reporting Standards no earlier than 2015. According to our previous research these  
88 companies in Russia were Mechel, Cherkizovo Group, Gazpromneft, Gals Development, Mobile TeleSystems, MGTS,  
89 NLMK, Rosneft, Lukoil, Slavneft-Megionneftegaz, Sistema JSFC, Tatneft, TNK-BP (before take over by Rosneft).

90 The Federal law "On consolidated financial statements" had facilitated the development of infrastructure for IFRS  
91 implementation into the Russian accounting system. To provide a legislative framework for IFRS in Russia Ministry of  
92 Finance in 2011 issued an order. According to the order 29 International Accounting Standards, 8 International Financial  
93 Reporting Standards and 26 Interpretations were enacted by this order. By issuing a special order the Ministry of Finance  
94 delegated the right of official publishing of International Financial Reporting Standards to Russian magazine  
95 «Accounting».

96 During the period under consideration substantial changes were made to the Federal law "On accounting" as well.  
97 The amendments to the Federal law had several consequences for Russian accounting system:

- 98 a) new four-level hierarchy of regulatory acts was approved (federal standards, industry-specific standards,  
99 recommendations in the field of the accounting, standards of economic entity);
- 100 b) the set of financial statements was revised and brought into the line with IFRS and thus starting from 2013  
101 auditor's report was excluded from the set;
- 102 c) the obligatory use of standardized by the statistical authorities source accounting documents was cancelled in  
103 order to provide IFRS substance over form principle;
- 104 d) for small businesses simplified formats of balance sheet and income statements were developed;
- 105 e) several drafts of Russian Accounting standards were developed as well. These drafts included accounting  
106 standards concerning leases, revenue, employee benefits, inventories, property, plant and equipment.

107 Despite the development of infrastructure for IFRS Implementation it is still too far to fully adopt International  
108 Financial Reporting Standards into the Russian accounting system. A lot of issues such as the development of Russian  
109 Accounting Standards by professional organizations, the remaining differences between Russian Accounting Standards

and International Financial Reporting Standards, the prevailing of juridical form over substance preserving in Russian Accounting system and some other problems still have to be solved.

### 3. Results

Existing accounting studies cover the issues of practical implementation of International Financial Reporting Standards mostly based on data for highly developed countries but not for developing countries. The intensifying processes of developing security markets, the need of funding for companies operating in countries with transitional economies such as Russia motivates management to provide high-quality information in financial reporting.

However in case with Russian companies it is not clear if the disclosure of information under International Financial Reporting Standards will help investors in getting high-quality information about financial position and financial results of companies. Historically the need for accounting under IFRS was higher for Anglo-American countries which are investor-oriented and have highly developed security markets [11]. Russian security market is too small in comparison with Anglo-American countries as it is shown in Table 1.

**Table 1:** Security market capitalization based on World Federation of Exchanges data (\$ bln)

Countries	Security market capitalization as of January 1, 2009	Security market capitalization as of January 1, 2013
Russia	337,1	825,3
Anglo-American countries:		
USA	11 457,9	18 668,3
Great Britain	1 868,2	3 396,5
Australia	683,9	1 386,9

Russian security market capitalization relatively to GDP of the country tends to decline as it is shown in Table 2 [14].

**Table 2:** Security market capitalization based on World Bank data (% of GDP)

Countries	2008	2009	2010	2011
Russia	23,9	70,5	67,5	42,9
Anglo-American countries:				
USA	82,5	108,5	118,9	104,3
Great Britain	69,6	128,1	137,3	118,7
Australia	64,2	136,5	127,7	86,9

In the conditions of week security markets it is important to determine the extent of application of International Financial Reporting Standards by Russian companies. Mandatory IFRS-compliant financial statements will have to be submitted by Russian companies only for 2013. In the chosen time interval we examine the voluntary application of IFRS by listed companies. Our sample is made up of the companies listed on MICEX. Our initial sample for the period from 2005 to 2010 consists of 307 year-observations relating to a total of 71 companies.

In 2010 there were 265 companies listed on MICEX but most of these companies were parts of group of companies (For comparison: on London Stock Exchange there were listed 2767 companies, Australian Stock Exchange – 2056 companies[12]). Russian companies listed on MICEX were not obliged to report consolidated financial statements under IFRS. For this reason we took only companies that actually reported under IFRS. We also eliminated 13 companies that report under US GAAP (Mechel, Cherkizovo Group, Gazpromneft, Gals Development, Mobile TeleSystems, MGTS, NLMK, Rosneft, Lukoil, Slavneft-Megionneftegaz, Sistema JSFC, Tatneft, TNK-BP (before take over by Rosneft) and firms with missing data.

**Table 3:** Selection of Sample Firms

Year	2005	2006	2007	2008	2009	2010	Total
Initial Sample	106	106	106	106	106	106	636
Less:							
Firms with missing data	63	48	18	14	5	6	154
Firms with non-IFRS Statements	13	13	13	13	13	13	78
Total	30	45	75	79	88	87	404



148 As it is shown in Table 3 starting from 2005 there was a steady growth of the number of Russian companies reported  
149 under IFRS. In critical 2007 the number of companies voluntary applying IFRS increased in 1.7 times from 45 to 75.  
150 Afterwards the growth was slowing down. In total the number of companies reported under IFRS increased in 2.9 times.  
151 Table 4 gives an overview of application of accounting systems by Russian companies.

152  
153 **Table 4:** Accounting systems applied by MICEX companies (% of overall number of listed companies)  
154

Year	2005	2010
Russian accounting standards	83,8	62,3
IAS/IFRS	11,3	32,8
US GAAP	4,9	4,9

155  
156 The share of Russian companies voluntary applying IFRS increased since 2005 from 11,3% to 32,8%. These results are  
157 consistent with European practice of IFRS adoption. To prove this we used data from German listed companies until the  
158 year 2000 when the EU announced its intention to make IFRS mandatory for all listed companies preparing consolidated  
159 financial statements (table 5).  
160

161 **Table 5:** Accounting systems applied by German companies before 2000 (% of overall number of listed companies)  
162

Year	1997	1998	1999	2000
German GAAP	70	47	27	17
IAS/IFRS	20	37	53	53
US GAAP	10	16	20	30

163  
164 The numbers demonstrate that German companies had favoured IFRS even prior to the EU announcement [11]. Before  
165 the mandatory adoption of IFRS half of the German companies (53%) have already prepared financial statements in  
166 compliance with International Financial Reporting Standards. In Russia the share of such companies was lower – 32.8%.  
167 In this respect one can expect the sharp rise of IFRS application by Russian companies in the future.

168 From 106 companies 16 of them chose US Dollar as a functional currency used for presentation of financial  
169 reporting under IFRS, 88 companies used rubles and 2 companies (Tattelekom and VTB Bank) had switches from one  
170 currency to another during the 2005-2010.

171 The other distinctive feature of Russian economy that influences the quality of financial reporting is a big share of  
172 lossmaking companies (table 6).  
173

174 **Table 6:** Data on Russian companies reported profits and losses under IFRS  
175

Year	2005	2006	2007	2008	2009	2010	Total
Initial Sample	30	45	75	79	88	87	404
Less:							
Firms reporting profits	28	43	72	54	63	72	332
Share of companies reported profits, per cent	93,3	95,6	96,0	68,4	71,6	82,8	82,2
Firms reporting losses	2	2	3	25	25	15	72
Share of companies reported losses, per cent	6,7	4,4	4,0	31,6	28,4	17,2	17,8

176  
177 Table 6 shows that during the period of 2005-2007 more than 93% of Russian companies declared profits in consolidated  
178 financial statements under IFRS. In critical 2008 every third Russian company was loss making (31,6%). Only in 2010  
179 there was shown a positive sign of financial results improvement when the share of loss making companies decreased  
180 from c 31,6% to 17,2% (almost in 2 times).

181 45 from 106 Russian companies (42.5% of overall number of companies) during the whole period of observation  
182 declared only profits in their financial statements. 9 companies (8.5% of overall number of companies) for the most period  
183 of 2005-2010 were loss making. These were such companies as United Aircraft Corporation, Transaero Airlines, Sollers  
184 OJSC, Rusgreyn Holding, RBK-TV Moscow, Quadra Power Generation, Ptk Group, O2TV and Uralmash Izhora.

185 There was a small number of highly efficient Russian companies that showed only positive dynamics of net  
186 incomes in their financial statements under IFRS including Magnit, Gazprom, Novatek, Pharmstandard, Transkredibank,



187  
188  
189  
190

Transneft.

**Table 7:** Companies with highest net income growth rate

Company	Net income growth rate 2010 to 2005, times
Novatek	2.95
Gazprom	3.16
Pharmstandard	3.52
Transkreditbank	5.22
Magnit	9.03

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The presentation of solid financial position and sound financial results in statements under IFRS might be helpful in the conditions of increasing demand to access capital markets. Regardless of legal requirements to prepare financial statements under IFRS many Russian companies have already implemented consolidated statements based on International Standards, driven by general economic conditions. Currently the challenge lies in enhancing acceptance of IFRS.

#### 4. Conclusions

The article, investigating International Financial Reporting Standards into the Russian accounting system, implies that during developing the infrastructure for IFRS implementation by Russian Government in the long-drawn period of the last twenty years many companies driven the necessity of getting access to capital markets complied with IFRS on a voluntarily basis.

Although the system of statutory regulation has already underwent substantial changes there is a lot of issues that have to be solved in the future. The standards-setting process has to be changed towards delegating the functions of development of Russian Accounting Standards from statutory level to private sector bodies, the process of elimination of substantial differences between Russian Accounting Standards and International Financial Reporting Standards has to be continued in the future.

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## Development of Financial Reporting Principles

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### Abstract

The paper discusses the link between the principles of financial reporting and informational needs of users who provide limited resources to the entity. It is argued that development of economic environment has led to the shift in resources, that are limited, and consequently has changed the primary user of financial reporting. This change is to be reflected in financial reporting principles as its aim is satisfaction of users' informational needs.

**Keywords:** financial statement, international financial reporting standards, integrated reporting

## 1. Introduction

Today, Russian generally accepted accounting principles are under reformation in accordance with the International Financial Reporting Standards. At the same, time the International Financial Reporting Standards are also going through substantial review process. These standards were formed and developed in an era of industrial production. Since then the business environment, models and value creation process has changed significantly. A recent crisis has also raised new challenges in from of the accounting system and regulators. To face these challenges new laws, standards and requirements have been introduced. Furthermore, the increasing complexity of production processes and economic transactions has led to additional disclosure requirements. The volume of disclosed information in financial reporting increased, new report of sustainability has appeared. Despite the increase in the information supplied by accounting system, it is still claimed to be inadequate, fragmented and disconnected. Scandals involving transparency of financial reporting make it necessary to rethink the principles of financial reporting.

## 2. Materials and Methods

To do so we analyzed the development of financial principles and their perception trough available sources of information.

## 3. Results and Discussion

Multidirectional informational needs of financial reporting users cause a difficulty in unifying principles of financial reporting. For example, creditors want to know financial stability and realizable value of a company's assets. However, the owners of a company usually are interested in return on capital employed and in valuation of assets at cost. Based on the analysis of the historical development of financial reporting principles in Russia and abroad, we conclude that principles are based on informational needs of users who provide limited resources.

International Financial reporting standards initially aimed to satisfy informational needs of wide range of users. "Framework for preparation and presentation of financial statement" (IASB, 1989) stated that "The users of financial statement include present and potential investors, employees, lenders, suppliers and other trade creditors, customers, governments and their agencies and the public".

However, in 2004 International Accounting Standards Board started the joined review project of the framework with US Financial Accounting Standards Board (IASB, 2012). As a result of this project in 2010 revised chapter "Objectives and qualitative characteristics of financial reporting" was issued. In the new chapter the objective of financial reporting stated as "to provide financial information about reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing recourses to the entity" (IASB,2010). This means, that it was

56 recognized on the international level, that financial statement primary serves providers of capital. It should be noted that  
57 this approach came from US, where financial markets historically were more developed. Even so, that not for all  
58 countries' financial markets are the main capital provider, they have to accept this approach if they accept International  
59 Financial Reporting Standards.

60 Change in the primary users of the financial reporting triggered the change in financial reporting principles. First of  
61 all it changed the qualitative characteristics of financial statement.

62 Initially International Financial Reporting Standards followed four basic qualitative characteristics:  
63 understandability, relevance, comparability and reliability, - where reliability described through faithful representation,  
64 substance over form, neutrality, completeness and prudence. The last one – prudence – was eliminated from revised in  
65 2010 Framework. It was argued that prudence principle conflicts with neutrality and may lead to understatement of  
66 income and overstatement of expenses (IASB, 2013). However, prudence principle was cornerstone of European and  
67 Russian accounting system. It defined measurement methods for assets and liabilities. All analysis and interpretations of  
68 financial reporting were based on assumption of prudence. Therefore, its elimination will change not only accounting  
69 treatment for elements of financial reporting, but the whole decision making process based on that information.

70 For a long time, the financial capital was the most critical recourse. However, current business conditions indicate  
71 the increasing role of human, social and natural capitals. This raises the need to reflect their contribution to the financial  
72 performance of the company. The absence of this information leads to bias and it does not allow making economic  
73 decisions based on comprehensive analysis. The International Financial Reporting Standards contain the tools to reflect,  
74 for example, environmental policy with the help of provisions. The contribution of each type of capital in the company's  
75 value and the financial results of its operations, both in the short and long term, also must be reflected in the report.  
76 Therefore, a mechanism should be found to assess human, social and natural capitals. As well as the format of financial  
77 reporting should be created, that allows disclosing this information.

78 The new integrated reporting format (IIRC, 2010) is intended to develop guidelines that address these challenges.  
79 An Integrated Report aims to display a company's stewardship not only of financial capital, but also of the other capitals,  
80 their interdependence and how they contribute to the value of the company. It also focuses on an ability to create and  
81 sustain value in the future, not on past financial performance and financial risk. Today's reporting is often said to be too  
82 compliance orientated, reducing the scope for organizations to exercise an appropriate amount of judgment. While a  
83 certain level of compliance orientation is necessary to ensure consistency and enable comparison, Integrated Reporting  
84 offers a principles-based approach that drives greater focus on factors that are material to particular sectors and  
85 organizations. It permits an organization to disclose its unique situation in clear and understandable language. However,  
86 the large number of estimates and forecasts leads to the subjectivity of accounting data and the complexity of their  
87 inspection. In our opinion, the reported data should be cleaned as much as possible from subjective estimation and allow  
88 its users to interpret it according to their interests.

89

#### 90 **4. Conclusion**

91

92 It should be noted that in Russia, the scarcest resource continues to be the financial capital and the main purpose of the  
93 transition to international standards is access to international financial markets. The contribution of other types of capital  
94 in the creation and stability of the value of the company on a regular basis is not tracked. The new format of financial  
95 reporting will help Russian companies to realize importance of all types of capital employed and assess their contribution  
96 to the company's value. Considering sufficient amount of natural and human recourses in Russia, an integrated reporting  
97 model may increase investment appeal of the country.

98 Financial reporting is crucial element of business transactions. Making an investment decision always involves  
99 transaction cost. Globalization, complexity of business and financial structures constantly increase them. However,  
100 transparent financial reporting could sufficiently reduce them. At the same time disclosing all relevant information will  
101 allow companies to get fair market value of their shares. That will bring stability to financial markets, the importance of  
102 which was clearly showed in the last financial crises.

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## Falsification of Financial Statements: Historical and Evolutionary Aspect

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### Abstract

Both Russian and foreign researchers devote their studies to the nature of falsification of financial statements. This subject was under interest of Russian accounting specialists since the beginning of the XX century. Therefore, the objective of the paper was to track historical development of the notion of financial statement falsification and its definition. This improves our understanding of falsification methods and helps to throw light to ways to prevent it.

**Keywords:** financial statement, falsification, balance sheet

### 1. Introduction

Various representatives of Russian and foreign accounting schools differently understood the nature of veiling and falsification of financial statements. N. S. Arinushkin narrowed a falsification problem to balance sheet and the misstatement of its items (Arinushkin, 1927). I.R. Nikolaev considered that falsification of the reporting is a consequence of various approaches to valuation of assets (Nikolaev, 1926). Ya.M. Galperin noted that falsification represents the distortion of balance sheet resulting in changes in the material contents of accounts and groups of balance sheet items (Galperin, 1925). N. R. Weizman believed that falsification is a consequence of an intention to hide business information (Weizman, 1927). I.F. Sherr claimed that falsification of the reporting is directed on distortion of a condition and a size of property and profitability of a company (Sherr, 1926). N.A. Kiparisov understood distortion of the material content of balance sheet which leads to misstatement of financial results of business activity of a company as a falsification (Kiparisov, 1928). According to Ya.V. Sokolov, falsification of the reporting are put into practices by a company's management intentionally (Sokolov, 2000). This illustrates that there was diversity of definitions of falsification of financial statement. Therefore, there was no uniform understanding of its causes and consequences. This led to the difference in the suggested methods of detection of the falsification and its prevention. With modern methods being the development of earlier ideas, it is important to study the evolution of falsification concept to understand purpose and limitations of those methods.

### 2. Materials and Methods

For reaching this objective, archive books and materials have been studied in detail. All collected definitions were analyzed and classified.

### 3. Results and Discussion

Some specialist, like N. S. Arinushkin, connected falsification with clarity and truthfulness of the balance sheet. Under clarity he understood understandability and presentation of financial statement in an easy to read manner, and also each "part of balance" to be congruent to its economic nature. The truthfulness of the balance sheet means that it is free from falsifications (Arinushkin, 1927).

In 1925 in the book "Basics of accounting study" (Galperin, 1925) Russian accounting specialist Ya.M. Galperin defined two main types of violation of truthfulness of the balance sheet:

- a) violation of truthfulness of the balance sheet, which affects its structure;
- b) violation of truthfulness of the balance sheet, which affects its quantitative estimates.

He called the first type of violations blackout, or balance sheet veiling, and the second type of violations – a

perversion, or balance sheet falsification. Ya.M. Galperin considered that in case of veiling of the balance sheet there is an opportunity to find a mistake, whilst in case of falsification this opportunity is considerably lower. Ya.M. Galperin believed that "falsification of the balance sheet leads to the presentation of a wrong balance sheet in its essence, which changes content and valuation of its elements".

The Swiss professor I.F. Sherr in 1926 in his work "Accounting and balance sheet" (Sherr, 1926) highlighted the need "of bringing to the light the secrets of the balance preparators, putting to themselves a task, because of different incentives, to present in the best or worst way companies' position, conditions and the value of a property and its profitability".

I.F. Sherr understood as veiling of a balance sheet "such form of preparation of a balance sheet that makes the economic facts not clear or difficult to understand so the picture of financial position of the company is inaccurate or wrong". He identifies formal and material means of veiling. Balance sheet veiling Sherr I.F. considered as an instrument of business policy of joint-stock companies.

The German accounting specialist of that time P. Gerstner in 1926 in his book "Balance sheet analysis" (Gerstner, 1926) proved the requirement to publish a balance sheet to be a reason of its veiling. In his opinion, those who prepare published balances sheet use "different tricks, like shift of items, aggregation of several items to one, special not clear designations, not to mention possible obscuration or even fakes" ("a coloring, a combing, a balance waving" are also noted as ways of veiling of the balance sheet).

In 1931 well-known Russian accounting study specialist N.A. Blatov in the book "Accounting study" (Blatov, 1931), describing rules of balance sheet preparation, notes that violations of balance sheet preparation requirements leads to veiling and falsification of balance sheet. Besides "veiling sometimes happens unintentionally, because of ignorance or negligence of those who prepare balance sheet". However, intentional veiling cases are not rare – it is when "veil" is thrown on unattractive parts of the balance sheet to be hidden from public gaze. Falsification is defined as "violation of the requirement of accuracy, truthfulness of balance sheet; becoming incorrect, the balance sheet represents distortion, fake, falsification of the actual, correct balance sheet by its invaluable substitute. Falsification always happens deliberate, and the forged balance represents a balance sheet crime".

N.A. Blatov considered that it is difficult to draw clear, certain line between the concepts "veiling" and "falsification": "deliberate veiling is very close to falsification, and any falsification, of course, does balance sheet not clear, veils it".

In 1927 in N. R. Weizman's book "Accounting study course" (Weizman, 1927) the whole chapter is devoted to the questions of falsification and veiling of balances sheet. He understood the wrong aggregation of balance sheet items as veiling of balance sheet, "being reflected in clarity of balance sheet, but not causing any changes in the profit (loss) or capital of a company". Falsification, according to N. R. Weizman, represents violation of reality of an asset and a passive, almost always resulting in a wrong bottom line figure.

According to N. R. Weizman, receivables in a balance sheet is the most vulnerable item for all kinds of falsification, because valuation or doubtfulness of receivables from the third parties almost always depends on a judgment of a company itself. Among receivables items special attention should be paid to "other receivables" where many doubtful and disputable amounts can be hidden very often.

In work of leading Russian accounting specialist N.A.Kiparisov "Accounting study basics. Preparation of balance sheet and its analyses", written in 1928 (Kiparisov, 1928), it was noted that it is quite difficult to differentiate "veiling" and "falsification" concepts, because any blackout of a balance sheet is already its misstatement, but nevertheless some difference between these two concepts can be found. "Veiling, or balance sheet blackout, is used to hide in balance some parties of economic activity or some shades of economic position, but doesn't affect net profit and amount of capital. Falsification of a balance sheet assumes misstatement of its material content, which often leads to distortion of the results reached by a company" Furthermore N.A. Kiparisov distinguished two types of balance sheet falsification: falsification resulting in misrepresentation of balance sheet by making wrong entries, but without affecting financial results, and falsification of results and capital of a company.

Professor Ya.V. Sokolov in 2000 introduced the idea that it is impossible to achieve exact reflection of economic activities in financial statement preparation and therefore companies use veiling and falsification tricks (Sokolov, 2000). According to Ya.V. Sokolov, "if requirements of normative documents are fulfilled, but the absolute truth after all isn't reached, it is said about reporting veiling ... If applied accounting techniques are beyond the rules, set by normative documents, in that case it is reporting falsification".

#### 4. Conclusion

The analysis of professional views on the nature of falsification of financial statements showed that it is one of the

110 accounting problems that have been understood differently through the time. There was no one exact definition for  
111 financial statement falsification and therefore different approaches were suggested for preventing it.

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## Human Capital Accounting in Professional Sport: Evidence from Youth Professional Football

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### Abstract

The article comprises a set of theoretical and methodological statements and practical suggestions about the development of youth players' registrations accounting in professional football clubs. Nowadays financial accounting of acquisition costs of professional football players' registrations is well developed and used in practical management of sports organizations. However, accounting for the costs of internally prepared youth players have been neglected. As a result, a substantial share of assets is not adequately reflected in the accounting system and financial reporting of football club. The article proves that investments in youth players meet criteria of asset which is formed over the years in sports academies in the course of trainings and education, and which is capable to generate economic benefits as a part of club's squad.

**Keywords:** accounting, football, player registration, IFRS, youth academy

### 1. Introduction

Nowadays professional sport became an independent economic industry. Analysis of income structure of European football clubs, conducted according to reports of UEFA "Club licensing benchmarking report financial year 2011" [1] and "Club licensing benchmarking report financial year 2012"[2], shows that source of more than 90% of income is the main sports club activities (Table 1).

**Table 1:** Revenue structure of European football clubs

Revenue	2011 (235 clubs)		2012 (237 clubs)	
	in € bn	in % to the total	in € bn	in % to the total
Sports revenues, including:				
- Broadcasting	2,6	32,91	2	25,00
- UEFA competition prize money	1,3	16,46	0,9	11,00
- Sponsorship	1,7	21,52	2	24,00
- Commercial	0,3	3,80	0,8	10,00
- Gate receipts	1,7	21,52	1,6	20,00
Other revenues	0,3	3,80	0,8	10,00
Total	7,9	100	8,1	100

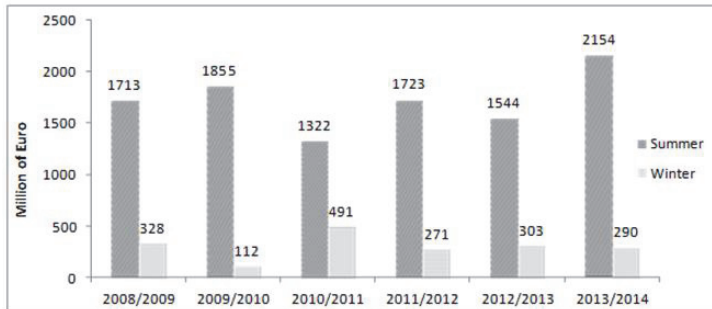
Success of sports activity depends primarily on the composition of players which form basis of team. Without talented, highly skilled athletes football club has little chance to attract audiences and and make potential investors, sponsors and advertisers commercially interested in partnership with club.

In this regard, football clubs, annually carrying significant investments in the acquisition of player registrations, aim to improve the quality of game, which promotes the growth of investment attractiveness of club as business unit.

Scales of investment into professional players are comparable on amounts to direct investments in industrial sector.

According to the report «Soccer Transfer Review 2014-Winter window», prepared by the marketing agency «Prime

47 Time Sport» in February 2014, at the end of winter transfer window in the season 2012/2013 the total volume of players'  
48 transfers from one club to another made by football clubs of five leading Football Associations in Europe (England, Spain,  
49 Italy, Germany, France) was estimated at € 290 million [3]. The volume of transactions in the summer transfer window at  
50 the same season reached a record volume, having increased compared with the previous period by 40% and amounted  
51 to € 2,1 billion. (Figure 1).  
52



53  
54  
55 **Fig 1.** Transfer costs of football clubs from five leading Football Associations (France, Germany, Great Britain, Italy and  
56 Spain) in summer and winter transfer window.

57 Thus, it is obvious that investments in players' registrations are considered as a source of economic benefits which is  
58 able to generate cash flow to the sports organization in future.  
59

## 60 2. Accounting for Player Registrations in Professional Football

61  
62 Nowadays extensive practice of capitalization of costs on players' registration acquisition as asset with the subsequent  
63 reflection in the financial reporting as a part of intangible assets of football clubs is already created.

64 Analysis of foreign experience has shown that most European football clubs capitalize acquisition costs of players'  
65 registrations as intangible assets and reflect them in financial statements. According to the report of UEFA "Club licensing  
66 benchmarking report financial year 2010", which characterizes the activity of 665 European football clubs from top  
67 divisions, 60% of European clubs consider costs of players' registrations acquisition as assets and recognize them in the  
68 balance sheet [4].  
69

70 In Great Britain historically costs of purchased players' registrations on terms of transfer contract were considered  
71 as current expenses and reflected in profit and loss account. This approach was justified by uncertainty concerning,  
72 whether keeping of players registration gave to the club sufficient control over future benefits from the conclusion of the  
73 transfer contract [5].

74 The first club adopted an alternative accounting policy was FC "Tottenham Hotspur". In financial report for the year  
75 ended 31 May 1989 it recorded the cost of players' registrations as intangible assets on the balance sheet [6].

76 Already 18 English clubs applied accounting policy on capitalization of purchased costs of players' registrations as  
77 intangible assets by the middle of the 1990th. Book value of such assets consisted of historical acquisition costs minus  
78 accumulated depreciation charged during the period of the labor contract signed with football player.

79 Introduction of national accounting standard FRS 10 'Intangible assets and a goodwill' in December, 1997  
80 significantly changed further accounting practice of English football clubs, demanding from them to follow accounting  
81 policy on capitalization of costs of players' registrations as intangible assets and their subsequent depreciation during the  
82 period of the labor contract signed with football player [7].

83 The legal framework regulating Italian professional sport is set out in Law # 91 of 1981, mentioning the main  
84 aspects of financial accounting, taxation and financial activities [8].

85 The position of the Italian legislators is not fundamentally different from the global practice. Costs of acquiring  
86 player registrations are to be recognized as intangible assets, be amortized over the length of player's contract and be  
87 reflected as assets on balance sheet [8].

88 Football clubs "Lazio", "Milan", "Napoli", "Roma", "Juventus", as well as many other Italian football clubs, prepare  
89 financial statements on the base of IFRS. According to club's accounting policy costs of purchased players' registrations

90 are considered as intangible assets with the certain useful life equal to the length of player's contract with club. Initial  
91 value of asset is based on historical costs. Depreciation of such intangible asset is charged by linear method during the  
92 length of the contract. Besides, according to the accounting policy in case of long impairment of the rights on player's  
93 registration book value is reflected in balance sheet taking into account an impairment loss.

94 Spain is now moving towards convergence of national accounting standards with IFRS, although it is carried very  
95 selectively. The ultimate goal of reform of the Spanish accounting is not total introduction of IAS and IFRS, but rather the  
96 adaptation of existing Spanish GAAP. Such adaptations will be ensured by the inclusion of the principles of accounting,  
97 which are set by IFRS on a mandatory basis, and where there are discrepancies with IFRS - the choice of the principles  
98 which are considered as the most reasonable taking into account Spanish legislative [9].

99 Long before the beginning of reform of the Spanish accounting system industrial accounting standards were  
100 developed for companies of such industries, as construction real estate; sports (sports federations, sports corporations);  
101 health care; power industry; wine industry; insurance etc.

102 Reform of the Spanish accounting requires a revision of the existing industrial standards in order to adapt them to  
103 the new accounting principles.

104 However, no changes still have been made, so that these standards remain in force [9].

105 Based on the standard for sports corporations, football clubs "Barcelona" and "Real Madrid" capitalize costs on  
106 acquisition of players' registrations and other similar payments as intangible assets and amortization them by linear  
107 method during the length of contract signed with player. The costs connected with prolongation of the contract, are  
108 capitalized in case of asset improvement (which is understood as prolongation of contract length, increase in  
109 compensation in case of termination of the contract) and are amortized during the length of new contract. In case of early  
110 termination of the contract residual cost is written off.

111 Thus, world experience shows that nowadays financial accounting of acquisition costs of professional football  
112 players' registrations is well developed and used in practical management of sports organizations. Such accounting  
113 practice was developed for long years. However, accounting for the costs of internally prepared youth players have been  
114 neglected. As a result, a substantial share of assets is not adequately reflected in the accounting system and financial  
115 reporting of football club.

### 116 3. Development of Youth Players Registrations' Accounting Policy

117  
118  
119 Results of the last Champions League and the World Cup in Brazil in 2014 showed that Germany is deservedly  
120 considered as one of the leaders in world football. These achievements are in many respects obliged to the system of  
121 training of young athletes which was established in Germany for the purpose of promotion of youth football.

122 High quality game of the German football players was formed over the years on the base of well organized system  
123 of preparation of football players.

124 After the failure at Euro 2000 German Football Association conducted an analysis of the state of football in the  
125 country and concluded that the best German football schools were at the most successful clubs like "Bavaria", "Borussia"  
126 and some others. But these schools were not able to fulfill needs in players of whole national football league.

127 Schools in less elite clubs can't prepare many strong players. Therefore, it is impossible to rely only on clubs in the  
128 system of youth preparation. Thus, it became obvious that the national system of training of football players was  
129 demanded. As a result the program of development of youth football including construction of national football schools  
130 was accepted.

131 In two years already 390 training centers were constructed. Each school serves 70 clubs which are located nearby.  
132 Thus, German Football Association gradually has provided even weak clubs with high-quality young players.

133 All the children pass careful and constant medical control of regular doctors of the center. Database of all players  
134 of the regional centers and national teams is conducted with early age. German Football Association has complete  
135 information on talented football players and coaches. As a rule, the first junior German national team is formed from  
136 players of the combined regional centers. Football players at the age of 16 years are already invited by professional  
137 clubs.

138 Annually German Football Association spends about € 10 million for this program.

139 However, football clubs try not to keep up, putting crazy amounts in their academies. According to the report of  
140 Bundesliga, 18 clubs of the top division spent about € 80 million for the season-2012/13 for various youth development  
141 programs, and since 2001 clubs have already invested in their academies in total € 820 million [10].

142 It is obvious that investments in youth players are perspective investments with high return in the future. However  
143 international accounting practices developed in such a way, that perspective investments couldn't find reflection in a

144 financial system of accounting of the company.

145 According to requirements to the accounting of players registrations, set by UEFA Club Licensing and Financial  
146 Fair Play Regulations, despite the fact that football club can obtain some benefit from the use or transfer of players grown  
147 in club, in terms of financial accounting expenditures on development and education of home-grown youth players  
148 couldn't be reflected in the balance sheet, because only costs of purchased registrations of players are subject of  
149 capitalization [11].

150 Football clubs of Great Britain, Italy and Spain in the accounting policy directly specify impossibility of capitalization  
151 of costs associated with education of home-grown players. Such impossibility is proved by provisions of IAS 38  
152 "Intangible Assets" which forbid capitalization for costs of internally generated intangible assets.

153 Brommer, 2011 [12] explains such accounting dualism pointing out that the value of purchased players  
154 registrations can be measured reliably by paid transfer fees for football player contracts, while internally generated youth  
155 players registrations fail to have accurate assessment.

156 Oprean and Oprisor, 2013 [13] agree that youth academy is a very important element for a football club as it  
157 assures an ongoing scouting process, it helps lowering medium squad age and it carries the continuity of this sport. The  
158 academy's existence is stated in the UEFA licensing regulations as mandatory criterion. Thus, the clubs must have a very  
159 well established scouting system, separate youth teams for different age categories, educational programs, qualified  
160 personnel, healthcare, management strategy and a development strategy approved by the Licensor.

161 At the same time Oprean and Oprisor, 2013 [13] highlight that players from the youth academy cannot be  
162 recognized as an asset category because they do not meet the criteria of IAS 38. Clubs are not able to provide control  
163 over asset due to impossibility to make professional contract with underage player. As a result there is no reliable base  
164 for accounting.

165 Nevertheless, contemporary researchers point out negative effect of accounting policy on ignoring costs of youth  
166 football players' registrations.

167 Lozano and Gallego, 2011 [15] note that football players' transfer rights are the main and core assets in football  
168 clubs, but they are partially recognized as assets in accounting. Internally generated players' exploitation rights are not  
169 reflected in the balance sheet. Only the acquired players' transfers fees are disclosed but at their historic acquisition cost  
170 [15]. Thus, ignoring costs of internally grown player leads to remarkable deviations of market value of club's equity from  
171 its book value.

172 Lozano and Gallego, 2011 [15] show illustration of remarkable cases in which deficit in accounting for youth  
173 players' registrations occurs. Most of worldwide famous football players Xavi Hernández, Iniesta, Casillas, Puyol, Piqué,  
174 Busquets, J. Navas, F. Llorente, acting in the Spanish national team, the 2010 World Cup Champions in South Africa, the  
175 2012 European Cup Champions, or the multiple winner of the FIFA Golden Ball as the best player in the world Leonel  
176 Messi have no accounting value in the balance sheet of their clubs of origin due to their condition of being home-grown  
177 players and therefore no transfer fees having been paid when they became part of their clubs' professional squads [17].

178 This idea finds confirmation in research conducted by Amir and Livne, 2005 [17]. In example of 58 football clubs  
179 listed on the London Stock Exchange or the Alternative Investment Market (AIM) for which full financial statements over  
180 1990–2003 were able to be obtained. Using market-based analysis they have found that market values are positively and  
181 significantly associated with investment in player contracts.

182 In our opinion, prohibition for capitalization of costs on home-grown players is fundamentally wrong. The high-  
183 quality system of training of football players is guarantee of future success of football club. Players of youth teams are the  
184 foundation of squad. World experience shows that own youth academy is the most effective way to upgrade the basic  
185 structure of club, ensures stability of game and good sports results in the future.

186 Moreover, availability of youth academy in structure of football club is the mandatory criterion which is to be carried  
187 out; otherwise license of UEFA may be cancelled and football club won't be allowed to participate in national and  
188 international competitions. Hence, the presence of young players is a prerequisite for future economic benefits, because  
189 it gives the club the right to engage in sports activities.

#### 191 4. Conclusion

192  
193 In other words, costs of training player in youth academy meet the criteria of an asset:

- 194 - Result from long-term preparation;
- 195 - Able to bring future economic benefits in the form of streams of income from sports activities;
- 196 - Controlled by clubs using employment contracts to ensure compliance with the principles of contractual  
197 stability, guaranteed by standards regulations of UEFA.

198 Consequently, investments in youth players represent an asset which is formed over the years in sports academies  
199 in the course of trainings and education, and which is capable to generate economic benefits as a part of club's squad.  
200 The impossibility of a reliable assessment of internally generated asset, in our opinion, is excluded in case of organization  
201 of a proper analytical accounting within sports academies.  
202

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# Science of Balance Preparation: Substance and Stages of Development in Russia

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## Abstract

*In this article we have studied the stages of the historical development and formation of science of balance sheet preparation. The article considers various approaches to the essence of keeping a balance sheet as well as its content in the investigations of Russian scientists of the end of the XIX the beginning of XX century. The article demonstrates how the economic essence and content of balance sheet preparation have changed during the development of accounting sciences; different kinds of accounting knowledge can be pointed out – "accounting", "keeping accounts", "bookkeeping" and "science of balance preparation".*

**Keywords:** science of balance preparation, bookkeeping, keeping accounts, accounting

## 1. Introduction

The science of balance preparation in Russia was created at the end of XIX – the beginning of XX century. During the years authors had different understanding of the concept of this science (Sievers, 1892; Galagan, 1928; Galperin, 1930; Rudanovskiy, 1928; Weizmann, 1924; Blatov, 1931; Kiparisov, 1928; Koshkin, 1933).

Very often "science of balance preparation" was interpreted as "keeping accounts". At the same time according to many authors, the "keeping accounts" should be distinguished from the definition "bookkeeping". In the 1892 a prominent Russian accountant Sievers, 1892 in his book "Keeping accounts and bookkeeping. The research experience" has defined bookkeeping as practical activity and "keeping accounts" as science about accounting (Sievers, 1892). According to his opinion, the words "keeping accounts", "accounting" and "bookkeeping" are synonymous. Sievers, 1892 has stressed that "keeping accounts" was a purely Russian word which was corresponding to French word "comptabilite", "accounting" was Russian word for German word "Buchhalterei", and "bookkeeping" was Russian word formed from the direct translation of French "tenue des livres" and German "Buchfuhrung". On the base of etymological analysis of these words we can see that "keeping accounts" expresses management of accounts, while "accounting" and "bookkeeping" highlight keeping of the books.

In the twenties of the XX century definition of "keeping accounts" is fixed in the accounting theory as science.

## 2. Materials and Methods

In order to investigate the process of development of balance preparation science, archive books and materials have been studied in detail. All collected definitions were analyzed and classified.

## 3. Results and Discussion

Professor Galagan (Galagan, 1928) in the 1928 in his book "Foundations of general keeping accounts" has noted that in countable sciences it was possible and necessary to distinguish theoretical side of science from the practice. According to his opinion, "a set of fundamental propositions explaining some practical techniques represents a theoretical science, which is called keeping accounts; a set of practices developed by keeping accounts and applied in practice is known as bookkeeping or accounting". Galagan, 1928 has supposed that keeping accounts was a science because it used the same methods which were generally accepted in the scientific disciplines.

Professor Galperin, 1930 in the 1930 in his book "Essays on the theory of balance" has considered that it was necessary to make difference between the concept of "accounting", "keeping accounts" and "science of balance



56 preparation". According to his opinion, "accounting is the first stage of our science (Galperin, 1930). Being limited mostly  
57 by techniques of registration of business facts, accounting was more an art than a science. Keeping accounts represents  
58 a further development of accounting. At this stage the art of accounting is becoming a science of accounting, which is not  
59 limited by registration of business operations, but extends to the research of accounts' functions and principles which  
60 determine various techniques of registration". As Galperin, 1930 has considered, "our science is reaching the greatest  
61 scientific heights and the peak of creative cognition when it becomes a science of balance preparation - the science of  
62 balance sheet". Thus, Galperin (Galperin, 1930) has put forward the idea that science of balance preparation represented  
63 a new stage in the development of the accounting knowledge.

64 Professor Rudanovskiy, 1928 which was named by Galperin, 1930 as outstanding researcher, founder of science  
65 of balance preparation, in the 1928 in his book "The Theory of the balance sheet accounting. Introduction to a balance  
66 sheet accounting. Balance sheet as an object of accounting" has written that science of balance preparation was a  
67 special science, which had a balance sheet as its object (Rudanovskiy, 1928). The purpose of this science is an  
68 assessment of all business activities. Rudanovskiy, 1928 has given the following definition: "Science of balance  
69 preparation is a special science, which, firstly, gives the knowledge of total economic relationships opened by this science  
70 in business economy and which is called balance. Secondly, this science gives the theory as a particular set of balance  
71 calculation methods, which makes up the accounting, and, finally, for practical purposes, this science is called to answer  
72 the question about assessment of total economic activities, which are a part of scientific object – balance sheet.

73 According to another well-known scientist Weizmann, 1924 science of balance preparation is a part of  
74 bookkeeping. Weizmann, 1924 has considered that "using the opportunities offered by bookkeeping, the person who  
75 studies the life of enterprise, can not only give an overview of company's property and achieved results, but also is able  
76 to assess its financial stability" (Weizmann, 1924). According to Weizmann, 1924 bookkeeping is divided into four parts:  
77 keeping accounts, science of balance preparation, accounting expertise (or auditing) and accounting analysis. He has  
78 suggested that science of balance preparation was the prelude to the analysis of the balance sheet (Weizmann, 1924).  
79 Thus, Weizmann, 1924 has distinguished science of balance preparation and balance sheet analysis.

80 Some authors have considered that keeping accounts and science of balance preparation were two different but  
81 equal sciences. This approach was adopted primarily by Blatov, 1931, the author of many academic and practical  
82 tutorials on science of balance preparation. He has supposed that the purpose of keeping accounts was construction of  
83 balance sheet and the purpose of science of balance preparation was study of balance sheets (Blatov, 1931). Science of  
84 balance preparation represents a natural continuation and logical finish of keeping accounts. According to Blatov, 1931,  
85 science of balance preparation is a new, independent branch of accounting knowledge, which is necessary for a  
86 systematic and comprehensive, theoretical and practical, general and special study of balance sheets (Blatov, 1931).  
87 Thus, Blatov, 1931 has considered science of balance preparation as analysis of balance sheet.

88 Blatov, 1931 has supposed that science of balance preparation should investigate balance from two points of view:  
89 from the formal point of view and according to its content. The study of balance sheet from a formal point of view was  
90 named by Blatov, 1931 as countable analysis, and the study of the balance content - economic analysis (Blatov, 1931).

91 Kiparisov, 1928 in 1928 in the book "Foundations of science of balance preparation. The construction and analysis  
92 of balance sheets" has supposed that keeping accounts was divided into three parts: science of balance preparation,  
93 history of keeping accounts and general theory of accounting. Moreover, he has pointed out two parts of science of  
94 balance preparation: first part dealt with the doctrine of the balance construction and second part focused on the doctrine  
95 of methods of researching economic activity of business unit on the base of its balance sheet (Kiparisov, 1928).

96 Like Blatov, 1931, Kiparisov, 1928 has subdivided science of balance preparation into general and special parts.  
97 However, in contrast to Blatov, 1931, Kiparisov, 1928 has considered science of balance preparation more widely, not  
98 only as analysis, but also as construction of balance sheet (Kiparisov, 1928).

99 Koshkin, 1933 in 1933 in his book "On the methods of operational-balance accounting" has presented science of  
100 balance preparation as a part of counting science, which differed from keeping accounts. He has written: "in recent years  
101 instead of definitions "keeping accounts" and "bookkeeping" accounting was used to be called as science of balance  
102 preparation and more often as balance accounting" (Koshkin, 1933).

103 Koshkin, 1933 has believed that theory of accounting and counting analysis were necessary to be distinguished  
104 from keeping accounts. Author also has suggested that science of balance preparation consisted of theory of balance  
105 sheet and its economic analysis (Koshkin, 1933). The theory of balance sheet includes a description of balance, its  
106 methodology, methods and classification of balance sheet items. According to Koshkin, 1933 the balance is a method of  
107 current accounting. Moreover he has noted three stages of development of the balance accounting: calculation,  
108 materiality and balance.



#### 110 4. Conclusion

111 Very often "science of balance preparation" was interpreted as "keeping accounts". At the same time according to many  
112 authors, the "keeping accounts" should be distinguished from the definition "bookkeeping".

113 In the twenties of the XX century definition of "keeping accounts" is fixed in the accounting theory as independent  
114 science.

115 Being limited mostly by techniques of registration of business facts, accounting was more an art than a science.  
116 Keeping accounts became next stage of further development of accounting.

117 Some famous Russian scientists have expressed the view that accounting science was reaching the greatest  
118 scientific heights and the peak of creative cognition when it became a science of balance preparation - the science of  
119 balance sheet.

120 In such conditions science of balance preparation represented a new stage in the development of the accounting  
121 knowledge.

122 Thus, the economic substance and content of science of balance preparation have been changed during the  
123 development of accounting knowledge and economic analysis.

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## The Problem of Accounting for the Costs Incurred after the Initial Recognition of an Intangible Asset

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### Abstract

The article comprises a set of theoretical and methodological statements and practical suggestions about the specific ways of disclosing information on the costs of completion of intangible assets. IAS 38 Intangible assets contain the extensive list of norms regulating initial recognition and approaches to the assets evaluation at initial and further recognition and determines the rules of intangible assets. However, the problem of accounting for the additional costs incurred after the initial recognition of intangible assets is not illustrated enough.

**Keywords:** intangible assets, maintenance costs, the costs for software revision, initial recognition

### 1. Introduction

It is becoming increasingly clear in today's economic development that not only tangible assets can bring economic benefit to companies. A couple of decades ago, it was hard to imagine that the assets without a real tangible embodiment would be reflected in the balance sheet along with material assets. The existence of rights that protect intellectual property, contractual and other rights to operate physical assets and infrastructure, purchase and sale of broadcasting rights in the telecommunications sector, the implementation of spending on research and development – all these features characterize the activities of modern companies.

Figure 1 represents the differences in fixed versus intangible assets for various businesses according to their annual reporting. In this regard, the most interesting fact is that the largest share of the total assets are intangible assets in the service sector while in the service industry and the oil industry the share of intangible assets is negligible.

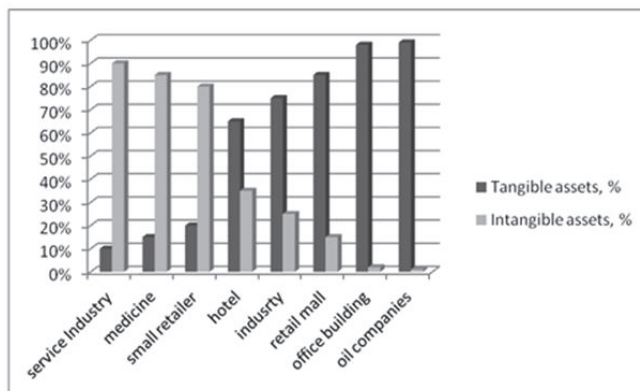


Fig. 1. Differences in Fixed versus Intangible Assets for Various Businesses

43 The IASB has developed common rules for intangible assets that are not regarded separately in any other standard, IAS  
44 38 *Intangible assets*. Accounting issues of specific intangible assets, including the cost of developing and maintaining  
45 websites, are presented in SIC -32. But management choice to record intangible assets is associated with the strength of  
46 the technology affecting the firm's operations the length of the technology cycle time and property-rights-related factors  
47 that affect the firm's ability to appropriate the investment benefits (Anne Wyatt, 2005).

48 This research deals with the accounting of expenses for subsequent costs after the initial recognition of intangible  
49 assets in the form of improvements in its qualitative characteristics while operation.

50 Computer programs are considered to be the results of intellectual activity (intellectual property), which should be  
51 provided with the legal protection. In the process of revision and adaptation of a computer program, carried out by a  
52 special company under contract with the owner of the intangible asset, a variety of additional software modules  
53 (subroutines), altering the characteristics of the main program, may appear. Exclusive rights for such software modules  
54 (programs) belong to the contracting authority, unless other is stipulated by the contract (Erik Brynjolfsson, et al., 2002).  
55 The owning company can also make changes in the software on its own.

56 IAS 38 *Intangible assets* contains extensive list of norms regulating initial recognition and approaches to the assets  
57 evaluation at initial and further recognition, and determines the rules of intangible assets. Questions of identification and  
58 evaluation of intangible assets are presented in the most interesting works of the following scholars: Anne Marie Knott  
59 (2003), Lie Dharma (2009), Kulikova L.I. (2009), Richard N. Cooper (2010).

60 However, the problem of accounting for the additional costs incurred after the initial recognition of intangible assets  
61 is not illustrated enough.

62

## 63 2. Theory

64

65 Due to this, we should point out that the recognition of intangible assets in IAS is based on the general principle applying  
66 to both the initial acquisition, and the subsequent costs, however, the latter requires more stringent conditions for  
67 recognition as an expense in the cost for revision of an existing intangible asset (Kulikova L.I. and Goshunova A.V.,  
68 2014). Thus, the standard defines the possibility of increasing the cost of an intangible asset in the case of the revision of  
69 the item if the cost of these works is directly linked to the improvement of the characteristics of a particular intangible  
70 asset. However, as the following paragraph 20 IAS 38 states, the nature of intangible assets is such that in many cases,  
71 improvement or partial replacement of such assets doesn't take place (Naomi A. Gardberg and Charles J. Fombrun,  
72 2006). According to this, the most subsequent expenditures forming the expected future economic benefits and  
73 consisting in an existing intangible asset as a rule are not able to meet the definition of an intangible asset and the  
74 recognition criteria set out in the standard.

75 In addition, paragraph 63 of IAS 38 specifies that subsequent expenditure on intangible assets such as brands,  
76 mastheads, publishing titles, customer lists and articles of similar content is always recognized in profit or loss as they  
77 appear. This is due to the fact that these costs are connected with the expansion costs in general (Valeria Gattai, 2010).  
78 Thus, the rules of IFRS imply that almost all the additional costs to improve the quality characteristics of any intangible  
79 asset can not be capitalized as part of the previously received intangible asset. Indeed, this increase is possible only in  
80 extreme cases. Standard IAS 38 *Intangible assets* does not specify what these «extreme cases» may be.

81 However, we think that sometimes economic inexpediency of excluding additional costs in the value of an existing  
82 intangible asset or account of these costs in the cost of the current period takes place not at the same time but evenly.

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## 84 3. Results

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86 Here we are speculating on the cost accounting to finalize software previously adopted by the company as an intangible  
87 asset. We should point out that the cost of the subsequent revision of software, previously recognized as an intangible  
88 asset, can reach the quantities significant enough, especially if we talk about ERP systems such as SAP, Oracle, and etc.  
89 In the context of this research, we do not consider non-essential costs of maintaining the software, as they are  
90 recognized in profit or loss of the current period. Thus, telling about the cost of software maintenance costs we mean the  
91 costs for periodical update of the software (eg., accounting software), changing of releases, some insignificant  
92 improvements, and etc.

93 At the same time, costs for revision are the ones for making significant changes in the existing software, improving  
94 and modernizing the qualitative characteristics. For example, such costs may be connected with the work on the  
95 superstructure Module «Performance management» in a software company in the organization of financial accounting  
96 that will improve the characteristics of the software product (speed, reliability, convenience of the user interface, etc.). In

this regard, it is important to mention that the company may not be able to identify these changes as a separate asset, as the plug-ins created in the process of refining and adapting the software may not be designed to perform independent functions. Their main function should be to provide the output improvement, and furthermore, the modules can not function independently of the main software.

However, under certain conditions when implementing modules (add-ons) to the existing software, the company may capitalize the expenses for their creation as a separate intangible asset. Consequently, if the software is recognized as an intangible asset and is used by both exposed refinement, the approach to the recognition of costs of completion, in our opinion, should be formed on the basis of the following scenarios:

**Table 1:** Approaches to the costs recognition

Scenario	Content
1 the most commonly used in practice	the costs for software revision are unimportant, and subsequent costs provide the expected economic benefits, but will not meet the general criteria for recognition as an intangible asset
2 less applicable in practice	the costs for software revision are important, and subsequent costs provide the expected economic benefits, but will not meet the general criteria for recognition as an intangible asset
3 not applicable	the costs for software revision are important, and subsequent costs provide the expected economic benefits and will meet the general criteria for recognition and identification as an intangible asset

In the first case, we regard the costs for software revision as an expenses in the current period due to their immateriality, and as a consequence, it becomes an inappropriate capitalization.

In the second case, the costs for software revision are important, and therefore, we think that it is economically viable to capitalize the costs of software completion in individual «Other non-current non-financial assets» with further transferring its actual (original) cost on a uniform basis on production costs, works and services. For example, the useful life may be set depending on the duration of extracting economic benefits from the use of the modified software. This approach stems from the fact that the cost for revision is a substantial amount, and the income from the use of this asset is received in several reporting periods. But in this case one nuance appears, and it makes the possibility of such capitalization of software revision doubtful. The fact is that, as we have already mentioned, the company may not be able to identify the changes as an independent asset and to separate them from the previously recognized. Thus, the absence of the object's properties, such as being the source of alienable economic benefits, makes the possibility of its identification as a separate asset doubtful.

In the third and the most rare case, the cost of software revision should be capitalized in the cost of an intangible asset initially recognized on the following conditions:

- the cost of revision can be directly linked with the improvement of the characteristics of a particular intangible asset;
- as a result of the improvements the company will receive additional economic benefits in future;
- the company has a real opportunity to get a reliable evaluation of the costs incurred on completion of the intangible asset.

#### 4. Conclusions

Such variety of specific ways of disclosing information on the costs of completion of intangible assets suggests that it is expedient to regulate their order autonomously, ie separately from the other categories of objects. However, we know, that the considered category of assets is not heterogeneous (Vetoshkina, 2009).

Thus, we see that the accounting model after the initial recognition of an object as an intangible asset, costs, assuming their capitalization as a part of the cost of an intangible asset (and, therefore, their correlation with the benefits received) should be defined as a separate element of the company's accounting policies in relation to specific types of intangible assets, such as software.

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# Budgeting System in Construction Organizations in Conditions of Process-Oriented Normative Model of Cost Accounting

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## Abstract

The article analyses the features of the structure of the budgeting system in conditions of the process-oriented normative method of cost management. The authors set out the peculiarities of budget development in the construction industry, consider the stages of implementation of process-oriented budgeting in conditions of application the process-oriented normative method of cost management in construction industry. Using this model can be very useful for construction industry companies and help them set their goals to achieve performance indicators.

**Keywords:** budgeting, ABB-budgeting, ABC-costing, process, construction

## 1. Introduction

In conditions of the unstable economic situation the demand for cash flow planning, budgeting and financial analysis of performance increases in almost all construction companies. As a result, the budgeting system becomes relevant, it takes into account not only the industry-specific characteristics of the construction industry, but the requirements of an integrated accounting system as well.

Construction of the budgeting system should be done in close interconnection with the process-oriented normative model of cost management. The process-oriented normative model of cost management is an adaptation of two methods of cost accounting: regulatory accounting and accounting by functions (ABC-costing) [1, 2]. In conditions of application of the process-oriented normative model of cost accounting it is necessary to use costs calculations of construction works with details on key technological and service processes, and to analyze the cost items within these processes for the construction of budgets.

At that technological processes are processes that are directly connected with construction of the object (earthworks, piling work, roofing, etc.) [3]. In general, direct costs of construction industry are formed in the framework of these processes. Service processes are the processes aimed at maintaining the technological processes (determination of the construction work, making a construction contract, providing the construction site by resources, etc.). In the context of these processes overhead costs of construction industry are formed [4].

## 2. Theory

Due to the peculiarities of the construction industry, the budgeting process is somewhat different from the methodology in other industries [5, 6]. For example, the following factors are analyzed in production and trade: market capacity, shipments, customer behavior, etc. Then, based on the analysis of these indicators, the trading budget is formed; it is followed by the production budgets, selling costs, wages, etc.

In our opinion, in the construction industry the sales budget should not be drawn up, the construction budget fulfills its functions. Construction cycle does not depend on the plan of sales, and the construction of the budgeting process in the construction industry on the basis of the sales budget is impossible.

In the classical variant the design estimation documentation is always in the basis of the construction budget [7]. The authors do not deny this statement, but at the same time, we believe that the process-oriented approach for drawing up of budgets should be in the basis of drawing up of the construction budget, which, in its turn, requires data correction

56 of design and estimation documentation.

57 The fact that the planning should be carried out not only by budget items, but linked to a specific project as well (as  
58 far as each investment-construction project has a clear construction schedule, cost estimates, which cannot be broken),  
59 as well as in the context of technological and service processes of construction organization, is the feature of the budgets  
60 of construction companies. At the same time technological processes are divided on the basis of design and estimation  
61 documentation, and service processes – according to the process-oriented methodology (ABB budgeting). In conditions  
62 of application of ABB-budgeting the budgets are developed on the basis of activities (functions performed) of construction  
63 organizations.

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### 65 3. Results

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67 The authors developed the methodology of introduction of the process-oriented budgeting in conditions of application the  
68 process-oriented normative method of cost management [8].

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#### 70 3.1 Determination of quantitative requirements in the basic processes

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72 The presence of this stage does not cancel the obligation of priority of construction budgeting, on the basis of which the  
73 indicators of the other budgets are formed in the traditional system of budgeting. When applying the ABB-method, the  
74 estimated budget of construction in natural and value is only one of the drivers which is necessary for making the  
75 budgeting operations [9]. On the basis of design and estimation documentation for construction the calculation of the  
76 required level of intensity of the main production processes (basic operations) is made in order to produce the required  
77 amount of production.

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79 At the first stage it is necessary to form the production program which will take into account the peculiarities of the  
80 cost-oriented budgeting. It is necessary to correlate the formation of the production program with drawing up of  
81 construction documentation on the basis of previously signed construction contracts. At that the technological processes  
82 will be presented by the direct costs in cost estimating documentation, and servicing ones – by overhead costs. Due to  
83 the nature of pricing in the construction industry and the methodology of determination of the estimated cost of  
84 construction the enlarged value of the overhead costs should be presented as a set of service processes allocated on the  
85 basis of ABC-costing methodology.

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87 In conditions of application of the cost-oriented budgeting the production program presents only generalized  
88 indicators. As a result, it is necessary to detail the processes by names of processes, by articles, as well as by their  
89 elements.

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91 In conditions of construction of the process-oriented budgeting the formation of the work schedule with possibility  
92 to create any hierarchy (phases, groups, subgroups) for more construction projects, as well as for drawing up the tables  
93 for the analysis of the performance plan of construction work is of great importance.

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95 In our opinion, such presentation of information in conditions of application of the process-oriented normative  
96 method of cost accounting and its automation, will allow for the management of the analyzed building organization:

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- 98 - to form schedules with possibility to create any hierarchy (of processes, phases, groups, subgroups, etc.);
- 99 - to control the appointment of the responsible executives for the performance of works of the schedule of labor  
100 and technical resources;
- 101 - to make up the schedules of resources in the context of work, as well as the schedules of use of materials in  
102 the context of works;
- 103 - aim and reflection of logical relationships between the works with possibility of delay in time and size;
- 104 - to keep a record of the real performance of work according to the schedule;
- 105 - to form reports of the use of resources on selected construction sites, in the context of works of any frequency,  
106 etc.

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108 At the output of the first stage, we obtain the information concerning quantitative demand in intensity of  
109 technological and service operations in order to achieve the planned volume of construction works.

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#### 105 3.2 Determination of need for direct costs

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107 In construction companies this stage of is not difficult, since the calculation of direct costs is carried out according to the  
108 norms of consumption of raw materials per unit of production, regulatory labor intensity, etc. In other words, the standard  
109 norms of consumption of fixed costs per cost unit are used [6].



110 At this stage, on the basis of design and estimation documentation the information for the number of sub-budgets  
111 linked to specific technological processes is detailed. For example, the operation "pasting of roll materials on asphalt  
112 mastic" refers only to the technological process - "Installation of four-flat roofs, from roll roofing materials", while it is not  
113 reflected in the other processes.

114 Formation of needs in technological processes should be in connection with creation of construction schedules and  
115 have the information for further use of the basis of the process-normative method of cost accounting. In our opinion,  
116 creating the need for industrial processes should be in two stages [10]:

- 117 - formation of the local resource cost budget in context of technological process;
- 118 - formation of the final local cost budget with relevant standards and the estimated cost budget of the process.

### 119 3.3 Determining of need for servicing operations

120 This stage is the most complicated in the process -oriented budgeting. The fact is that in the construction industry the  
121 serving (management) processes are calculated as a percentage of the value of the wage fund, and it is an abstract  
122 amount.

123 At the same time, as it has already been mentioned, the process-oriented approach is aimed to reflect the cause-  
124 and-effect relationships of costs in the construction company with more details. In the process of determination of need  
125 for service processes it is necessary to use the planning values of costs in the context of the allocated functions  
126 (processes). For example, among serving processes it is possible to say about the following ones: preparation  
127 and control of the production process, provision of building sites by resources for production, storage of construction  
128 materials, preparation of orders for support production, technical control of construction, etc. In our opinion, in the process  
129 of determination of need for service processes it is necessary to use the planning values in the context of the allocated  
130 functions (processes).

### 131 3.4 Определение потребности в ресурсах

132 At drawing up the budgets in the construction industry the technology of creation for the resource needs can be as  
133 follows:

- 134 - lists of cost items included in the cost of every technological and service process are preliminarily determined;
- 135 - the drivers for serving processes are determined (the parameter, proportionally to which the costs are  
136 transferred to the cost of resources) for each line item;
- 137 - standards for flow-rate of drivers of dependent costs in the context of serving processes per unit of driver  
138 operation are determined;
- 139 - the norm of flow-rate of the driver of the cost budget is multiplied by the budgetary value of the driver  
140 operation, and finally we get there is a natural (sometimes even value) expression of the budget line. Then the  
141 natural expression of the budget line is multiplied by the expected rate of cost driver (number of processed  
142 documents, time of work, number of inspections of technical supervision, etc.), and the ruble value of these  
143 costs is found as a result of these calculations;
- 144 - For the formation of further analysis of costs in the construction industry it is also necessary to determine the  
145 overrun or under-utilization of cost drivers, as well as to interconnect with other operations in order to reduce  
146 its overrun or under-utilization.

147 According to the results of charges the data concerning underutilized time of workers is brought to a single  
148 database, analyzed, and managerial decisions are made on its basis. As a result of these decisions the risk of implicit  
149 losses should decrease at the expense of internal resources, and accordingly the high performance efficiency of the  
150 organization will be reached [11].

151 The amount of costs of serving processes which depend on the operations cost drivers of cost items are set for the  
152 whole organization, or by departments, and then they are distributed to organizations in proportion to the cost drivers.

153 The titles of cost drivers can remain unchanged for a long period of time. At the same time, at this stage it is much  
154 more important to determine the values of the budget cost drivers, most of which are described as "external", i.e. formed  
155 in the process of consumption of resources belonging to other organizations. In most cases the determination of  
156 quantities of cost carriers cost is possible by the study of their dynamics over the past periods.

164 3.5 Calculation of costs for maintenance of the desired amount of resources.

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At this stage of the calculation of the final budget cost of every operation is carried out: technological processes – on the basis of the design and estimation documentation, and service processes – by adding the preliminary value of all cost items included in them. Due to the fact that these budget cost values (especially service processes) are only preliminary, it can lead to deviations, which are caused by changes in rates of drivers operations.

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The authors offer to make the calculation of the final cost of operations, as well as the rates of cost drivers in specially designed analytical tables, which in process-oriented budgeting can be also called the budget of operations and the budget of resources. [10]

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In accordance with the methodology of the process-oriented budgeting the operations budget (in terms of technological processes) is based on the construction budget which contains information about planned construction projects. Then, on the basis of the budget of operations (technological processes) the remaining part of the budget of operations (service processes) and the budget of resources are formed. The data of the budget of resources are used to calculate the planned overhead costs by three budgets: the budget of general production costs, the budget of commercial budgets and the budget of general running (overhead) costs.

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All the other budgets of the system of process-oriented cost budgeting do not differ from traditional budgets in form.

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3.6 Budgeting procedure by the methodology of ABB-budgeting

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As it has already been mentioned, the change in methodology of calculation of the target values of costs requires changing the form of budgets. Change of the approach for budgeting influences the planning costs from operating activities, so it does not bring any significant changes in the structure of indicators and methods of calculation of financial budgets. All changes take place on the operational level, where there is the budgeting of costs.

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Making up of the generalized budget of costs of construction projects is the main objective of this stage. Budget of costs should consist of two sections, the first section is made to reflect the distribution of service processes for technological processes. At that the cyclic dependencies can occur among serving processes. As a result, with respect to these processes the step-by-step method of cost allocation can be supplemented by techniques of the relative distribution. It is also important to say that a lot of service processes in the construction industry can be directly attributed to technological processes. These processes can be grouped in a separate form of the first section or attached as separate lines called "directly attributable to technological processes."

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The second section of the budget is intended to reflect the process of calculation of costs of construction work. The distributed amount of service processes – with the account of redistributed mutual services (if necessary) of the budget processes – is added to the budget value of technological processes (direct costs) for the relevant positions of objects of calculation.

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3.7 Analysis of the Identified Deviations within the Application of the Process

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At the end of the reporting period, the data of budgets should be analyzed. For this preliminary and actual costs of performance, as well as the rates of processes drivers are compared in special registers. We recommend to find the total deviation for each process, focusing on which in future it will be possible to make deeper analysis of the cost of operations in the context of its items revealing reserves for cutting the rates.

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The degree of impact of the rate on the cost of the operation performance depends entirely on the value of the driver operation. In some cases, even small changes in rates can lead to significant cost overruns due to the large values of the driver operation. At the same time a relatively small deviation of the driver – even with a high rate – makes it possible to postpone such operation [2].

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**4. Conclusion**

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In conditions of the process-oriented cost budgeting the formation of budgetary performance indicators in the construction industry makes calculations more complicated. At the same time, the information generated in the system of the ABB-method is more accurate and detailed, and it can be used for the analysis of the expected load of building sites and construction machines and mechanisms, for the study and adjustment of the cost value of operations, for calculation of the well-founded cost of construction works and financial results, etc.

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# The Interrelation between the Professional Judgment of the Accountant and the Quality of Financial Reporting

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## Abstract

*The urgency of the given research is defined by the fact that the improvement of financial reporting quality which is the basic source for the conduction of enterprise's financial state and results of activity analysis is continuously connected to the efficiency of assets and liabilities, their quantification and classification. The purpose of the research is to consider the basic approaches to the definition of financial reporting quality, to reveal interrelation between professional accounting judgment regarding accounting objects and forecast value of information introduced to users.*

**Keywords:** *quality, limits the quality of financial reporting prognostic value of information, the discounted cost, qualitative characteristics of information for professional accounting judgment international standards*

## 1. Introduction

Under conditions of enhancing of interest in information introduced to accounting financial reporting, the problem of its refinement arises. It is important to note that the notion «quality» is rather versatile. Thus, in philosophical understanding it is the totality of essential attributes, peculiarities and characteristics which distinguish one object or phenomenon from another and make them certain. Series of international standards describing requirements to the management system of organizations and enterprises quality – ISO 9000 defines quality as the totality of the object's characteristic features showing relation to its capability to satisfy the established and expected consumer's requirements [1]. From the technical and economic points of view, quality cannot be static in the process of production, science, and technics development; from the juridical point of view, the notion being analyzed is static and signifies correspondence to the definite, affirmed beforehand and co-ordinated criteria. In other words, legal appraisal of the production quality signifies the level of correspondence of production features compared to the complex and level of requirements established and fixed in the corresponding properly executed document.

Analysis of the notions of class quality allows to form its definition in regard to financial reporting. Thus, quality of financial reporting is the totality of accounting reporting characteristics regarding their capability to satisfy the established and expected needs of potential professional users of accounting reporting under conditions of its actual use in taking economic decisions [3].

The quality of accounting information is defined by how much information needs of the interested users can be satisfied from the possibility to make substantiated economic decisions point of view. It is proved by the fact that in accordance with Conception of accounting in Russian market economy, the basic criterion of accounting information quality being its usefulness in terms of the position of managing decisions taking by the interested users.

## 2. Materials and Methods

Theoretical foundation of the research is based on fundamental accounting conceptions, hypotheses and approaches

presented in classical and modern academic economic literature. Methodological foundation of this work is the systematic approach to the processes and phenomena being investigated, methods of dialectical and formal logics. A wide range of methods were used: comparative analysis, synthesis, systematization and generalization of theoretical materials, summary and grouping, analytical procedures and other methods.

### 3. Results and Discussion

Conceptual bases of preparation and presentation of financial report turn out to be ideal vision of financial reporting which in practice cannot be achieved [14]. This is proved by the fact that financial reporting is largely based on assessments, judgments, since significant role in the format of accounting financial reporting belongs to professional judgment of an accountant. Conceptual bases give general definition of qualitative characteristics of useful financial information, define basic (fundamental) characteristics which make information useful and improving qualitative characteristics which enhance the usefulness of information and define the sole limitation to useful financial accounting – expenditures [5].

Frequently the choice of the ways of accounting may be connected to the necessity to make choice between this or that requirement. For example, methods providing plenitude of economic life facts accounting may not completely meet such a requirement as rationality and vice versa. To provide timeliness of information, occasionally it is necessary to sacrifice the plenitude and reliability of data; at the same time the expectation of moment when all details of economic operations become precisely known allows to reach reliability of information but makes it useless for timely decision taking by the users [8].

In such situations the company's management and specialists should evaluate the level of influence of the method chosen upon financial information usefulness and decide which requirement to choose. Relative importance of separate requirements in different economic conditions is determined by professional judgment [6].

From our point of view, professional judgment could be characterized as a proved opinion of a professional accountant given under conditions of uncertainty during qualification, cost measurement, classification and evaluation of economic facts significance for purpose of accounting reporting based on the available at the this point entire, true and objective information and peculiarities of managing subject's functioning [3].

Professional judgment within concrete decision should possess two features:

- decrease entropy in the accounting system (exclude variativeness in parameters of accounting politics in regard to homogeneous group of economic life factors);
- introduce value for the accounting system being modelled during the presentation of financial reporting [11].

Therefore, it is possible to conclude that since the accountant's professional judgment means conscious influence upon the shape and content of accounting balance within working principles and standards aimed at the formation of the indices corresponding strategic goals of the enterprise's development set beforehand, it turns out to be one of the basic means of quality management. This occurs by the following directions: variation of indices of accounting balancing with the help of its items' assessment and change of the assets and liabilities structures. This fact can influence prognostic value of information and thereby influence its quality [9].

Nevertheless, the enhancement of financial reporting quality becomes complicated because of its economic nature, since it is restricted by a number of aspects: accounting reporting cannot deliver all information which is required by the users (it is necessary to include information about economic, political, branch events from other sources); accounting is not intended to reflect the company's cost, it must provide information which helps the users to estimate such cost: each group of the main users may have their own information needs, and these needs of individual groups of users may conflict with each other.

Apart from the above said, financial reporting traditionally contained information about previous events, and recently increase of need in forecasting information is observed [10]. At the same time, data for the accounting date or period could be used to forecast future [13]. The degree of these results correspondence made during such an investigation is determined by the quality of information provision.

In connection with this fact large practical importance belongs to the methods of perspective analysis which allow to take managing decisions evaluating possible situations and making choice between several alternative variants. The key moment during preparation of financial reporting is determination of initial and further evaluation of assets and company's liabilities since reliability and reality of the given information depend on it and therefore validity of the economic decisions accepted on its basis [12]. Under such conditions particular urgency is given to validity of the way of assessment which concerns the jurisdiction of the accountant's professional judgment.

Reflection of assets and liabilities in accounting (financial) reporting according to the initial cost does not always allow to take into account influence of such macroeconomic factors as depreciation of national currency, inflation

background that can lead to significant misrepresentation of information accounting value. In connection to this it is necessary to seek other approaches to consider influence of macroeconomic factors on the assessment of assets and liabilities in accordance with forecast of funds movement and individual entrepreneurs' preferences, i.e. the use of the discounted cost.

The discounted cost as a type of assessment allows to determine the cost of assets and liabilities from the position of temporal cost of money concept. The use of the discounted cost during the assessment of assets and liabilities is proposed by a wide range of international standards. In particular, to them belong IFRS 2 «Reserves», IFRS 16 «Main means», IFRS 38 «Nonmaterial assets» - concerning assessment of assets purchased with deferment of payment, IFRS 39 «Financial instruments : recognition and payment», IFRS 40 «Investment real estate», IFRS 41 «Agriculture», IFRS 3 «Unification of business», IFRS 5 «Long-term assets intended for sale and discontinued activity» with determination of fair cost of financial assets, IFRS 18 « Profit» with provision of counterpart with delay in payment determined by discounting of future entries sum; IFRS 36 «Depreciation of assets» with determination of value from the assets use figured out by discounting of future cash flows the receipt of which is anticipated from the assets, IFRS18 «Profit» with recognition of profit in size of the discounted sum of future entries in the event of the provision of counterpart with delay in payment for a long time, IFRS 17 «Rent» with evaluation of the discounted cost of minimal rent payments and evaluation of gross investments in rent. Despite the discounting technique unified for all cases of its application, calculation of the discounting rate being used and determination of discounting period differ in each separate case and concern jurisdiction of the accountant's professional judgment [2].

At the same time it is important to note that increase in forecast value of information is possible to reach by decrease in part of partial assessments in choice of the object's accounting, its assessment and further reflection in accounting [7]. Nevertheless, as it was mentioned above, according to Russian and international law qualification and quantification of objects concern jurisdiction of the accountant's professional judgment. Within the formation of accounting politics, the choice of accounting type is granted capable of influencing in a large degree indices of the company's financial state, this can significantly influence the quality of accounting.

In connection to this fact, important role is given to the comparison of information – qualitative characteristics which give the users opportunity to identify and understand similarities and differences between the parts of financial reporting [7]. Since the users' decisions involve choice between the alternatives, information about reporting company is more useful if it is compared to analogous information about other companies and analogous information about the given company for another period or date.

Control carries out an important function in the system of the reporting users' provision with the quality information and assists in the enhancement of information reliability, correspondence of indices of accounting reporting with the established requirements. Hold of control over accounting reporting quality is directed to the protection of public interests and provision of truthfulness of official accounting reporting, i.e. refers to financial regulating and is of public and law nature.

Scholar A.F. Sokolovsky points out on the existence of two main ways to verify quality : preoperating and consumer (operating). The first variant when the quality is determined before consumption is inaccurate: it does not show how in the end quality satisfies the users' needs. Only consumption can reveal quality more precisely. From this concept's application to the control of financial reporting quality, audit of financial reporting turns out to be preoperating which verifies validity of the accountant's professional judgment to evaluation of economic life facts and their representation in reporting [9]. The problem of consumer control is that each user because of their subjective opinion can differently estimate the quality of the given accounting information. This fact determines the subject's further actions: to accept the received information as quality or deny it because of the lack of evidence. Thus, because of the existence of different understanding of information quality by different users it is necessary to define general criteria for quality.

Subjective criteria of evaluation of accounting information quality are determined by the users from their information needs and ideas on the level of their satisfaction point of view. And each user ranks the given in the accounting (financial) reporting information about the quality marking out (by level of significance) the first rank and the second rank qualities in the hierarchy of properties of the information presented.

Objective criteria of the quality of the accounting information are determined by calculating on the basis of the study of objective data (accounting and analytical indices) reflecting the results of the events allowing to assess the accounting reporting quality. And to obtain the objective criteria of assessment, it is necessary to apply calculating methods to the whole totality of accounting information namely to evaluate its importance for all groups of users.

According to I.A. Slobodnyak, the formation of professional judgment has:

- objective side when the object's essence itself is studied and becomes a subject of professional judgment:
- subjective side which is the study of different specialists' points of view on the basis of which personal

subjective opinion of each specialist is formed [12].

#### 4. Conclusion

Thus, namely the users' information needs determine the set of the basic criteria for the quality of accounting information. Conceptual bases of financial reporting presentation determine the concepts which underlie the accountant's professional judgment and these concepts are the aim which is necessary to seek. This definition of aim is ideal and required for further development of financial reporting and enhancement of its quality.

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# The Need of Professional Judgement of the Accountant in Accounting Assets of Exploration and Evaluation of Mineral Resources

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## Abstract

*The relevance of the investigation is predetermined by the fact that application of IFRS 6 "The exploration for and evaluation of mineral resources" presupposes the application of professional accounting judgment while running the information about exploration and evaluation of mineral resources. The aim of the article is to study how oil producing companies apply IFRS 6 and to work out some suggestions on perfecting the accounting policy in the above-mentioned assets in the conditions of uncertainty of the norms of International standards.*

**Keywords:** professional accounting judgment, the accounting of minerals, assets exploration and evaluation, IFRS 6

## 1. Introduction

The necessity to single out the assets of prospection and evaluation of mineral resources into a separate category is predetermined by the absence of the economic benefits revenue into the organization of these very assets in the process of their exploitation and also by the ambiguity of the future economic benefits. So, if an organization applied the general criteria to recognize fixed or intangible assets, set in IAS 16 "Property, plant and equipment" and IAS 38 "Intangible assets", it wouldn't be able to recognize any assets used in prospecting and evaluation of mineral resources. Besides, proceeding from the circumspection concept laid in the Framework of preparing financial reporting based on international standards and taking into account the ambiguity of the future prospective, the expenditure in the area of natural resources development should be included into the financial result of the period during which they were made, which will lead to the distortion of the perception of real dynamics.

On the stage of development the financial result is going to be understated, because from the current income there will be deducted the expenditure carried out for the future, but for not the current earnings. On the stage of mining operation the financial result is oppositely going to be overstated, because from the recovered mineral products sales there will be deduced only the expenditure necessary to carry out the very process of mining. Significant expenditure incurred mostly to carry out the mining process is not counted, and the cost value becomes incomplete. This kind of approach goes in conflict with the set world practice of accounting in extracting sector.

In this respect there appeared a necessity to accept a separate standard of IFRS 6 "The exploration for and evaluation of mineral resources", which allows some deviations from the conceptual principles of IFRS.

## 2. Materials and Methods

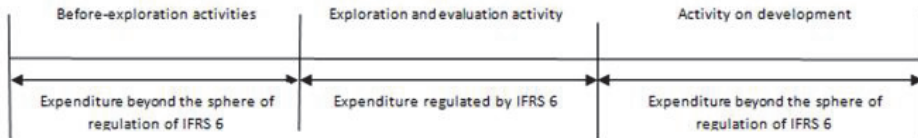
The theoretical basis for the investigation is based on the fundamental accounting concepts, hypotheses and approaches of classical and modern scientific economic literature. Then the methodological basis of the work is the comprehensive approach to the investigated processes and phenomena, the techniques of dialectic and formal logics. We used a wide range of methods: comparative analysis, synthesis, systematization and generalization of the theoretic materials,

56 consolidation and grouping, analytical proceedings and other methods.

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### 3. Results and Discussion

60 Only part of the expenditure connected with mineral resources and allocated to the stage of prospecting and evaluation of  
61 mineral resources gets under IRSF 6 regulation. The costs incurred before the rights to prospect and evaluate were  
62 procured as well as the costs incurred after the fact of technical feasibility and commercial practicality of mining  
63 operations has been set are not regulated in IFRS 6. The graphic display of IFRS 6 regulating sphere is presented in  
64 figure 1.  
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68 **Fig.1** The sphere of regulation of IFRS 6 “The exploration for and evaluation of mineral resources”

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70 So, the enterprise has to develop the accounting policy for a separate display of expenditure referring to each stage of  
71 the usage of mineral resources in extractive industries:

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- Activities on exploration and evaluation of mineral resources;
- Before-exploration activity;
- Activity on development and extraction.

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Future possible economic benefits from the exploration of mineral resources are not always obvious. One needs to rely on professional judgment [11]. It is possible to use the results of project review done by senior managers or an authorized body, or business-plan, medium terms of an agreement concluded on other projects, political situation, argumentativeness of the territory, commercial aspects, tax and judicial peculiarities, etc. In other words, on the stage of before-license prospecting of hydrocarbons the expenditures appearing before taking the decision on the project technical feasibility and the organization's interest in procuring the rights on subsurface resource management should be expensed as incurred [14]. And expenditures appearing after such decision has been taken should be included in the cost of the rights on subsurface resource management.

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In accordance with § 9 IFRS 6 an enterprise should work out the accounting policy defining the expenditures which will be accepted as assets connected with exploration and evaluation, and practice consistent application of accounting policy [10]. The judgment made at this has to be based on the data about the connection between making charges and finding out particular mineral reserves. International standards offer an approximate list of expenditures which might be included into the primary measurement of active assets connected with exploration and evaluation:

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- Procurement of rights on carrying out prospecting works;
- Topographical, geological, geochemical and geophysical investigations;
- Prospecting and exploring drilling;
- trenching;
- selection of tests and samples;
- activity on evaluation of technical feasibility and commercial practicality of mineral resources exploration [3].

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So the organization carrying out expenditures on exploration and evaluation of mineral resources has to provide in its policy the conditions to recognize the assets on exploration and evaluation of mineral resources in accordance with § 10 IAS 8 “Accounting policies. Changes in accounting estimates and errors”. It is necessary for the accounting policy to provide the kinds and content of expenditures the organization recognizes as assets in exploration and evaluation of mineral resources taking into account the degree of their correlation with the exploration of particular mineral resources.

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The recognition of assets of exploration and evaluation stops at the moment when the technical feasibility and commercial practicality of the mineral resources mining on a particular mineral resources block have been proved, or from the moment when mineral resources mining on a particular site has been proved as having no prospect. [6]. In this respect it is necessary to mark in the accounting policy the particular criteria and a list of documents on the basis of which one makes the decision that the technical feasibility and commercial practicality of the mineral resources mining on a particular mineral resources block are considered as proved, or mineral resources mining on a particular site is regarded

105 as having no prospect. It is recommended that the accounting policy should reveal the information about the periodicity of  
106 evaluation and setting the criteria of technical feasibility and commercial practicality of mining on a site. The criteria might  
107 be finding out resources on the site, availability of the specified data about the geologic structure and resources reserves  
108 and carrying out the test operation to get the data and parameters to work out a technological scheme for working of  
109 mines, etc.

110 After the decision that mining operations are economically viable has been taken, the exploration and evaluation  
111 assets need to be reclassified [1]. If the exploration and evaluation expenditures are effective, corresponding assets  
112 should be transferred into the category of development assets. Ineffective exploration and evaluation expenditures should  
113 be written down up to the fair value with the deduction of expenditures on costs to sell, because it's impossible to use the  
114 concessionary terms, which allows to group these assets with the ones on mining operations in the framework of a bigger  
115 unity generating monetary means [8].

116 For example, the 2014 accounting policy of JSC "OC Rosneft" makes provisions for "the expenditures on  
117 exploration including expenditures on geological and geophysical works and carrying a dry hole are allocated to the  
118 expenses of the period when these expenditures were made. The cost of exploration wells (including stratigraphic ones)  
119 are temporarily capitalized till oil and gas reserves are found out by implementing the drilling programme. The length of  
120 period of time necessary to carry out such an analysis depends on technical peculiarities and economic difficulties in  
121 making an evaluation of resources extraction. If the conclusion is made that the wellhole carries such amounts of oil that  
122 it might be ineffective to produce it, the wellhole expenditures are written down to the costs of the corresponding period of  
123 time in the "Expenditures on exploration and evaluation of mineral resources" section.

124 The jurisdiction of the accountant's professional judgment includes establishing the order of classification of assets  
125 of exploration and evaluation as tangible or intangible proceeding from the essence of recognized assets [15]. While  
126 establishing weather to classify assets of exploration and evaluation as tangible or intangible assets of exploration and  
127 evaluation it should be taken into account the creation of what object the expenditures are allocated to most [4]. If the  
128 expenditures on exploration and evaluation are allocated to the object having a physical shape which will be used as an  
129 independent asset, then the asset may be classified as the tangible asset of exploration and evaluation. If the  
130 expenditures lead to getting information about creating the assets of exploration and evaluation of mineral resources on a  
131 particular subsurface site, then this kind of an asset should be classified as intangible asset of exploration and evaluation  
132 [2].

133 Exploration and evaluation assets are recognized by the production cost, i.e. actual expenditures [7]. The  
134 organization acknowledges any liabilities connected with the destruction of objects and rehabilitation of environment,  
135 mineral resources, which it suffers for some period of time as the result of performing works on exploration and evaluation  
136 of mineral resources.

137 In this case there might arise some difficulties in figuring out a reliable assessment of the cost of exploration and  
138 evaluation of mineral resources. In this respect it is recommended that one should use the International Valuation  
139 Standards in extractive sector worked out by International Valuation Standards Committee.

140 Within the jurisdiction of accountant's professional judgment there fall the choice of the model of the further  
141 evaluation of the assets connected with the exploration and evaluation of mineral resources:

- 142 – by original cost;
- 143 – by revalued amount (as prescribed in IFRS 16 for assets revaluation or in IAS 38 for intangible assets  
144 revaluation depending on the classification of assets).

145 Revaluation of the assets is possible only when they are submitted to reliable fair value measurement. The  
146 revaluation should be carried out regularly to provide the correspondence of the balance sheet value of the object to the  
147 one which is defined by the fair value applied to it on the date of evaluation [9]. The usage of the model of assets  
148 revaluation in exploration and evaluation of mineral resources doesn't exclude systematic amortization charges and  
149 calculations on impairment, but each date of revaluation the original assets cost changes: it either increases or decreases  
150 in accordance with the carried revaluation.

151 At the same time the alternative procedure of the further evaluation of intangible assets on revalued amount  
152 provided in § 10 IFRS 6 "The exploration for and evaluation of mineral resources" is limited by the cases when fair value  
153 is determined on the basis of active market data. In fact, active market exists only for quotas to extract a particular  
154 quantity of minerals [16]. But the right to unlimited site development is always unique, that is why even theoretically these  
155 rights can't have an active market, consequently, this model of revaluation of intangible assets can't be applied.

156 The assets connected with exploration and evaluation of mineral resources should be tested for impairment in case  
157 there appear some circumstances which will testify that balance sheet assets may exceed its recoverable amount [12].  
158 Since it might be hard to apply the standard impairment testing procedure before the commercial practicality of the

exploration has been proved, IFRS 6 sets a particular list of possible facts speaking for the necessity to carry an impairment test.

Due to the fact that the list is open-ended in the accounting policy it is possible to foresee some other factors specific for the particular enterprise which speak for the impairment. Besides, the enterprises have to determine the level of the impairment test (the monetary means generating unit or a group of such units).

The enterprises are allowed to group exploration and evaluation assets together with the recovery ones if there is a distinct accounting policy regarding such grouping, and the policy is practiced consistently from period to period. The only restriction is the claim that the monetary means generating unit or a group of such units should not be bigger than the segment defined by IFRS 8 "Operating Segments".

However, when the exploration and evaluation assets have been reclassified and transferred into another category they should fall under the usual testing procedure in accordance with IAS 36 "Impairment of Assets" at the level of monetary means generating unit and amortization at the level of separate assets [13]. In this case the impairment testing and amortization of the group of assets are impossible.

As an example we will give an extract from the accounting policy principles description of JSC "Lukoil" taken from the Notes to consolidated interim financial reporting, drawn up for the period of 6 months up to the date of June, 14<sup>th</sup> 2014: "Long-term assets, such as oil- and gas-producing fixed assets are evaluated in terms of possible impairment when some events or discontinuance of circumstances point out that there is a possibility that the balance sheet assets might not be compensated. Recompensation of the assets cost is estimated by comparing the book value of the group of assets and the predicted value of the future non-discounted cash flows generated by this group of assets. In those cases when the balance sheet assets exceed the predicted value of the future non-discounted cash flows one has to admit the impairment loss by the write-off of the balance sheet value to the predicted fair market value of the group of assets, which is usually defined as the net worth of the future non-discounted cash flows".

The elicited impairment loss is allocated to profits and losses before carrying out the reclassification and exclusion of the exploration and evaluation assets items from the assets. Some tangible assets can be reclassified into the category of fixed assets and general industrial stocks [1].

The disclosure of information about the exploration and evaluation of mineral resources is obligatory from the point of view of explanation of separate indicators of the financial data reporting. In particular, an accepted order of assets recognition is uncovered, and also total assets, value of liabilities, amount of income and expenses, operational and investment cash flows which arise while carrying out operations on exploration and evaluation of mineral resources. Despite IFRS 36 lapse from a whole set of International standards, the disclosure of information about the accounting policy concerning the expenditures and assets on exploration and evaluation of mineral resources should be carried out in accordance with IAS 8 "Accounting policies, changes in accounting estimates and errors".

#### 4. Conclusion

So, the application of the accountant's professional judgment while shaping information about exploration and evaluation of mineral resources for financial data reporting is necessary to admit, classify, make a preliminary and more detailed judgment. The recommendations offered in the article will allow to shape the accounting policy of oil producing companies in the optimal way and to raise the quality of disclosure of the information about the mineral resources mining.

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229 19.

# Efficiency Analysis of Taking out Real Estate Loans for Profit-Making Organizations

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## Abstract

*This article presents modified factors to analyze efficiency of getting real estate loans by profit-making organizations. These factors make allowance for the characteristic features of real estate lending transactions such as their long-termness, and uneven stream of cash-flows. Total value of net cash return from a real estate lending transaction is typically discounted revenue, which we calculated both pretax and post-tax. Taxation is shown to exert a considerable impact on discounted revenue position. Real estate lending transaction financial leverage effect is calculated for the whole duration of the investment project, with allowance for time value of money.*

**Keywords:** *analysis, real estate loan, real estate lending efficiency, financial leverage, borrowings*

## 1. Introduction

Economic benefits from calling for a credit on real estate and credit funds will be derived by to those organizations which invest these money means. The encumbered estate and credit object can be either the same or different.

As any other investment decision, employment of considerable amount of borrowed funds is based on economic calculation of expediency of their attraction. But there is no complex method to deal with real estate lending transactions and this issue does not receive its due attention. This determines relevance of this research, as well as theoretical and practical importance of its findings.

While estimating efficiency of obtaining a credit on real estate for investments, Russian and foreign scientists usually confine themselves to computing cash receipts from the real estate lending transaction and financial leverage effect according to the classical method. However these indexes do not make allowance for the characteristic features of real estate lending transactions such as their long-termness, and uneven cash-flow during the year.

This research aims to work out modified indexes to analyze efficiency of employing credits on property, with due regard to the characteristic features of real estate lending transactions.

## 2. Methods

Many scientists, including Raberto, M., A. Teglio, A. and S. Cincotti [1], Ilat, V. and W. Pontoh [2], Wellalage, N.H. and S. Locke [3], Shvab, O. [4], mention the need for an in-depth economic efficiency analysis of borrowed funds.

To assess efficiency of employing real estate credits we can use both absolute and relative indexes (fig.1).

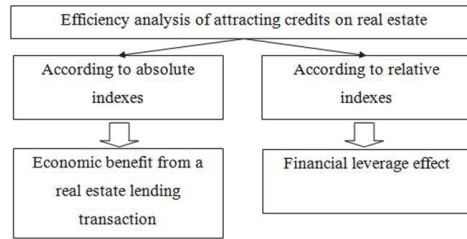


Fig.1. Indexes to assess efficiency of attracting real estate credits.

Economic effect from real estate lending transactions will be beneficial for the investor if net operating income from the borrower exceeds the debt expense (including principal debt repayment) and amount of owner's equity invested in the capital investment project. Net operating profit index is widely used by such scholars as Devaney, M. and W.L. Weber [5], Lu, S.-C. and X. Luo [6] to assess the return on fixed asset investments.

Net operating income is calculated as a difference between real total revenue brought by the investee, and operating expenses to manage it. That is net operating income equals to annual return from delivering production, labor and services, produced with the help of the given fixed asset, together with annual depreciation of the object. If to acquire a fixed asset the investor requires a real estate credit, than he will have additional annual expenses associated with financing terms, such as principal debt repayment and interest payment. Difference between net operating profit and debt service payment reflects the investor's net cash returns, which will present the real estate lending transaction effectiveness.

In our opinion net cash returns value for capital investment project should be calculated both yearly and totally. While calculating total project cash receipts the key method is that of cash flow discounting, which makes allowance for longevity of real estate lending transactions. Efficiency of attracting borrowed funds by the investor largely affects financial leverage, an objective factor which appears when debt funds penetrate the employed capital, and allows the company to bolster profit margins on their core capital. Financial leverage is necessarily taken into consideration while assessing optimal capital structure of a company, which is mentioned in researches by Chung, Y.P., H.S. Na and R. Smith [7], Al Shafer, T. [8], Calabrese, T.D. [9], Chod, J. and J. Zhou [10].

To evaluate increase in investor's capital gains it will be necessary to calculate financial leverage effect. The calculation methodology to be employed must take into account the specific nature of real estate lending transactions.

### 3. Result

Given the fact that receipts and payments associated with investment projects and real estate credit servicing are usually received during several years, and vary from year to year, we find it necessary to estimate the total effect from investments during the whole project lifecycle. If the investment project lifecycle is indefinitely long, we recommend adopting credit length as the calculation period. In so doing we should consider time element by discounting cash flows and bringing their amount to the capital investment project initiation date. The effect of a real estate lending transaction can be more accurately calculated by correcting profit tax rate. We suggest calculating pretax discount effect (DE) by the following formula:

$$DE = (1 - TR) \cdot (DP - DI) + DD - DMC - C,$$

Where

TR – is income tax rate, expressed in unit fractions;

DR – is discounted value of return on investment;

DI – is discounted sum of credit interest payment;

DD – is discounted investee depreciation amount;

DMC – is discounted loan principal repayment amount;

C – is amount of investor's equity.

When  $DE > 0$  the effect is beneficial, i.e. the capital investment project will be profitable; when  $DE < 0$  the effect is adverse, that is, the project will be losing.

Let us illustrate the method of calculating discounted effect from taking out a credit on real estate by the following examples.



Example 1. A company took out a real estate credit to purchase production machinery in the amount of 1.7 mln. rubles for two years at 15 % per annum. The encumbered property is the industrial building. The production machinery costs 1.9 mln. rubles. The investor steered 200 thousand rubles of his own resources to the purchase. The machinery has a useful life of five years. According to the credit contract the interest is delivered at the end of each year during the loan disbursement period, and the principal amount of the loan is repaid at the end of the loan term. The chosen discount rate for the computations is 14%.

Table 1 shows the machinery depreciation amount, estimated sum of operating surplus by years, discounted amount of net operating income, debt service payments and the discount effect of the transaction analyzed.

**Table 1.** Calculation of the discount effect from obtaining machinery by raising a real estate loan, rubles.

Index	Years					Total
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
1. Present value factor	0,8772	0,7695	0,6750	0,5921	0,5194	x
2. Annual depreciation amount	380000	380000	380000	380000	380000	1900000
3. Annual discount sum (p. 2 · p. 1)	333333	292398	256489	224991	197360	1304571
4. Amount of return	200000	250000	260000	240000	230000	1180000
5. Discounted amount of return (p. 4 · p. 1)	175439	192367	175493	142099	119455	804852
6. Discounted net operating profit (p. 3 + p. 5)	508772	484765	431982	367090	316815	2109423
7. Loan interest	255000	255000	—	—	—	510000
8. Discounted loan interest (p. 7 × p. 1)	223684	196214	—	—	—	419898
9. Principal redemption	—	1700000	—	—	—	1700000
10. Discounted amount of principal redemption (p. 9 · p. 1)	—	1308095	—	—	—	1308095
11. Discounted debt service payments (p. 8 + p. 10)	223684	1504309	—	—	—	1727993
12. Own resources	—	—	—	—	—	200000
13. Pretax discount effect (p. 6 – p. 11 – p. 12)	x	x	x	x	x	181430
14. Income tax ratio	x	x	x	x	x	0,2
15. Post-tax discount effect [(1 – p. 14) · (p. 5 – p. 8) + p. 3 – p. 10 – p. 12]	x	x	x	x	x	104439

As described in Table 1, taxation exerts a significant influence on the amount of discount effect from taking out a credit on property. The pretax discount effect amounts to 181,430 rubles and post-tax – only to 104,439 rubles.

Let us consider financial leverage effect resulting from the real estate lending transaction. Financial leverage depends not only on the interest rate, loan term and credit repayment profile, but also on the fraction of fixed assets value funded with the loan. We calculate the return on owner's equity rate when employing borrowed funds for the investment project and compare it with the project profitability when funded without raising a loan. To assess various financing options the following formula for counting financial leverage effect is typically used.

$$EFL = (1 - TR) \cdot (R - IR) \cdot (MC / C),$$

Where

EFL - is financial leverage effect, which consists in return on equity increase, %;

IR – is real estate loan interest rate;

MC – is real estate credit value;

R – return on the investment, made by using a loan:

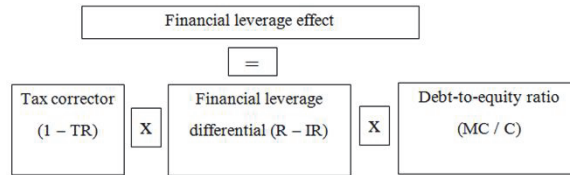
$$R = P / CIP \cdot 100 \%,$$

Where

P – is pretax profit from investment;

CIP – is price tag for the investment project.

The above mentioned financial leverage effect formula consists of the following three basic elements: tax corrector, financial leverage differential, debt-to-equity ratio [11]. They are shown in Figure 2.



**Fig.2.** Elements needed to calculate financial leverage effect

When calculating financial leverage from a real estate lending transaction, tax corrector and debt-to-equity ratio are comparatively stable variables, but financial leverage differential is a highly dynamic one. This results from instability of income from the investee and changes in credit interest rates (for rescheduled real estate loans).

This being so, financial leverage effect can vary from year to year, from favorable to unfavorable one. That is the reason why it is important for the investor to specify financial leverage effect during the whole period of the investment project life cycle. In this connection we recommend transforming the formula for calculating financial leverage as follows:

$$EFL = (1 - TR) \cdot [(DNOI - CIP) / CIP - (DDSP - MC) / MC] \cdot (MC / C) \cdot 100 \%,$$

Where

DNOI – is discounted net operating profit;

DDSP – is discounted debt service payment.

Let us illustrate the method to calculate financial leverage effect for the whole investment period of the investor's share of the investee's profit.

Example 2. We will combine the data given in the first example and the calculation data in Table 1. Financial leverage effect calculation is presented in Table 2.

**Table 2.** Financial leverage effect evaluation

Index	Index equation	Expected value
Tax corrector	$1 - 0,2$	0,8
Financial leverage differential	$(2\ 109\ 423 - 1\ 900\ 000) / 1\ 900\ 000 - (1\ 727\ 993 - 1\ 700\ 000) / 1\ 700\ 000 = 0,1102 - 0,0165$	0,0937
Debt-to-equity ratio	$1\ 700\ 000 / 200\ 000$	8,5
Financial leverage effect, %	$0,8 \cdot 0,0937 \cdot 8,5 \cdot 100$	63,72

The calculations testify that taking out a real estate credit to purchase machinery will increase the rate of return on equity capital, invested in the project, at the rate of 63,72 % for the whole crediting period, as compared to return on equity when employing own resources only.

Such a financial leverage effect calculation makes it possible to estimate increment in investor's equity profit, due to attracting a real estate loan to finance an investment project, during the whole credit term, with allowances made for irregular distribution of cash receipts from the project by years.

#### 4. Conclusion

The factors offered to analyze effectiveness of taking out a credit on real estate, i.e. post-tax discount effect, and financial leverage effect during the whole investment project period, make it possible to pay due regard to such significant features in real estate lending transactions as their longevity and irregularity of cash-flow from period to period.

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## Accounting of Reserves for Impairment of Inventory

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### Abstract

*The article reveals the problems of the methods of reserves accounting for impairment of inventory. The authors offer and substantiate some recommendations how to improve reserves accounting allowing to create informational conditions to manage impaired inventory, and also basic documents and registry to keep record of the reserves for the inventory impairment.*

**Keywords:** record keeping of the inventory, management of material and production stocks, impairment, impairment factors, reserves for impairment of inventories.

### 1. Introduction

The objective factors of inventory impairment are the reduction of the current market value, functional depreciation, full or partial loss of original characteristics due to non-observance of storage requirements, serviceable life expiry [1, 2]. A timely identification of the reasons for impairment has to be included into the general system of tasks to manage material and production stocks (MPS).

The disclosure of the fact of depreciation of commodity stocks and supplies (CSS) in the system of accounts testifies, on the one hand, about the capability of business management to effectively manage inventories, risks connected with tangible security, and, on the other hand, about the future possible losses of the enterprise connected with the depreciation of CSS [3, 4]. In this respect the improvement of the methods of keeping record of inventory impairment is an absolutely topical issue.

### 2. Method

First of all, we are going to describe the peculiarities of inventory record in accordance with the requirements which influence keeping record of inventory impairment.

According to Russian accounting standards, the fact of impairment can be disclosed only by the means of accumulating reserves for impairment of inventory, and the inventory book value adjustment is not allowed for. IAS 2 "Inventories" allows for reduction of inventories as the result of their impairment [5].

In our opinion, due to impairment the issue of inventory cost adjustment should be treated depending on the revealed factor of impairment.

So, if the impairment is the result of full or partial loss of original qualities of inventory, it is necessary to carry out the cost adjustment by reducing the book value, since we are speaking about irreplaceable losses of economic benefits of an enterprise. In the case when functional depreciation is claimed to be the reason for tangible assets impairment, then it is necessary to disclose the reduction of the book value of inventories by means of direct write-off if there is no opportunity to use such kind of tangible assets for other purposes or their sale on the market.

If the impairment is revealed as the result of reduction of the current market value or functional depreciation, or of the future full loss of the original qualities, it needs to be adjusted by means of accumulation of reserves. Such adjustment of the tangible assets book value reflects objectively the projected value of future losses, admitting the possibility of their replenishment, for example, as the result of increase in their market value, sale of tangible assets before the expiry date.

In accordance with p.25 of the Accounting Standards 5/01 "Inventory recording" the reserves for inventory

56 impairment are accumulated for the sum of the difference between the current market value and actual costs of  
57 inventories if the latter evaluation is higher than the current market value. At this, the level of current inventory value is  
58 defined on the basis of the information available to the enterprise before the date when financial statements are signed  
59 [6, 7].

60 This testifies that the change of price or actual costs of inventories from the balance sheet date to the date of  
61 signing the financial statements is claimed in accounting as the adjusting event after the balance sheet date. In this  
62 respect the sum of the reserve for impairment of inventory disclosed by the balance sheet date is subjected to adjustment  
63 in case of change of price or actual cost, the adjustment made for minus as well as for plus.

64 According to the Inventories Accounting Guidelines, the reserves for inventory impairment can be accumulated  
65 both for each unit of inventory and for separate kinds (groups) of similar and related commodity stocks and supplies. The  
66 reserve is formed only in the case when at the balance sheet date the actual costs of the finished commodity are higher  
67 than its market value [8].

68 In accordance with the above mentioned documents in accounting the allowance of the reserve is made only  
69 through increase in miscellaneous expenses, but its allowance recovery with the inventory issue or current market cost  
70 increase leads to the increase of miscellaneous incomes.

### 71 72 73 **3. Results**

74 The analysis of the Russian inventory recording showed that an overwhelming majority of enterprises don't observe the  
75 accounting regulations in inventory impairment disclosure and don't accumulate the reserves for inventory impairment, as  
76 the result of which the assets evaluation of such enterprises maybe unreal. The main reasons for not meeting the  
77 requirements are accounting labour intensity which increases with the necessity to accumulate, use, adjust the reserves  
78 for each inventory unit, and also the disparity in inventories accounting records and fiscal accounting.

79 However, the mentioned reasons cannot serve the basis to waiver the obligatory accounting requirements. At the  
80 same time, the tightness of general normative regulations in the sphere of inventories impairment recording also serve  
81 the deterrent for their implementation. In this respect, the order of recording of reserves for inventory impairment has to  
82 be an element of the accounting policy.

83 In our opinion, as a minimum it's necessary to provide the parameters given below for the inventory impairment  
84 recording in the accounting policy, and as a maximum, besides the general parameters provided by the accounting policy  
85 it is viable to work out a separate Regulations (for example, "Regulations for reserves for impairment of inventory") which  
86 would include both methodological and organizational issues for accumulation and usage of such reserves.

87 As the parameters of recording the reserves for inventory impairment subjected to disclosure in the enterprise  
88 accounting policy we treat the kinds of commodity stocks and supplies for which the reserves are accumulated; the  
89 periodicity of disclosure of the inventory impairment, accumulation and adjustment of the reserves; the determination  
90 of impairment materiality level to take the decision about the reserves accumulation; determination of the levels of analytical  
91 specification of the reserves recording; the order of admission of inventories impairment and the methods of calculation  
92 of the reserve supply capacity, its adjustment and usage; the basic documents, analytical records to register the reserves  
93 for inventory impairment.

94 So, it is viable to carry out the inventory impairment testing on the materials, finished commodities and goods.  
95 Regarding the unfinished goods we will follow Z.Tuyakova who considers the adjustment of the unfinished production  
96 cost through accumulation of reserves for impairment quite nonviable and hard to put into business practice.

97 The periodicity of the disclosure of the impairment factors should depend on the organization of the general system  
98 of inventories management. In case of due record and control for inventory state this can be done monthly. However, as  
99 we see, the optimal periodicity is the quarter as regards the reporting of data about the assets impairment both in interim  
100 financial reporting and management reports.

101 One of the principles of accumulation of reserves is the materiality of expenses and/or losses to clear which the  
102 reserve is accumulated [10, 11]. In this case the materiality level may be the relative indicator of each inventory unit  
103 impairment by 5–10%.

104 To organize analytical accounting of reserves for inventory impairment at the account 82 "Surplus Reserve" which  
105 we suggest, subaccount "Assessed reserves adjusting the assets assessment as the result of their impairment", tertiary  
106 account "Reserves for inventory impairment" it is necessary to provide the following levels of analytical specification: the  
107 kind of commodity stocks and supplies, factor of their impairment, the group they belong to or the reserve unit of  
108 inventory.

109 The institutionalization of the admitting impairment order in the enterprise accounting policy has to be precise. We

110 recommend to implement this kind of order for each impairment factor.

111 Accumulation of the reserves, in our opinion, should be displayed out of profits. To do so we introduce the notion of  
112 an abstractive benefit of the accounting period and suggest taking it into account at the contra-liability account 85 "An  
113 abstractive benefit of the accounting period".

114 As for the reserve usage and adjustment we suggest an order of their disclosure different from the one provided by  
115 the current normative documents. In our opinion, instead of reserve recovery while the commodity stocks and supplies  
116 release or increase of the current market value it is viable to show its usage to cover the real losses from both the  
117 impaired inventory sale and the write-off of the obsolescent commodity stocks and supplies or the one which have  
118 completely lost their original qualities due to expiry.

119 To implement this suggestion it is necessary firstly to provide an additional analytical position at the accounts  
120 allowing to identify the impaired inventory by the reason of their impairment for inventory recording, and to include  
121 additional requisites allowing to identify the inventory behavior into the basic documents on inventory record keeping.  
122 Secondly, to keep record of benefits and expense and/or write-off the impaired inventory it is necessary to provide an  
123 additional specification at the accounts 90 "Sales", "Other revenues and expenses" and 99 "Gains and losses".

124 Thus, it will be possible to reveal the write-offs and impaired inventory sales losses at the accounts, which have to  
125 be written off for the accumulated reserves by the end of every month or quarter.

126 The adjustment of the reserves for the commodity stocks and supplies impairment in our understanding is the  
127 change of their rests by the end of the accounting period with the account of their usage during the accounting period,  
128 and also new circumstances of the revealed fact of inventory impairment by the balance sheet date and events after the  
129 reporting date affecting the change of the current market value or inventory actual costs.

130 If according to the information about the revealed facts of inventory impairment at the end of the accounting period  
131 the accounted reserve will constitute a bigger sum than the one at the beginning of the accounting period lessened by the  
132 sum of its usage, then the reserve sum should be increased. In the reverse situation, when the accounted sum of the  
133 reserve is smaller than the sum of the reserve at the beginning of the accounting period lessened by the sum of its usage,  
134 then the sum of the reserve should be reduced.

135 To reveal the commodity stocks and supplies impairment it is necessary for the enterprise to organize a committee  
136 which would include the leading specialists of the marketing, materials and manufacturing departments as well as  
137 inventory managers.

138 The procedure of disclosure of the impairment by its factors should represent the gathering and analysis of  
139 information about the accounting and current market value of the inventory, about the statistics of inventory write-offs due  
140 to the expiry, projected value of the sales of the obsolete inventory.

141 We see the following advantages of the suggested order of the impairment recording as compared with the current  
142 one: firstly, the given order allows to reflect the real miscellaneous revenues and expenses; secondly, the absence of the  
143 necessity to recover the reserves with the inventory release and increase of the current market value simplifies the  
144 accounting procedures; thirdly, the recommended variant takes into account the impairment factors, which gives an  
145 opportunity to manage the risks of asset impairment more effectively; fourthly, the suggested order of accumulation,  
146 usage and adjustment of the reserve will let more clearly reflect the given information in the financial data reporting, which  
147 will make it more available for users' understanding.

148

#### 149 4. Conclusion

150

151 Thus, the suggested recommendations on the improvement of reserves recording for the inventory impairment will  
152 contribute to the increase of the quality of the information about inventory impairment in the system of accounts.

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# Budget Efficiency for Cost Control Purposes in Management Accounting System

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## Abstract

*The article reviews the economical essence of budgeting in management accounting system. Budgeting represents the higher level of business development and allows focusing on long-term results, effective use of financial resources, business activities supervising, assists in making sound and timely managerial decisions. Budgeting helps to effective cost management and financial performance of the organization, allows you to compare all the planned costs and anticipated revenues for the coming period.*

**Keywords:** budgeting, purchasing budget, labor budget, (general) production cost budget, managerial decisions.

## 1. Introduction

Budgeting – is a process of planning future business activities, the results of which are documented with the system of budgets.

Normally, budget creation is done within operational planning. Based on strategic goals, budgets solve the issue of distributing economic resources held by an enterprise. The major budgeting tasks are as follows: ensuring current planning ; ensuring coordination, cooperation and communication within enterprise departments; cost justification; building basis for evaluating and monitoring enterprise plans; executing requirements set in laws and contracts. The cost of budget development and adoption is by far paid back by the advantages of a qualitatively drawn up budget and control over its implementation. Budgeting implementation stages are: studying internal and external documentation of an enterprise, its structure and interaction between structural units, management accounting tools, etc.; finding less painful ways of involving management team into the budgeting process; elaboration of budgeting implementation plan (all further activities will be determined by implementation plan); revision of old and elaboration of new internal standards; information base creation for budgeting stipulating elaboration of new reports per structural unit, while reports need to be related to the specifics of business activities; establishing new or restructuring older departments for budgeting process delivery; developing or purchasing of software with further installation on internal network; staff training.

## 2. Theory

Implementing of budget management system is a rather lengthy process associated with informational and business development of an enterprise. Prior to forming requirements for budgeting process, it is necessary to set budget management goals and work out requirements for resources in use.

Common goals and objectives addressed when implementing budget planning and management methods are: establishing of efficient operational and financial management; efficient operational planning of financial and economic activity of the enterprise; optimization of resources utilization, reduction of production cost and cost budgeting improvement by setting budgetary cost standards, effective control and variance analysis; improving cooperation and

57 coordination between various departments for the purpose of achieving set goals; management performance and  
58 assessment of department heads by means of comparing actual figures of monitored economic parameters (in the first  
59 place, expenses) with the planned ones; staff motivation for achieving business goals; increasing business efficiency by  
60 carrying out operative economic analysis of product portfolio and its optimization upon analysis results; finding out of  
61 monetary resources demands and financial flows optimization; securing changes in organizational structure with the help  
62 of modern management techniques.

63 In the present context any enterprise functions within the tough conditions of competitive environment and must  
64 have a clear understanding of where, how and when available financial resources need to be used in order to increase  
65 performance. One of the major tools used for managing commercial activities is budgeting.

66 It is known that saving and efficiency start when we begin to count spendings. It is assumed that budgeting is  
67 operational planning tool essential for financial managers. Because managing is about setting particular goals, planning,  
68 monitoring of approved plans, analyzing of results, finding out the reasons of variations and taking timely decisions  
69 eliminating these discrepancies.

70 Budgeting is aimed at increasing efficient use of working capital, getting profit increase, making reasonable  
71 investment decisions resulting in increased return on investments.

72 Budgeting is a technique of financial planning, recording and monitoring expenditures and income gained from  
73 commercial activities at all levels of management and allowing analyzing of forecasted and achieved financial  
74 performance. It is a process of elaborating, executing, monitoring and analyzing of financial plan covering all spheres of  
75 business activities and allowing comparing all costs incurred and results achieved for the coming period overall and for  
76 separate sub-periods.

77 The given methods have some disadvantages: conditional values are used for making related product types equal;  
78 amount of sideline products received and used is not fully taken into account; analytical accounting does not single out  
79 sideline product to reflect direct and indirect expenses in standard dimensions; quality of product produced is not taken  
80 into account when calculating cost. Cow milk fat might vary from 2.5% and higher depending on natural and climatic  
81 conditions, breed type and feeding practices. Thus, the given factor should not be ignored and a notice should be made  
82 that cows from the main dairy herd breed various weights, whereas cost is allocated to 1 head of livestock.

83 Complication of the market situation, production, sales and other business processes make business management  
84 and business planning more complicated. It takes a well-running mechanism of interaction between various units and  
85 departments to deliver management objectives. From the prospective of business stability in competitive struggle, well-  
86 established system of corporate planning covering all departments and using up-to-date methods of business  
87 administration and high information technologies becomes more essential. Apart from that, manufacturing and  
88 operational planning and management need to be connected with those of financial. That very system is represented by  
89 the system of budget planning and management (budgeting).

90 Budgeting is a process of determining such parameters, planning movement of resources across the enterprise for  
91 the specified future period. Production cost budget is formed based on livestock breeding production plan, which is, in the  
92 first place, represented by average livestock, its productivity and the amount of product. Considering the specifics of  
93 agricultural industry it is important to note that cost budgeting is, on the one hand, built on standards base, but, on the  
94 other hand, on its technical and methodological tools and methods of its use in the process of planned calculations.

95 Accounting data is required not only when consolidated budget is drawn up but also at the subsequent stages of  
96 budgeting cycle – monitoring and plan-fact analysis of budgeting frameworks. Management services must have both  
97 budgeted (planned) and actual (budget implementation rates) figures to carry out accurate plan-fact analysis to be able to  
98 budget subsequent period.

99 Therefore, integrated standard costing method (standard-direct-costing) — is such an accounting system that  
100 keeps record of business operations when the following is registered on all the stages of financial cycle and with a  
101 breakdown to all major types of activities (product types), allocated into a separate budget planning object: planned  
102 (budget) figures, actual figures, variance of actual and planned figures.

103 Present day financial theory and practice distinguishes budgeting as a subsystem of management accounting and  
104 as informational system of corporate business management.

105 In the market conditions, budgeting becomes the basis of planning as the core management function. On the  
106 whole, the significant features of budgeting, as a specific approach to managing operational and financial activities, are:  
107 integrated combination of planning, accounting, control, analysis and business regulation in terms of managing financial  
108 results and financial situation not only on enterprise level but also on the level of each structural unit (responsibility  
109 center); coordinating major business activities (production, sale, finances) by means of coordinating respective budgets;  
110 commitment to generic financial goals when making decisions on each level of management (including departments);

111 widely involving managers of all levels into the process of budget planning and monitoring.

112 The second significant feature of integrated standard costing method is clear distinction between conditionally-  
113 variable (accounts 20, 23, 25, 44 subaccount 44-1 «Direct selling expenses») and conditionally-constant (accounts 26  
114 and 44 subaccount 44-2 «General selling expenses») expenses for the purpose management planning and, first of all, for  
115 informational support of “cost-volume-profit” analysis when drawing up and analyzing sales budget, which, let us remind  
116 you, is the starting point for consolidated budget simulation. English variant of integrated standard costing method is  
117 called «standard-direct-costing» and it outlines two key aspects on which the mentioned accounting system is based.

118 Standard costing (*standard-costing*) — is a normative method of expenditures and financial results accounting. The  
119 method proceeds from expenditures and revenue accounting that is maintained based on standard (planned) figures,  
120 while variance is posted separately and is written off at the end of budget period to a respective stage of financial cycle as  
121 a result of which actual expenditures and financial results are determined.

122 It is worth mentioning that planned figures in “standard-costing” system are registered twice: first, before the start  
123 of budget period in the documents of management services (economic planning department, financial and economic  
124 department); second, during and after the budget period upon actual booking.

125 Such approach is not a coincidence as it helps to separate plan variations from the effect produced by such  
126 variations on financial results in terms of particular stages of financial cycle and separate business transaction. In fact,  
127 different types of variations from planned indicators produce different effect on business depending on the time of  
128 business transaction and financial cycle stage it applies to.

129 Market uncertainty makes it necessary to forecast the future, foresee possible changes in business conditions by  
130 means of advance planning and monitoring, i.e. by budgeting.

131 Budgeting system covers the overall enterprise, including production, sale, distribution, finance, as well as  
132 departments involved in certain types of financial, economic and production activities. Budgets are included in the  
133 majority of enterprise monitoring systems and are widely used in standard cost accounting and calculation.

134 Budgets can be of various types and forms; separate budgets, characterizing interim transactions (purchase of raw  
135 materials, production budget, etc.), may contain information on expenses or revenue only (sales budget), whereas  
136 consolidated budget (profit and loss account, cash budget) show expenses and revenue of the enterprise. Every  
137 enterprise chooses a particular form of budgeting on its own.

138 As a rule, budget period covers short-term aspect of planning (year, quarter), however, budgets dealing with capital  
139 investments are drawn up for a longer period of time – five, ten years.

140 Budgets, characterizing production and sale costs or cost applied to launch of new technological process (raw  
141 materials purchasing budget, administrative and commercial expenses budgets, labor budget, etc.) are based on sale  
142 budget.

143 Materials purchasing (utilization) budget specifies purchasing terms and the amount of raw materials, materials,  
144 semi-products that need to be purchased to fulfill production assignment. The amount of materials required to achieve  
145 planned production figures is calculated in the following way: materials required for planned output minus materials in  
146 stock at the beginning of the period. Multiplying quantity of material units by purchase price we get materials purchasing  
147 (utilization) budget.

148 Labor budget specifies required labor time in hours necessary for planned output and calculated by multiplying the  
149 quantity of production units (works, services) by labor cost standard in hours per product unit (works, services).

150 General production expenses budget represents detailed plan of estimated production expenses that cannot be  
151 immediately included into the cost price of a particular cost bearer (maintenance costs, depreciation of fixed assets of  
152 industry-wide application, etc.).

153 Cost of sales budget is based on the following formula:

154  $\text{Cost of sales} = \text{Opening stocks} + \text{Cost of goods manufactured in the planned period} - \text{Closing stocks.}$

155 Selling costs budget is a spending plan for production distribution in the future period.

156 Administrative expenses budget includes a plan of current operation expenditures differing from expenses directly  
157 associated with production and sales but necessary in the future period for maintaining business activities. Generally,  
158 those are fixed costs.

159

### 160 3. Results

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162 Operating budget preparations are completed by elaboration of profit and loss plan. Based on the prepared current  
163 budgets a forecast of profit and loss is developed and, in general, it looks like this:

164 Sales proceeds — Cost of sales = Gross profit — Operating (administrative, selling) expenses = Operating profit. See

165 cost budget in table 1.

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167  
168

**Table 1.** Cost budget for milk production at «Ak Bars Agro» LLC in the year 20xx in thous. rub.

Indicators	Actual	Plan
Milk sales proceeds	24256	23765
Product cost - total, thous. rub., including:	20657	18712
Labor cost with social security contributions	2890	2765
Feed	7592	7550
Energy	337	350
Fuel	580	667
Major and minor repairs of capital assets	2588	1880
Production and management set up	6670	5500
Profit, thous. rub.	3599	5053

169

In conclusion, it should be noted that the issue of implementing budgeting system becomes crucial due to:

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1. The necessity of finding internal resources for reducing production and sales cost, justifying optimum costs for financial means and, as a result, creating competitive advantages for the enterprise.
2. Tax policy optimization.
3. The necessity of increasing investment prospects of business, as the investor invests financial resources into the company with high level of management organization.

176

Performance evaluation of the project budget shall be considered from the prospective of solvency ratio, which is the major indicator of financial standing of the enterprise.

177

178

Estimated solvency ratio of the enterprise is calculated in table 2.

179

180

**Table 2.** Solvency ratio of «Ak Bars Agro» LLC for the year of 20xx

181

Indicators	Actual	Plan	Changes	Standard
Current liquidity ratio	0,99	0,6	-0,39	≥ 0,2
Acid-test ratio	0,6	0,5	-0,1	≥ 1
Absolute liquidity ratio	0,4	0,35	-0,05	≥ 2

182

Data in table 2 confirms that solvency in the projected year will reduce, which is proved by negative changes in liquidity ratios. During the projected period current liquidity ratio at «Ak Bars Agro» LLC decreased by 0.39 points compared to the beginning of the analyzed period.

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185

When drawing up budgets, one can calculate estimated figures of profitability: return on assets, return on equity, etc. In addition, budget preparations help with evaluating operating performance.

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Let us evaluate project budget performance from the prospective of solvency ratio which is one of the major characteristics of business efficiency. See estimated profitability figures in table 3.

189

190

**Table 3.** Profitability ratio of «Ak Bars Agro» LLC, Arsk district of RT, %

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192

Indicators	Year 20xx	Forecasted	Variance
Return on sales	1,1	0,9	-0,2
Business profitability	1,0	0,7	-0,3
Return on assets	0,002	0,001	-0,001
Return on equity	0,04	0,02	-0,02

193

Data in table 3 shows downward changes of all profitability ratios, which negatively characterizes capital consumption policy of the enterprise.

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196

With the help of monthly, quarterly and annual estimates drawn up for every unit the level of expenditures is effectively monitored by comparing actual figures to the estimated ones and by analyzing the reasons for deviation of actual expenditures of estimates.

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It is recommended to keep record of activity accounting for provision of information on actual implementation of various estimated figures.

200

201 Activity accounting assumes retrieving required information from financial accounting system, collecting data on  
202 each responsibility center and providing reports comparable to estimated data.

203 By all means, such strategy guarantees constant liquidity but is quite expensive as credit commitments, as a rule,  
204 cost much and require constant servicing. Big expenses on attracting funding, for example, debt financing, run the risk of  
205 decrease in return on equity.

#### 206 4. Conclusion

207 Therefore, it is obvious that suggested dynamic system of financial planning and budgeting will enable more efficient  
208 management of financial resources, as budget is set synchronically "from the top" and "from the bottom" in close  
209 collaboration with production department heads, as well as with the use of current production capacity for the purpose of  
210 achieving targeted results set by top management.

211 Thus, it is apparent that the mentioned issues can be solved only by implementing dynamic system of financial  
212 planning and budgeting, which, in every particular case, will suggest a proven solution for a specific question. «Ak Bars  
213 Agro» LLC is suggested to use various budgeting methods and dynamic budgeting model for solving the given tasks.

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## Organization of Accounting in Fur Farming according to IAS

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### Abstract

*The article deals with biological assets accounting in accordance with International Accounting Standard (IAS) 41; a list of physical indicators of organization activities for each group of biological assets, tabular presentation of information about the fair value of agricultural products and biological assets, as well as about the profits and losses in fur farming are offered. The data and arguments mentioned above show the possibility and a clear line of reporting in the field of fur farming in accordance with the requirements of IAS 41.*

**Keywords:** fur farming, biological assets, International Accounting Standard (IAS) 41, fair value.

## 1. Introduction

In today's conditions of economic crisis the enterprise management presents a complex problem. In this situation, there is a need in timely (daily, hourly) information for management decisions making. One of the main criteria for efficient management is the effective use of financial, material and human resources. Managerial accounting forms essential mechanism for this, while allowing fully solving problems of planning, accounting of certain activities, regulation and monitoring. But at the same time there is a problem of developing of such a system of management accounting, in which this mechanism would work efficiently. In this case, one can use the principles and concepts of accounting in developed countries, namely International Accounting Standards (IAS), which include methodology, technology, financial apparatus, well-developed forms of financial reporting used for management. These standards oriented to specific users are based on the criteria of usefulness of financial information for economic decision-making. Therefore, the same data are useful for making management decisions. Due to specifics of agricultural organization activities for management purposes it is advisable to use IAS 41 "Agriculture", which defines agricultural activity as a "business management process of biological transformation of biological assets for sale, agricultural products obtaining, or additional biological assets producing." In the Russian Federation, the developed drafts of normative documents for accounting of biological assets can be used: draft regulation on accounting "Accounting of biological assets"; comments on the draft on accounting "Accounting of biological assets"; draft guidelines on primary use of regulation "Accounting of biological assets."

## 2. Theory

IAS 41 defines agricultural activity as management of biological transformation of animals and plants (biological assets) in order to implement, obtain agricultural products, or produce additional biological assets. Fur farming in accordance with IAS is a sub-sector of agriculture, engaged in management of biological transformation of fur animals in



57 order to implement the farmed products (live animals, skins, meat and manure), get farmed products (skins, meat and  
58 manure) or get additional number of animals (progeny obtaining).

59 IAS 41 establishes order of biological assets accounting during the period of growth, degeneration, production and  
60 reproduction, as well as the order of agricultural products initial assessment at the point of their collection.

61 With regard to fur farming, IAS establishes the accounting treatment of fur animals (rabbits) during growth of young  
62 animals; degeneration - mortality, poor development, diseases, mechanical damage of the fur of live animals, etc.;  
63 production in fur farming, which partly coincides with growth of animals, in another part the production concerns the  
64 offspring of fur-bearing animals. The accounting treatment for production in this case refers specifically to the offspring.  
65 The reproduction also concerns the offspring of animals. The requirement of IAS 41 to evaluation of animals from the  
66 time of initial recognition and until the beginning of slaughter: the assessment should be carried out at fair value less  
67 estimated point-of-sale costs, except in cases, where at the time of initial recognition the fair value cannot be determined  
68 with sufficient reliability.

69 IAS 41 regulates the issues of state subsidies of agricultural activity.

70 According to IAS 20, "government subsidies are state aid in the form of transfers of resources to a company in  
71 return for compliance in the past or in the future to certain conditions relating to the operating activities of the company.  
72 The state subsidies do not include such forms of government assistance which cannot be reasonably estimated, as well  
73 as such transactions with the state, which do not differ from the normal course of trade". The government grants have  
74 one special feature - different conditions for granting subsidies can be set in each case.

75 In this regard, IAS as a whole (in particular, IAS 20 and IAS 41) does not focus attention on the possible conditions  
76 for granting subsidies. The main emphasis is made on the time of recognition of subsidies accounted for, namely, for the  
77 moment of recognition of the subsidy is taken the moment, when the grant becomes subjected to the receipt.

78 IAS 41 should be applied in the process of accounting for the following objects of fur farming in the cases, where  
79 they relate to agricultural activity: adult fur-bearing animals and rabbits, fur-bearing animals and rabbits for breeding, the  
80 offspring of fur animals and rabbits - as the biological assets; adult fur animals and rabbits at the time of slaughter, raw  
81 skins, raw meat of animals at the time of its getting, manure at the time of its getting - agricultural products at the time of  
82 its collecting; government subsidies for fur farming (rabbit farming) of both federal and subjects of the Federation.

83 The process of killing and removing the skins, as to its meaning, corresponds to the process of harvesting, the  
84 order of which is determined by IAS 41.

85 IAS 41 defines the collection of agricultural products as "detachment of products from biological asset or cessation  
86 of life of biological asset ". The process of killing and removal of skin is usually called the slaughter of animals, in this  
87 regard, the process of harvesting in accordance with IAS 41 for fur farming should be considered as the slaughter of  
88 animals. In domestic practice of fur farming, there is a clear division between slaughtering and primary processing of  
89 skins. In this regard, the primary processing of skins is already related to the processing of agricultural products in terms  
90 and concepts of IAS 2.

91 According to IAS 41 "biotransformation consists of processes of growth, degeneration, production and  
92 reproduction, resulting in qualitative or quantitative changes in a biological asset" and "Group of biological assets is a set  
93 of similar animals or plants".

94 The group of "homogeneous" biological assets should include fur-bearing animals and rabbits as technologically  
95 and historically developed sub-sector of human activity.

96 IAS 41 regulates the issues of accounting and reporting of only process of artificial breeding of animals and rabbits  
97 and does not address obtaining products of fur-bearing animals as a result of trade - the collection as a result of hunting.  
98 With regard to fur farming, biotransformation of fur animals consists of the processes of growth, degeneration and  
99 reproduction, resulting in quantitative and qualitative changes of fur-bearing animals.

100 The degeneration according to IAS 41 is defined as "a decrease in the number of animals and plants or  
101 deterioration of their quality characteristics." Degeneration for fur farming is a potential deterioration of skins of animals as  
102 a result of disease or mechanical damage to the body of animal or reduction in the number of animals due to mortality. As  
103 a result, recitation or decrease in fair value of potential skin occurs. Valuation issues of farming products obtained in  
104 conditions of degeneration are fully regulated by IAS 41.

105 To determine the financial result, IAS 41 requires the implementation of procedures for recognition and  
106 assessment of a biological asset, as well as products obtained from biological asset.

107 With regard to fur farming, IAS 41 in paragraph 10 determines that a company should recognize a biological asset  
108 - live fur-bearing animals or agricultural products - raw materials and carcasses when:

- 109 1. The company monitors the asset as a result of past events. It is about getting the offspring of fur animals at the  
110 farm and its growth. Also the live fur-bearing animals may be acquired - in this aspect, they are also accepted



- 111 for admission according to this requirement. Since in this paragraph is mentioned just the asset, regardless of  
112 whether it is biological or otherwise, under its requirements fall raw pelts of fur-bearing animals and carcasses  
113 produced on the farm or taken from the public and other producers for further processing and sales.
- 114 2. There is a likelihood of company's future economic benefits from the asset. Here we are talking about the  
115 concepts of products and goods. In fur farming, the products are raw skins and carcasses of animals, the  
116 commercial products are also raw skins and carcasses of animals. However, for agriculture, as it is known, the  
117 concept of level of marketability is characteristic one, which shows the share of products for sale in the total  
118 volume of products. That part of products manufactured, which is due to technological reasons will not be  
119 directed to the sale, and will be used for other purposes, which, in turn, will contribute to the production of  
120 additional marketable products - getting future economic benefits must still be recognized for accounting in  
121 accordance with the requirements of this item of IAS 41. Such products may include the carcasses of animals  
122 that will serve as feeding stuff for animals, nutria carcasses sent to the canteen of the company for preparation  
123 of meals paid, natural payment in the form of fur farming products. Fur farming products do not covered by this  
124 item, they are consumed in the company for personal use without payment. This could include a free lunch  
125 (prepared only from the carcasses of rabbits and nutria), free distribution of carcasses (to workers, villagers,  
126 etc.), raw skins of animals, intended to be used as gifts, i.e. everything, that in no way attracts the potential  
127 investors because does not give direct future economic benefit (although these positions may be considered  
128 as expenses of the organization).
- 129 3. Fair value or cost of the asset can be evaluated reliably. If it is impossible to determine the fair value, domestic  
130 regulatory and methodological framework, in case of its compliance and maintaining appropriate records,  
131 adjusted to the requirements of IAS 41, makes it possible to determine on a reasonable basis the cost of fur-  
132 bearing animals and products of fur farming. Algorithm for estimating the offspring of fur animals at initial  
133 recognition. If it is possible to sell the pelt of a newborn puppy of this type of fur-bearing animals, then these  
134 puppies should be valued at the last price of the transaction or at the announced price for such a skin on the  
135 market plus the price for the sale of the puppy carcass less estimated selling expenses. Puppy carcass can be  
136 evaluated at the price of similar products purchased by the company for food of fur-bearing animals, for  
137 example, chicken carcasses. If one cannot sell the skin due to lack of physical qualities of the skin (small size,  
138 weak pubescence, etc.) and, consequently, lack of market, the puppies should be valued at standard cost less  
139 accumulated depreciation and any impairment losses.

140 The standard cost in this case is calculated as 50% of expenditures (excluding depreciation) for maintenance of the  
141 whole herd of young animals of this species to the point where the physical parameters of the puppy already allow the  
142 use of its skin for sale divided by the number of puppies. The amount of expenditures is taken on the basis of historical  
143 data corrected for inflation. The moment of costing when the physical parameters of the puppy already allow the use of its  
144 pelt for sale must be considered fundamental in contrast to the method proposed in the national guidelines.

145 By the end of production cycle of fur animals growing at the time of slaughter the skins in any case must be evaluated at  
146 fair value. According to IAS 41, regarding the production of fur farming (agricultural products) assessment should be  
147 carried at fair value established at the time of animals slaughtering (harvest) less the estimated selling expenses. Such  
148 estimation is the cost of production of fur farming as of the date when application of IAS 2 "Inventories" begins. Based on  
149 the technology of slaughter the date of collection of fur farming products (crop) and the date of application of IAS 2  
150 "Inventories" should be considered as coincident.

151 To facilitate the determination of fair value IAS 41, paragraph 15 provides guidance: "The fair value of a biological asset  
152 or agricultural product is easier to define, if to group the biological assets or agricultural products according to background  
153 characteristics, such as age or quality. The company chooses the basic characteristics on the basis of those used in the  
154 market as the basis for pricing".

155 Fur farming is characterized by the following group of products: by type of animals: mink, sable, arctic fox, fox, etc.;  
156 by color attributes, for example, minks have the following color groups: brown, mahogany, pastel, light brown, pearl,  
157 palomino, white, silver, blue, sapphire, black corduroy etc.; by size, in different fur exchanges there are various  
158 approaches to estimating the size; by quality.

159 According to IAS 1, paragraph 54, information about the value of biological assets should be reported in the balance  
160 sheet as a separate line.

161 IAS 1, paragraphs 66 and 67, permit (commit) the division of the article "biological assets" into subclasses or in  
162 balance, or in the notes to the balance sheet. In reporting of organizations involved in fur farming, it is advisable to  
163 allocate at least two sub-items: the value of biological assets - fur and rabbit farming; the value of biological assets - other  
164 branches of agriculture. Such division of articles of biological assets is significant for potential consumers of information

165 about activities of organization dedicated to fur farming, since it clearly separates value of biological assets related to fur  
166 farming and the value of biological assets related to other branches of agriculture, which the organization is engaged in.  
167

168 **3. Results**

169 IAS 41 does not provide accurate list of groups and classification features of biological assets, leaving this procedure to  
170 organizations. In this case, the organization must disclose the principles underlying the classification used. We  
171 recommend the groups of biological assets for fur farming, as to which it is necessary to form information in financial  
172 accounting prepared in accordance with IAS.  
173

174 **Table 1:** Groups of biological assets for fur farming presented in accordance with IAS 41  
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Kinds of biological assets		Groups of assets of fur farming	fur animals groups as to types			
Mature	Bearers	main herd	Mink	Fox	Arcticfox	Sable
	Consumed	Animals for slaughter	Mink	Fox	Arcticfox	Sable
		Sperm	Mink	Fox	Arcticfox	Sable
Not mature	X	Foals in growing	Mink	Fox	Arcticfox	Sable

177 In paragraph 46, IAS 41 establishes the requirement about disclosure of positive performance of organizations for each  
178 group of biological assets. With regard to fur farming it is necessary to disclose physical indicators shown in table 2.  
179 This list of physical indicators is essential and largely determines cost valuations in fur farming industry, both current and  
180 projected ones, which is important for consumers of financial accounting prepared in accordance with IAS.  
181

182 **Table 2:** Physical indicators of fur farming disclosed in accordance with IAS 41  
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Groups of physical indicators	Physical indicators			
	Mink	Fox	Arctic fox	Sable
	biological assets			
Main herd	livestock, total mass, mode of mass, color groups, type of hair (long, short)			
Animals to slaughter	livestock, total mass, mode of mass, color groups, type of hair (long, short)			
Young animals in growing age	Age, livestock, total mass, mode of mass, color groups, type of hair (long, short)			
Agricultural products				
Sperm	Number of pellets or polypropylene straws with their volume in milliliters and the estimated number of motile sperm cells after thawing.			
Crude skin	Number of units divided into color groups and type of hair (long, short)			
Carcasses	Food and feed (amount in centers)			
Manure	Quantity in tones			
By-product (fat etc.)	Quantity in centers			

185 When correlating mode of mass with average value of mass of fur animals, one can judge on uniformity of herd and thus,  
186 more objectively to evaluate the health of animals and predict future cash flows. In addition, mode is more objective  
187 measure than the arithmetic mean. Its inclusion is due to the fact that it is necessary to assess the nutritional state of  
188 animals, and in this case for all sex and age groups. This is the important indicator, since, for example, for broodstock the  
189 excessive fatness and underweight greatly determine fertility, and for animals in growth fatness determines the potential  
190 size and quality of skin, which the price depends on.  
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192 Based on the requirements of paragraphs 40 and 48, according to IAS 2, tabular representation of the fair value of  
193 agricultural products and biological assets, as well as the financial results in terms of fur farming will be as follows.  
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**Table 3:** Fair value, profits and losses of fur farming (fragment of report on financial results for fur farming, drawn up in accordance with the requirements of IAS 41 and IAS 2 for \_\_\_ quarter of 20xx, ths, rub.

Indicators	Line code	At the beginning of the period	movement of cost for the current period		At the end of period	Change
			income (growth)	expenditure (decrease)		
Fair value total(2110+2120+2200+2210+2220+2230+ 2240)	2100	49539	103043	37663	114919	65380
Of main herd	2110	19992	0	157	19835	-157
young in growing	2120	29397	83119	19506	93011	63613
of them slaughtered total (2131+2132)	2130	0	19573	19573	0	0
including adult animals	2131	0	157	157	0	0
young	2132	0	19416	19416	0	0
fair value of pelts	2200	0	18447	18000	447	447
Carcasses obtained	2210	1195	1127	0	2321	1127
Of Manure	2220	150	350	0	500	350
deaths	2230	(10)	(90)	0	(100)	90
sperm	2240	0	0	0	0	0
Sales of raw skins (revenue, profit) total from the beginning of the year	2300	20100	18000	X	38100	18000
Expenditures (total cost)	2400	18150	X	X	37950	19800
Estimated marketing costs on the sale of assets related to line 2100	2410	4000	1004	4	5000	1000
Profit according to IAS 41 (2100+2300-2400-2410)	250	48684	X	X	111263	62580
Profit according to Russian accounting standard (2300-2400)	260	1950	X	X	150	-1800

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The information in this table reflects the schematic representation of the statement of financial performance in fur farming drawn up in accordance with IAS 41 and IAS 2. However, this scheme has a practical value and can be used in preparing financial accounting in accordance with IAS unchanged, respectively, adding the accounting data on other areas of the organization.

Let us consider Table 3 line by line.

Line 2100 reflects the fair value of minks of all age groups based on the fair value of skins, carcasses, manure and cost of cattle loss, from which it is impossible to obtain the potential revenue (fallen animals, from which there is no way to get skins and carcasses suitable for further use). In lines from 2110 to 2130 the fair value is reflected in accordance with IAS 41, based on the fair value of live animals (plus the cost of the skins of carcasses) and sperm. Expenditure in lines 2120 and 2130, column 5, is the cost (in fair evaluations) of live animals going to slaughter, and unused cattle loss. Correspondingly, these figures form the data as to lines from 2130 to 2131 and line 2230 column 3.

In lines from 2130 to 2132 the fair value of slaughtered animals is reflected. It should be noted here that the value of slaughtered animals includes in sum the fair value of skins and carcasses.

Lines 2131 and 2132 decrypt line 2130.

In line 2230, "Mortality" the value of mortality is shown, provided that it is impossible to use the carcasses and skins of dead animals. In table 3, in line 2230, column 5, further movement of the value of mortality is not shown in order to maintain the consistency of formation of column 6. In practice, this cost is included in expenditures and in the above calculations is also taken into account in the expenditure.

In line 2200 there is reflected the income of animals skins in stock at the cost of 18,447 thous. rubles (column 4), which is calculated as difference between the value of slaughtered mink (line 2130 column 5) and the value of carcasses (line 2210 column 4). Also in line 2200 is reflected the expenditure (column 5) of skins from reserve to implementation at cost of 18,000 thous. rubles. The result is that in store is left the amount of skins for 447 thous. rubles (column 6), which passes into the following periods.

It is necessary to take into account that the estimated fair value of sales sent to the reserve and attributed to the cost, in Table 3 is made according to prices at the moment of time, relating to the end of \_\_\_ quarter of 20xx. In other words, the table takes into account the principle of revaluation of assets at the time of reporting, nominated in accordance with IAS.

Line 2300 reflects the proceeds from the sale of skins, cumulative from the beginning of the year at the beginning and the end of period, as well as the current period. In this line the estimation of the fair value corresponds to IAS 18.

Proceeds from the sale of manure and carcasses may also be present, which should be reflected appropriately in this report. However, in the conventional example, these products are not implemented to the side, so revenue from it is not reflected, but in lines 2210 and 2220 the fair value is simply shown. Lines 2210 and 2220, column 5, do not show further movement of value of carcasses and manure in order to maintain the consistency of formation of column 6.

In practice, the carcasses completely go to be eaten by animals, and their cost is included in the full cost of products of farming (included in line 2400). In the analysis it should be taken in mind that the cost of carcasses presents in the valuation of live animals and deduction of the total cost from the fair value of fur-bearing animals, in which is also present the value of carcasses, we have mutually compensating values. From economic point of view, this means savings on feed of its own production.

In line 2400 the full costs associated with growth and sale of minks are reflected. In this example, we do not concentrate on registering the report on profits and losses in the accepted format, focusing on IAS 41 and IAS 2. Therefore, the known articles of expenditures (depreciation, administrative expenses and so on.) are not mentioned in Table 3.

The line 2410 reflects the expected marketing costs associated with possible sale of all assets of mink farming. This item is included on the basis of requirements of IAS.

Line 2500 reveals profit according to the requirements of IAS as the sum of the fair value of minks (sperm, adult animals and young), skins left, manure, carcasses and raw pelts sold minus the total expenditures.

For comparison the line 2600 reveals profit according to Russian accounting standards as the difference between the proceeds from the sale of raw skins and full expenditures.

The form of Table 3 brings together a number of possible reporting forms, which should clarify the statement of profits and losses of fur farming industry, which follows from IAS, in general, and IAS 41, in particular. Columns "income" and "expenditures" of Table 3 are intended to make clear changes in the fair value of the assets of fur farming at the end of the reporting period compared to the beginning of the period, so they are given in the table. In practice, the movement of cost for the period may be reflected in a separate report form similar to that shown in Table 3.

The data and arguments mentioned above show the possibility and a clear line of reporting in the field of fur farming in accordance with the requirements of IAS 41.

#### 4. Conclusions

In the current economic environment, both external (financial) and internal accounting reporting are the main sources of information for assessing the solvency and creditworthiness of potential business entities, management decision-making in evaluation and optimization of structural units, business processes, and other segments of agricultural organization.

Using this information in the field of supply, the selection of suppliers and contractors is made, the ways of transporting and delivery of raw materials, components, semi-finished products to the organization and directly to the production units are determined. Biological assets from the investor's perspective as a user of accounting data require special user skills, that is, the rules of evaluation and recognition in reporting, in view of their special economic function as a property that cannot serve as collateral for obligations of the company, when its financial position corresponding to the principle of continuity of operations, but for this it is a major potential of profitability of appropriate enterprises. On this basis, a possible way to improve the content of accounting reporting in Russian agricultural enterprises should be adaptation of method of biological assets accounting, determined by international accounting standards, with a view to the possibility of its use in Russian accounting practice.

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## Special Aspects of Horse Husbandry Production Costs Calculation

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### Abstract

*The given article considers the special aspects of horse husbandry production costs calculation and proposes the scientific-methodological approach of its optimization. Utilization of this approach will make possible to determine a well-reasoned cost of product produced and the data received thereby will serve as the basis for rational decision-making in the field of strategic management and manufacturing activity planning. Data base of cost management in horse breeding development is certainly a complex process that involves planning, valuation, accounting, analysis, effective cost control and management, forecasting, and making appropriate decisions to prevent negative results.*

**Keywords:** *output cost determination, production cost, expenses, horse husbandry, items of calculation.*

## 1. Introduction

Output cost determination appears to be one of the main aspects of bookkeeping and theoretically substantiated method of cost accounting. At agricultural undertakings cost determination is used for: establishing the level of break-even price, cost of goods manufactured control, calculating efficiency of technological, zoocultural and organizational measures being planned and implemented in industrial activity development and estimation of produce profitability. Since output cost determination completes the last stage of production costs accounting, it plays an important part in obtaining verifiable information with regard to cost management in horse husbandry.

## 2. Theory

At estimating output cost production a well-reasoned choice of calculation items and revenue unit of service what makes possible to production costs determination

Different processes act in the function of accounting entity and as the items of calculation serve separate kinds of produce received in the production process. In horse husbandry the main accounting entities are the reproductive herd and youngsters being grown. The items of calculation are the following:

- 1) according to the reproductive herd: milk, animal yield, colt body-weight increase and work;
- 2) according to youngsters being grown– body-weight increase.

Revenue unit of service is an adopted unit to measure the item of calculation in real terms: milk (1 c), animal yield (heads), colt body-weight increase n (1 c), work (1 work day). Considering that horse youngsters is not weighted the body-weight increase should be estimated not in centners but to determine the self-cost of one feed- day, i.e. of one day of animal housing (Figure 1).

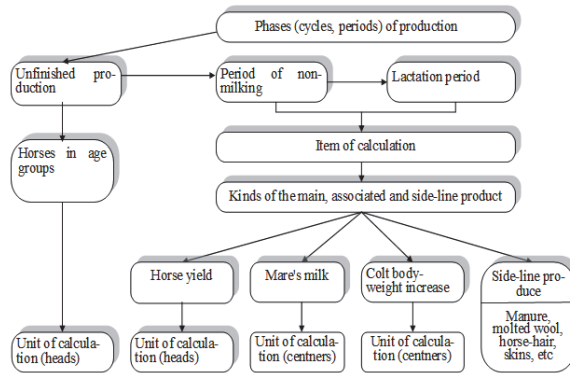


Fig.1. Stages and items of horse husbandry production cost calculation at phase method of cost accounting

Moreover, at calculating production costs it should be useful to establish an accounting period and to determine the method of accounting. The accounting period in horse husbandry is considered to be a calendar year what is not at all correlated with technological aspects of the given industry and trespasses against the principle of compliance. In other words, expenses for brood horses growing and housing of the given calendar year is impossible to refer to this year's manufacture of products as the production cycle in brood horse husbandry makes 3-5 years.

At present production cost accounting in horse husbandry is implemented by means of mixed method that implies the use of several techniques: method of expenses involved in side-line produce exclusion and non-process method. The method of expenses involved in side-line produce exclusion is applied at production costs accounting and lies in the fact that according to their structure the manufactured products are divided into the main and side-line produce. In doing so, merely the main produce is accounted. The side-line produce in horse husbandry comprises manure, molted wool, horse-hair, skins and fallen animals' recycled meat. The side-line produce is estimated by previously fixed prices. At accounting the main produce the value of production is subtracted from the total sum of expenses. The remaining amount will present the costs of the main produce. The main disadvantage of this approach is that in practice not all the side-line produce is entered into accounting records. As a consequence, the main produce cost is deliberately overestimated.

Application of one or another method of costing is influenced by production description, the intended use of a manufactured product and the duration of the cost-accounting period. The use of only one of the widely used existing methods does not make possible to determine certain kinds of produce cost size to the full extent and produce cost-effectiveness analysis.

Cost accounting in horse husbandry is necessary to arrange in compliance with the special aspects of technology and manufacture in the given industry. It should be noted that production process in brood horse husbandry is monitored according to technological process stages by reference to specific features of brood horses' youngsters housing, i.e. each technological stage in youngsters growing, mare's milk and koumiss (fermented mare's milk) production has its own peculiarities. The initial stage of youngstock growing up to 2 years both in efficient horse husbandry and on stud farm appears to be the type of mass production of brood horse husbandry with primarily group housing. The first stage of brood horse-breeding production must be characterized by the availability of non-process cost accounting items and breeder youngsters costing. At the stage of breeding up to 6-7 months age the suckling colts are housed together with mares and they are fed by primarily mare's milk. Gradually the colts are trained to follow the dam and later on the mares and colts are combined in groups. In dairy horse husbandry the mares within 30 days after colting are batched in groups to be accustomed to machine milking and the mares with foal at foot are transferred to group cubicle houses by 12-15 dams with foals per cubicle. Since the one-month age the specific weight of supplementary feeding is gradually increased (including concentrated feeding, Calf Milk Replacer and premixes) to prepare them to weaning.

At horse breeding complexes the weaners are separated according to sex. The fillies come to the shop where they are batched into three age-groups:

- 1) after weaning from 8 months up to 1 year;
- 2) older than 1 year to be grown for remount and sale;
- 3) older than 2 years for breeding.

Last group is designed for young mares' covering since a 2,5-year age.



Colts after weaning also enter the shop where they are grown for remount and sale. Part of them beginning with a three- years- age is left in the quality of a breeder. The youngsters are housed in group cubicle houses and paddocks by 20-25 heads per a housing unit. Daily they are doing physical exercise in the field during two hours.

On brood stud farms the weaning colts are housed by pairs in box stalls. Colts and fillies are managed separately taking into account their advancement and temper. At the age of 6-12 months the colts-weaners are set to training. Action lessons for colts at this stage involve running in alternating pace with gradual enlargement of distance.

In 2-3 months after weaning begins the next stage of the colts breeding and housing when they are directed to hippodrome and where they are taught to be accustomed to horse harness, horseman crew and reining. They are also housed in groups and involved in compulsory action lessons. At the age of 18-24 months, at the next stage, the colts are trained individually. The goal of individual training is maximal development of horse working capacity by means of progressive load enlargement and youngsters' involvement in various paces (trot, extended canter). As a consequence of training the horses work out high action, hardiness, ability to spurts and clear transition from one allure to another. Within this period it is wise to use phase method for cost accounting of brood horses' youngsters and their output cost determination.

The core products of koumiss farm are mare's milk, fermented mare's milk or koumiss and colts grown before the weaning. Production expenditures for koumiss manufacturing are accounted as a whole, according to production line, i.e. accounting of all expenditures are entered to a separate sub-ledger account. In case when an enterprise is engaged in permanent processing of the mare's milk and has its own koumiss workshop then cost accounting is necessary to implement according to separate technological operations. For instance, koumiss production costs are influenced by amount of expenses related to mare's milk and absorbed expenses of its processing. Self-cost of the mare's milk is shaped up from the amount of expenses for managing stallions and mares on a koumiss farm (including expenses for colts supplementary feeding and milking operations) but excluding cost of colts-weaners, male-horses and mares' work, manure and molted wool. Therewithal non-breeding colts are estimated by prices for beef cattle, but breeding colts-weaners - in size of 40% of sales price established for one horse of II category I class of the appropriate breed. The cost of mares and male-horses work is estimated by standard cost of a horse-day for a working horse, manure is accounted by fixed estimate and molted wool - by realizable value price.

Processing of mare's milk to produce koumiss comprises the following stages: ferment manufacture, koumiss production, bottling and cooling in refrigerating chamber. At koumiss output cost determining total sum of expenditures for koumiss farm management (excluding colts-weaners and side-line products cost) is divided into total quantity of koumiss produced. In other words, a simple (non-process) method of cost accounting and output cost determining is used.

### 3. Results

In brood horse husbandry the self-cost of animal yield (broodmares, stallions and colts before weaning) at birth and by the day of weaning (young animals per mother) is estimated by reproductive herd.

Colts self-cost at birth is estimated on the basis of the expenses for 60 feeding days of mares housing. To calculate the self-cost of one colt at birth the cost of the side-line product is subtracted from total sum of mares management and the remaining amount is divided by the number of the mares' feeding days then a one feeding day cost is multiplied by 60.

On brood stud farms the core produce within a year is estimated according to target prime cost:

- foal crop of trotting breed by target prime cost of 60 days of feeding adult horses;
- foal crop of roadster breed by target prime cost of 60 days of feeding adult horses;
- foal crop of heavy harness horse breed in size of 80% of target prime cost for 60 days of feeding adult horses;
- mare's milk in the amount of 20% of target prime cost for 60 days of feeding adult horses;
- the cost of one head surplus young stock for a month is determined based on the established procedure of calculating 1 feeding day in housing youngsters of pure-blood roadster breed, Russian trotting breed and heavy harness horse breed.

For output cost determination of young animals per (one) mother (before weaning from a dam) the total cost of reproductive herd housing (excluding side-line products cost and cost of mares and stallions' work according to target prime cost of horse-day for working horses) is divided by the number of heads of young animals per (one) mother. The assessment of the indicated numbers of head is implemented by this prime cost in all directions of movement.

In brood horse husbandry the prime cost of horse youngsters' one head at the end of year and the cost of one head surplus are accounted according to group of all-age youngsters.

In the event the youngsters are being not weighed, the cost of one head surplus is determined on the assumption

of calculating the number of feeding days in horse housing and average cost of one feeding day. At calculating the cost of one feeding day the expenditures for horse housing minus cost of the side-line produce are divided by the number of feeding days. At accounting the cost of youngsters one head surplus the cost of one feeding day is multiplied by the number of feeding days according to the given youngsters group.

The expenditures associated with work horses are allocated to that kind of product for which manufacture draft-cattle was used. While assigning expenses on kinds of produce one horse-day (one day of horse's work) is used as a conventional measure.

At one horse-day prime cost determination the following expenses are accounted:

- labour cost with charges to horsekeepers and other workers engaged in adult horses servicing;
- the cost of foodstuff and horse-litter;
- depreciation and current repair of stable facilities and of equipment;
- other direct costs (electric power and water supply);
- general production expenses and general running costs allocated to work horses in the established order.

The amount of expenses does not comprise the costs of work horse youngsters as well as the expenses on labour remuneration for riding horsemen and other workers engaged in draft-cattle servicing. Then, the cost of one is determined by dividing the difference of annual expenses sum and side-line products cost by the total number of days in the given organization' horse housing. The cost of a work horse's colt is equated to the cost of 60 feeding days.

The foal crop total cost is estimated by multiplying the cost of one feeding day by 60 and by the number of youngsters produced.

The cost of one horse-day in the horse work is accounted according to the formula:

$$\text{Skd} = (Z - ((Z - P) / \text{KD}) * 60 \text{ Zh} - P) / \text{GVkd} \quad (1)$$

where, Skd – the cost of one horse-day;

Z – total cost of work horse housing;

P – side-line products cost (minus foal crop cost);

Zh – number of youngsters produced;

KD – number of feeding days in the year;

GVkd – annual horse days output.

Once in a while, we may need to refer to the determination of average annual unit for a certain kind of work (harrowing hectare, ton –kilometer of transportation), then we may use the formula:

$$\text{Sr} = ((\text{Skd} / \text{RD}) + \text{OT}) / \text{VR} \quad (2)$$

where, Sr – cost of the given kind of work unit;

Skd – the cost of one horse-day;

RD – work days number (horse-days produced);

OT – remuneration of labor for the whole accounting period to workers engaged in the given kind of work;

VR – completed work amount in the accepted units.

The technique of determining foal cost at birth and by the moment of weaning needs to be thoroughly studied. The existing method for output foal cost determination at birth and by the moment of weaning does not comply with technological requirements for fetus bearing and foal breeding after weaning as well as makes impossible to provide managerial staff with reliable information for making efficient managerial decisions in relation to costs management.

Mare's fetus is being formed within 11 months and is completed by colting only the next year. Therefore, absorbed expenses on in-foal mare housing since the moment of impregnation in the current year must be allocated to cost of the next year foal. In the process of the whole covering campaign and up to the latest terms of insemination in mid-June we can observe the effect of fetus bearing period displacement in relation to the accounting period. In this connection the expenses for impregnated mare housing should be accounted in the next accounting period. The fact that a foal's cost by the moment of birth is accounted in accordance with cost of 60 feeding days in a mares' housing is based on the assumption that fetus formation is more intensive within last two months. The given assumption can be used at determination of cost for only work horses since along with their foal crop production they are extensively used in internal works therefore it can be needed to determine the cost of one head of foal crop, one horse –day.

As the main goal and designation of broodmares' housing in horse husbandry is foal crop production, the existing method appears to be merely conventional and doesn't make possible to obtain the exact information for costs managing. In our opinion, the foal's cost by the moment of birth should comprise all the expenses on broodmares' housing within the period of pregnancy and the prior service - term apart from supplementary expenditures connected with suckling colts' breeding and works implementing. The mares' lactation period makes about 6 months and by the end of this term the mare has already been five months pregnant when the process of fetus formation is not so intensive. In order to allocate

206 supplementary expenditures it is necessary to exclude permanent expenses for broodmare's maintenance feeding and  
207 include them into the cost of the next year foal, the rest of the expenditures being included into the cost of foals by the  
208 moment of their weaning.

209 Brood horse youngsters' cost after weaning is determined by summing up the costs of their housing in the  
210 accounting year which is defined by the number of the feeding days and one feeding day average cost as well as the cost  
211 of youngsters to be on the books as of the beginning of the year. The reality is that cost accounting of brood horse  
212 youngsters' management is estimated by direct costs summing up with their subsequent allocation in proportion to  
213 average annual head numbers of all age youngsters. In addition to the above it should be taken into account that the  
214 expenses on different age colts' housing and feeding (for instance, at the age of 6 months and two years) are varied  
215 widely. To put it differently, this information appears to be averaged and cannot serve as the basis for obtaining reliable  
216 data in relation to this industry cost management.

217 The most well-reasoned cost object providing trustworthy cost determination for brood horse youngsters at various  
218 stages of their breeding is one feeding day. For the purposes of accountable- analytical form of costs management in  
219 horse husbandry it is possible to propose dividing costs accumulation and accounting of one feeding day according to  
220 stages (phases) of breeding. This can be done by use of automated accounting record where accumulative cost  
221 accounting and one feeding day cost calculation is implemented according to each stage of youngsters' breeding within a  
222 certain period of time (a week, 10 days, etc.). This procedure will give an option of doing assessment for one feeding day  
223 cost change at each stage of brood youngsters breeding. In doing so, it is possible to calculate individual cost of a colt at  
224 each stage of his breeding at transfer to the senior age group and up to his sale, by the following formula:

$$225 \quad S_{zh} = C_o + (S_{k.d.i} * D_i * K) \quad (3)$$

226 where,

227  $S_{zh}$  – a colt self-cost, rub.;

228  $C_o$  - a colt self-cost at birth,

229  $S_{k.d.i}$  - cost of one feeding day in i-period, rub.;

230  $D_i$  – the duration of a colt housing in i- period of accounting;

231  $K$  – number of accounting periods being included in a colt self-cost accounting.

232 The procedure of cost accounting and one feeding day cost calculation organized in this way requires no  
233 permanent calculation within the process of horse youngsters' breeding and gives an option of more exact determining a  
234 colt's cost at any stage of his breeding. In addition to the above, the use of up-to-date information technologies  
235 significantly diminishes labor effort as compared with manual accountable information processing [4].

236 Application of standard costing method for production expenses and output cost determination assumes compiling  
237 cost-information report where all calculations are stated. The cost-information report is made up by the accounting  
238 records of the manufactured produce quantity and actual expenditures. The cost-information reports are correlated with  
239 cost budget (standard) by means of uniform nomenclature of calculation items. Actual costing is applied to control the  
240 fulfillment of Key Performance Indicators and to diminish production costs. The cost-information reports comprise  
241 expenses and losses being not provided for cost budget, for instance, youngsters and adult horses' mortality, non-  
242 monetary physical things inadequacy within the limits of natural loss rates. This will not bring about the violation of cost  
243 budget and cost-information reports compatibility but promote enhancement of supervising and analytical functions of  
244 accounting information. The cost-information reports makes possible to assess progressivity of the current norm for  
245 resources consumption and the efficient application of the organization's funds and, moreover, it appears to be one of the  
246 main sources of information at cost budgeting, economic cost analysis and cost prediction [2].

247 The main documents to be guided in horse husbandry output cost determination calculation comprise such  
248 specialized forms of documentation as «Cost calculation for one horse head housing» and «Calculation sheet of  
249 husbandry output actual costs determination».

250 «Cost calculation for one horse head housing» is used for cost calculation of housing one horse head according to  
251 brood youngsters and the reproductive herd separately as well as by each breed individually. The figures in the document  
252 are shown as of the beginning and the end of the accounting period what is necessary for implementing the most detailed  
253 and complete analysis of horse housing cost management to take managerial decisions.

254 «Calculation sheet of husbandry output actual costs determination» (see Table 1) is formed in compliance with  
255 «Methodological recommendations on book records of production cost accounting at the agricultural enterprises». The  
256 similar calculation sheet can be compiled in relation to youngsters being bred and koumiss production. The calculation  
257 sheet gives the possibility to monitor cost structure according to cost items both as a whole and per one horse head as  
258 well as per one litre of koumiss. The given document, its structure and content entirely comply with the requirements of  
259 production cost reporting preparation and is important in itself as the source of reliable information in compiling

260 accountable-analytical data.

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262 **Table 1:** Calculation sheet № \_\_\_\_\_ of husbandry output actual costs determination for the year of 20XX.

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3.1 Cost items structure (debit side of sub-ledger account \_\_\_\_\_ reproductive herd \_\_\_\_\_)

Cost items	Costs, total, thous.rub.		Costs per one head, thous.rub.	
	Actual	Budget	Actual	Budget
Numbers of head	164			
1. Related Costs				
Individual Costs	1618,4	1600	9,87	9,75
a) feeding-stuffs				
c) means of animal protection	81,99	80,10	0,50	0,49
d) oil products	19,8	20,4	0,12	0,12
e) fuel and energy for the purposes of technology	22,5	21,1	0,14	0,13
f) (main) direct labor cost	673,26	670,0	1,63	1,65
g)(supplementary) direct labor cost	191,3	190,4	1,17	1,16
h) allocations for social requirements of production workers	216,14	205,8	1,32	1,25
Composite expenditures				
a) expenses involved in maintaining durable means of production	267,6	270,0	1,63	1,65
b) production preparation and development costs	28,5	25,4	0,17	0,15
c) outsourced works and services	19,29	20,1	0,12	0,12
d) indirect costs for works and services	588,2	580,2	3,58	3,54
e) Other production costs	61,4	60,4	0,37	0,36
Production losses				
a) losses due to rejects	-	-	-	-
b) losses due to animal mortality	28,9	-	0,18	-
c) other losses	-	-	-	-
2. Constant Expenses (semi-fixed costs)				
2.1. General expenses of production on management	248,6	250,0	1,52	1,52
2.2. General economic expenses	96,6	95,4	0,59	0,58
Total of expenses	4530,4	4500,8	27,62	27,44

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3.2 Cost accounting for object of costing and revenue unit of service

Item №	Indicators	Amount, rub.
1.	Actual amount of expenses on horse reproductive herd housing, including:	4530481
	- side line produce costs	291420
2.	Costs allocation:- share of expenses charged to mare's milk	80%
	- share of expenses charged to horse foals	20%
3.	Expenses involved in production by deducting side-line products	4239061
4.	Expenses involved in mare's milk	3391248
5.	Expenses involved in foal crop	847813
6.	Produced: - mare's milk, centners	1311,08
	- foal crop, heads	127
7.	Actual costs:- 1 centner of mare's milk	2586,6
	- 1 foal head	6675,7

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3.3 Correlation of budget cost up to the level of actual costs, rub.

Item №	Product designation	Actual costs, rub. .		Cost in budget estimation, rub.		The amount of correlation, rub.		
		Total	1 revenue unit of service	Total	1 revenue unit of service	«+», «-»	Total	1 revenue unit of service
1.	Mare's milk	3391248	2586,6	3005528	2292,4	+	385720	294,2
2.	Foal crop	847813	6675,7	824228	6380,3	+	23585	295,4

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### 3.4 Cost-accounting difference writing-off

Item №	Items of product use	Quantity	Cost-accounting difference («+»revaluation surplus; «-» reversing entry)	Corresponding account (Dt)
1.	Sold	1500 kg	+	90
2.	Rearers (and fatteners)	127 heads	+	11
3.	Sent to recycling in the same organization	129608	+	20.3

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## 4. Conclusions

As can be seen from the above, production cost accounting (throughput accounting) in the conventional accounting practice presents a part of the common system of book records. While doing so, the proper accounting (financial) records and production process accounting are interdetermined and interrelated since both of them have the same procedures of business transactions documentation and their valuation base. Besides, the data of the uniform accounting system can be converted either into financial or into management information system depending on the user's goals.

Moreover, the criteria of financial accounting primarily characterizing the financial status and the organization financial performance in whole can be supplemented by operational information and inner accounting reports submitted by financially accountable persons what gives the possibility to assess the efficiency of production engineering in any production area. In such a case, the accounting acquires managerial positioning since it is the accounting structure being recommended by the requirements of International Financial Reporting Standards [3].

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# Functions Accounting at the Enterprises of Dairy Cattle Breeding in the Context of Cost Pool According to Physiological Groups

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## Abstract

The given article is devoted to accounting functions and development of the device for cost-pricing of milk and animal yield in dairy cattle breeding on the background of cost pool according to physiological groups that makes possible to find more exact cost values, to currently detail both actual and scheduled information and take managerial decisions on eliminating the effect of the distortions exposed and implement measures aimed at costs budgeting for a period ahead.

**Keywords:** dairy cattle breeding, physiological groups, managerial accounting, cost calculation, direct costs.

## 1. Introduction

Livestock producers noticed that the dry cows within various periods after not-milking milk and consume feeding-stuffs with different degree of intensity. In dairy cattle breeding it brought to such technology as cows housing with a glance to their physiological groups. As distinguished from mixed housing this technology makes possible to specialize milk cows' diet, improve the quality and enlarge the volume of the milk received.

## 2. Theory

The core of physiological groups technology lies in the fact that a milking herd is divided according to three criteria: the number of days post calving (D), daily lactation performance (U) and scored by five-grade scale (K). Let us take the table of criteria for a milking herd division recommended by the federal state unitary enterprise (FGUP) "GVTS Minselkhoz of Russia (RF Ministry of Agriculture)".

**Table 1.** Criteria "D", "U", "K" for a milking herd division into groups

Group number	Number of days post calving (D)	Daily lactation performance per head (U), kg.	Body condition (K), grades
1	0-100	More than 24	3,5-2,5
2	101-200	24-16	2,5-3,0
3	201-305	16-8	3,0-3,75
4	306-345	-	3,0-3,75
5	346-365	-	3,0-3,75



The figures for daily lactation performance (U) are taken on the assumption that annual milch cow productivity is equal to 6000 kg. Let us characterize the given groups:

- 1) The first cow group called «the group of increasing the milk yield» is defined by the largest lactation performance: more than 24 kg per head in a day. The cows come to this group on the 6<sup>th</sup> day after calving in a weakened state. High lactation performance of this group inevitably results in milking cows' weight reduction and even well-balanced diet cannot replenish the loss of energy. That is why the main goal of the cow management in the first physiological group (apart from milk yield) is cow's special care;
- 2) The second group is distinct by less lactation performance: (24-16 kg per head in a day). Within this period the cows begin to take weight since the reduction of lactation performance also brings to the diminishment of metabolic cost. The main goal of the cow management in this group is the prevention of decrease of daily lactation performance in more than 9% per month.
- 3) The third group is characterized by the least lactation performance (at most 16 kg of milk per cow in a day). As well as for the second group the main aim of the cow management in this group is the prevention of decrease of daily lactation performance in more than 9% per month. Here such objectives as thrush preventative, weight take –up and preparation to calving are realized;
- 4) The fourth group comprises dry cows. The period of not-milking lasts on average about 60 days, nearly 40 of which fall on this group. The aim of the cows housing in this group is the prevention of the cow's fetus overgrowth that can be the result of the excessive fleshing and lead to hard and complicated calving. The cow's diet should be balanced with micronutrients, magnesium, in particular, and contain minimal quantity of concentrated feeding stuff;
- 5) The fifth group is maternity barn. The cows stay there about 20 days before calving and 5 days after – to feed the yield by colostrum milk. The cow begins to get the first group's diet within 20 days before calving. The mass of combined feed is gradually enlarged up to 3-4 kg per day. The cow management in this group is aimed at animal yield when calving takes place without outside help.

With a view to milk getting technology cows' management in physiological groups as compared to mixed housing promotes lactation performance, bettering of the health condition, production of healthy animal yield, concentrated feeding stuff saving within not-milking period, etc. With regard to financial and managerial accounting cows' management in physiological groups must imply costs record-keeping and cost accounting according to each group individually, when doing so, the main object of accounting in the first three groups will be a centner of milk produced but in 4<sup>th</sup> and 5<sup>th</sup> groups – animal yield. Various housing conditions in different groups and variants of diet are the most expensive items for the enterprises of dairy cattle breeding because it implies getting not the same self-cost of a centner of milk in a group. Prime costs should be also allocated either with a view to physiological groups or passing this stage - between final objects of accounting. Thus, in our opinion, the technology of a milking herd cost accounting should come along with the described above technology of separate cows' housing.

### 3. Results

The tool of assigning costs being direct in relation to physiological groups between such items as milk and animal yield is founded on the following proposed coefficients (Table 1)

**Table 2.** Coefficients of assigning costs being direct in relation to physiological groups between such items as milk and animal yield

Objects of accounting	Physiological groups				
	I group	II group	III group	IV group	V group
Milk	0,96	0,9	0,9	0	0
Animal yield	0,04	0,1	0,1	1	1

Since the cows are transferred to the first group on the 6<sup>th</sup> day after calving, on the 65<sup>th</sup> day they are conceived and on the 100<sup>th</sup> day they come to the second group, in our opinion, it is necessary to take into account temporal factor and apply the proportion of not 90% to 10%, but 96% to 4%, i.e. the costs for animal yield are cut by more than twice. The temporal factor also implies that the conventional ratio of 90% to 10% should be used in the second and third physiological group where the cows have already become conceived. Consequently, metabolizable energy of the feeding stuff is consumed in size of 10% for yield from the first and up to the last day of the cows' stay in these groups. As for the cows being housed



in the fourth and fifth groups, they are dry and, hence, their diet is completely gone in fetal development, i.e. 100% of direct expenses are allocated for animal yield.

In the development of cows' management accounting by physiological groups it is necessary to consider the aspects of accounting direct and allocating indirect expenses of the enterprise which includes the conditions of milk and yield total and direct cost forming. With this end in view it is needed to state and describe input matrix of expenses for a milking herd management in physiological groups (Table 2).

**Table 3.** Input matrix of expenses for a milking herd management in physiological groups

Divisions (TsO)	Expenses for cows housing in physiological groups (FG)					Total by TsO
	$\Phi\Gamma_1$	$\Phi\Gamma_2$	$\Phi\Gamma_3$	$\Phi\Gamma_4$	$\Phi\Gamma_5$	
TsO <sub>1</sub>	$\sum_{1,1}$	$\sum_{1,2}$	$\sum_{1,3}$	$\sum_{1,4}$	$\sum_{1,5}$	$\sum_{1,z}$
TsO <sub>2</sub>	$\sum_{2,1}$	$\sum_{2,2}$	$\sum_{2,3}$	$\sum_{2,4}$	$\sum_{2,5}$	$\sum_{2,z}$
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TsO <sub>n</sub>	$\sum_{n,1}$	$\sum_{n,2}$	$\sum_{n,3}$	$\sum_{n,4}$	$\sum_{n,5}$	$\sum_{n,z}$
Total by FG at the enterprise	$\sum_{i,1}$	$\sum_{i,2}$	$\sum_{i,3}$	$\sum_{i,4}$	$\sum_{i,5}$	$\sum_{i,z}$ (i = 1...n) (z = 1...5)

As it is shown in the Table 2 in the course of accounting according to physiological group method accountants in managerial bookkeeping department will have possibility to enter expenses by two directions: in horizontal direction, i.e. each division individually, and in vertical – by each physiological group where the horizontal format is designated, primarily, for making decisions by the managers of the divisions and vertical format – for the operating efficiency analysis at the level of top management. In both cases direct expenses for cow management will be accounted on a mandatory basis. As for indirect costs, in this case there are variants available.

The most logically true at applying horizontal format, according to our reckoning, is the approach implying inclusion of general production expenses and general running costs into function costing that will make the managers of the certain level possible to take decisions in the field of pricing, cost optimization and their short payback period, etc. For vertical format it is logical to account only direct expenses. It is determined by the fact that in order to match the results of the goals stated before the subdivisions top management is needed a cost index free of expenses being not connected with the activities of the certain physiological group of the certain subdivision.

If the senior management is given a possibility to group both direct and indirect costs for cow housing with a view to vertical format of accounting, it will result in the situation when these subdivisions' workers can be able to vary the figures of indirect expenses allowed for costs group, for instance, by means of applying another allocation base, etc. This will probably mean the distortion of the accounting results and profitability ratio. To prevent this from happening, the senior management must develop tough instrument of expenses accounting and cost determination the same for all divisions in order to reconcile all the data stated in the accounts. However, allowing for the fact that the structure and method of indirect costs allocation should be provided in all inner company regulations and be corrected by totals of the accounting period. The approach of «tough regulation instrument» leads to the appearance of cost-based bureaucratic system that will result in the struggle for extra financial resources laid in the company budget instead of production growth and healthy competition arising.

#### 4. Conclusion

In this connection it is more coherent to refuse from indirect costs accounting for housing of cows in groups and calculate the cost only by the indices of direct expenses as it was originally stipulated by «direct-cost method» developed by Jonathan Harris in 1936. Hence, the necessity of indirect cost tough regulation is eliminated, in any case, with a view to prediction of basic analytical indices presented below, in Table 3, in relation to cows housing in physiological groups. It is noteworthy that waiver to include indirect costs in the analysis of core indicators automatically brings to one more problem related to the senior managers' temptation of transferring part of direct expenses into direct costs structure. In doing so they try to make possible «improving» baseline indices of effectiveness what is not positive for an enterprise as a whole. To solve this problem it is possible:

- 1) To elaborate the list and device for cost accounting by direct expenses the same for all divisions in order to reconcile all the data stated in the accounts. Similar to the case of full inclusion of expenses in the structure of

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cost it will be necessary to reconsider the scope of direct expenses by totals of the accounting period at the senior management level. So, on this side the danger of creating a bureaucratic system of regulation again springs up. The difference, however, lies in the fact that the scope of regulation proposed will be more modest since indirect expenses to be not taken into account and, hence, the whole system will be more flexible and viable.

**Table 4.** Performance indicators in relation to the tasks of the cows housing within physiological groups

Physiological groups	Cows housing	
	Technology goals	Performance indicators
1	2	3
1 group – the group of increasing the milk yield (from 0 up to 100 days after calving)	Milk production, special cows care after calving	1. Search of the group profitability ratio in each subdivision; 2. The group profitability ratio correlation with the analogous indicators in other subdivisions; 3. Each group profitability ratio correlation with the analogous indicators of the accounting period; 4. Search of the group profitability ratio in a company as a whole; 5. The group profitability ratio correlation with the analogous indicators of the accounting period in a company as a whole.
2 group (101-200 days after calving)	Prevention of decrease of daily lactation performance in more than 9% per month.	1. Search of the group profitability ratio in each subdivision and their correlation with the analogous indicators of the previous months ; 2. The group profitability ratio correlation with the analogous indicators in other subdivisions;
3 group (201-305 days after calving)	Prevention of decrease of daily lactation performance in more than 9% per month.	3. Search of the group profitability ratio in a company as a whole and their correlation with the analogous indicators of the previous months.
4 group (306-345 days after calving)	Cow preparation to successful calving	1. Search of calf crop actual costs per head in each subdivision; 2. Correlation of cost figures found with the scheduled ones in each subdivision; 3. Correlation of calf crop actual costs in a subdivision with the analogous indicators in other subdivisions;
5 group (346-365 days after calving)	Animal yield production	4. Search of calf crop actual costs per head in a company as a whole and their correlation with the analogous scheduled indicators.

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- 2) Since, indirect cost pool takes place in horizontal format of expenses accounting the idea of parallel monitoring indirect items dynamics especially in relation to scheduled figures and including the data of the previous periods, results of correlation with other subdivisions' analogous indicators, etc. seems to be logical. Each of the given above paragraphs (1 and 2) can be applied individually.

The cow housing performance indicators are not limited by those stated in Table 3 but, however, it appears to be the main list for the assessment of fulfilling tasks related to cow management pursuant to physiological groups. So, the performance indicators of the first physiological group do not imply juxtaposition of different physiological groups' profit margin with the analogous data of the previous months, as, for instance, the first group or «the group of increasing the milk yield» is defined by the largest figures of milk yield. The peak of the milk yield falls to 40<sup>th</sup> -50<sup>th</sup> day further the figures begin to slightly decline but remain to stay at rather a high level. Therefore, at this stage the main goal is not so much monitor the dynamics of monthly milk yield decline as getting the more milk yield and, consequently, maximal book rate of return, be meant, without compromising the procedures of cow care after calving. Nevertheless, the performance indicators for the first group assume juxtaposition of the obtained results with the analogous data of the previous accounting periods, not per month but quarterly and annual profit margin values.

The index of effectiveness in the 2<sup>nd</sup> and 3<sup>d</sup> groups can be calculated separately from each other in view of the fact that the preset (scheduled) values of milk yield for the 2<sup>nd</sup> group will be higher than for the 3<sup>d</sup> one, as these groups' milch cow productivity falls by the intrinsic (physiological) reasons. However, the objectives for the technology of cow housing in these groups coincide and from this perspective the indexes of effectiveness in the reports of various subdivisions can be united, therewithal, the task of this groups' milk yield dynamics monitoring per month comes to the fore. Respectively

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analytical accounting of costs for cows housing should be made according to the months of cows staying in groups. It should be noted, that the search of the enterprisewide indices of milk yield profit margin is characteristic for all the groups that makes the senior management possible to estimate the enterprise produce competitiveness on a consumer market, to soften the processes of pricing formation, and, vice versa, to use pan-corporate product sale price as a guide for the price calculation. When doing so, in order to find profitability ratio in separate groups it becomes possible to use milk yield index-numbers as sales volume accounting on the basis of quantities correlated for pan-corporate product sale price. The last two groups are interrelated by a single goal – bovine offspring. In this light it is not necessary to search cow management expenditure level in 4<sup>th</sup> and 5<sup>th</sup> groups separately. The expenditures for both groups are one way or another laid in cost per cow yield head, therewith, care should be taken to the fact that fodder costs for 1-3 groups are allocated between milk and animal yield by means of the ratios stated in Table 5. As can be seen from the above, at calculating cost per cow yield head apart from the 4<sup>th</sup> and fifth groups' own expenditures it is necessary to add secondary costs of the previous groups. Consequently, to find profitability index for 1-3 groups we use solely the costs related to milk yield but not to animal yield in the following ratios 96% to 4% and 90% to 10%, appropriately. Schematically it can be shown in the following way (Fig.1).

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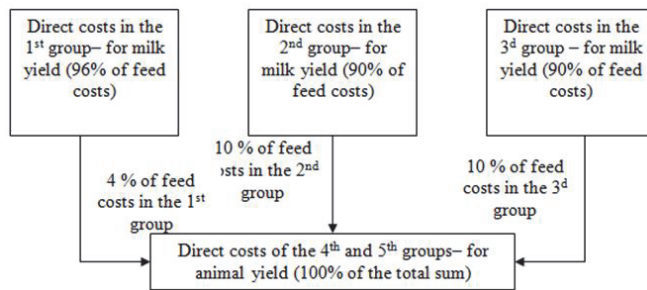


Fig.1. Allocation of feed costs for finding performance indicators for cow housing in physiological groups

In order to make a company-wide analysis the senior managers of a dairy cattle breeding enterprise can calculate self-cost of animal yield per head in all subdivisions. Provided that the activities of the separate subdivisions are relatively identical, a company-wide self-cost can be used in forming a target price per head with a view to enter the calves into accounting records within a year.

At analyzing the scheme given above and the performance indicators from Table 3 inference should be drawn that some convention exists in cost pooling between the 2<sup>nd</sup> and 3<sup>d</sup> groups as well as the 4<sup>th</sup> and the 5<sup>th</sup>. In other words, it could be possible not to regard all 5 physiological groups of animal housing but take into accounting only the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>d</sup> and 4<sup>th</sup> ones where the costs of the 4<sup>th</sup> and the 5<sup>th</sup> groups are combined. Moreover, the costs of groups 2 and 3 can be also combined with the result that only three groups of animal housing account are left what will significantly facilitate the enterprise managerial staff's work. At the same time, it should be noted that availability of three groups instead of five though simplifies these groups' performance measurements analysis but is not possible to objectively estimate milk yield self-cost at each stage of cow housing technology use. Milk yield self-cost received according to the 2<sup>nd</sup> and 3<sup>d</sup> groups remains to be different and combining these groups' indices will subsequently bring to cost figures distortion and, hence, to the distortion of the main point in the accounting by physiological groups.

The same relates to groups 4 and 5: despite their interrelation they are not at all identical. The housing of the cows in the 4<sup>th</sup> group is aimed at their preparation to calving. Correspondingly, while pooling the costs within the determined framework the medium-level managers prepare and submit to the management the information about the charges for a 45 –days' preparatory phase before calving not only for each subdivision but for the whole enterprise. As for the costs combined into the fifth group, called a maternity barn, they reflect information of the calving cost. Thus, the convention of groups division into the 4<sup>th</sup> and the 5<sup>th</sup> lies not in the fact that both groups are associated with the animal yield birth but is related to the matter of what time will be required for a cow transferred from the 4<sup>th</sup> group into the 5<sup>th</sup> to give birth to a calf – a week, a couple of weeks or days.

As it has been already mentioned, to estimate overall subdivision performance horizontal format is used which is based on explicitation of costs in relation to each physiological group. At the same time, combining groups within the

218 frames of horizontal format makes no sense since it is implemented only with a view to more fast performance  
219 measurements analysis, especially in relation to tasks intrinsic to the technology of cows housing in physiological groups  
220 (Table 3) and to compiling accounts for the senior management. But as far as the subdivisions are concerned, they do  
221 need information about the groups to make managerial decisions of costs optimization. So, the cows housed in the 4<sup>th</sup>  
222 group receive a limited diet rich in mineral additives while the cows of the fifth «maternity» group are gradually transferred  
223 to the group of increasing the milk yield's diet. It can be explicable on the basis of the fact that a cow's fetus will not give  
224 an excessive growth within some days left before the calving, at the same time, microbial population in the rumen will be  
225 prepared for the lactation period. Therefore, separate accounting in groups four and five will make possible within the  
226 whole accounting period to monitor any change associated with cows' management and influencing their performance  
227 and well-being. By the totals of the accounting period the heads of the subdivisions can take managerial decisions on  
228 eliminating the effect of the distortions exposed and implement measures aimed at costs budgeting for a period ahead. In  
229 what connection the procedures of costs accounting according to physiological groups are simplified since cows transfer  
230 from one group to another is mapped out to the last day and each physiological group has a certain costs structure and  
231 distinctive performance data.

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# Management Reporting and Its Use for Information Ensuring of Agriculture Organization Management

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## Abstract

*In the article, the procedure for formation of administrative documents is determined, information flows are identified and the major primary documents and accounting records of information for management decision making are marked out, management documents are developed and proposed that allow one to quickly gather accounting data and process the information for decision making. The main source of information for management decision-making in the assessment and optimization of structural units, business processes, and other segments of agricultural organization is internal reporting*

**Keywords:** management accounting, internal management reporting, information, report.

## 1. Introduction

The globalization of economic relations, use of modern information systems and current information processing technologies have specific requirements for provision of agricultural organization management with detailed information in the context of business processes, forms and activities segments. There is need in reflection of costs and revenues in financial and mainly management accounting, in forming the specialized reporting, creating the system of analysis and processes and activities monitoring. In IAS and RSPA in order to ensure the effectiveness of management and monitoring of economic activity, particularly close attention is paid to specification of information on various activities.

## 2. Theory

Internal management reporting is a fundamental element of the entire management structure, the most important instrument of control in agricultural enterprise management. Despite the fact that management reporting was established long time ago, until now there is no standard form of management reporting approved at the state level. Each organization develops its own form. However, despite the lack of strict regulation in development of management accounting forms, it makes sense to be guided by the regulation on Management Reporting SMA 5B "Fundamentals of reporting information for managers" [1].

In our opinion, the internal management reporting can be described as a collection of administrative documents included in schedule of workflow, containing the system of interrelated economic indicators and used to make effective, timely management decisions. Upon decision-making, crucial is period of time from receiving a report to decision-making and its implementation. Paramount value is here acquired by location and method of supplying relevant information, accessible format of management reports. Internal management reporting does not contain a standard set of common

57 shapes and is strictly individual.

58 Internal management reporting is an integral part of the overall accountability of enterprise and is marked out on  
59 the basis of such classification attribute, as the purpose of drawing up. In most agricultural organizations there is shared  
60 responsibility of heads of various departments for various tasks, the achievement of planned results in the overall  
61 management structure. This dividing of responsibility, as a rule, has a hierarchical structure, which is conventionally  
62 divided into three levels:

- 63 - Operational (lower) level. When planning at this level, very detailed information arrives relating directly to the  
64 current time, i.e., decisions in respect of accounts receivable and payable, payroll; complaints and claims from  
65 customers (clients), works schedule (plan) performance, identification and analysis of deviations of actual  
66 results from the planned ones actually have short-term nature. In agriculture, the operational management  
67 level is presented mostly by foremen, who reflect business operations in primary documents and further apply  
68 them to their management activities;
- 69 - Tactical (middle) level studies the effectiveness of resources use to achieve better results. Decisions are made  
70 in relation to: procurement, location (store) of stocks of raw materials and finished products, sales (based on  
71 the results of analysis), cash flows forecast. The experts at this level of management include shops  
72 executives, various specialists (agronomists, engineers, zootechnicians, etc.), who use accounting information  
73 directly from the source documents and registers;
- 74 - Strategic (top) level is aimed at the long-term prospects, involves decisions making about the organization as  
75 a whole and determines the direction of development of organization in future. Decisions are made in respect  
76 to: investments in different projects; entering new markets (development of potential markets); forecasting and  
77 budgeting. In agricultural companies, top-level management, which is represented by managers and senior  
78 staff, requires systematic information in the form of such qualitative indicators as crop production, animal  
79 productivity, labor costs and so on. These parameters can be obtained either from the primary documents,  
80 accounting records, or may be designed according to special formulas. On the basis of intensive use of these  
81 indicators it is possible to make effective management decisions, to detect and timely remove deviations [3].

82 When setting the workflow, one must keep to the following sequence: analysis of accounting information  
83 movement; workflow schedule formation; binding to specific employees of the enterprise the responsibility for records  
84 management; preparation of reporting activities schedule; preparation of notifications to the persons responsible for  
85 workflow implementation.

86 For agricultural organization management it is important to chose the way of reporting information presenting,  
87 which is directly influenced by the content of information defined and provided, and methods of its acquiring and transfer,  
88 requirements of reports users, etc. The most of administrative documents are presented traditionally in tabular form on  
89 paper. But one can also use such methods as presentation on display, with colored charts and graphs, and other means  
90 of demonstration.

91 The frequency of reporting for management is of great importance. In agriculture, as in other industries, it depends  
92 on the time during which the information is relevant and useful to make effective management decisions. Thus, the  
93 frequency of submission of reporting information and formation of management reports in crop production is directly  
94 influenced by such factors as seasonality of production and duration of production cycle. For example, part of  
95 management information on the progress of harvest, carried out in relatively short time, should come to users in real-time,  
96 each time it changes. Of course, the most of indicators of management accounting and reporting does not require such  
97 efficiency. Thus, data on production of stock-raising products, spoilage, deviations from standards and targets, amount of  
98 products sold and their cost are usually presented on a daily or weekly basis.

99 One may draw conclusions about the profitability and efficiency of certain types of products, services of industrial  
100 and auxiliary production based on monthly reports. In any case, management reporting systems need to be developed  
101 with account for the needs of leaders of various levels of management in reporting they need for its presenting in the  
102 shortest time after the end of the reporting period.

103 In order to make effective management decisions more informative and sufficient, we consider it is necessary to  
104 include in reports the indicators of planned (standard) or similar data of past periods. A comparison with the planned  
105 values allows us to estimate its performance and identify the causes of discrepancies, which can be caused by wrong  
106 planning and inaccuracy of forecasting. The comparison of management reporting data of past periods, comparison with  
107 indicators of advanced enterprises, industry market values present significant addition to management reporting and also  
108 have a special value and practical significance.

109 Farm management requires accurate and up to date information about all changes taking place in presence and  
110 movement of fixed assets, intangible assets, inventories, animals for breeding and fattening, production costs and yield of



111 agricultural products, etc. Using this information, officials can make reasonable and cost-effective management decisions.  
112 As is known, one of the objectives of accounting is to provide accounting information for internal users. This  
113 information is generated at the following stages of accounting process:

- 114 1. Documentation of operations is characterized by collection of information on financial activities of organization.  
115 Since the primary documents contain primarily the reporting information that may be not enough for effective  
116 management decisions making, it may be necessary to supplement the primary document or create a new  
117 managerial document.
- 118 2. Grouping and ordering of reporting information - are characterized by technical processing and  
119 systematization of reporting information based on the chart of accounts of financial and economic activities of  
120 agribusiness organizations.
- 121 3. Formation of certain forms of accounting reporting, including internal reporting of agricultural organization used  
122 in management process.
- 123 4. Application of reporting and accounting information in the analysis of financial and economic activities of  
124 agricultural organization [4].

125 Managerial document is the main form of information provision to managers of organization and as the primary  
126 accounting documents it must contain the obligatory entries: name of document, name of organization, indicators (their  
127 calculations or interpretation of economic sense if applicable), conclusions and recommendations, the date of  
128 compilation, names of posts responsible for the information provided, and their signatures.

129 There are the following stages of internal management report [6]: 1) defining the purpose of providing information  
130 for the head; 2) determination of the level of management for which the administrative document is composed; 3)  
131 determining the division of the organization for which the managerial document is drawn up; 4) creating a list of indicators  
132 that most fully and objectively satisfy the requirements of the head for information; 5) calculation of indicators and their  
133 inclusion into the managerial document. On the basis of the above stages of managerial document creating, we have  
134 developed formats of internal management reports for major reporting objects of agriculture organization.  
135

### 136 3. Results

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138 When making a decision on each of the processes of assets management (purchase, repair, replacement, sale,  
139 improvement, etc.), various alternative solutions arise. To make the most effective solutions of the proposed ones,  
140 calculations for each of them should be prepared. Also, when preparing estimates for management decisions, unused  
141 production capacity should be taken into account, details of which can be obtained from technical documentation for fixed  
142 assets. Typically, accounting of this information is performed by economic planning service of organization. In preparation  
143 of managerial decision one must take into account that non-used production capacities generate extra costs for their  
144 maintenance, which consequently increases the cost; in organization loss of income occurs that it could have got, if all  
145 the production facilities have been used for its intended purpose; unused production capacity provide organizations with  
146 some flexibility in decision-making on output. In this regard, taking into account the demands of efficiency, effectiveness  
147 and comparability, we have developed a management report format for agricultural enterprises, which presents the  
148 analytical table, designed in such a way as to combine several forms of managerial documents [5].

149 Table 1 provides a report on fixed assets, comprising administrative data on fixed assets. This document contains  
150 information about the intended and actual availability of fixed assets, useful and actual period of their operation, the  
151 amount of accumulated depreciation. Also, it includes quality characteristics, such as functional depreciation, external  
152 depreciation, performance. Functional depreciation - reducing of consumer appeal of certain properties of an object,  
153 caused by the development of new technologies in production of similar machines or equipment. Reducing the  
154 attractiveness of the object as a result of these reasons entails its impairment. When determining the functional  
155 depreciation of tractors and equipment one must be guided by the following rules:

- 156 - Machinery and equipment previously used and not in demand in the market up to 10%;
- 157 - If at the time of inspection production of the equipment of estimated modification is stopped, then - from 5 to  
158 30% and additionally up to 15%, if production of spare parts is stopped for the equipment being evaluated of  
159 this model.  
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**Table 1.** Report on fixed assets

Name of Fixed Assets	Actual Availability		Actual Life, Years	Expected Life, Years	Depreciation, Thousand Rub.		Functional Wear, %	External Wear	Efficiency
	Number	Cost, thou. Rub..			%				
Bulldozer crawler tractor DT-75N based "Kazakhstanets"	1	200	17	20	85	1133	10	No obvious signs of impact of outer wear is revealed.	technical level is low; annual checkup; Repair - once in three years.

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Performance of machines is defined by technical level of products, system of checkup and repairs and operating conditions.

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External wear becomes apparent in the loss of cost caused by major industrial, regional, national, or global technological, socio-economic, environmental and even political shifts and changes.

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As is known, one of the objectives of cost accounting is to determine the production costs for evaluation of inventories in order to create financial statements and management decisions. Such tasks of inventory accounting as control over the observance of the norms of consumption, control of correspondence of stocks to standards established by the organization, proper allocation of cost of expended in the material resources production for the objects of calculation, shall be carried out not only for the purpose of financial reporting, but also in the management of inventories.

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For decision-making management the following objectives are set: organization of timely information about presence and movement of inventory; material classification conducting; materials movement control; determination of optimal level of inventory; valuation of stocks released for management decisions making; allocation of cost of material resources expended in production for the objects of calculation; analysis of variances of actual consumption of raw materials from the normative (planned) one.

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To account for the inventory in agricultural organizations a number of primary documents is used: power of attorney, credit slip; act of acceptance of materials; limit fence-card and other documents. The information provided in these documents, in our opinion, would be sufficient for classification of materials and determination of optimal inventory levels. In addition, one can analyze the supply of tangible assets, for which we propose the following form of management report (Table 2).

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**Table 2.** Report on supply of tangible assets

Type of material values	Suppliers	Quality Specifications	Price, rub..	Scope of supply					
				plan		reporting period		on accrual basis	
				rub.	%	rub.	%	rub.	%
Thermal protection	LLC "Selkhozapchasti »	Wicker glass-optical thread, covered with silicone rubber layer	2304	2304	100	2304	100	6912	100
Agricultural tires	LLC "Selkhoztekhnika	Diagonal design with all-metal frame, in chamber version	1200	1200	100	1200	100	6000	100

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As for inventory management, we have developed a report form (Table 3), which is based on cards of materials reporting, statements of reporting balances of inventory in storage areas, report on movement of inventory items in storage. This document is to be drawn in the form of a register of all kinds of materials and may include such factors as product name, item number, unit of measure, rate of stock, income, consumption and residue materials at the end of the reporting period. Indicators in the management report must be adjusted in accordance with inventory data.

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**Table 3.** Report on inventories

Material Name	Item No	Unit of measurement	Norm stocks	income			consumption			residue
				purchase price	Quantity	Sum	Price of issue	Quantity	Sum	
Autoventilator	000000535	Piece	3	60	3	180	60	1	60	120
Bucket	000000479	piece	30	95,06	20	1901,2	95,06	5	475,3	1425,9

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199 When making management decisions on output and sales, management primarily needs information about presence and  
200 movement of finished products, formed in operational report. Movement of finished products in agriculture is registered by  
201 a variety of primary documents, analytical accounting is carried out in "Statement of sales reporting of products, works  
202 and services of agricultural organizations" and in supporting documents "Register of documents for sale of finished  
203 products" and "Register of documents for sale of inventories, works and services, fixed assets and other assets". On the  
204 basis of accounting information compiled in these documents we offer to make the managerial document "Report on  
205 movement of finished products," which will display the following for each product: channels of arrival and sales of finished  
206 products, amount of contract revenue actually received in the past month and cumulatively from the beginning of the  
207 year, and deviations.

208 This document is, in our opinion, will help to solve a number of problems, including:

- 209 - Evaluation of finished products. As is known, the evaluation of finished products in agriculture is conducted  
210 according to the planned (normative) production cost. There are also estimates according to accounting and  
211 market prices. According to the most researchers the most appropriate in terms of decision-making is the  
212 method of assessing according to the market cost, since in this case, management is provided with the most  
213 realistic picture on reflection of finished products in the assets of organization;
- 214 - Coordination of production with the work of provision service, namely, a change in the product range due to  
215 the customer's needs;

216 Taking part in the development of the system of discounts for regular customers and maintaining control of the  
217 system of discounts to make it contribute to the development of the enterprise in order to achieve the main objectives.

218 Particular attention should be given to obtaining of managerial information on production costs accounting. In the  
219 modern conditions formation of the cost of production is one of the urgent tasks in management decisions.

220 Upon cost accounting, the main task of managing is production costs management. The main condition for  
221 obtaining of reliable data on the cost of production of organization is clearly defined composition of production costs. The  
222 main principles of cost accounting organization are: coordination of cost accounting indications with planning indications;  
223 inclusion of all production costs of the reporting period in its cost; grouping and reflection of costs on production units,  
224 types of products, components and cost items; consistency of cost accounting objects with objects of calculation;  
225 providing separate reflection of production costs according to current regulations and deviations from them; maximum  
226 approximation of methodology and organization of cost accounting to IAS.

227 Cost management depends on how is estimated the cost of production (works, services). In the process of  
228 calculation, initially it is required to determine accurately the value of primary costs. In this respect it is necessary to carry  
229 out permanent monitoring of material values consumption in the course of production. Fairly reasonable calculation of  
230 costs of products (works and services) involves a series of successive accounting activities, which provide the formation  
231 of real costs for all accounting objects.

232 During the formation of information for management decisions on accounting for financial performance of  
233 organization one must use accounting information that is generated in the accounts of financial results and well presented  
234 in "Report on Financial Performance." Management information is generated based on the results of financial analysis  
235 performed and is included in managerial document "Report on the results of the work of the unit" (Table 4).

236 Also, the use in practice of principles of precaution and requirements to business operations documenting take the  
237 important part. This practice leads to the fact that the accounting records appear in a few weeks, or even months after the  
238 reporting period. In this regard, operational account of contracts and relationships with contractors, movement of material  
239 assets, receipts and payments, the feature of which is exceptional focus on management goals, as well as use of non-  
240 documented sources of information, forecast estimates, etc are formed in divisions of organization. With simultaneous  
241 use of data of accounting and operational reporting for management accounting the problem of disparate data arises,  
242 forcing organization management to use manual or operational data, or accounting.

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**Table 4.** Report on the results of division activities for 20XX

Indicators	Unit	Plan	Actual	For the same period of the previous year	the deviations from +, -	
					Plan	the same period of the previous year
<b>I. Milk</b>						
1.livestock	head	500	500	450	0	50
2. yield per 1 head	l	65,3	63,3	69,4	-2	-6,1
3. Gross yield	c	32650	31683	31259	-967	424
4. Material expenditures: including - feed	Thous. Rub.	8050	8037	7592	-13	445
- Mineral and organic fertilizers	Thous. Rub.					
- means of animals protection	Thous. Rub.					
- combustive lubricating materials	Thous. Rub.	1500	1330	580	-170	750
-service of supportive productions	Thous. Rub.	355	366	337	11	29
5. Salaries	Thous. Rub.	3540	3630	2890	90	740
6. Subscriptions for social needs	Thous. Rub.					
7. Depreciation charges	Thous. Rub.	4620	4588	1588	-32	3000
8. Works and outsourcing	Thous. Rub.					
9. Other expenses	Thous. Rub.					
10. Cost total	Thous. Rub.	18065	7951	12987	-114	4964
11. Cost of product unit	Rub.	553,3	566,6	415,4	13,3	151,2
<b>II. Growth of live weight</b>						
1. livestock of animals for breeding and fattening goal	head.	1250	1388	612	138	776
2. Growth of live weight, obtained total	c	2320	2084	2480	-236	-396
3. Material expenditures: including - feed	Thous. Rub.	6500	5438	6313	-1062	-875
- Mineral and organic fertilizers	Thous. Rub.					
- means of plants protection	Thous. Rub.					
- combustive lubricating materials	Thous. Rub.	1230	1587	696	357	891
-service of supportive productions	Thous. Rub.	125	205	188	80	17
4. Salaries	Thous. Rub.	1250	1182	2398	-68	-1216
5. Subscriptions for social needs	Thous. Rub.					
6. Depreciation charges	Thous. Rub.	71	71	71	0	0
7. Works and outsourcing	Thous. Rub.					
8. Other expenses	Thous. Rub.					
9. Cost total	Thous. Rub.	9176	8483	9666	-693	-1183
10. Cost of product unit	rub	3955,1	3464,3	3897,5	- 485,8	-428,2

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To eliminate the existing contradictions, we consider it is necessary for management accounting to use in organizations internal reporting data within a single information space of accounting information on the basis of ERP-system. In this

system all actual data are entered once, and then they are reflected either in balance, or only in operational account, or simultaneously in both two types of accounting. Comparison of the data of sales department, procurement, finance department and other departments with the accounting data is converted into elementary automated procedure performed with any frequency on user's request.

#### 4. Conclusions

Thus, we determined the order of formation of administrative documents, information flows are identified and the major source documents and accounting records of information for management decision-making are marked out, management documents are developed and proposed that allow one to quickly gather accounting data and to process the information for decision making.

Internal reporting is the main source of information for management decision-making in the assessment and optimization of structural units, business processes, and other segments of agricultural organization. Content of the internal reporting is determined by the volume of powers delegated to a particular unit. Calculation of specific indicators of reporting is largely dependent on organizational and technological features inherent in a particular organization and its structural units.

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# Accountancy in Horsebreeding Organization in Compliance with International Accountancy Standards

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## Abstract

The article deals with the issues of biological assets accounting in compliance with the international accountancy standard (IAS) 41; we have studied the IAS 41 and IAS 2 spheres of influence in horse breeding accountancy by the stages of the production process, and offered the groups of biological assets in horse breeding, which require generating of information in financial accounting compiled in compliance with the IAS. Improvement of the production costs accounting and analysis in horse breeding will allow fostering the accounting and information support of self-cost management and creating the necessary basis for taking clever management solutions aimed at the profit maximization.

**Keywords:** horse breeding, biological assets, international accountancy standard (IAS) 41, fair value.

## 1. Introduction

IAS selection as a basis of the domestic accountancy reforming demands more thorough study of the standards essence, their requirements, as well as evaluation of their application opportunities in the domestic accounting practice. Despite the fairly great attention paid to the systematic approach development towards the IAS introduction into the Russian accountancy practice, the issues of IAS complex interpretation remain still understudied. Thus, the research of IAS evaluation as an integral system being in close relationship with the systems of management accounting, audit, estimation, etc., is not fulfilled making the source of the certain problems, which occur by the IAS application.

## 2. Theory

International accountancy standards – are the documents containing the integral system of requirements governing the aims, application area, approval (accounting) scheme, estimation, presentation and disclosure of information on the separate accounting objects and types of activity in the financial accounting, which is rendered to the internal and external users by their effective managerial decisions making. International Financial Reporting Standards include International Accounting Standards developed by the former International Accountancy Standards Committee (IASC) and International Financial Reporting Standards – IFRS, developed by the International Accounting Standards Board (IASB) acting within the frames of the new International Accountancy Standards Committee Foundation (IASCF).

In compliance with the acting Conceptual framework the financial accounting shall be prepared basing on the following fundamental assumptions: the accrual basis means that the results of operations and other events shall be recognized whenever they occur, but not when the monetary funds or their equivalents are received or paid; going concern basis means, that the financial accounting is compiled on the basis of the assumption that the enterprise shall continue its activity in the nearest future, i.e. there is nether necessity nor the intention to considerably decrease the volume of operation and liquidate itself.

The Conceptual framework indicates the following quality characteristics making information useful for the users: understandable, relevant, reliable, comparable one. The Conceptual framework reflects as well the concept of the "true and fair presentation", which is not determined as the quality characteristic, but indicates that the compliance of information to all listed quality characteristics allows truly and fairly representing of the financial state. The concept of the "true and fair presentation" is for the most part connected with the theoretically anticipated result – the reflection in the accountancy of the real state of the company. The existing Conceptual framework does not emphasize the present concept specially, nevertheless it is considered that by using the basic quality characteristics and corresponding standards the result will be of the "true and fair presentation".

Financial accounting shows the financial results of the events and other operations, herewith it groups them into broad categories in compliance with their economic characteristics.

The Conceptual framework emphasizes five basic elements of financial accountancy: assets, liabilities, own capital, profits and losses. Carrying out the comparative analysis of the financial accountancy elements in compliance with the Russian practice and IAS there is an opportunity to make conclusions of the differences existing in their formulations alongside with the certain similarity, stipulated by the application of these concepts in the practical activity of the Russian organizations.

Acceptance of the element in the financial accounting supposes its estimation. Estimation – is a process of the money magnitudes' evaluation in which the element of financial accounting is accepted and reflected in the balance and statement of profits and losses. The financial accounting may use different estimation methods.

The initial (historical) value:

- for assets – the sum of monetary funds or their equivalents, or the fair value at the moment of their acquisition;
- for liabilities – the sum of monetary funds or other revenues acquired as a result of the liabilities occurrence, or in some cases the sum of monetary funds planned for payment to meet the liability within the process of the normal economic activity.

The current value (or the reinstatement value - in the Russian accounting): for assets – the sum of monetary funds or their equivalents which should have been paid in the event the same or the equivalent commodity is purchased at present moment; for liabilities – non-discounted value of monetary funds or their equivalents, which was required to be spent for repayment of liabilities by the ordinary course of business. The American Conceptual framework uses the term the "replacement value" instead of the term the "current value". The realization (repayment) value: for assets– the sum, which can be acquired at present from sale of the asset in the ordinary conditions; for liabilities – non-discounted value of monetary funds, which is planned for payment to repay the liabilities in the course of the ordinary economic activity. One of the realizable value types is a net realizable value - a realizable value after deduction of realization costs. Capital (discounted) value: for assets - discounted value of future net cash inflow planned to receive from this asset in the process of the ordinary economic activity; for liabilities – discounted value of future net cash outflow, which presumably be required for liabilities repayment by the ordinary process of the company activity.

Apart from the indicated estimation types, the international standards use another ones, such as: recoverable amount of assets (IAS 36); fair value (IAS) 2, (IAS) 16, (IAS) 38, (IAS) 39, (IAS) 41. The economic literature very often reflects discussions regarding the possible alternative/additional approaches to the financial accounting estimation selection: additional auxiliary information disclosure; alternative types of estimation disclosure; use of opportunity of history alteration based on the unsupported assumptions; setting of requirements to the rendered warranties; provision of legal application procedures.

Thus we see, that IAS applies a lot of different types of the term "value" without giving definition of the term itself. To our opinion the Standards should give the following definition of the value: product or service worth expressed in the monetary unit, which may substantially vary under the influence of the goods or services market offer as well as their effective demand value.

### 3. Results

IAS 41 determines agricultural activity as the animals and plants (biological assets) bio transformation management for the purposes of realization, agricultural products acquisition or additional biological assets production.

Horse breeding , as per IAS - is a sub-branch of agriculture engaged in horses bio transformation management for the purposes of horse breeding products realization (live horses, meet, kumiss-mare's milk, and dung), horse breeding products (kumiss, meet, and dung) acquisition, or production of the additional number of horses (foal crop).

IAS 41 establishes the biological assets accounting order in the period of their growth, degeneration, production and reproduction, as well as the order of the agricultural product initial estimation in the period of its picking.

As applied to the horse breeding IAS establishes the order of horses accounting in the period of the young horses stock growth; degeneration – mortality, bad development, diseases, etc.; production in horse breeding, which partly coincides with the horses growth, and partly deals with the foal crop. The order of production accounting in this respect concerns the foal crop. Here belongs the reproduction of horses as well.

IAS 41 requirements to evaluation of horses since the moment of the initial appreciation to the slaughter commencement: the evaluation shall be carried out by the fair value after deduction of the assumed sales costs, except cases, when at the moment of the initial appreciation it is impossible to determine the fair value with the sufficient reliability degree.

In cases, when it is impossible to determine the fair value of horses with the sufficient degree of reliability, it is necessary to be guided by the existing manuals of costs accounting in horse breeding, coordinated with the IAS 41 requirements. In this case, in compliance with the International standard IAS 41, the company should reflect the horses by their self-cost after deduction of the accumulated amortization and losses due to their depreciation. With the appearance of the horses' fair value estimation opportunity with the sufficient degree of reliability, the company should shift to the estimation by the fair value after deduction of the assumed sales costs.

IAS 41 shall be applied in the process of the following horse breeding objects accounting in cases, when they are connected with the agricultural activity:

- 1) mature horses, raised horses, foal crop – as biological assets;
- 2) mature horses before slaughter, mare's milk, raw skins, raw horse meat as of the slaughter moment, dung as of the moment of its receipt – is the agricultural product as of the moment of its picking;
- 3) state subsidies to the horse breeding, both of the federal and of the local sub-federal entities.

The process of milk production and slaughter correspond by the essence to the harvesting process, its procedure is determined in the IAS 41, where the cropping means "Separation of the product from the biological asset or termination of the vital activity of the biological asset". The process of horses' butchering is usually called slaughter, thus, the horses slaughter shall be considered the cropping in compliance with the IAS 41. There is a clear separation in the domestic horse breeding practice of the milk yield from the kumiss production. Here the kumiss production is related to the agricultural product processing in the terms and definitions of IAS 2.

There is one more specific type of products – the sperm. By its characteristics it is actually similar to the definition of the biological asset. Nevertheless, by the definition given in IAS 41, paragraph 5, biological assets embrace animals and plants, but sperm – is a microorganism, a cell and belongs to the realm of microorganisms. Proceeding from this sperm should be attributed to the agricultural products.

The Table 1 represents conclusions by the fields subject to accounting in horse breeding as per the IAS 41 and IAS 2.

**Table 1.** Separation by the spheres of influence between IAS 41 and IAS 2 in horse breeding accountancy by the stages of production process

Biological asset	IAS 41			IAS 2	
	Additional biological asset production	Agricultural product cropping	Agricultural product	Agricultural product processing	Product acquired as a result of processing after cropping
Mature horses		Sperm collection	Sperm	Special processing and freezing	Frozen sperm
	Foal crop	Slaughter (butchering)	Milk Meat	Milk processing	Kumiss
Horses in the process of rising			Meat	Carcass preparation	Food meat
				Sub-products separation	Fat, etc.
All horses		Dung collection	Dung	Dung processing	Organic fertilizers

As per IAS 41 "Biotransformation consists of the following processes: growth, degeneration, production and reproduction, resulting in qualitative and quantitative alterations in the biological asset" and "Group of biological assets – is a combination of similar animals or plants".

The group of the "homogenous" biological assets shall include horses as technologically and historically formed sub-branch of the human activity.

In respect of the horse breeding, biotransformation of horses consists of the following processes: growth,



154 degeneration, and reproduction resulting in the quantitative and qualitative alteration of horses.

155 The degeneration is construed in IAS 41 as “the decrease in the amount of the animals and plants or degradation  
156 of their qualitative characteristics”. Degeneration in horse breeding means the potential milk quality disruption resulting  
157 from horses’ disease or mechanical damage of the animal’s body, or the decrease in the horses’ inventory due to the  
158 mortality. As a result it brings about depreciation or decrease of the potential fair value of milk, meat, and kumiss. The  
159 issues of monetary evaluation of the horse breeding products received in the degeneration conditions are totally  
160 regulated by IAS 41.

161 For the financial result determination IAS 41 requires the procedure of recognizing and evaluation of the biological  
162 asset, as well as the products received from the biological asset.

163 As applied to horse breeding, IAS 41, paragraph 10 determines, that the company shall recognize biological asset  
164 – live horses or agricultural product – milk, meat, kumiss, when:

- 165 1) the company controls the asset as a result of the previous events. This refers to getting the foal crop in a  
166 definite estation and its raising. Live horses can be purchased as well – in this aspect they are also allowed for  
167 recognition in compliance with the considered requirement. As this item refers simply to the asset regardless  
168 of its being biological or any other type, so milk, meat and kumiss received in the estation or accepted from the  
169 population for the further processing and sale also fall under its requirements;
- 170 2) the company has a probability of getting future economic benefits from this asset. This item refers to the  
171 definitions of the product and the goods. Horse breeding construes milk, meat and kumiss as the products.  
172 Nevertheless, it is commonly known that the definition of the marketability level is characteristic of agriculture;  
173 it shows the market share of the product for sale in the total volume of the manufactured products.

174 The part of the product, which by virtue of technological reasons shall not be directed to sale, and shall be used for  
175 some other purposes, which in their turn will facilitate acquisition of additional commercial product – acquisition of the  
176 future economic benefits, still must be recognized for accounting as per the present item of

177 IAS 41. Milk, which will go for the foals rearing, can be attributed to such type of product, as well as meat and  
178 kumiss going to the company canteen for making commercial dishes; or natural payment by the horse breeding products.  
179 The products of horse breeding consuming in company for personal needs free of charge shall fall outside the scope of  
180 this item. Here belong free lunches (made only of horse meat), free giveaway of horse meat (to the employees, rural men  
181 etc.), kumiss and horse meat meant for using as gifts, that is all, which not in the least attracts any potential investors, as  
182 it will not give any future direct economic benefits (though these positions may be accounted as organization costs);

- 183 3) fair value, or self-cost of the asset may be evaluated with the good enough reliability level. At the impossibility  
184 to determine the fair value, the domestic norms regulation base allows determining the horses and horse  
185 breeding products’ self-cost quite reliably, provided the regulation base has been complied with and the  
186 respective accounting guided by the IAS 41 requirements has been carried out.

187 Paragraph 30 of IAS 41 reads, “There is an assumption regarding the fair value of the biological asset  
188 determination possibility with the sufficient degree of reliability. This assumption may be denied only at the moment of the  
189 initial recognition of the biological asset failing to submit any information regarding its market prices and indexes, whereas  
190 the alternative calculations of the fair value are most evidently not reliable. In this case biological asset shall be evaluated  
191 by the self-cost after deduction of accumulated amortization and losses due to their depreciation. Upon occurrence of  
192 opportunity to determine the fair value of biological asset with the sufficient enough reliability level, the company shall  
193 shift on to the evaluation by the fair value after deduction of the assumed sale costs”.

194 For the foal crop value determination at the moment of the initial recognition, we recommend to calculate the  
195 historical value (self-cost) after the deduction of the accumulated amortization and losses due to their depreciation.

196 Algorithm of the foals’ crop evaluation by the initial recognition will be the following:

- 197 1) if there is an opportunity to sell the foal’s meat, such foals shall be evaluated by the price of the last  
198 transaction of such kind or by the declared price for such meat at the market plus the sale price after the  
199 deduction of the assumed sales costs;
- 200 2) if there is no opportunity to sell the foal’s meat due to its low physical qualities (insufficient fat quantity, etc.)  
201 and respectfully the absence of the market, the foals shall be evaluated by the normative self-cost after the  
202 deduction of amortization and losses due to their depreciation.

203 Normative self-cost in this case is calculated judging from the cost of 60 feeding days of the mares’ breeding till the  
204 moment, when the physical parameters of the foal allow to use its meat for sale, divided by the number of foals. The  
205 costs volume is acquired judging from the data of the previous period corrected for the inflation.

206 All the succeeding horses evaluation shall be carried out by the fair value of meat and kumiss determined judging  
207 from the prices at the active market (retail trade, fairs, etc.).

208 This provision is regulated by IAS 41, paragraph 31, which indicates, that if the company has ever evaluated the  
209 biological asset by the fair value after deduction of the assumed sales costs, the aforesaid biological asset shall be  
210 reflected by the fair value after deduction of the assumed sales costs up to the moment of its disposal.

211 The most substantiated prices at evaluating of meat and kumiss by the fair value will be the prices, which has been  
212 worked out in the market.

213 At the insufficient substantiation of the prices taken from the channel other than sales through the active market,  
214 one should be guided by IAS 41, paragraph 16:

215 "The companies would very often conclude agreements stipulating the sale of biological assets or agricultural  
216 products on a definite day in future. By determination of the fair value one should not always be guided by the prices  
217 indicated in the agreements, as the fair value reflects the current range of prices at which the buyer and the seller are  
218 ready to sign the agreement. Thus, the availability of the agreement is not necessarily followed by the correction of the  
219 fair value for the biological asset or agricultural product. In special cases the biological asset or agricultural product sales  
220 agreement may occur onerous in compliance with the definition cited in the International Standard IAS 37 "Estimated  
221 liability and contingent assets". The International Standard IAS 37 provisions are applied to the onerous agreements".

222 The active market of horse meat and kumiss operation practice uses establishment of several market prices:  
223 minimal, maximal and average. As per IAS, and basing on the principle of diligence it will be appropriate to use minimal  
224 price for the purposes of estimation and accounting.

225 The fair value of the horses' estimation procedure consists of the following stages:

- 226 1) expert estimation of the horses' size (as well as their potential meat and milk yield) and their quality  
227 parameters (fat, nutrition substances, etc.);
- 228 2) the minimal price is determined in compliance with the price set in the market judging from the definite  
229 quantitative and qualitative parameters of meat, milk and kumiss; so the price estimation of horses is carried  
230 out by multiplying the horses quantity in the group by the received price.

231 At termination of the production cycle of horses' raising at the moment of their slaughter, the meat in any case  
232 must be estimated by the fair value. As per IAS 41 in respect of the horse breeding products (agricultural products) the  
233 estimation shall be carried out by the fair value set in the moment of the horses' slaughter (cropping) after deduction of  
234 the assumed sales costs. Such estimation shall become the self-cost of the horse breeding product as of the date of the  
235 IAS 2 "Reserves" application commencement. Judging from the slaughter technology, the horse breeding products  
236 cropping and the IAS 2 "Reserves" application commencement dates coincide.

237 To make the fair value estimation easier, the IAS 41, paragraph 15 gives the following recommendations: "Fair  
238 value of the biological asset or agricultural product is easier for determination provided the biological assets or agricultural  
239 products are grouped by the main characteristics, for instance, age or quality. The company chooses main characteristics  
240 judging from those used at the market for the price formation basis".

241 The following groping mode is characteristic of the horse breeding products:

- 242 1. Horse breeding products – mare's milk, growth and weight gain, horse raising products, horses' malt wool,  
243 horses' raw hair, horses' work, horses' dung.
- 244 2. Horses' livestock – stud stallions and teasers' livestock, stud horses, mares over 3 years old, teaser stallions,  
245 working horses, workhorses engaged on the agricultural work, other stallions and altered horses over 3 years  
246 old, stud horses over 3 years old.
- 247 3. Foal horses - young stock of stud horses from 3 to 4 years, young stock of stud horses from 2 to 3 years,  
248 young stock of stud horses from 1 to 2 years, young stock of stud horses before 1 year, altered horses of all  
249 ages, young stock of horses from 1 to 3 years, foals after 1 year after the weaning, foals before the weaning.
- 250 4. Young stock of horses by gender or age – stud mares over 4 years, stud colts from 3 to 4 years, stud fillies  
251 from 3 to 4 years, colts before 3 years, fillies before 3 years.

252 In compliance with the IAS 1, paragraph 54, information on the biological assets' cost shall be presented with the  
253 separate line in the balance sheet.

254 IAS 1, paragraphs 66 and 67, allows (obliges) separating of the article "Biological assets" into the sub-classes both  
255 in the balance sheet and in the footnotes to the balance. It is expedient to separate minimum two sub-classes of the  
256 articles in the accounting of the organizations dealing with horse breeding: biological assets value – horse breeding;  
257 biological assets value – other enterprises of agriculture.

258 Such division of the article shall be important for the potential information consumers regarding the organization  
259 activity dealing with horse breeding, as it clearly separates the value of biological assets belonging to horse breeding and  
260 the value of biological assets belonging to the other enterprises of agriculture, which the organization is engaged in.

261 The domestic instructional guidelines and accountancy forms stipulate the reflection of such information. However,

there the balance value is detached from the other qualitative indexes of biological assets, whereas IAS 41, paragraph 43, emphasizes the necessity to divide balance value according to the groups of biological assets basing on the definite qualitative and quantitative features.

IAS 41 does not establish a strict list of groups and classification features of biological assets, leaving this procedure to the organizations. Herewith, the organizations must open principles forming the basis of the used classification. We recommend the biological assets' groups of horse breeding, which need information forming in the financial accounting made in compliance with IAS (Table 2).

**Table 2.** Horse breeding biological assets' groups made in compliance with IAS 41

Types of biological assets		Groups of horse breeding assets	Horses' groups by the gender and age groups					
Mature	Yielding	Main animal stock	Stud stallions and teasers	Studhorses	Кобылы старше 3 лет	Working horses	Altered horses over 3 years	Studhorses over 3 years
	Consumed	Horses for slaughter	Stud young stock of horses of all ages	Altered horses of all ages	Young stock of horses from 1 to 3 years	Foals after the weaning before 1 year	Foals before the weaning	Working horses
		Sperm	Stud stallions and teasers	Studhorses	Studhorses over 3 years old	-		
Immature	X	Raising young stock	Stud young stock of horses of all ages	Young stock of horses from 1 to 3 years	Foals before and after the weaning	-		

Improvement of the production costs accounting and analysis in horse breeding will allow fostering the accounting and information support of self-cost management and creating the necessary basis for taking clever management solutions aimed at the profit maximization.

#### 4. Conclusion

Thus the development of market relations and the entry of Russia in WTO have increased the integration process and broadened cooperation between organizations not only within the country, but on the international level as well, which demands the provision of reliable information to the marker subjects regarding the financial state of the counter agents. Such situation causes objective necessity in transition to the accounting principles complying with the International Accounting Standards (IAS) and development of new instructive guidelines in the accountancy. It has stipulated the emergence of the new accounting category in agriculture - "biological assets" embracing into one group such accounting objects as plants and animals. The present absence of the scientifically based techniques and provisions of accountancy in the system of its normative and legal regulating hinders the objective estimation and accounting of biological assets. In this respect the studying of the theoretical basics, the current practice analysis, development of methodological provisions and practical recommendations in biological assets accounting improvement are essential for the theory, methodology and practice.

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# The Influence of Forms of Insurance Coverage Organization on Population's Life Quality

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## Abstract

*Social insurance is essential for the development of population's quality of life because it fulfils social functions such as low-income citizens support; and economic functions such as the renewal of human resources; the development of the voluntary insurance market due to the increase in effective demand. For historical reasons, there are different types of correlation between compulsory social and voluntary insurance. These types depend on the stage of the development of national economies of countries, as well as from the historically formed principles of social security. Each type has its own purposes, negative and positive sides. Furthermore, we should not forget the specific features of each national economy*

**Keywords:** population's quality of life, social insurance, commercial insurance, compulsory insurance, insurance premiums per capita

## 1. Introduction

Insurance, undoubtedly, plays a significant role in improvement of population's quality of life. The development of social security in this connection is of great importance. We can mark out the following interrelation. As a rule, the state is at the beginning of chain of interrelation. It receives mandatory contributions from population for the development of social security including insurance. Further, social security allows to renew human resources which, in turn, ensure the development of social security.

Voluntary, private, and commercial insurance is a different story. In this case, the demand for insurance resources is created by clients of insurance companies. In this regard, availability of customers funds (i.e., the effective demand for insurance services) is of considerable importance. However, a lack of appropriate funds among potential customers of insurance companies slows the development of voluntary insurance.

In result we have a kind of the vicious circle: insurance, certainly, has a high impact on quality of life, but, at the same time, the insurance development depends on the level of the effective demand, i.e. on the quality of human resources.

It is obvious that, as a rule, the state is at the head of the vicious circle of insurance market development (as an important factor of the population's quality of life). So, the state makes appropriate infusion in the form of mandatory payments to the development of social security; it affects the development of voluntary insurance as well.

## 2. Theory

The size of premiums on the insurance market depends on the population's income level and unemployment rate, and it correlates with the level of premiums per capita. We researched the interrelation of the marked factors within the framework of the Russian national economy for the period from 1998 until 2013. It should be noted that the analysis of the insurance market potential, as well as factor analysis of the relationship between endogenous and exogenous variables, has been performed at various times by many researchers. We can mark an insurance potential assessment model proposed by Shipitsyna S.E., who has built a system of indicators to assess the insurance potential of the region. However, the proposed factors that, according to the author, reflect the insurance potential of the region characterize a current state of the insurance market rather than its insurance potential. Among the indicators are: insurance market concentration, ratio of insurance premiums attributable to one company, volume of premiums, etc. All these indicators do not assess the insurance potential, they describe the result of insurance companies activities. The current state of the

56 insurance potential does not respond to the question of interest for insurers-nonresidents of the market - whether to enter  
57 this market at the moment when the entry barriers have not become a serious problem for access. The author, however,  
58 offers an interesting methodology to assess the insurance potential through its relationship with the investment potential.  
59 Unfortunately, at the time of assignment of a high credit rating and, hence, a high rating of the investment potential to a  
60 particular region, the entry barriers in the market increase rapidly due to the sharp increase in the market competition.

61 We also should note a study of the link between real life insurance premiums per capita and real gross domestic  
62 product (GDP) per capita for 41 countries within three levels of income covering 1979-2007 [1].

63 The authors came to the following conclusions. First, empirical results reveal that the traditional panel unit-root  
64 tests could lead to misleading inferences. Second, for the estimated half-lives, the degrees of mean reversion are greater  
65 in high-income countries. Third, there is concrete evidence favoring the hypothesis of a long-run equilibrium relationship  
66 between real GDP and real life insurance premiums after allowing for the heterogeneous country effect. The long-run  
67 estimated panel parameter results indicate that a 1% increase in the real life premium raises real GDP by 0.06%. Finally,  
68 it was determined that the development of life insurance markets and economic growth exhibit long-run and short-run  
69 bidirectional causalities. These findings offer several useful insights for policy-makers and researchers.

70 However, the authors sometimes omitted the fact that in some countries, such as Russia, life insurance is often  
71 binding (a voluntary form is not developed due to the lack of effective demand) and the state is on the top of life  
72 insurance. It means that, life insurance does not develop with the necessary degrees of freedom. Further, we mark out a  
73 study that incorporates multiple structural breaks to investigate whether property-casualty insurance (PCI) premiums per  
74 capita among 40 countries are mean-reverting or not. The results suggest that the panel dataset is stationary. However,  
75 after introduction of the structural breaks into the model and consideration of cross-sectional dependence the results for  
76 the test vary with regard to different country characteristics. The researchers came to the following conclusion: any  
77 external shocks can have a permanent effect on the insurance premiums. Accordingly, the associated insurance  
78 authorities should take possible structural breaks into account when implementing related policies [2]. Thus, such  
79 investigations should cover a wider period of time to include possible structural breaks.

80 Also we can mark an study of the effectiveness of insurance industry of the national economies within the  
81 international insurance market conducted according to 6462 insurers from 36 countries. The study is interesting for us  
82 because it considered the dependence of the efficiency of life and non-life insurance on special features of national  
83 economy, organizational form, size of insurance companies, etc. The researchers concluded that Denmark and Japan  
84 have the highest average efficiency, whereas the Philippines is the least efficient [3].

85 Economists conducted studies of the efficiency of voluntary insurance market within the BRIC countries [4]. The  
86 researchers found that the environment affects the efficiency of non-life insurers operating in the BRIC countries.  
87 Furthermore, the authors identified four drives of efficiency: Size, profitability, solvency, and ownership form. In our  
88 opinion, the analysis should take into account the historically formed redistribution of social and voluntary insurance in the  
89 country, in its context the BRIC countries differ essentially from each other.

90 Also, we will note a study providing an overview of the literature linking health, health insurance and labor market  
91 outcomes such as wages, earnings, employment, hours, occupational choice, job turnover, retirement, and the structure  
92 of employment. The empirical literature surveyed suggests that poor health reduces the capacity to work and has  
93 substantive effects on wages, labor force participation and job choice. Also the empirical literature suggests that access  
94 to health insurance has important effects on both labor force participation and job choice; the link between health  
95 insurance and wages is less clear [5].

96 Lets us introduce the marked factors of analysis. Insurance premiums (contributions) is a payment for the  
97 insurance that the insured (or beneficiary) shall pay to the insurer in the manner and within the time limits established by  
98 the contract of insurance. Income of the population is defined as a sum of all cash receipts of the population from various  
99 sources that is available for current consumption and savings, except for money withdrawn from previously accumulated  
100 savings and received by the population in the form of loans (credits). Income is determined on the basis of the sum of  
101 separate components.

102 In accordance with the current methodology (No. 61 approved by the State Statistics Committee of Russia as of  
103 July 16,1996) when determining the total income of population it is necessary to consider the data on wages and social  
104 benefits paid to employees, income from business and property, social payments (in the form of pensions, benefits,  
105 scholarships and other measures of social support) formed on the basis of official statistical reporting of organizations  
106 making payments to the population. Cumulative assessment of income includes increase of the volume of cash income  
107 generated in the informal sector of economy. The said increase is taken as equal to the difference between the total  
108 expenditure and savings growth of the population and the total cash payments to the population accounted on the basis  
109 of official statistical reporting of organizations. Unemployment rate is the ratio of the unemployed of a certain age group to



the economically active population (employed and unemployed) of the respective age group in percentage terms. The data on the economically active population employed in economy and the unemployed are obtained on the basis of sample surveys on employment conducted by Russian statistical authorities with the following extrapolation of results to the entire population of the surveyed age. The survey has been conducted in Russia since 1992. In 1992-1994, 1997, and 1998 it was conducted one time per year as of the last week of October; in 1995 - 2 surveys were conducted as of the last week of March and October; in 1996 - 1 survey as of the last week of March; since the year 1999 until August, 2009 the survey was conducted on a quarterly regularity. Beginning from September, 2009 the survey is carried out on a monthly basis. Observation units are households and persons at the age of 15-72 years, members of these households. More than 69 thousand people at the age from 15 to 72 years (0.06 % of the population in this age group) were polled during each survey. A varying sampling ratio based on the total population and a relative variation of the "unemployment" indicator is chosen for each constituent entity of the Russian Federation. The sample is based on the primary data base of All-Russia Population Census (ARPC-2002) containing information on the resident population i.e. who are permanently resident in the territory of the region, city, village.

### 3. Results

The panel study showed that the highest correlation is observed between the average per capita income (0.9) and insurance premiums per capita ( 0.95 ), which was supposed by us earlier (Table 1). At the same, time the relationship between the insurance premiums and the unemployment rate cannot be traced, the correlation was 0.1. Note that, unlike the unemployment rate, the employment rate of the population has a greater correlation with the dynamics of insurance premiums (0.86).

**Table 1.** Insurance premiums / marked factors correlation for the period of 1998-2013

	Per capita income, thous. RUR	Unemployment rate, in%	Insurance premiums per capita, RUR.
Insurance premiums, mln. RUR	0.933	0.148.	0.952

Thus, the availability of economically active, employed population with corresponding income allows the insurance market to develop. The state implements appropriate market stimulation through social insurance and, thus, allow the voluntary insurance market to develop.

Besides the empirical analysis, the influence of factors on the insurance market development should be also viewed in a psychological aspect, because the market development also depends on the consumers' behavior. When we talk about the potential demand for insurance services, we have to mention what affects the development of demand for insurance services besides the funds availability. According to a survey conducted by Oliver Wyman Company and Rating Agency "Expert RA", the behavior of retail customers in Russian insurance market continues to affect the cost of insurance products, while corporate clients prefer to take out insurance from large well-known insurance companies, as well as from those with which corporate customers have developed long-term positive economic relations. Thus, according to 80 % of the surveyed insurers, the retail customers targeted at cheap products, and 85% of insurers said that corporate clients prefer to take out insurance from major insurance companies [6]. According to a pool conducted by the Rating Agency "Expert RA", 12% of insurers noted that after the crisis clients of insurance companies began to choose only reliable insurance companies, and that will affect the growth of the cost of services of large insurers and the outflow of potential customers with less effective demand from the market [7].

The correlation between social and voluntary insurance. The present article should answer the following questions. What is more important for improvement of life quality - the development of social or voluntary commercial insurance? In our opinion, social insurance has the greatest impact on population's quality of life; but it should not be all-encompassing, it should not obstruct a commercial voluntary form of insurance. The correlation between social and voluntary insurance should be 60:40, where 60% - a level of social security of the population and 40 % - commercial insurance development. Thus, compulsory insurance must leave people a right and motivation to pay attention to a voluntary commercial form of insurance development. In favor of the existence and high level of social security we can mention a study whose author proved that a high level of social security is correlated with a high level of professional growth of the population [8]. The negative aspect of a high level of social security in comparison with voluntary insurance may be an increase of leading-strings mentality among the population, which, in turn, can lead to a high level of unemployment in the country. Low demand for insurance services in this case results in decrease in quality of offered insurance services. Possible changes in the structure of social security were offered by the authors of the following study [9].



162 In our opinion, social insurance is essential for the improvement of population's quality of life, because it fulfils  
163 social functions such as low-income citizens' support; and economic functions such as the renewal of human resources,  
164 the development of the voluntary insurance market due to the increase in effective demand. But at the same time a  
165 strong bias in favor of social security bears negative factors. Thus, social insurance reduces the economic freedom of the  
166 population as a kind of tax and does not depend on the population wishes. The excessive development of social  
167 insurance increases a bias in favor of compulsory insurance, thus pulling the demand off from the market of voluntary  
168 insurance services, and at the same time it reduces economic competition in the insurance market and increases  
169 dependence of the insurance market on compulsory insurance, reducing the activity of insurance companies in  
170 improvement of the quality of offered services. We offer the following correlation matrix.  
171

Level of voluntary insurance development	Dependence of insurance coverage on population's income which reduces the quality of life. High degree of economic freedom of the population. Improvement of competition in the insurance market	Dependence of insurance coverage on population's income which reduces the quality of life. Low degree of economic freedom
	Low level of population's quality of life Low level of protection against the risks associated with reproduction of the labor force	High level of population's quality of life. Low degree of economic freedom of the population. High level of leading-strings mentality among the population, as a consequence: increase in the number of immigrants, a negative state of migration policy. Lobbying of own interests on the part of insurers. Insurers' unwillingness to improve the quality of insurance services.
		Level of social security development

172  
173 **Fig. 1** Matrix of correlations between social and voluntary insurance and the quality of life of population  
174

175 It is interesting that in the countries where social insurance is not developed voluntary insurance develops due to  
176 employers interested in the improvement of human resources. For historical reasons, there are different types of  
177 correlation between compulsory social and voluntary insurance. These types depend on the stage of the development of  
178 national economies of countries, as well as from the historically formed principles of social security.

179 Let us consider these types. The first two types are: social security state depending on a type of economy:  
180 developed or developing. In developing economies, as a rule, social security is not developed, as the development  
181 course is targeted at the achievement of a high level of development by all means, in this connection the human capital is  
182 only consumed by economy, and the market is not interested in the availability of people of retirement age. The state of  
183 developed economy is reflected on the increase of the number of long-living people, due to a high level of health  
184 services, quality of life, etc. This contributes to the need for a high level of social security.

185 The case may be exemplified by the developing economy of China; its social security is underdeveloped for  
186 several reasons. Among these reasons are the following. First, the government has set the goal to show fast economic  
187 growth; the economy does not bear social character; human resources are only consumed by the economy, there is no  
188 incentive for their reproduction. Social security in such conditions will draw off a part of economic growth and will slow the  
189 implementation of the economy objective - which is the level of a developed system. Second, specific feature of China  
190 national economy is a high amount of economically active population, which is currently growing old rapidly. This  
191 circumstance does not allow the country to increase social welfare.

192 An example of a developed economy with a high level of social security is the national economy of Japan. In due  
193 course this developed economy has passed all stages of a developing economy when social security has been  
194 neglected. However, after transition to the developed type of national economy social security began to attract more and  
195 more attention to itself. Japan is known for the greatest number of long-livers.

196 The next two types of correlations: historically established balance in favor of social security or voluntary  
197 insurance. This can be exemplified by national economies of Russia and the United States. The national economy of  
198 Russia beginning from the time of the social type of economy has developed a high level of human resources social  
199 security. The example is interesting for the interrelation of premiums ratio in the insurance market and the degree of the  
200 market's "level of development" proposed by Oliver Wyman, within which the distinct premium ratios are considered  
201 depending on the "level of development" of economies [10].

202 We can see historically development of voluntary insurance in the USA economy, that resulted in the evolution of

203 competition in the insurance market. The economy's specific feature is that, despite assurances from President Obama  
204 on the revision of social policy for the purpose of public support increase, the lobby in the insurance market does not  
205 allow USA to implement the previously announced reform. The following study is interesting in the context of the history  
206 of voluntary life insurance. Analysis of the life insurance holdings of male probated decedents in Ontario in 1892  
207 demonstrates a negative correlation between the level of personal wealth and the demand for life insurance. Consistent  
208 with the study self-insurance was a substitute for market purchases of life insurance where self-insurance capabilities are  
209 a by-product of wealth accumulation. The study shows that households primarily demanded life insurance when they  
210 lacked accumulated reserves, or wealth, for self-insurance, often early in the life cycle [11]. Thus, initially, life insurance  
211 depends on the availability of the effective demand.

212 Each type has its own purposes, negative and positive sides. Furthermore, we should not forget the specific  
213 features of each national economy. Table 2 shows the types of social security of economies.

214 **Table 2.** Types of social security of economies  
215  
216

	Developed economy	Developing economy
Historically formed imbalance towards social security.	Purpose - social security of population, improvement of population's quality of life, civilized level of development. Disadvantages - draw of a part of economic growth to social security, growth suppression, leading-strings mentality, migration growth, migration policy revision, changes in structure of the historically formed residential population. Advantages - reproduction of the human capital, civilized level of development. Example: the economy of Japan, France, etc.	Purpose - rapid development of the economy. Disadvantages - draw of a part of economic growth to social security, growth suppression, leading-strings mentality. Advantages - reproduction of the human capital. Example: the economy of Russia, Kazakhstan, etc.
Historically formed imbalance in favor of voluntary insurance	Purpose - a civilized level of development. Disadvantages - limit of population's quality of life. Advantages - economic freedom of population, absence of leading-strings mentality among the population. Example: the U.S. economy, etc.	Purpose - rapid development of the economy. Disadvantages - the consumption of human resources without reproduction due to the lack of effective demand, limit of population's quality of life. Advantages - no draw of forces to non-economic objectives. For example, economies of China, India.

217  
218 **4. Conclusions**  
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220 Firstly, the panel study showed that the highest correlation is observed between the average per capita income (0.9) and  
221 insurance premiums per capita (0.95), which was supposed by us earlier (Table 1). At the same, time the relationship  
222 between the insurance premiums and the unemployment rate cannot be traced, the correlation was 0.1. Note that, unlike  
223 the unemployment rate, the employment rate of the population has a greater correlation with the dynamics of insurance  
224 premiums (0.86). The availability of economically active, employed population with corresponding income allows the  
225 insurance market to develop. The state implements appropriate market stimulation through social insurance and, thus,  
226 allows the voluntary insurance market to develop. The economic behavior of retail customers in Russian insurance  
227 market continues to affect the cost of insurance products, while corporate clients prefer to take out insurance from large  
228 well-known insurance companies, as well as from those with which corporate customers have developed long-term  
229 positive economic relations.

230 Secondly, social insurance is essential for the development of population's quality of life because it fulfils social  
231 functions such as low-income citizens support; and economic functions such as the renewal of human resources; the  
232 development of the voluntary insurance market due to the increase in effective demand. But at the same time a strong  
233 bias in favor of social security bears negative factors. Thus, social insurance reduces the degree of economic freedom of  
234 population as a kind of tax, and does not depend on population's wishes. The excessive development of social insurance  
235 increases a bias in favor of compulsory insurance, thus pulling the demand off from the market of voluntary insurance  
236 services, and at the same time it reduces economic competition in the insurance market and increases dependence of  
237 the insurance market on compulsory insurance, reducing the activity of insurance companies in improvement of the  
238 quality of offered services.

239 Thirdly, for historical reasons, there are different types of correlation between compulsory social and voluntary

240 insurance. These types depend on the stage of the development of national economies of countries, as well as from the  
241 historically formed principles of social security. Each type has its own purposes, negative and positive sides.  
242 Furthermore, we should not forget the specific features of each national economy.  
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## Peculiarities of Organization of the Foreign Mortgages and Mortgage-Backed Securities Market

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### Abstract

*The development of Russian efficient market economy requires creation and functioning of the financial market with modern stock instruments. The Mortgage-Backed Securities Market is an important segment of the financial market. Considered European and American models of the mortgage securities market organization are significantly different in: sources of mortgage loans financing; mechanisms of mortgage operations regulation; methods of mortgage institutions supervision; mortgage-backed securities investment environment; mortgage market infrastructure; role and functions of state at the mortgage market. The authors, basing on the analysis of foreign literature, considered models of the Mortgage-Backed Securities Market organization in developed countries, which allows them to develop and offer recommendations for improving the functioning of the Mortgage-Backed Securities Market.*

**Keywords:** investors, mortgage, mortgage market, mortgage-backed securities market, mortgage bonds

### 1. Introduction

Under the conditions of Russian Mortgage-Backed Securities Market formation the research works aimed at ensuring its cost-effective, stable and secure functioning becoming really significant. The mortgage market is a prerequisite for development and formation of the mortgage-backed securities market. Currently, the mortgage market is underdeveloped but it has the potential for growth. The World Bank considers the share of residential mortgage loans at the level of 25% of GDP as a benchmark for middle-income countries. EU average share of mortgage loans is 51.7 % of GDP. The highest level is in the Netherlands (106.2%) and Denmark (100.9%), the lowest one is in the Czech Republic (13%). The share of mortgage loans in Russia is 2.6 % of GDP.

### 2. Models of Mortgage-Backed Securities Market Organization

The analysis of the practice of mortgage securities market development reveals two basic models of market organization: American (two-tier) and European (one-tier). They were formed by the impact of factors arising from the peculiarities of legal mechanisms, specific development of credit institutions, business practice, historical and economic conditions of the country development. The comparative characteristics of these models are shown in Table 1.

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**Table 1.** Comparative characteristic of American and European models of the Mortgage-Backed Securities Market.

	American model	European model
Sources of housing financing	Savings deposits	Collective accumulation of savings in private banks and public savings banks Cumulative contributions to the housing construction are encouraged by the state premium at a certain value; or these contributions (up to a maximum amount) are exempt from income tax
Primary lenders	Savings banks Mortgage banks	Specialized institutions (mortgage banks, building societies, savings banks and land banks, mutual and cooperative banks) Universal banks Insurance companies
Issuers of mortgage securities	Specialized operators (Fannie Mae; Ginnie Mae; Freddie Mac), investment banks Savings institutions Conduits	Mortgage banks Universal banks
Types of Mortgage-Backed Securities	Pass-through (transferable), structured	Mortgage bonds (pfandbriefe and jumbo pfandbriefe), social bonds secured by the governments guarantees
Mortgages options:	Average loan amount is about 327 thousand U.S. Dollars. Maturities from 10 to 30 years Fixed interest rate Floating interest rate Coefficient of credit capacity (credit availability) is 28 - 30 %	Average loan amount is about 100 thousand Euros LTV = 70 Maturities from 10 to 30 years Fixed interest rate
Size of indebtedness under mortgage loans	7 trillion U.S. Dollars	1 trillion U.S. Dollars
Share of mortgage loans funding through Mortgage-Backed Securities	Over 54%	About 30 %
Amount of securities issue	1.4 trillion U.S. Dollars	1.1 trillion Euro
Regulatory documents	Securities Act of 1933 Securities Exchange Act of 1934 Trust Indenture Act of 1939, Law Investment Company Act of 1940 Sarbanes - Oxley Act of 2002 Securities and Exchange Commission Self-Regulatory Organizations of Professional Securities Market Participants	Exchange Act (end of the XIX century) Credit Transactions Act (the end of the XIX century) Securities Trading Act (1994) Securities Commission Stats - Commissioner Federal Chamber for Banks Supervision Special legislation - Mortgage Bonds Act
Investor protection	State guarantees State insurance Credit ratings set by international rating agencies	A special status of the mortgage collateral Legislative restriction of permitted operations for mortgage banks Institute of the trustee controlling the mortgage collateral and issuer compliance with mortgage legislation

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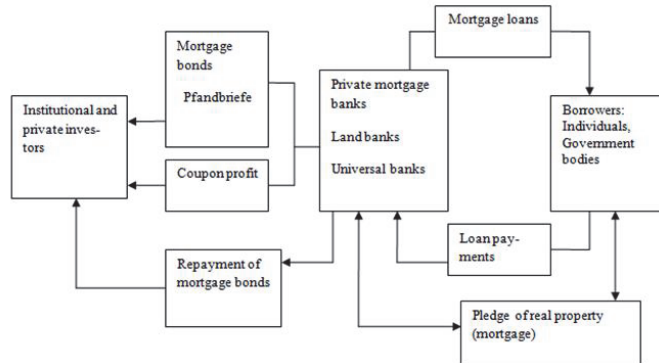
**2.1 European Model of Mortgage-Backed Securities Market Organization.**

In the European model of Mortgage-Backed Securities Market organization the bulk of financial resources comes from a specially organized secondary market for secured bonds. The primary lenders are specialized institutions (mortgage banks, building societies, savings banks and land banks, mutual and cooperative banks) and universal banks, their share is over 90%; the share of insurance companies is 10%.

Currently, European countries have over 100 mortgage banks and a professional organization - European Mortgage Federation (EMF). European mortgage banks are entitled to issue mortgage bonds (pfandbriefe and jumbo pfandbriefe) and social bonds secured by the guarantees of governments for the purposes of social infrastructure financing. These bonds are considered collateralized (by real estate or guarantees) bonds, also known as covered bond [1]. The standard of the European model of Mortgage-Backed Securities Market is the German system of market organization. Generally, the largest number of European banks is concentrated in Germany - up to 4 thousand (in France there are 1.2 thousand banks, in the UK there are 500), as well as a developed branch network - 57 branches for every

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100 thousand inhabitants (at an average in Europe there are 48 branches for every 100 thousand inhabitants; in Russia - as of 01.01.2009 there are 18 branches, the number of banks is 1058). [2] The European model of Mortgage-Backed Securities Market organization is shown in Fig. 1.



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Fig. 1. European Model of Mortgage-Backed Securities Market Organization. [3]

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German Pfandbrief market is the largest debt market in Europe and the sixth largest in the world. At the end of the year 2008 the share of covered bonds was about 40% of the total country's stock market, in Denmark - 66%, in Sweden - 35% [4].

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Pfandbriefe can be issued by 45 financial institutions: 25 private mortgage banks, 18 state (land) credit institutions and 2 private mortgage banks dealing with courts lending. Recently, due to entrance to foreign markets, pfandbriefe have got ratings. The share of private mortgage banks in mortgage bonds issue is 70%. In Germany since 1997 the volume of pfandbriefe issue has grown averagely 10% per year and reached 261.2 billion Euros in 2007. The total amount of outstanding commitments on the mortgage bonds is kept at the level of 1.1 trillion Euro [5].

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The dominant position among investors in the financial market is occupied by credit institutions (43%), investment funds (22.8%), central banks (13.2%), pension funds (6.6%), insurance companies (5.2%), and foreign investors (10%) [6]. The internal high investment demand for pfandbriefe is provided by: a possibility to be used as collateral to obtain a lombard credit from the central bank; investment funds generally can not invest more than 10 % of assets in securities of a single issuer, for pfandbriefe the figure is 20 %, the pfandbriefe share of insurance companies in reserves may be up to 30%; funds held in fiduciary management (the trust) are invested in pfandbriefe without limitations.

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The second Europe's largest mortgage market is Danish market. It is financed almost at 100% by eight mortgage banks possessing the right to issue mortgage bonds [7]. The mortgage-backed security is issued immediately after the credit provision. High degree of bonds security is provided by a so-called principle of balance: payments of the borrower on the loan and payments of the bank on the bonds must be balanced within the prescribed limits, thereby the mortgage bank's risk is reduced only to default of the borrower.

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The Swedish Mortgage-Backed Securities Market is third in Europe according to trading volume. Until 2004 the Swedish mortgage securities were not regulated by special legislation and were guaranteed not by a specific pool of mortgage loans, but by all mortgage assets on the balance sheet of the bank. The privileges of mortgage bonds holders were observed by strict restrictions and specialization of activities of mortgage institutions that provided mortgage loans with a maximum LTV (Loan-To-Value ratio), that is 60 % for commercial property and 75% for residential loans. [8]

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The analysis of markets allows us to mark out mortgage securities markets models in European countries depending on the type of the issuer of mortgage-backed securities:

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- French model (France, Ireland, Finland, Norway, Sweden) presupposing complete isolation of the issuer activities (SPV) from the parent company (universal bank);
- Model of a specialized bank with its own staff but partly external management, that enables greater managerial independence of the issuer from the parent company in comparison with the French model (Hungary and partly Sweden);
- Model of a central financial trust assumes availability of one or several companies-issuers of covered bonds in the country, whose shareholders are other credit institutions (Switzerland, Austria, partially France);
- Model of a specialized bank with a small amount of non-core operations, thereby it minimizes the risk of the issuer by means of priority operations with covered bonds (Denmark , Poland, Hungary, Luxembourg, partly

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- 114 Sweden);
- 115 - Model of a specialized bank with a greater amount of non-core operations (Germany);
- 116 - Model of a universal bank which established requirements for issuers of covered bonds, i.e., any bank
- 117 intending to issue mortgage bonds shall comply with the requirements established by the supervisory
- 118 authorities (Russia, Latvia, partly in Germany, Slovenia);
- 119 - Model granting all credit institutions the right to issue covered bonds without special authorization or
- 120 compliance with certain requirements, or simplified licensing procedure (Spain, Bulgaria).

121 Thus, an important feature of European Mortgage-Backed Securities Markets infrastructure is that it is private

122 corporations acting as intermediaries at the mortgage bonds market. The reason is that in Europe the state regulation of

123 the mortgage market is directed more towards the support of credit organizations in the form of tax exemptions and

124 preferential loans. As for the mortgage securitization, in Europe only 5 % of mortgage loans were refinanced through

125 securitization [8].

126 In summary , we can conclude that the European Mortgage-Backed Securities Market is characterized by the

127 following features: the main source of mortgage loans financing is retail deposits; strict regulation of mortgage operations;

128 supervision of specialized mortgage credit institutions; creation of favorable conditions of placement of mortgage bonds in

129 pension funds and insurance companies; provision of budget guarantees on securities, attracting resources for

130 residential, commercial and social real estate mortgage loans.

## 132 2.2 American Model of Mortgage-Backed Securities Market Organization

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134 Another Model of the Mortgage-Backed Securities Market operates in the USA. The specific feature of the Mortgage-

135 Backed Securities Market organization is that at the stage of modern mortgage system development (from the 1930s to

136 the 1970s) the State not only generated a legal basis for the mortgage system functioning, but also directly created

137 specialized institutions of the secondary mortgage market. These institutions were responsible for effective functioning of

138 the whole mortgage system of the country, its unification and standardization, as well as for the achievement of strategic

139 goals of economic development of the State. The number of personnel involved in real estate market servicing was

140 approximately 6.9 million of people or 5.3% of the total working population in the USA [10]. In the American model the

141 primary lender and the issuer of mortgage-backed securities are separated. This means that functions of long-term

142 residential mortgage loans allowance and servicing are separated from functions of resource mobilization and financial

143 risks management. Primarily, the reason for this is the support of liquidity of credit institutions participating in long-term

144 mortgage lending. The size of indebtedness on residential mortgage loans in the United States coming up to more than 7

145 trillion USD is significantly higher than in Europe. On average, more than 54% of debts are financed through mortgage-

146 backed securities issue. According to the data presented in Table 3, the total volume of mortgage securities issued by

147 agencies Fannie Mae, Freddie Mac, and Ginnie Mae in 2007 amounted to 1.4 trillion USD [9]. Guarantees of securities of

148 the mortgage agencies are perceived by investors as government guarantees; and the rate of return on these securities

149 is comparable to the rate of return on U.S. government ones.

151 **Table 2.** The annual volume of mortgage-backed securities issue in the United States, in billion US Dollars.

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Year	Agencies	Other	Total
1999	884.9	161.2	1146.1
2000	582.3	125.8	708.1
2001	1454.8	217.3	1672.1
2002	1985.3	233.9	2219.2
2003	2725.8	345.2	3071.0
2004	1375.2	403.9	1779.1
2005	1321.0	645.3	1966.3
2006	1229.5	773.1	2002.6
2007	1371.7	655.6	2027.3

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154 In the United States the investment banks performing securitization of mortgage pools insured by state insurance

155 agencies or private insurance companies are of importance at the Mortgage-Backed Securities Market. For example, the

156 volume of annual issue (2007) of mortgage-backed securities by private operators totalled to 0.6 trillion US Dollars, for

157 agencies 1.4 trillion US Dollars. (see Table 3) [11]. The aggregate nominal value of American agency mortgage bonds



158 being currently in circulation amounts to 5.63 trillion US Dollars. The securities amounting to 965.9 billion US Dollars (not  
 159 including issued obligations for mortgage-backed securities purchase) are on the balance sheet of the Federal Reserve  
 160 System of the USA (FRS); i.e. more than one third of all the securities are on the balance sheet of the US Central Bank.  
 161 92% of the FRS assets are an investment in securities, the share of the mortgage here is 35% [11].  
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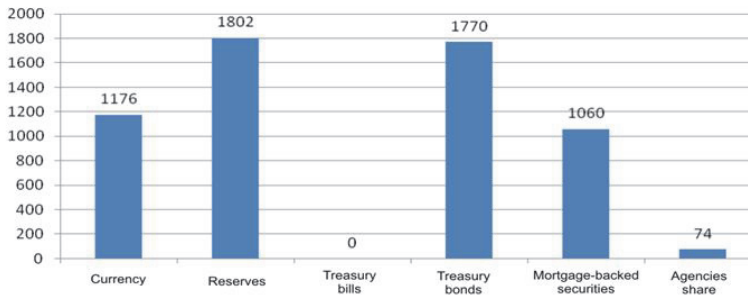
163 **Table 3.** The United States mortgage market volume in 2007-2012, bln.USD [6].  
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Period	2007	2009	2011	2012
Consumer mortgage loans	2,447.91	1,951.02	1,440.89	1,819.93
Commercial mortgage loans	326.72	62.50	45.95	36.50
Total	2,774.63	2,013.52	1,486.84	1,856.43

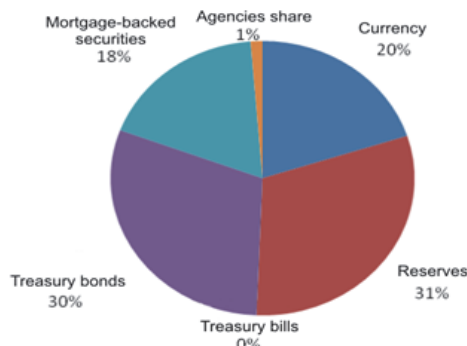
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 166 **Table 4.** Top-5 of banks according to the volume of provided mortgage loans in the United States in 2007-2012., bln. US  
 167 Dollar. [12]  
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Period	2007	2009	2012
Wells Fargo & Co.	271.93	427.21	528.14
JP Morgan Chase & Co.	210.20	187.13	185.7
U. S. Bank Home Mortgage	—	34.26	88.42

169 We can conclude on the basis of the presented banks financial indexes that the banking sector is in a stable condition.  
 170 Thus, the volume of consumer loans grew by 14.8% from 2009 to 2012. The total debt on mortgage loans in the United  
 171 States is gradually reducing. The level of "bad" mortgages fell to 7.5% (2012) from 9% (2009). Near-term sector  
 172 prospects will depend entirely on steps of the USA Federal Reserve System aimed at further regulation of the sector.  
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 176 **Fig.2** FRS balance sheet (as of March 14, 2013), in billion US Dollar  
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 179 **Fig. 3** Structure of the FRS balance sheet (as of March 14, 2013) on a percentage base [13]

180 A Primary lender can refinance his loans at the U.S. capital market in various ways: through their direct sale to the  
181 investor (large banks act as investors); through their sale to specialized operators of the secondary mortgage market;  
182 through exchange of loans collected in pools for mortgage-backed securities issued by a specialized issuer.  
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### 184 3. Types of American Mortgage-Backed Securities 185

186 The main instrument of the American Mortgage-Backed Securities Market are so-called MBS - mortgage-backed  
187 securities (hereinafter MBS) which are characterized as securities giving their holders the right to receive cash flows from  
188 a pool of mortgage assets. The pool of mortgage assets is the receivables for mortgage loans collateralized by real  
189 estate. Holders of mortgage -backed securities backed by the pool of mortgage assets receive most of the mortgage  
190 payments depending on the method of distribution of cash flows from mortgage loans. On the basis of this feature, the  
191 following types of securities presented in Table 6 can be distinguished at the American Mortgage-Backed Securities  
192 Market: Pass-through (transferable) - mortgage payments are transferred to investors on a pro rata basis after deduction  
193 of fees for the mortgage loans administration and servicing; structured - emission is divided into classes between which  
194 the payments and risks are redistributed in accordance with a certain set of rules for structuring and servicing, which  
195 provides investors with greater certainty regarding the maturity and incoming payments.

196 We can mark out some features of organization of trade in US mortgage-backed securities:

- 197 - Firstly, mortgage securities are listed as treasury securities; for example, the organization of securities  
198 parameters assumes assignment of index and pool number established by governmental agencies. The index  
199 indicates the type of transferable bonds; for example, the index 20 for PC of Freddie Mac means that the pool  
200 being collateral of the bonds consists of ordinary mortgage loans with an initial period of 15 years. AR index for  
201 MBS of Ginnie Mae indicates that the pool includes mortgage loans with variable rates. The pool number  
202 serves as reference to specific mortgage being collateral for securities and reference to the issuer of the  
203 securities. Many transactions are made when the parameters of the pool are not yet defined (TBA (to be  
204 announced) transactions). Such transactions presuppose the right of short supply or oversupply of pools by  
205 the seller in amount not exceeding 0.1%. The seller selects pools for sale at his own discretion. Ordinary  
206 transactions involve the sale of a specific pool, with its number known in advance. Thus, important  
207 characteristics of the American Model of Mortgage-Backed Securities Market organization are: dependence on  
208 the general state of the financial credit market; expanded infrastructure of the mortgage market; state  
209 assistance in the form of guarantees and government insurance; control of the issue of securities traded on  
210 the secondary market; use of mechanisms for internal and external support.  
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### 212 4. Causes of US Mortgage-Backed Securities Market Instability 213

214 Analyzing the American Mortgage-Backed Securities Market, it is necessary to mention the reasons that led to  
215 destabilization of the mortgage market:

- 216 - Loan growth. That was the reason for: increase in real estate prices (before 2006); decrease in mortgage  
217 rates; introduction of new mortgage products; relaxation of requirements for borrowers. According to the US  
218 Mortgage Bankers Association, the total volume of mortgage loans amounted to 10 trillion US dollars, which  
219 was 75% of GDP [14];
- 220 - Weak control of mortgage assets securitization transactions. Credit institutions have reduced requirements for  
221 borrowers because of the possibility to transfer credit risk in the process of securitization. It resulted in huge  
222 pools of loans with undervalued credit risk. The development of securitization also allowed new non-deposit  
223 organizations to enter the market. These organizations were minimally regulated; and their business has been  
224 primarily focused on high-risk borrowers;
- 225 - Investors' high demand for mortgage-backed securities. Statistics shows that more than 110 investment  
226 companies held in their investment portfolios the mortgage-backed securities in the amount of more than 12.1  
227 billion US Dollars [15];
- 228 - Poor quality of the internal system of mortgage risk management, including mortgage-backed securities risks;  
229 a narrow attention on the ratings of leading international rating agencies.  
230

### 231 5. Conclusion 232

233 The study of foreign practice of Mortgage-Backed Securities Market organization with due account for the crisis

phenomena in the financial market allows us to make the following recommendations which can also be used in the Russian practice for the purposes of preventing the negative phenomena:

- Need to improve regulations applicable to securitization as related to liquidity and risk management of financial institutions-members of the mortgage market;
- Increase in the number of personnel in the field of asset securitization;
- Improvement of risk management systems, in particular, management and assessment of credit risk arising from the use of securitization mechanism by banks;
- Expansion of the knowledge base on transactions in the financial market;
- Use of independent legal and auditing expertise in the mortgage-backed securities issue;
- Need to regulate the activities of credit rating agencies;
- Introduction of residual risks stress testing tool (which is used only by rating agencies on the stage of initial rating assignment) to the practice of banks - participants of the securitization market;
- Introduction of the planning system in the creation of reserves of credit institutions;
- Use of measures aimed at improving the process of rating assignment for securities backed by low-quality mortgage loans;
- Additional checks of credibility of information provided by borrowers, appraisers and mortgage brokers by independent parties;
- Determination of scope of liability of such transactors as trustees, main mortgage loans servicing agents;
- Improvement of licensing requirements for mortgage originators;
- Establishment of additional requirements for issuers to disclose information about the structure of transaction and quality of assets.

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## Institutional Traps of Human Capital Consumption: Public Goods Production Problems

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### Abstract

Taking into consideration the importance of human capital resource, many countries had initiated national research aimed at assessment of national human capital and its contribution to national wealth and economic growth. Top human capital index and global competitiveness index in a cross-section of regions were recorded in North America, Europe and Central Asia. Human capital consumption appears as one of its reproduction aspects. But effect generated in the process of human capital consumption differs in different countries. It is explained by diversity of institutional environment, the elements of which may form self-sustained ineffective stable relations, i.e. institutional traps that hamper the effective consumption of human capital. In this article authors attempted to reflect on matter of institutional traps, stipulating restrictions in human capital consumption which derive from public goods production and granting of social guarantees. Origins of appearance and rooting mechanisms of two types of institutional traps have been studied in the context of a number of countries: surplus production of public goods and underproduction of public goods and social guarantees. Research outcomes make it possible to review the approaches to settlement of modern problems in development and consumption of human capital as a resource in developed and underdeveloped countries.

**Keywords:** human capital, public goods, social guarantees, paternalism, institutional trap, ageing of population, dependency, employment.

### 1. Introduction

Human capital in present global economics is interpreted during the past decades as key resource for intensive development and prospect for competitive advantage. Understanding of importance of human capital as economic growth resource and driving force came with publications of Becker G.[1], Schultz T.[2], Mincer J.[3] who were awarded later the Nobel prize, in 1960-s.

In follow-up works in 1990-s, human capital resource was recognized the basic notion of sustainable development concept. In the late 20th century expert group headed by J. Dickson was founded under the aegis of the World Bank , aimed at advancement of updated national wealth concept, methodology development and structural components computation [4].

Taking into consideration the importance of human capital resource, many countries had initiated national research aimed at assessment of national human capital and its contribution to national wealth and economic growth. So, in accordance with report of the World Economic Forum on human capital in 2013, top human capital index and global competitiveness index in a cross-section of regions were recorded in North America, Europe and Central Asia, and lowest index - in the Middle East and in Africa.[5][6] Their direct relation was proved statistically.

Recent research held by Abbas K. in relation to experience of rapid accumulation of physical capital in underdeveloped countries, confirmed relevancy of emphasis to development of human capital, since it's obvious that effective use of physical capital in its turn depends on the state of consumed human capital.[7]

Human capital consumption is seen as part of its reproduction, precisely, the process of realization in the course of business of standard and specialized, including idiosyncratic resources in the form of knowledge, skills, proficiency and

58 professional competence.

59 Thereat standard human capital resources are formed in the process of pre-school and secondary-level education,  
60 enjoyment of traditional medical services. Highly specialized resources are formed in the process of secondary and  
61 higher professional education upon condition of low level of educational services individualization.

62 It is worth to note, that effect generated in the process of human capital consumption differs in different countries. It  
63 may explained by differences in institutional environment of countries where human capital is consumed.

64 In its turn, constitutional environment is represented by fundamental political, social and legal rules, which form the  
65 basis for the process of extracting benefits and useful effects from human capital at all levels of economy.

66 Unfortunately, in the present state of economy interaction of the said institutions may result in self-sustained  
67 ineffective relations, i.e. institutional traps.

68 In this article we make an attempt to reflect on matter of institutional traps, stipulating restrictions in human capital  
69 consumption which derive from public goods production.

70

## 71 **2. Institutional Trap Logic of Surplus Production of Public Goods**

72

73 In recent researches quality and volume of public goods production, especially of individual ones (such as education and  
74 healthcare), first of all are related with the process of human capital accumulation. For example, the role of education in  
75 human capital growth is studied in works by Fuentedela A., Jimeno J.[8], Joshua C.[9], Lee J., Barro R.[10], the role of  
76 medicine and healthcare - in works by Janet C.[11], Johnson R., Schoeni R.[12].

77 At the same time, there exists the reverse of public goods production, effecting uniformity and efficiency (in time  
78 and space) of human capital consumption.

79 In modern economy quality standards and quantity of public goods are set by the state as main producer of the  
80 said goods. Private sector in most cases is not interested in production of those goods. It may be explained by their high  
81 costs with concurrent extension of benefits to all participants in the economic process, including those, who did not incur  
82 costs. Volume and quality of public goods considerably differed at different times and for different countries,  
83 demonstrating some or other state priorities..

84 The sphere of public goods and social guarantees takes a certain scope of social functions, aimed at, first of all,  
85 direct formation of human capital (goods of education, healthcare, culture, physical culture spheres), second, implied  
86 participation in human capital accumulation ( including defence, public security, municipal improvement and  
87 environmental protection, mass media).

88 Public goods supply contributes for public habit-forming to them, increasing welfare and becoming a permanent  
89 characteristic of a shaped living standard. It has an impact on direct effects of human capital consumption in the form of  
90 growth of real income of the population. In reality, Samuelson Pareto principle of public goods optimal production not  
91 always is realized in practice. It means that public goods trap takes place both in situation of production surplus, and in  
92 case of underproduction of public goods.

93 There may be many reasons for imbalance. As fairly noted by American professor J.E.Stiglitz, under  
94 circumstances when the state undertakes a great scope of paternal responsibility, one citizen group may impose its will  
95 and preferences via bodies of government on other social groups, as well as their conviction of how to behave and what  
96 to consume [13]. Besides, in a competition-constrained environment, state monopolies granting public goods may make  
97 non-optimal use of resources.

98 Surplus production of public goods in terms of human capital accumulation has a number of positive effects, in  
99 particular, growth and enhancement of national human capital as the result of improvement of education level, health  
100 promotion, scientific and cultural development.

101 In the context of human capital consumption, surplus production of public goods provokes dependency in the  
102 society, thus decreasing human capital efficiency.

103 History of the part century shows us negative consequences of total governmentalization of social services. Quite  
104 evident are such factors of breakdown of such policy as tendency towards monopolization of state power by bureaucracy,  
105 chasing political rent, resource-cost characteristics of economic mechanism of public decisions in the absence of  
106 competitions, social dependency development.

107 Contemporary history of developed countries also has examples of institutional traps of surplus production of  
108 public goods and social guarantees. Serious unrest in a number of European cities that take place in recent years ( the  
109 most vivid example is Paris) is explained with unbalanced migration policy, encouraging migration from underdeveloped  
110 countries.

111 For example, after Algeria has gained independence in 1962, population of France has increased almost to 42

112 thousand immigrants from the former colony. Introduction of migrants employment programme in 1950-60-s resulted in  
113 rapid increase of migrant inflow from African Muslim countries. The same effect was observed in other European  
114 countries that encouraged labour migration, i.e. FRG, Great Britain [14].

115 The launched further on migrant family reunification programme and multiculturalism policy [15], when the state  
116 guarantees to its cultural minorities the possibility of full participation in cultural life and preservation of their identity, and  
117 undertakes obligations (including financial ones) concerning security of such guarantees, had resulted in growth of social  
118 dependency. In particular, the chosen national policy had provided for the use of wide, customary for the developed world  
119 set of social policy instruments for migrants. This inevitably resulted in inappropriate perception of incentives by the  
120 migrants. So, introduction (or increase) of maternity allowance was aimed to motivate women who are involved in public  
121 production, to leave work temporarily. But many of migrant women, in line with customary living and values, prefer not to  
122 work, and allowance (coupled with high-quality public goods and high demands to life standards) fixes stereotypes of  
123 dependant behaviour, forms ineffective human capital. As a result, in the early 21 century, nearly 65 percent of  
124 immigration to France was due to family reunification [16].

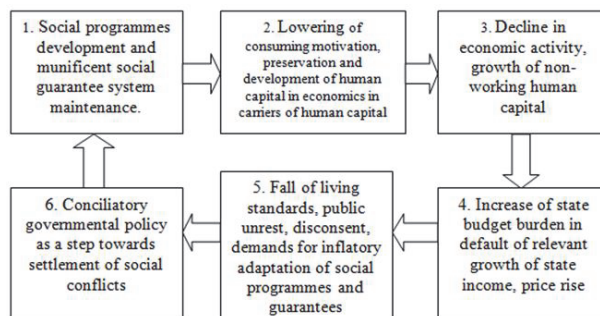
125 In further increase of public goods production and progress of social guarantees, human capital hampers national  
126 economic development. When French government undertook an expensive measure of granting social dwelling to  
127 migrants in Paris suburbs, the dependant mode of behaviour of the second migrant generation had deep-rooted.  
128 Financial crisis that came next in 2008-2009, which made it impossible to maintain further social policy at the same level,  
129 had resulted in mass protests. It is worth to note that at the present moment, the quantity of migrants from former French  
130 colonies equals nearly to 6 million. According to the data of International Labour Organization, one third of the world's  
131 migrants (56 million) live in Europe, 27,5 million of them conduct activities there. In some countries, for example, in  
132 Luxembourg and Switzerland the share of foreigners in total workforce reaches 25%.

133 The trap of surplus production of public goods may cover not only human capital with underestimated stereotypes  
134 concerning quality and quantity of social guarantees and public goods. Such dependant behaviour may be provoked  
135 among the person who attained pension age, able to work, but preferring inactivity due to weak return-to-work and  
136 qualification incentives, supported by extended public goods and indistinction between living standards of non-working  
137 pensioners and workers of productive age.

138 The problem of non-working human capital of pensioners is especially pressing in ageing baby boomer countries.  
139 For example, in Iceland average pension reaches 96,5% of employed net income, in general in EC countries this index  
140 may vary within 65%, while average American may build upon pension that equals to 39% of their pre-pension income.

141 In Russia this index equals to 33,5%, and in China traditionally welfare for the aged lies on children rather than the  
142 pension system.

143 The staged scheme of consolidation of traps of surplus production of public goods and social guarantees is shown  
144 in Figure 1.



146  
147  
148 **Fig. 1.** Traps of surplus production of public goods and social guarantees.

149  
150 Surplus production of public goods and munificent social guarantees increase budget expenditure and do not stimulate  
151 economic activity of the country.

152 Over a period of years such policy would create a dependency habit of population. Any attempt by state authorities to escape  
153 such policy would be followed by popular discontent and even hostility, which may be observed now in some European  
154 countries.



### 3. Traps of Underproduction of Public Goods

Let us turn to institutional trap of underproduction of public goods and social guarantees. It is quite obvious, that the lower is quality and quantity of public goods and social guarantees, the more the population has to spend on purchase of paid required goods (especially in the sphere of education, healthcare, security and so on). On the one hand, underproduction of public goods increases human capital efficiency, setting for maximal efficiency, use of knowledge, skills, experience, physical and mental abilities. Availability of services for a pay would set up people for labour activity towards acquisition of income.

On the other hand, underproduction directly results in underconsumption.

Theory of economy and modern age allow to specify following reasons that drag human capital into a trap of human capital underproduction:

1. Rushed economic and social progress that outrun the progress of public goods and social guarantees. In terms of industrial growth, the population pays more attention to matters of education, healthcare and social security, has higher demand for fairness. This is the character of public goods underproduction trap of modern China. For the past 35 years, with spring of the policy of reforms and economic openness, China had overcome the problem of lack of material resources, increased personal income, but underproduction of public goods of educational sphere, medicine and social security had formed new barriers in development of society. Labour unrest became more frequent and more intensive. For example, according to the data from WHO Department of Health Statistics and Informatics, in average medical service payments amount to nearly 12% of household budget in China after expenses for meal. State healthcare expenditure in China amounts to 5% of GDP of China, as reported by WHO, which takes 111 position in global rate (364 dollars per capita in PPP), the similar index for the USA equals to 17% of GDP, and for European countries 8-12% of GDP [17]. Weak healthcare financing in China in recent years exposes families to risk to sink into poverty, which happened to be in the late 1990-s [18].
2. The policy of mass privatization, provoked, in particular by accession to the WTO, International Monetary Fund and the World Bank. So, as per the WTO rules, public goods of member states (including spheres of education and healthcare) are services subject to privatization. IMF, the World Bank and WTO, making demands for privatization, put emphasis on the following: reduction or total abolition of state financing, cease of state adjustment of social goods price, encouragement of public sector privatization, admission of major US and European corporations to public services. The said measures are successful in the case of public goods sector competitiveness, its ability to stand competition with corporations of the developed countries, and in case when household income allows to purchase of paid services. The result of implementation of the said measures was human capital degradation in a number of underdeveloped countries that had joined the WTO and the World Bank. In the result of implementation of the World Bank requirements in Zimbabwe educational and healthcare spheres of that country, that used to be the best in Africa, had turned into degrading ones. The country faces lack of medical instruments and medicine, labour conditions and payment of health workers had deteriorated. The lack of finance for operational costs is compensated partially by imposition of charges for recording and treatment services. But in general, the majority of population, especially those living in rural locality, who are unable to pay different contributions, almost have no access to healthcare. Educational sector in Vietnam is facing the same problem, since higher learning fees became customary practice since the year 1990 [19].
3. Demographic deadlock is recorded presently in a number of countries with a considerably outworn human capital due to ageing of population. The high rate of persons who attained pension age, the baby-boom generation means the increased load on the sector of public goods and social guarantees. Demographic deadlock is characteristic for countries that have no economic means for pensioners social guarantees and settlement of population ageing problem. In the countries with developing economy, ageing in China is goes faster than in other countries. In 2050 people over 65 years will make one fourth part of population, or 480 million. At the same time, with the ageing of population more and more resources will be allocated for elderly people keeping and healthcare [18].

Similar processes take place in Malaysia, according to data by Mafauzy M., where ratio of population over 60 years has also increased for all these years: from 5,2% in 1970 and to 6,3% in 2000. It is expected, that in 2020 this parameter will reach 9,8 % of population [20].

Due to poor provision for old age in those countries, they become a burden on those states. The ageing population slows down economic development with growth of costs of old-age welfare.

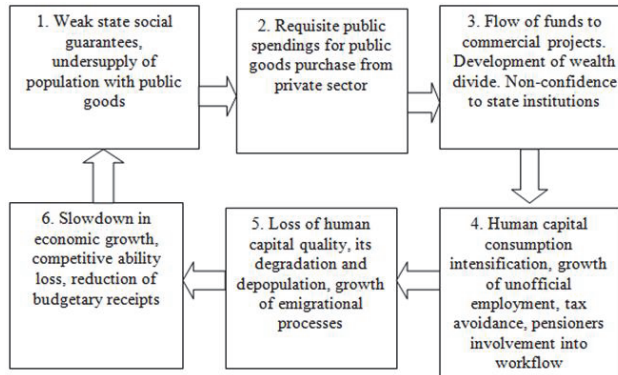


209 The more the state estranges itself from the sector of public goods, the more are the "market failures", and human  
210 capital would have to purchase paid public goods. That means that commercial projects will be supported to the  
211 disadvantage of social ones. The population would have to use extensively its human capital to enable purchase of public  
212 goods in the market.

213 Differentiation of society in terms of living standards and quality would gallop. Unavailability of public goods would  
214 result in deterioration of human capital quality and impoverishment of the country. Migrant runoff would increase, social  
215 instability would deepen.

216 The staged scheme of consolidation of traps of underproduction of public goods and social guarantees is shown in  
217 Figure 2.

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Fig. 2. Traps of underproduction of public goods and social guarantees.

As we may see from Figures 1 and 2, traps of public goods production are self-sustained and in default of state or public intervention may result in transformation of human capital into economic stagnation factor.

#### 4. Conclusion

Represented materials give an opportunity to make conclusions on positive and negative effect of the scope and quality of public goods on the processes of human capital consumption. The matter is that the process of human capital consumption is the mechanism of correlation of demands and abilities. It is specific for human goods and social guarantees production that it effects both accumulation of human capital abilities, and lowers th need of its use, granting goods and services free of charge.

The unconsumed part of human capital may be concerned as a kind of deduction from the society wealth.

The traps of public goods production are characteristic both for developed and underdeveloped countries, and in all situations they are followed by strengthening public anger. Consolidation and rooting of institutional tramps of public goods production, that have been considered in this article, progresses in effect of several reasons at once, as it had happened in China and in some underdeveloped countries.

The issue of the ways of public goods and social guarantees effective system formation, maintaining a balance of human capital accumulation and consumption, is still the matter of contentious debates. It is well established that financial crisis had revealed the need of change of the budget course in implementation of public goods and social guarantees development programmes both in developed and underdeveloped countries, otherwise, the probability of dramatic budgetary situations is great.

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## Methodology for Rating of Insurance Portfolio

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### Abstract

The article proposes a methodology for rating of insurance portfolio, which allows the insurance company to ensure the financial stability and solvency. The authors propose the use of three groups of methods to assess the insurance portfolio - mathematical and statistical methods, methods of economic analysis, and an analysis of the subjective characteristics of the portfolio. Comprehensive assessment of the insurance portfolio adequately formulate targets of the insurance company

**Keywords:** Insurance portfolio, Evaluation of quality of insurance portfolio, Methods of evaluation of insurance portfolio, The main index number of insurance portfolio, Insurance reserves

### 1. Introduction

Comprehensive assessment of the insurance portfolio under the contracts allows us to give a forecast of the portfolio, to assess the current and future profitability of insurance operations along the lines of business (type of insurance as a whole or by-products). Assessment of the quality of the insurance portfolio is regarded as one of the key factors in the final rating of the company [1]

A comprehensive assessment of the current insurance portfolio to determine the targets in the medium and long-term period by business lines (products and / or insurance) and to ensure the financial stability and solvency of the insurance company.

### 2. Theory

Analysis of the insurance portfolio usually goes along the following lines:

**Tabl 1.** The main indicators of the insurance portfolio

Key indicators	Brief characteristic
Diversification of portfolio insurance	The high level of portfolio diversification and lack of dependence on large customers ultimately has a positive effect on the final financial result of insurance operations
The stability of the insurance portfolio	At the level of stability of the insurance portfolio, affect, first of all, a high level of extension of contracts of insurance. Stable insurance portfolio has a positive effect on the profitability of insurance operations
Unprofitability by activity	Group loss ratio reflects the correctness of payment, which is covered by insurance
The technical result is along the lines of business	Characterizes the ratio of earned premium to the cost of the lines of business, it is necessary to determine the profitability of the business
The relative magnitude of the risks taken	The relative magnitude of the risks taken by ratio to the size of equity determines the susceptibility of catastrophic risks

To assess the portfolio, we propose to use a range of methods, which includes the following groups of methods:

1. Mathematical and statistical methods.
2. Methods of Economic Analysis.
3. Analysis of the subjective characteristics of the portfolio.

Here is a brief description of each group of methods:

1. Mathematical methods imply an adequate assessment of the calculated value of the reserves, and their

46 coverage. Sufficient quantity of own funds of the insurance company guarantees its solvency in the presence  
47 of several factors - sound insurance reserves and proper investment policy. Let us dwell on the calculation of  
48 reserves, their evaluation and coverage. Economic meaning of insurance reserves is the insurer was able to  
49 meet its obligations. According to the adopted abroad scheme forming insurance reserves, each kind of  
50 commitment that is an insurer cover appropriate kind of insurance reserve. [4]

51 In particular, life insurance, depending on the terms of existing contracts, formed math reserves, reserves  
52 annuities, equity reserves and reserves of participation; for other types of insurance - premiums reserves (Provision for  
53 unexpired risks reserve increasing risks) and loss reserves (established but not paid losses, claims lodged, but not  
54 established damages; non writing loss). [5]

55 Insurance reserves in the nature of capital and credit are formed depending on commitments. Since insurance  
56 reserves represent liability accounts, the large size of them, provided that adequate reserves liability on insurance  
57 contracts, will talk about the solvency insurer if there are at least two conditions: compliance with the proportion amount  
58 of own funds; their optimal placement (rational investment policy). [12]

59 The main purpose of the evaluation of provisions - the adequacy and reasonableness.  
60

61 **Tabl 2.** Indicators of insurance reserves  
62

Sufficiency	Coverage	Solvency
The share of insurance premiums insurance reserves for risky types of insurance $K1 = \text{Insurance reserves} / \text{netto-premium of risk insurance} * 100\%$ Normal less 100%.	Coverage level of insurance reserves own funds $K4 = \text{Own capital} / \text{technical insurance reserves netto} * 100\%$ Normal more 50%.	The degree of coverage of the insurance premium own funds and insurance reserves, the recommended value of the index not less 150% $K1 = (\text{Own capital} + \text{insurance reserves}) / (\text{netto-premium of risk insurance}) * 100\%$
Coverage level reserve declared, settled losses cash $K2 = \text{Cash flow} / \text{reserves claims} * 100\%$ Normal less 100%.	Adequacy of inflows in the form of insurance premiums to cover the running costs of the insurance premiums, the current cost of doing business, management, operating expenses excluding expenses related to investing activities $K5 = (\text{netto-premium of risk insurance}) / \text{costs of the proceedings} * 100\%$ Normal more 700%.	The share of own funds and insurance reserves in the company's assets $K2 = (\text{Own capital} + \text{Insurance reserves}) / \text{total capital} * 100\%$ Normal more 80%.
Level of cover unearned premium reserve accounts receivable (recommended - less 100%) $K3 = \text{Receivables under insurance, coinsurance} / \text{unearned premium reserve} * 100\%$	Coverage level reserve declared, settled losses cash $K2 = \text{Cash} / \text{allowance claimed, unsettled losses} * 100\%$ Normal less 100%.	The share of equity in the obligations of the company, not related to insurance contracts, the recommended value of the coefficient of not less than 100% $K3 = \text{Own capital} / \text{non insurance liabilities} * 100\%$

63  
64 **3. Methods of Economic Analysis**  
65

66 Analysis of the portfolio on the basis of the static methods in an insurance company on the first few slices.

67 1.1. The most informative method of calculation - a calculation of underwriting loss. Unprofitability insurance  
68 operations - performance indicator of insurance activity insurer for insurance other than life insurance, which is calculated  
69 for all types of insurance, or for each type separately. The order of calculation depends on the calculation basis: on  
70 underwriting, the calendar year of operation, or by the onset of loss (the insured event). On settlement of the underwriting  
71 year is the ratio of insurance payments plus the calculated allowance for losses, including reserves for incurred but not  
72 reported claims to accrued (paid or earned) premiums.

73 On settlement of the calendar year is the ratio, the numerator of which reserves of insurance payments (losses) at  
74 the beginning of the calendar year plus insurance payments during the calendar year minus the reserves of insurance  
75 payments (loss) at the end of the calendar year in the denominator - earned during the calendar year premium . When  
76 calculating on year loss events is the ratio, the numerator of which insurance payments for insured events that occurred  
77 during the calendar year, plus insurance reserves for losses incurred during the calendar year and the denominator - the  
78 premium earned during the calendar year.

79 Loss Ratio = ( Loss Adjustments / Premiums Earned )  
80 Expense Ratio = ( Underwriting Expenses / Net Premiums Written )  
81 Combined Ratio = ( Loss Ratio + Expense Ratio ) [6]

82 Often, in order to get a quicker result, the loss ratio is calculated as the ratio of paid losses to the premium received  
83 in the underwriting year, allocation of losses for each insurance contract during the term of the insurance contract. Thus,  
84 this calculation is made possible only after the contract for a specific period. Therefore, relevant information about a year  
85 ago.

86 2.2. Some companies for rapid assessment of the portfolio in terms of cash flows using a so-called cash settlement  
87 loss, which implies a correlation of all paid losses on the portfolio over a given period Casco on all premium received in  
88 the same period. This calculation does not allow analysts to review the tariff policy, as it does not identify segments loss.

89 2.3. Portfolio Assessment on the basis of statistical indicators of the dynamics of the portfolio. By the number of  
90 contracts in each period on the collected premiums on these contracts, according to the average of the sum insured  
91 portfolio, the average insurance premium. These data are necessary for the subsequent analysis for tariff revision. Also  
92 needed are calculations of the average rate for the portfolio. A more analyst on payment of commission is the basis for  
93 the discount policy and budget presentation discounts to insurance intermediaries.

94 The basis of a cost-effective portfolio is a reasonable tariff policy of the correct size net rates. For this vital portfolio  
95 assessment on the basis of statistical data on the incidence of accumulated losses, the average size of the damage,  
96 determining the highest probability of occurrence of insured events. Separately calculated the average paid loss and the  
97 average loss claimed. [13]

98 Then, based on the statistics of losses projected trend in future periods, which allows you to create policies for the  
99 net-rate payment for the portfolio . For example, for a portfolio can be analyzed in the following areas:

100  
101 **Tabl 3.** Direction-depth portfolio analysis

Fields of analysis (tariff factor)	Analysis results
Territory into the insurance contract	Reveals territorial differentiation on loss and assess the adequacy of regional coefficients
Sales channel	To evaluate the effectiveness of sales channels in order to select the least loss
Agent	As a result of analysis in the context of loss of designers selected designers with the lowest loss ratio
The primary conclusion \ extension	Allocated risk population for primary and extended contracts to carry out a comparative analysis on the key characteristics of profitability
Brand, model	Reveals the target segments with the highest profitability
Insurance contract	
Insurance summ	Risk profiling in the context of the insurance sums allows you to select the most interesting segments of sales

102  
103  
104 These criteria allow the company to make timely adjustments to the tariff policy on motor insurance and thus to achieve  
105 break-even insurance operations. Depending on the results of the analysis, selection criteria expand or deepen.

106 3. Analysis of the subjective characteristics of the portfolio. Reveals the problematic aspects of the insurance  
107 portfolio. These characteristics are subjective:

108 3.1. Level of client companies, which ultimately affects the ratio of clients to the company and the company's  
109 image.

110 3.2. The number and level of complaints to regulatory authorities (in relative terms to the number of contracts),  
111 which indirectly indicates the number of dissatisfied customers.

112 3.3. Level of customer loyalty level prolongation clients complete coverage of each client insurance products.

#### 113 114 **4. Results**

115  
116 The use of only one group of methods does not allow for a full assessment of the insurance portfolio. Initially, in the  
117 calculation of loss reserves accounted for the maximum loss ratio, which leads to an overestimation of loss reserves, if  
118 not take the case of catastrophic loss of volume. For example, the deviation of the total established reserves against  
119 future losses on a massive insurance can reach considerable amounts.

120 1) Insurance reserves the majority of companies are not fully formed, which in turn affects the amount of  
121 investment capital. Can be divided into the causes of the lack of provision for technical and conceptual.

Specifications related to the division of accrual and cash basis. Conceptual reasons due to weaknesses in the calculation of loss reserves. To evaluate of reserves used primarily statistical methods, most of which is based on triangles - tables of payments in insurance cases occurring over a number of periods. Such statistical methods are many, but they are based on similar assumptions: the development of incurred losses occurring in different time periods, there is a similar manner.

- 2) It should be noted nonadditivity division business segments, namely: if you break the line of business into several parts and apply to them the same statistical method for estimating the reserves, and then add up the results, then we have the estimate entire line of business. However, this estimate is almost never coincides with the estimate considered line of business, received the same statistical method used in this line of business as a whole. In accordance with the practice in most cases the total parts line of business exceeds the estimate of reserves made all along the line of business
- 3) Lacks depth statistics on line business, then there are statistics available for the loss of an insufficient number of frames. Methods of economic analysis in comparison with other methods provide the most objective view of the portfolio, but does not allow a rapid diagnosis of problematic aspects of the company's image and customer loyalty. In turn, the analysis of the subjective characteristics of the portfolio does not assess the financial and economic indicators of the insurance activities. Only an integrated approach by applying the above techniques to the assessment of the insurance portfolio can more fully characterize the quality of the insurance portfolio and with high precision to give a forecast of its development.

## 5. Conclusion

The use of various alternative methods of analysis in the planning of an insurance organization, break-even analysis and evaluation of the stability of income, representing a coherent system of indicators allows the ultimate in online to get important information to monitor the success factors of financial and economic development of the insurance organization. Balanced insurance portfolio, the possibility of its expansion are factors of competitiveness of the insurer.

Comprehensive assessment of the insurance portfolio allows you to plan targets insurance activities in future periods, and ultimately ensures the financial stability of the insurance operations and solvency of the insurance company

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## Russia's Anti-Offshore Policy in the Global Economic System

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### Abstract

Role of offshores in the global economy is rather controversial. It depends on effectiveness of national policy. In whole, offshores have started playing a critical part in global capital and assets flow. In the estimation of specialists, in 1990-s offshores have controlled nearly 20% of total world wealth, and almost 22% of external bank assets have been placed there. Today up to 60% of world money are located in offshore zones, nearly half of financial transactions passes through these zones. World experience has shown that offshore capital is not going to disappear in the foreseeable future. It will undergo essential transformation, growing more transparent and predictable. Yet tax competition and investment potential of certain jurisdictions will keep on determining capital flow in the world economy. Under WTO conditions the authors' suggestions to develop free and special economic zones, using the world experience, will allow Russia to develop regional social infrastructure, to attract investments, including foreign investments, into national economy.

**Keywords:** offshores, globalization, special economic zone, taxes, global economy, finance.

### 1. Introduction

At current stage of the world economy development, offshore zones have taken global form, being the consistent part of national economies both in developed and developing countries. In the last 20 year classical offshores have started playing a critical role in global capital and assets flow.

Thus, urgency of the research issue is stipulated by the following main reasons:

In the first place, foreign practice has shown that offshores in global financial system activate cross-border financial flows and expedite financial asset turnover on an international scale, encourage development of financial markets, provide conditions for diversification of investments, expand access to credits, and facilitate better capital allocation.

In the second place, offshores encourage tax burden reduction, stimulating economic activity in the global economy.

In the third place, application of flexible development strategies leads to increase of competitive power of companies at the domestic and global levels.

In the fourth place, formation of instability element in the world economy and finance, contributing to capital outflow, leading to possible accumulation in offshore zones of substantial capital volume, speculative for the most part.

### 2. Economic Relations of Offshore Zones

The following may be referred to positive effects of offshores:

- activation of cross-border financial flows and acceleration of financial assets turnover on an international scale, promotion of financial markets, arrangement of conditions for diversification of investments, expansion of access to credits, and better capital allocation;
- encouragement of tax burden reduction, and stimulation of economic activity in the global economy;



- 57 - decrease of expropriation risk, arrangement of conditions for property rights protection, which in turn may  
58 initiate acceleration of economical growth, particularly in donor countries;  
59 - - prosperity promotion of countries with offshore zones. This encourages more harmonious development of the  
60 global economy in whole.  
61 - increase of competitive power of companies at the domestic and global levels due to application of flexible  
62 development strategies .

63 Negative sides of offshores are as follows:

- 64 - unfair tax competition, depriving onshore countries of income;  
65 - formation of instability element in the world economy and finance due to possible accumulation in offshore  
66 zones of substantial capital volume, speculative for the most part;  
67 - promotion of capital outflow;  
68 - shadow economy support;  
69 - reduction of employment in donor-countries;  
70 - unjustified competitive advantages to certain companies;  
71 - adverse influence on social situation in donor-countries, connected with negative public assessment of tax  
72 avoidance.

73 Comparison of these two lists proves: one and the same feature of offshores can be treated both as advantage  
74 and disadvantage depending on specific and sometimes opposing interests of private investors, national authorities (tax  
75 authorities in particular), international institutions. Thus, offshores can be treated as the distinctive feature of the modern  
76 stage of globalization development of the global economy. . In our opinion, offshore – is specific financial institution-  
77 intermediary, providing financial advantages for legal entities and natural persons in the process of conversion of savings  
78 and other monetary funds into investments.

79 Offshores should be characterized with consideration of specific level of economic relations: for macro- and meso-  
80 level (i.e. offshore zone of offshore region) specific business status lies in "offshore environment"; for micro-level  
81 (offshore company) - in specific features of business dealing; mega-level (global offshore market) can be characterized  
82 by combination of the first and the second levels on a global basis.

83 Comparative analysis of "popular" countries, where offshore company can be established, is given in the Table 1.

84 According to the Table 1 the countries where offshore companies are registered can be conditionally divided in  
85 several categories:

- 86 - ministates, islands with low level of development of national economy, but with high political stability  
87 (Bahamas, British Virgin Islands, Vanuatu, Seychelles, etc.). Generally these states do not specify any  
88 requirements to financial reporting, the only requirement is to make fixed contribution to treasury. On the  
89 Marshall Islands, one can establish the company without payment of the authorized capital, but with issue of  
90 bearer shares. Usually in these countries no registers of shareholders and directors are maintained,  
91 confidentiality of such company ownership is very high. Usually these companies are used for financial  
92 transactions;  
93 - countries where in addition to offshore companies there also exist general onshore companies, that can be  
94 owned by non-residents, however, in case of any business activity within this country they can lose preferential  
95 tax exempt status. In these countries the company must be annually audited and submit reports in order to  
96 prove that it didn't carry on any such activity. Control on the part of the government in these countries is more  
97 strict as compared to the first category, registers of directors and shareholders are maintained there, though  
98 status of such companies is higher. These are Ireland, Gibraltar, Malta, Luxembourg, Switzerland, Isle of Man,  
99 etc.;
- 100 - countries which are difficult to define as offshores, but in accordance with legislative requirements of these  
101 countries, one can work in major company and pay rather low taxes. Let's call them "pseudo-offshores". These  
102 are USA, Great Britain, Canada, etc. These countries are characterized by high level of business  
103 transparency, payment of taxes and dues, maintenance of registers of shareholders and directors are  
104 mandatory requirements. Though there are some legal organizational forms paying only fixed charges. These  
105 companies are good both for reputable business and simply for keeping of cash assets.

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**Table 1.** Comparative analysis of operational climate of offshore companies in different countries.

Jurisdiction	British Virgin Islands	Bahamas	Panama	Ireland	Delaware llc	Delaware corporation
Official language	English		English, Spanish	English	English	
Profit taxation	none	none	none	none	none	none
Disclosure of beneficial owners	none	none	none	yes	none	none
Bearer shares	yes	yes	yes	yes	none	none
Minimal paid up capital	none	none	none	EUR 2	none	USD 1
Standard stated capital	USD 50000	USD 5000	USD 10000	EUR 100 000	none	USD 150 000
Currency of stated capital	any	any	any	any	USD	any
Minimal number of shareholders	1	1	1	1	2	1
Minimal number of directors	1	1	3	2	1	1
Corporate directors	yes	yes	none	none	none	none
Secretary	none	none	yes	yes	none	yes
Public registration of directors	none	none	yes	yes	none	none
Public registration of shareholders	none	none	none	yes	none	none
Required annual audit	none	none	none	yes	yes	yes
Required annual report	none	none	none	yes	yes	yes

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For instance, companies, registered in the USA in Delaware State, that are not engaged in any transaction within the State, are exempted from all local taxes and charges, except for so-called "franchise tax", which is rather low and depends only on number of the authorized shares (i.e. authorized capital). However, all companies registered in the United States must pay federal taxes, including corporate tax on income received by the company in any other country of the world. Moreover, financial statements are obligatory for all companies registered in any State of the country. American jurisdictions are the most inexpensive, besides most often the companies operation within these territories is notable for incorrectness, consequences whereof are not estimated.

The report by Boston Consulting Group (BCG) contains estimates on the world private assets dynamics. In 2006 assets under management (AuM), concentrated in offshores have been estimated at 6.7 tln. dollars, or 6.9% of total cost. Persian Gulf countries have held in offshores nearly 40% of their assets; countries of Latin America, Middle East and Northern Africa - nearly 30%. As regards European countries, this figure makes 9%, and in Northern America and Japan - 2-3% [3]. In other words, in countries with developed public institutions and civil society, transparency of economy is higher, economical and political situation is more stable, interest in specific offshore environments is lower.

### 3. Russia's Policy towards Offshore Jurisdictions

Priority in contemporary policy of Russian government is obviously placed on prohibitive and restrictive measures. Thus, plans of the Federal Tax Service of the Russian Federation provide for systematic break-up of taxation optimization schemes, review of double taxation conventions with offshore territories, and introduction of pricing policy agreements between the Federal Tax Service and major companies. Double taxation conventions between Russia and foreign countries provide functioning of legal tax avoidance schemes with participation of offshore jurisdictions. As of January 1, 2014, there are 78 current agreements with the Russian Federation.

Main anti-offshore novation suggested by the Ministry of Finance consists in treatment of income of the controlled foreign company (registered in offshore affiliated company of the Russian company) as income received by Russian parent company, and accordingly imposition of tax in Russia. In order to follow relations of Russian companies with offshore there has been suggested to lay the companies under obligations to state in tax statements information about all affiliated foreign companies, specifying the interest. Thus the Ministry of Finance can declare a company registered in offshore zone as tax resident of the Russian Federation. In this case offshore company must pay to the Russian budget tax on income from amounts saved due to lower tax rate of the country of incorporation. Thus, businessmen who draw income through affiliated companies in offshores (above mentioned list of 41 jurisdictions) from the year 2008 must pay income tax if profit taxation in offshore is less than two thirds of the Russian 20%.

Besides, it is planned to sign agreements with certain countries and territories concerning interchange of information required for identification of shareholders of offshore companies and calculation of the earned income. At present Russia has concluded agreements with 33 countries concerning combating money laundering. There are only three countries among them (Liechtenstein, Luxembourg, Monaco), that are traditionally referred to offshore jurisdictions.

149 It is planned to step up struggle with inland offshores and fly-by-night companies that are widely used for outflow of  
150 capital to foreign offshores and tax avoidance. Strengthening of control over transfer prices is a part of this policy.

151 All these changes contribute to struggle with illegal outflow of capital from Russia, and with legal tax avoidance via  
152 offshores. However, it is difficult to foretell any results of such novations.

153 Integrated approach is required to deal with these problems. Refining of tax policy, reduction of administrative  
154 barriers and arrangement of favourable conditions for business activity in Russia, competing with those in offshores, must  
155 become prime directions of this struggle.

156 Current offshore jurisdictions are notable both for tax remissions and top positions in different world ratings with  
157 respect to conditions for capital. For instance, from 1998 till 2011 Hong-Kong has been ranked first in the annual rating  
158 Economic Freedom of the World, made by The Wall Street Journal and Heritage Foundation [4]. In 2011 Hong-Kong was  
159 given 89.7 points out of 100, particularly noting the existing low-tax environment and flexible labour market. The second  
160 position of this rating among 183 countries has been held by Singapore with 87.2 points. Switzerland, Luxembourg,  
161 Ireland, Mauritius, Panama, Bahamas, Bahrain and some other countries connected with offshore business also maintain  
162 good positions in this rating.

163 In the ratings developed by experts of well-known PriceWaterhouseCoopers and the World Bank, in the world top  
164 twenty on general tax environment the leading positions are maintained by offshore jurisdictions and countries with  
165 offshore taxation environment. For instance, in the top six there are four such jurisdictions. According to this integrated  
166 rate, Russia is the 130th due to its rather low effective tax rate [5].

167 Efficient national policy will determine to a considerable extent whether offshores become complimentary elements  
168 of Russian economic area, contributing to growth of international competitive power of Russian companies, or remain  
169 "black channels" for cross-border migration of tax receipts and outflow of capital.

170 Establishment of free and special economic zones (FEZ and SEZ) of different type is considered the way to secure  
171 national economic growth. FEZ-s were intended to forward solution of such tasks as quick integration into the world  
172 economy, attraction of foreign investments, development of advanced innovative and technological experience. Though  
173 lack of unified national policy in this sphere, lack of federal law about special economic zones, direct imitation of foreign  
174 experience without regard to conditions of Russian economy, spreading of conditions of free economic zone within  
175 territorial and administrative borders, coincidence of these zones formation with protracted economy crisis in Russia have  
176 had an adverse effect on development of FEZs.

177 Russia is known to be the actual participant of international relations, however, its strategic mission lies in changes  
178 of essential mechanisms of national economy integration into the global economy by gradual reduction of raw-material  
179 orientation of export, compensated by high technologies development, strengthening of financial institutes, infrastructural  
180 industries and information sector. Institutes of special economic zones, prefigured by free economic zones, may become  
181 the tools of integration into the system of the world economic relations on conditions that allow competition with foreign  
182 states at internal and international markets.

183 At present time, expansion of integration process is conditioned by development of service zones, including  
184 offshore zones, complex and international SEZs. Such SEZs are called the zones of the fourth generation - integration-  
185 type SEZs. Special economic zone is understood to be complex integrated reproduction economic system including  
186 territorial and organizational structure, administrative machinery, tax preferences system, the aggregate of operating  
187 enterprises-residents. Mechanisms of SEZs allow establishment of new or renewal of existing relations between  
188 economic entities based on congruence of their economic interests, formation of competitive capacity, participation in  
189 redeployment of the world economy resources, levelling-out of lags in development of allied and related industries,  
190 effective participation in interstate production cooperation.

191 Thereby, establishment of new production and other infrastructure in SEZ leads to introduction to particular  
192 national economy of unusual methods of productions, connected primarily with forms of business activity. SEZs differ  
193 from the rest of the country territory in financing and productions-and-sales activity, economic relations connected with  
194 production and distribution of added-value formed in SEZ. These relations are connected with the system of economic  
195 incentives: tax, currency, customs, monetary and other, that can be treated as intentionally modified as compared to the  
196 prevalent ones in the given country.

#### 198 4. SEZs as the Instrument of Investment Capacity Building of Russian Regions

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200 Our interest is conditioned by the way of development of special economic zones in the Russian Federation till the end of  
201 2015.

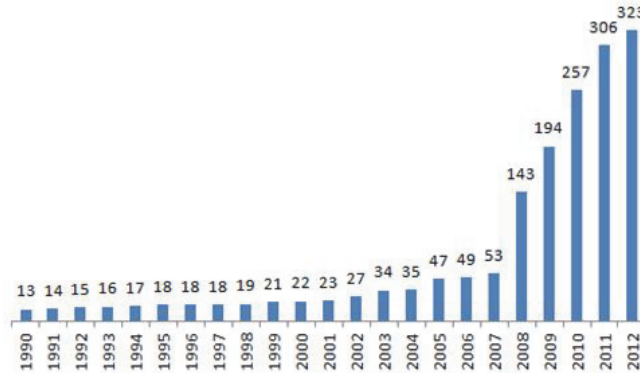
202 We have applied Box-Jenkins method for prediction of development of special economic zones for the Russian

203 Federation for the variable "number of residents operating within these zones".

204 Time series "number of residents registered in free (special) economic zones in the Russian Federation" for the  
 205 years 1990-2012 has been used as the basis for prediction. In the Figure 1 the time series is represented by a diagram.

206 Within Box-Jenkins procedure, in the GRETL package there has been applied optimal for prediction non-seasonal  
 207 ARIMA model with 3 years period (1,2,1).

208 As shown by the Figure 1, there is light growth dynamics till the year 2004, considering that the main objectives  
 209 declared at establishment of FEZ have not been accomplished, because in most cases the companies were registered on  
 210 corresponding territory, enjoyed preferential benefits, yet conducted activities outside the territory. Thus, those zones  
 211 operated actually as offshores, and only SEZs established on legislative level in Kaliningrad and Magadan regions are  
 212 currently functioning.



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215 **Fig. 1** Number of residents registered in free (special) economic zones in Russia.

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217 The result of 3 year prediction by application of ARIMA model (1,2,1) is given in the Table 2, column "prediction".  
 218 Anticipated number of residents by the year 2015 according to the model data is 401, and with 95% probability we may  
 219 state that by the year 2015 number of registered residents of special economic zones in the Russian Federation will make  
 220 313-541. Thus, mistakes made in the process of implementation of normative legal acts regulating functioning of the  
 221 former economic zones in Russia, have enabled to some extent to expedite re-thinking of national industrial policy.

222

223 **Table 2.** Prediction of the dynamics of number of residents registered in special economic zones in the Russian  
 224 Federation, by the end of 2014.

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Observation	Prediction	St. Error	95% confidence interval
2013	346.13	33.459	280.55 – 411.71
2014	386.34	46.053	296.08 – 476.60
2015	401.20	58.647	313.31 – 541.49

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227 The Table 3 shows the results of ARIMA model (1,2,1) parameters estimation. Student statistics for each parameter are  
 228 rather high in absolute magnitude, that is all model parameters given in the column "coefficient" have high significance.

229 Russia has established or plans to establish SEZs of nearly all main types widely-spread all over the world:  
 230 industrial production, technology development, tourism and recreation, and port zones.

231 The world experience has proved that establishment of SEZs in economically safe regions enables the most  
 232 efficient application of public funds, attraction of private capital. Such enterprises, in turn, provide prompt and greater  
 233 return, including in form of tax liabilities. Consequently, Russian authorities have taken decision about establishment of  
 234 SEZs at first in economically strong regions, as distinguished, for instance, from China that has gained wealth of  
 235 experience in establishment of such enclaves. Initially, selection of territories for SEZs in the People's Republic of China  
 236 was conditioned by their geographic position - nearly all of them are isolated from the other parts of the country by  
 237 mountain groups or are located on islands or peninsulas. In China provision of state tax privileges and other benefits to  
 238 the residents of free zones was of major importance for successful operation of these zones.

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**Table 3.** ARIMA model (1,2,1) parameters estimation results

Parameters	Coefficient	St. Error	t-statistics	P-value
const	2.62901	3.12828	0.8404	0.4007
phi_1	0.46789	1.03787	0.449	0.6564
theta_1	-0.9999	0.220059	-4.544	5.51e-06

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Mean of Dependent Variable	5.235294	St. Deviate of Dep. Variable	21.23243
Mean of Innovations	-2.484685	St.dev. of Innovations	18.89178
Log Likelihood	-75.07144	Akaike Criterion	158.1429
Schwarz Criterion	161.4757	Hannan-Quinn Criterion	158.4742

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Foreign experience has proved that exemptions for income tax, property tax, value-added tax, local taxes contribute to reduction of production costs and business operations risk, development of competitive environment, expansion of business relations, trade facilitation, renovation of main production facilities, attraction of investments into production and social sphere. Accordingly, the specified benefits are widely applied in different types of SEZs.

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In industrial production and scientific-industrial zones for promotion of export activity for all participants there have been permitted duty-free import and export of goods, applied low income tax rates, preferential customs tariffs for transportation; all these contribute to currency inflow, development of industrial production, new jobs creation, new technologies development, introduction of modern management techniques. In industrial production zones there is a practice to grant tax allowances and subsidies in the form of refund of VAT, excise taxes, export duties, taxes for purchase of domestic raw materials and components, grants, tax refunds, and premium price cancellation. These measures stimulate establishment of industrial relations of SEZs' enterprises with other parts of national economy, consolidate export potential, improve its integration into the world economy.

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In technology development SEZs with the purpose to stimulate attraction of investments, priority structural investing, and production modernization there are widely applied tax holidays for property tax, income tax, reduced rates for returns on sales of patents, licenses, benefits for new jobs creation. In undeveloped and depressed regions such measures provide for population employment, growth and modernization of production. In many countries for all types of SEZs there are granted deductions from taxable income for expenditures connected with infrastructure arrangement, subsidies. Such measures are intended to stimulate investment projects, development of social and production spheres, increase of consumer goods output, activation of regional economic activity, local budgetary recharge.

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In the global practice there appear some differences between SEZs in developed and developing countries. In developed countries, the prime objective is technical re-equipment of production based on new technologies, therefore mainly tax remissions are granted. In developing countries, in addition to economy modernization, the priority objectives are to attract foreign capital and to gain advanced managerial experience, therefore benefits are provided not only in respect of taxation, but also for land lease, labour utilization. Bearing in mind, that in Russia tax and customs preferences are third among basic instruments of government regulation of SEZs (after state support of infrastructure development in SEZs territories and introduction of facilitated administration form), it may be concluded that we have followed the path of developing countries.

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## 5. Conclusion

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While setting the objective to create favourable investment climate, one should not overestimate contribution of foreign investments into regional economy - international practice has shown that in developing countries investors prefer to invest funds into short-term fast-payback projects, following which they leave SEZs, and just minor amounts are spent on development of infrastructure and provision of necessary facilities. Besides, there is a widely-spread practice to hide the income by means of mechanisms of intra-firm trade with application of transfer pricing. The same is the purpose of payment to the parent company of interests on credits, rents, payments for use of technical innovations, trademarks (royalty payments). Experience of developing countries also has shown that efficiency of SEZs is connected to a great extent with correct location of such zones. In Russia the boundary regions having well-established economic relations with neighbouring states have the most favourable positions.

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## Economic Bases of Formation and Development of Financial Engineering in Financial Innovation

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### Abstract

*Today the main spheres of society are developed mainly through the using of innovative technologies and constant updating of products. The result of active innovative activity of the economic subjects directed on the solution of different financial problems including the management all of increasing innovative risks became the prompt progress of financial engineering. In turn, the process of designing innovative financial products created to reduce the various types of risks through instruments of financial engineering is characterized in economic science as a risk-engineering.*

**Keywords:** *innovation, life-cycle of innovation, innovation risk, financial engineering, innovative technologies, risk-engineering*

### 1. Introduction

Currently not in doubt that the major spheres of society at the expense of developing innovative technologies. The path of constant updates of all activity in the market today is the most attractive. However, so far in the various branches of science, including in the economic, point of contention is the very definition of "innovation." According to the Assistant to the President of the Russian Federation Andrei Fursenko, "Innovation - it is not just something new. It is the application of knowledge to create new value, expressed in monetary terms." According to N. Ermilov, General Director of "Innovations of Leningrad Institutes and Enterprises", "Innovation - it is an innovation based on scientific research, which is implemented in the market. If innovation is sold in the market, so it is - an innovation. If not implemented - not innovation".

These definitions of innovation, as well, and some others found in scientific publications, are pragmatic enough and applied nature. In most publications, being based on the innovations in the field of scientific and technological progress, while the innovative processes in the economy remain outside review.

The dependence of the economy on science not only not diminished, but on the contrary, it becomes more and more obvious. In the U.S., where over 80 and especially 90-ies of the last century showed very strong growth (7.3% per year), the lowest in the history of the country's unemployment rate, record exports, and so on, there was a school economists argue that the economy based on knowledge, perhaps not subject to the laws of cyclicity, which determined the course of its development in the past. Innovations being introduced into society much faster than before. The development of innovation in the country determines the competitiveness in the international arena.

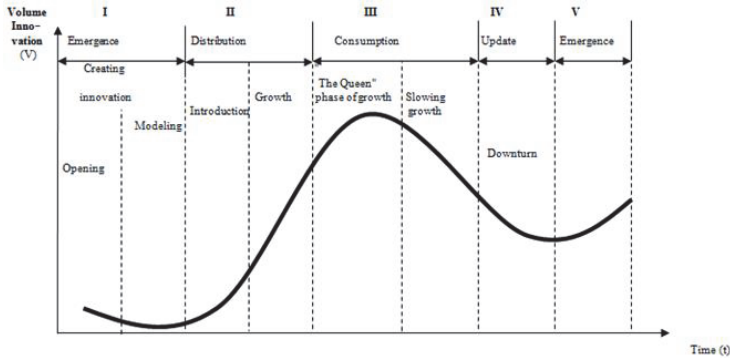
Innovation occurs when you use the results of research and development aimed at improving the process of production activities, economic, legal and social relations in the field of science, culture, education and other sectors of society.



57 **2. Life-Cycle of Innovation**

58  
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 60

The period of time from the inception of the idea, creation and dissemination of innovations and to use it is called life-cycle of innovation (Figure 1). Several distinct phases of the innovation cycle.

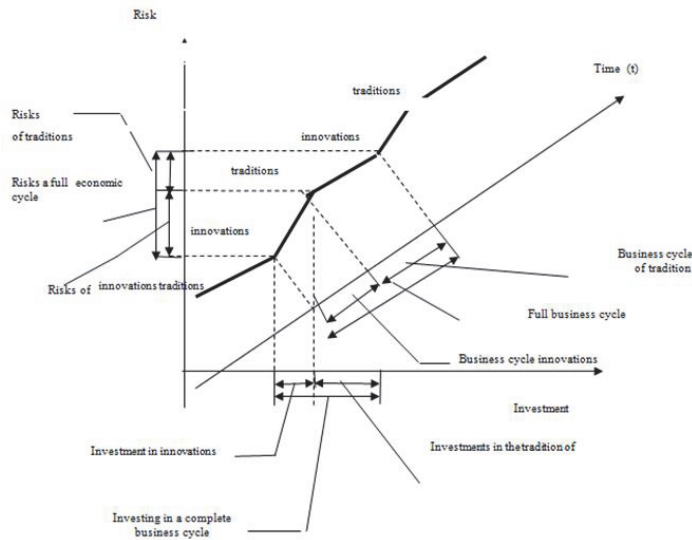


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**Figure 1.** The life cycle of innovation

64 The first stage of the cycle is the occurrence or creation of innovation. It can be divided into two phases: the opening of  
 65 innovation and styling. The scientists are not guided by practical motives, but from a desire to expand the understanding  
 66 of the nature of things. They do not consider the results of their findings as a material for use in the production cycle. Due  
 67 to the high cost of development and a fairly high level of risk financing, usually engaged state. Modeling involves the  
 68 definition of feasibility and advisability of using the results of the opening in the practical sphere. Performed prototypes  
 69 (models), the tests, the processing of test results. If the result is not a complete reflection of the real situation, the tests  
 70 are repeated. The result is a prototype (model) of a product or idea, which is already possible to assess market  
 71 prospects.

72 The second stage of the life cycle of innovation include the spread of innovation. This step is included in the  
 73 innovation process, when the introduction of innovation is not limited to a single economic entity, and carried out at the  
 74 level of the industry or the economic system as a whole. Here we select the phase of implementation and growth. The  
 75 first is a "revision" model of a product or idea, that is, transformation model in a trade or industrial design. The second  
 76 process is accompanied by a dynamic transformation in the tradition of innovation (Figure 2).



77  
 78  
 79

**Figure 2.** Cycles, patterns, investment and risk transformation of innovation into traditional relationships in economic systems.

80 The third stage of the life cycle of innovation is its consumption or disposal. There is a "consolidation" of innovation as  
81 tradition, at the same time as it is detected and recognized as a rare usefulness - "peak" phase of growth innovation. This  
82 phase is preceded by a phase of slower growth of innovation, as the latter is characterized by rejection, lack of  
83 recognition of the existing structure of the innovation needs in connection with which there is a development of the new  
84 requirements for innovation.

85 The fourth stage - the update, which is a partial or complete replacement of innovation, as a result of the  
86 completion of a full business cycle downturn lifecycle innovation and the emergence of the next life cycle of innovation  
87 (see fig. 2).

88 It is well known that the transition from one quality to another requires the expenditure of resources (energy, time,  
89 finances, etc.). The translation process innovation (innovation) in the tradition also requires costs of various resources,  
90 the most important of which is the investment and time (see fig. 2).

91 Thus, innovation is a kind of activity that is associated with the transformation of ideas (the results of research and  
92 development or other scientific and technical achievement) to a new or improved product, introduced to the market in new  
93 or improved technological process used in practice.

94 Our investigation of the economic category of "Innovation" shows that the latter is directly dependent on these  
95 components of the financial market, as the capital market, investment, risk, financial resources, etc. Depending on the  
96 degree of interaction with these categories of innovation we can talk about the areas of implementation of innovations in  
97 financial markets. In the context of this research innovation implemented in the financial markets can be divided into two  
98 groups:

- 99 1. The introduction of new instruments in the financial markets. An example of such application will be called  
100 today have become a tradition derivatives - swaps, futures, forwards, and innovative financial products of the  
101 derivatives market - swaptions, credit derivatives, innovative leasing options etc.
- 102 2. The new (innovative) a combination of financial market instruments, allowing to design a variety of innovative  
103 financial products - and the stock exchange, derivatives and credit, financial innovation and the capital market,  
104 etc. - To increase the profitability of the enterprise, attracting investments, increase sales, insurance and  
105 innovative potential financial risks, financial and credit support innovation actors, etc. As an example of such a  
106 combination of innovative acts leasing, venture financing, forfeiting, franchising, special issue of securities, etc.  
107 These products are the result of active innovation, characterized in economics as financial engineering.

### 108 3. Financial Engineering

109 The term "financial engineering" is now used in a variety of practical situations, scientists, researchers and practitioners,  
110 giving the same value of the concept of non-uniform. This is often due to the fact that financial engineering is a young and  
111 developing industry knowledge, as noted by U.S. researchers Vipul Bansal and John Marshall, any practitioner is inclined  
112 to consider their own experience as the most important, as the foundation on which to build and a new discipline.

113 Inaccuracies in the definition and use of the term "financial engineering" is not only complicate its place and role in  
114 economic science, but do not significantly promote the introduction of the domestic economic systems.

115 Study of the economic concept and essence of financial engineering in the first place to start with the term  
116 "financial engineering", which first appeared in the financial literature in the late 80's. the last century. By that time it  
117 strengthened the derivatives market, as well as a proliferation of different types of innovative financial products.  
118 Significant conversion of the derivatives market of the time are more affected U.S. financial markets, this explains the  
119 emergence and establishment of the U.S. market the concept of «financial engineering». Hence, a significant number of  
120 books, textbooks and research papers on the subject. The site [www.amazon.com](http://www.amazon.com) - the largest online bookstore -  
121 published a list of the most popular books to date, relating to research in the field of financial engineering. The most  
122 significant research works are works of authors such as Frank J. Fabozzi (Editor), Janet M. Tavakoli, Jessica James,  
123 Nick Webber, Keith Cuthbertson, Dirk Nitsche, Yuh-Dauh Lyuu.

124 By analyzing data from the study, we note a practical focus to making concrete schemes and mechanisms for the  
125 application of certain financial innovation. In this case, special attention should be fundamental work Vipul Bansal and  
126 John Marshall, "Financial Engineering: A Complete Guide to Financial Innovation" and Lawrence Galica "Financial  
127 Engineering: Tools and methods of financial risk management." This is a comprehensive theoretical and practical work,  
128 which give an idea about the diversity occurring in the financial sector innovation.

129 Overview of the main discussion of the concepts of financial engineering in the Western theory and local know-how  
130 in this field indicates that the full talk about the Russian theory and practice of financial engineering is not necessary,  
131 research in the field of financial engineering are just beginning. Therefore, domestic researchers to this problem is more

134 limited to the analysis and systematization of the existing foreign developments.

135 Thus, in their study Russian economist Yu Kapelinsky out two Western concepts:

- 136 1) financial engineering as the design of financial instruments and technologies for the management of a portfolio  
137 of securities Keperta Michel, co-president of the Swiss Association of Financial Engineers;  
138 2) financial engineering as the creation, management and use of derivatives Fields Coudray, editor of financial  
139 magazine (Switzerland).

140 The above concept of limiting the activities of financial engineers to the sphere of securities as a whole (concept  
141 Michel Keperta), or limited solely to the derivative markets or, in a broader sense, the derivatives market (the concept of  
142 fields Coudray). According to the latest theory of the specificity of financial engineering in the derivatives market is  
143 associated with a focus on creating innovative characteristics of the well-known derivative instrument - futures (forward),  
144 option or swap, not the innovative product itself.

145 However, it should be noted that the very instruments of financial engineering in the derivatives market in many  
146 ways has the general characteristics and concepts of financial engineering in general. First of all, it concerns the process  
147 of modeling and a combination of innovative financial products. In this context, for the purposes of our study, we use a  
148 classic, in our view, the definition of financial engineering, the proposed J. Finnerty. Thus, financial engineering - the  
149 design, development and implementation of innovative financial instruments and processes, as well as creative new  
150 approaches to solving problems in the field of finance. The fundamental nature of this definition is that it succinctly and at  
151 the same time adequately describes the nature of the financial engineering as an economic category. It does not limit the  
152 scope of any financial engineering. In addition, its distinctive feature was the use of the word "creative" in relation to  
153 finance.

154 The rapid development of financial engineering was the result of a need to manage the ever-increasing innovation  
155 risks associated with the investment and innovation activities of economic subjects and the development of modern  
156 techniques and technologies that enable and facilitate the creation of innovative products aimed at solving financial  
157 problems.

158 As a reaction to the problem of liquidity have been developed and introduced some innovations to facilitate  
159 companies' access to cash, and others - to run temporarily idle cash. In Examples include money market funds, money  
160 market accounts, sweep accounts, electronic payment systems. A more complete list of the most specific demand in the  
161 market of financial innovation have received distribution was formed American researcher J. Finnerty in 1988. In  
162 academia, the list is known as the "List of Finnerty," which is often used for the analysis of visual displays examples of  
163 factors that have stimulated the emergence of financial instruments and solutions.

164 Other instruments have been developed to increase the liquidity of the existing tools, giving the market depth:  
165 sometimes it took the form of standardization previously non-standard tools, sometimes due to the restructuring of the  
166 financial instrument or activities that enhance credit worthiness.

167 But the main direction of development of financial engineering in the last twenty years has more to offset the  
168 various risks to prevent as much of the rational investors are more risk averse. Among the new effective tools and  
169 strategies for risk management for individual and institutional investors began to interest rate futures and options, stock  
170 index futures, options on stocks and stock indexes, foreign exchange derivatives, as well as a whole range of innovations  
171 exchange type (different variations swaps), various forms of strategy on the basis of duration and immunization, new  
172 methods of risk assessment, etc.

173 The key factor, and at the same time encourage the development of financial engineering is the concept of agency  
174 costs (agency costs), launched in 1976 by Michael Jensen and William Meckling. The idea of this concept reflects the fact  
175 that the managers of the company's own interests do not always coincide with the interests of the owners of the firm.  
176 Managers are able to enter into contracts, very profitable for itself, bringing in the "sacrifice" the interests of long-term  
177 growth of the company's own premium bonuses. This is the agency costs. Many innovations have 80's of the last century,  
178 for example repurchase using a lever or active use of junk bonds, have the ability to partially reduce such costs.

179 Financial and engineering activities are concentrated mainly in the financial services industry, and most of all it  
180 showed in the securities industry. The industry, on the one hand, financial engineering has helped to take shape, and the  
181 other - she was transformed them.

182 Speaking of the laws of development of financial innovation, we note the wave-like nature of their occurrence  
183 periodically have fundamental financial innovation - options, the potential of which is used for decades, which combined  
184 can create a variety of other, less significant innovation. After some time the fundamental innovations arise again, like we  
185 discussed before and shown in fig. 1 and 2. Thus, the development of financial innovation in general and in particular, is  
186 similar to the cyclical nature of the economy, characterized by a set of different wavelengths.

187 The influence of many factors predetermined the development of financial engineering. But if we talk more

188 specifically, all the factors can be divided into external (environmental factors beyond the control of the economic  
189 operators, but providing them a direct impact) and internal (intra-factors).

190 The dominant external factors contributing to the emergence and development of financial engineering, include the  
191 destabilization of the world economy, the ever-increasing price volatility of globalization and the transformation of the  
192 industrial and financial markets, tax asymmetries, advances in science and technology.

193 On the other hand, considerable importance for financial engineering and have in-house factors - Need of liquidity,  
194 the ability to quickly and inexpensively to attract resources, aversion to risk management, agency costs, and many  
195 others.

196 One of the determining factors to the use of financial engineering techniques to market innovation is the insurance  
197 and risk mitigation.

198 The traditional approach to reduce various types of risks in theory and practice is to gain a penalty, guarantee,  
199 bank guarantee, mortgage, bills of exchange security and other remedies provided by applicable law. All the ways to  
200 ensure commitments are additional to the main obligation that they provide.

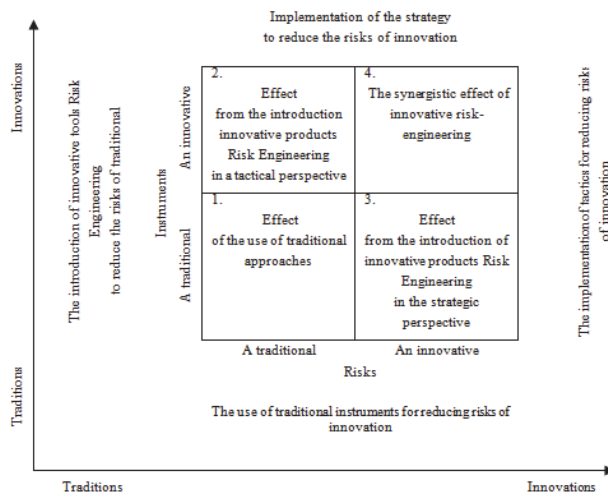
202 **4. Matrix Directions of the Innovative Features of Risk Engineering**

204 Given us examples of traditional approaches to reduce various types of risks in the theory and practice are more related  
205 to basic civil legal relations between the different actors (see Fig. 3, segment 1). However, most of them are absolutely  
206 not applicable to innovative financial products, by their nature. Since the nature of a last underlies financial engineering,  
207 then the methods and ways to reduce the risks involved in the market of innovative financial products need to look  
208 themselves in financial engineering instruments (see fig. 3, segment 2).

209 If the existing instruments do not meet the requirements set by the new task to reduce the risk, you need to create  
210 a new product based on the new conditions and the available tools (see fig. 3, segment 3), or solve the problem by  
211 getting a fundamentally new financial product as a result of achieving through financial engineering instruments  
212 synergistic innovation effect (see fig. 3, segment 4). The process of designing innovative financial products created to  
213 reduce risk through various instruments of financial engineering, and will be called the risk-engineering. Thus one of the  
214 main tasks of risk engineering is risk management, which, as already mentioned by us above, is one of the functions of  
215 the application of financial engineering.

216 Thus, in the most general definition of the purpose of our study under the risk-engineering refers to a set of  
217 methods of financial engineering aimed at eliminating or optimizing financial risks. Or, using the definition of financial  
218 engineering, we have given above, the risk-engineering, in our opinion, is a complex of measures, including the design,  
219 development and implementation of innovative financial products and processes, as well as creative new approaches to  
220 solving problems related to the management and reduction of risks arising from financial market subjects.

221



222  
223  
224

**Figure 3.** Matrix directions of the innovative features of risk engineering.

## 5. Conclusion

Investigation of the application of risk-engineering reveals the following characteristics:

- The main objective of risk that affect the development of financial innovation is a credit, interest rate, market, an innovative risk and liquidity risk;
- The need for the application of risk-engineering as a set of techniques for insurance risk lies with both the demand side and the supply side of innovation of financial products;
- In the basis of the findings of such transactions are differences in predicting the behavior of the market, the different investment horizons, different tolerance to risk and subjective.
- Thus, the development of financial engineering today contribute to the factors that are common patterns of development of the financial market. All of the above factors favor us impetus to further development of financial engineering as a science, that is, practical scope of financial engineering intersects with the factors of its development. This kind of system, the elements of which are mutually influence each other: objective reasons require the creation of new financial products, which complicate economic relations, giving rise to all the new requirements that entail more sophisticated financial innovations.

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## Method of Valuation of Financial Factors Influencing the Implementation of Liquidity Risk for Leasing Companies

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### Abstract

Today liquidity risk is the least known and formalized. Leasing companies are exposed to liquidity risk, no less than the banks and other financial and credit institutions. In this paper we describe the financial risk factors that affect the liquidity of the leasing company, and propose alternatives for calculating each of the risk factors on the basis of the analysis of financial statements. Produced mathematical models influencing change of liquidity risk of leasing company and as a consequence of the financial results. Presents a graphical representation and reasoning occurring transformations.

**Keywords:** risk, liquidity, risk-factors, risk-engineering,leasing company

## 1. Introduction

The companies transferred in leasing a goods based on short-term borrowings, and expect cash flow from its operations as revenue of lease payments. For this reason, there is a risk of liquidity loss due to possible inconsistencies between the maturities of their assets and liabilities, that imply that the incoming cash flows from the assets will not meet the outflows of cash to pay debts.

The proposed method allows us to evaluate the liquidity risk, based on the analysis of financial statements and cash flows, taking into account the risk factors that might alter the liquidity of leasing companies and influencing final financial result.

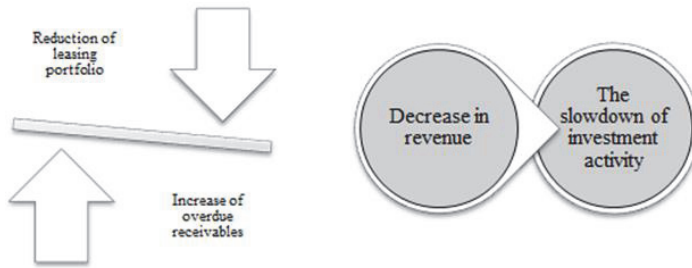
Factors may be either financial and not financial. In our paper we will offer its own interpretation of the financial assessment of the risk factors affecting the level of liquidity risk.

## 2. Liquidity Risk and Financial Risk-Factors

The most significant for any of leasing company is credit risk. Its realization will in terms of evaluating the financial statements originally manifested as deterioration in the quality of accounts receivable, which will result in decrease revenue.

As the crisis of 2008 has shown, when times massive defaults come on and leasing portfolio gradually depreciate, the company operates a defensive reaction, which is expressed in a tightening approaches to the assessment and improvement of the lessee's risk management system. These measures lead to a reduction in the leasing portfolio. It follows that after a while, we should observe a reduction of the investment cash flow, which reflects the development of leasing activity

Credit risk as the probability of non-payment by the lessee may be represented as follows (Fig. 1).



54  
 55 **Fig. 1.** Key indicators of credit risk in leasing activity  
 56

57 Overall, we have identified four indicators, which may indicate the manifestation of credit risk in the organization.  
 58 However, in our view, having as input only the official statements, the credit risk of leasing company is characterized,  
 59 above all, indicator of overdue accounts receivable, as well as decrease in revenues. These two indicators of credit risk,  
 60 in our opinion, most accurately reflect its essence. Reduction of leasing portfolio as a result of slowdown of investment  
 61 activity - this is the side effects.

62 Thus, as a measure credit risk (CrR), we propose to use the indicator asset impairment, multiplied by the the  
 63 frequency of decrease in revenue for a given period of time (month, quarter, year).

64 
$$CrR = p * \frac{\sum_{i=0}^{\infty} x_i}{\sum_{i=0}^{\infty} y_i} \quad (1)$$

65 where CrR - credit risk; p – frequency of lower revenues; xi – overdue receivables for the i-time; yi – the  
 66 company's assets or management leasing portfolio for the i-time.

67 As an index of yi can be used as well a managerial leasing portfolio as balance sheet assets of the leasing  
 68 company.

69 The first option reflects the current degree of impairment of the leasing portfolio, and being in management  
 70 accounting. The second option, which we will use, reflects the degree of impairment of assets as a whole. It should be  
 71 noted that the most significant will be the first way to calculate, but due to the fact that leasing portfolio managerial "is  
 72 blurred" in the balance sheet and relate only overdue receivables to total receivables have been used is not quite  
 73 correctwe think that each of the analyzed us absolutely leasing companies engaged only in leasing, and its assets are  
 74 fully formed through leasing operations.

75 As for the frequency of lower revenues it is calculated using the following formula (2).

76 
$$p = \frac{m}{n}, \quad (2)$$

77 where m - amount of facts of lower revenues; n - the amount of all observed periods.

78 Both indicators are reduced to unified point scale estimate (Table 1).  
 79  
 80

81 **Table 1.** Expert assessment of indicators of credit risk reduction to unified point scale

Frequency decrease in revenue	Score
>50%	1
40-50%	0.8
30-40%	0.6
20-30%	0.4
10-20%	0.2
0-10%	0.05
Asset impairment	Score
>25%	1
20-25%	0.8
15-20%	0.6
10-15%	0.4
5-10%	0.2
0-5%	0.05

82  
 83 The ranges of indicators and their corresponding scores are based on the following assumptions:



1. If the frequency of lower revenues is more than 50% of study period, it becomes critical to the company, and therefore the weighting score is the maximum (1).
2. Further periods of lower revenues are divided into predetermined amount of ranges, each of which is given the score.
3. Likewise is constructed evaluation of the level of impairment assets.

Critical to the leasing company, we believe impairment of assets more than 25%.

Portfolio risk, in our view, tightly is associated with credit risk, as its detrimental effect is reduced eventually to receive large losses as a result of excessive concentration on any segment of the massive non-payment by the lessee.

Portfolio risk includes:

- high concentration for one lessee (a group of lessees) or for one of the creditor;
- high concentration for one sector of economy, with representatives of which were concluded the greatest number of leasing contracts;
- high concentration of one region in which the largest number of lessees (in value terms).

We propose to carry out assessment of portfolio risk using the following algorithm, based on the available data:

1. Because portfolio risk is closely related with the credit, then about the quality the portfolio management will indicate the degree of impairment. We know the current concentration on branch and the region at any given period, and the leasing company disclose the total overdue debt on the balance sheet. In this case, as a measure of the potential loss of portfolio risk can be used following formula (3).

$$PotL = \frac{ID}{TA} * SC * \frac{SC}{TA}, \quad (3)$$

where PotL – potential losses; ID - impaired debt; TA - total assets; SC - sum of concentrations (by industry, region, on one of the lessee).

Then we must calculate their share in total assets for each of the analyzed period.

$$PotL, \% = \frac{PotL}{TA}, \quad (4)$$

Next, expect itself portfolio risk, which represent as a percentage of weighted average impaired debt on specific industry, region, product, lessee.

$$PoR = \frac{\sum PotL * PotL\%}{\sum PotL}, \quad (5)$$

As a result, is chosen parameter whose value is the maximum (if this is a region is taken portfolio risk in the region, if the industry, by the industry), and include it in the calculation of premium for liquidity risk.

$$PoR = \max(PoR_{reg}, PoR_{bran}, PoR_{prod}), \quad (6)$$

The next risk influencing violation liquidity risk is the balance risk. Evaluation of the balance risk is most conveniently done using an estimate of the coefficient method.

For the calculation of the balance risk are invited to use the current ratio, as it is, in our view the most accurate for assessing the balance risk because it is based on the balance of current assets and liabilities.

A reflection of the balance risk from a statistical perspective is to reduce the frequency of the current liquidity ratio. However, the frequency only indicates some actual trend of deterioration. In addition, the method for estimating the coefficient implies certain restrictions (limits). Thus, in the global financial environment it is assumed that the current liquidity ratio must not fall below 1.5.

Thus, in the coefficient calculation of frequency reduction of current liquidity will only include values that satisfy the following conditions:

the current value must be less than the established standard;

the current value must be less than the previous value.

Therefore, we propose to calculate the balance sheet risk as the weighted average rate of change of the current ratio to the balance of the cash at the end of the reporting period

$$BR = \frac{\sum xy}{\sum x}, \quad (7)$$

where x – cash balance at the end of the reporting period;

y – change of the current ratio, calculated by the next formula:

$$\begin{cases} CR_t < CR_n \\ CR_t < CR_{t-1} \end{cases} \Rightarrow \left| \frac{CR_t - CR_{t-1}}{CR_{t-1}} \right|, \quad (8)$$

где CRt – current ratio of the reporting period; CRn – normative value of the current ratio; CRT-1– current ratio for the previous period.

Since the condition is already included in the calculation only negative changes ( $CR_t < CR_{t-1}$ ), then the resulting change in the calculation of the balance risk take in modulus.

135 Another important kind of risk inherent in leasing activity, is a currency risk arising from the currency transactions.  
136 Currency transactions appear as at the conclusion of the currency lease agreements and currency loans upon receipt  
137 and signing of supply contracts with foreign partners. Currency risk management in many leasing companies is reduced  
138 to the so-called natural hedge, or, in other words, the establishment of payments under lease contracts associated with  
139 foreign currency loans in the currency of the loan. This method really allows us to transfer the primary foreign currency  
140 risk to the lessee. However, several features of accounting and reporting, as well as the established order of taxation  
141 exchange differences arising during the revaluation of assets and liabilities denominated in foreign currency are not allow  
142 to fully avoid the negative effects of sharp movements in exchange rates.

143 Currency risks may also arise if the leasing company had issued loans to other organizations in the currency, or  
144 the company has currency deposits, while the funds are received by it in rubles. Then the leasing company may use  
145 various methods to minimize currency risks from insurance to futures contracts.

146 Implementation of currency risk in this case will be received losses that in the financial statements may be seen in  
147 other operating income and expenses. In this case, the resulting loss of currency transactions is estimated as negative  
148 delta between revenues and expenses for the period related to foreign currency transactions.

$$149 \quad CuL = CuI - CuE, \quad (9)$$

150 where CuL - currency losses; CuI - currency income (positive currency revaluation); CuE - currency expenses  
151 (negative currency revaluation).

152 Currency loss negatively affects the operations, resulting in additional and usually unplanned removal of money  
153 from circulation. Therefore, in our opinion, the currency risk in this case should be calculated as the average value of the  
154 period

$$155 \quad CuR = \frac{\sum_{i=1}^{\infty} x_i w_i}{\sum_{i=1}^{\infty} x_i}, \quad (10)$$

156 where  $x_i$  - is the net operating cash flow for the period of i-time;  $w_i$  - the ratio of currency loss to net operating cash  
157 flow for the i-time period.

158 In calculating the interest rate risk, we offer to follow recommendations of IFRS: so, under IFRS as indicators of the  
159 implementation of interest rate risk, the following indicators:

- 160 • EBITDA / debt service costs;
- 161 • EBITDA / interest expense.

162 In this case, we propose to consider it as the product of three weighted averages.

$$163 \quad IntR = \frac{\sum_{i=1}^{\infty} C_i a_i}{\sum_{i=1}^{\infty} C_i} * \frac{\sum_{i=1}^{\infty} |E_i| b_i}{\sum_{i=1}^{\infty} |E_i|} * \frac{\sum_{i=1}^{\infty} |E_i| d_i}{\sum_{i=1}^{\infty} |E_i|}, \quad (11)$$

164 where C – cost price for the i-period; a – the indicator is calculated by the following formula:

$$165 \quad a_i = \frac{|IntI_i - IntL_i|}{C_i}, \quad (12)$$

166 where IntI – interest income for the i-period; IntL – interest expense for the i-period; E (EBIT) - profit before tax,  
167 interest income and expense; d – score of 100%, if EBIT < 0 for the i-period.

168 b - the indicator is calculated by the following formula:

$$169 \quad b_i = \frac{IntL_i}{E_i}; IntL_i > E_i \Rightarrow b_i = 100\%, \quad (13)$$

170 While if interest expenses exceed the value EBIT, then  $b = 100\%$ .

171 In calculating the may be a situation when one of the calculated indices is equal to zero, and then according to the  
172 formula of our interest rate risk is zero. As in the case of currency risk, we believe that the interest rate risk for these  
173 companies a little, and then its value is taken as 0.01%.

174 Thus, when calculating the interest risk are taken by us the following conditions:

- 175 – availability interest loss automatically implies a presence of interest risk, which manifests itself in the event that  
176 the interest expenses exceed the interest income, ie delta between them will be negative;
- 177 – if EBIT is less than zero, ie, has a negative value, the presence of interest expense will increase loss, ie in this  
178 period, the maximum interest rate risk;
- 179 – if the interest expenses exceed the value EBIT, it also means that there is interest rate risk.

180 The next risk factor related to the group financial risks - is the risk of impossibility attract bank funding. In  
181 constructing the cash flow model is often the case, when to serve its Leasing company will seek additional funding from  
182 the owners or producing cash infusion. The reasons for additional funding can serve a variety of factors, but one fact  
183 remains unchanged: the company a deficit of liquidity, which had to be closed. On this basis, we believe that the  
184 substitution of bank financing in cash from the owners may be subject to implementation risk of being unable of attracting  
185 bank funding.

186 In our model, additional injections of cash flows to the leasing company are reflected in the financial cash flow  
187 under the article "Capital flows associated with the Inflow / Outflow of funds" and "Change in retained net earnings /  
188 accumulated deficit is not reflected in the movement of capital".

189 Then the calculation of the risk impossibility to attract bank funding we offer is as follows:

- 190 1. Calculate the total sum additional non-bank financing for the items "Capital flows associated with the Inflow /  
191 Outflow of funds" and "Change in undistributed net earnings / accumulated deficit is not reflected in the  
192 movement of capital" for each period under analysis.

$$193 \quad ANBF = OC_{cap} + OC_{ncap} \quad (14)$$

194 where ANBF - additional non-bank financing; OCcap - owner cash in capital; OCncap - owner cash not reflected in  
195 the movement of capital.

- 196 2. Accept the condition that 50% of "infused" in the company amounts are based on the fact that leasing  
197 companies have any difficulty getting bank loans.

$$198 \quad ANBF_{cor} = 50\% * ANBF, \quad (15)$$

- 199 3. Next, we correlate additional funding to the net financing cash flows for each period of time. Sign of the net  
200 financial cash flow in this case does not matter, because we define the sensitivity of the net financial cash flow  
201 to cash flow from property owners.

$$202 \quad S_{ANBF_{cor}} = \frac{ANBF_{cor}}{|NFCF|}, \quad (16)$$

203 where  $S_{ANBF_{cor}}$  - sensitivity of net financial cash flow to funds from the owners; NFCF - net financial cash flow.

204 Since the we do not really know whether is due entering of cash from the owners of difficulties with bank financing,  
205 then this indicator will always be limited to 50% abroad. In other words, we think that with the probability 50% was due to  
206 the infusion of additional problems with bank financing.

- 207 4. Additional funding from the owners should be directed to cover investment and operating expenses. This  
208 means that the risk of impossibility of attracting funding will be determined as the probable share of being  
209 unable to fund operating and investing activities. The sensitivity of net financial cash flow to the owners of the  
210 means in this case is a weighting factor to cover the net operating cash flow and investment.

$$211 \quad \begin{cases} Z = |(NICF_i + NOCF_i)| * S_{ANBF_{cor}}, (NICF + NOCF) < 0 \\ Z = 0 \end{cases} \quad (17)$$

212 where Z – cover the cost of operating and investing activities at the expense of the owners; NICF – net investment  
213 cash flow for the i-period; NOCF - net operating cash flow for the i-period.

214 The sum of net investment and operating cash flow for the i-th period should be less than zero, because otherwise,  
215 additional funding was presumably caused by the need to repay loans.

- 216 5. In fact risk impossibility of attracting funding is calculated as a weighted average of the sum of net investment  
217 and net operating cash flow, adjusted by a factor  $S_{ANBF_{cor}}$  in analyzed period.

$$218 \quad RIAF = \frac{\sum Z}{\sum |(NICF_i + NOCF_i)|}, (NICF_i + NOCF_i) < 0, \quad (18)$$

219 In other words, the same percentage of funding from the owners of operating and investing activities for the whole  
220 period of time, we believe as a possible absence funding percentage of cash from banks. This percentage in the event of  
221 termination of "infusion" from will also be a measure of the possible occurrence of a liquidity deficit.

### 222 3. Conclusions

223 In this article we tried to complete and expand the scientific results in the field of financial theory and risk-management for  
224 such economic categories as "liquidity" and "liquidity risk" by identifying risk-factors affecting on the change in the  
225 financial statements (balance sheet, income statement, statement of cash flows).

226 As we have identified, liquidity risk is a complicated structural risk changing under the influence of variety of  
227 conditions and factors, and its role in general system of financial risk management, and in the risk management system of  
228 leasing companies, today, in our opinion, undervalued. As a result, we can see deficit or excess surplus funds.

229 Thus, we have proposed risk assessment model and method of calculation of the liquidity risk premium allows you  
230 to comprehensively assess the impact of the most significant factors on the level of risk and cash flows of leasing  
231 companies. In addition, when calculating the premium for liquidity risk leasing companies can use their own methodology  
232 for assessing specific factors (eg, credit), which makes the procedure versatile enough for practical use.

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# Application of Optimization Models in Prediction of Inland Water Transport Organizations' Profit

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## Abstract

The optimal allocation of scarce resources and the maximization of profit is one of the most important tasks of the transport organizations management. The article's significance is in consideration of ways of optimization of the resources allocation aimed at profit maximization in inland water transport organizations. The authors offered to use time of vessels operation by types of activities as constraints due to optimization, as the period income river companies is rather short period of time. The article shows an example calculation of the optimal allocation of resources to maximize profit on a real example.

**Keywords:** inland water transport, activity segments, marginal profit, resources, optimization.

## 1. Introduction

The process of various economic phenomena management requires the prediction of results in certain conditions on a on-going basis. To expedite the decision on the choice of optimal management and savings model, the modelling of real processes of business operations is used.

Shipping organizations due to a relatively short income period (5-8 months per year) at the year-round defrayment of expenses and limited resources available need to identify the priority areas to allocate fixed assets, material and financial resources.

River shipping companies should use optimization models of managerial decision making to select the optimal resources allocation in order to maximize marginal profit under uncertainty.

## 2. Method

The economic essence of optimization techniques is in choice of the method of certain limited resources distribution made to achieve maximum or minimum target value. The models of finding the parameters values that provide the extremum of the function subject to constraints imposed on the arguments are called mathematical programming problems. Such problems are widely used for solving problems related to resource allocation, production planning, transport management, etc.

The marginal profit is one of the most significant (for management) performance indexes of segments activity. That is why its maximization is one of the priority tasks of improving performance of the separate segment and the organization in general. A *segment* is understood as a selected on a certain criteria, relatively independent, capable of generating revenues and incurring expenses part of the organization activity being a basis for preparation of reports for internal and external users.

The formulation of the marginal profit maximization model for organizations of inland water transport can be described by the following formula:

$$MR = \sum_{i=1}^n \sum_{j=1}^m mr_{ij} \cdot x_{ij} \Rightarrow \max, \quad (1)$$

where  $mr_{ij}$  - marginal profit per 1 machine day of  $i$  vessel working at  $j$  segment;

$x_{ij}$  - number of machine days worked by  $i$  vessel of  $j$  segment.

The system of constraints is represented by Formula 2.

(2)

$$\begin{cases} \sum_{i=1}^m x_{ij} \leq T, & i=1,2,\dots,n, \\ \sum_{i=1}^n b_{ij} \cdot x_{ij} \leq K_j, & j=1,2,\dots,m, \\ \sum_{i=1}^n b_{ij} \cdot x_{ij} \geq L_j, & j=1,2,\dots,m, \\ x_{ij} \geq 0, \\ x_{ij} \text{ -integral -valued} \end{cases}$$

54 where  $T$  - the total time of  $i$  vessel operation in all areas of activities. For shipping companies it is limited to the  
 55 navigation season, that is 200 days at an average;  $m$  - number of segments;  $b_{ij}$  - carriage volume of  $i$  vessel at  $j$   
 56 segment per time unit;  $K_j$  - minimal scope of work of  $j$  segment. For example, if you have contractual obligations to the  
 57 contractor for freight services, sale of a certain volume of the extracted non-metallic building materials (NBM), etc.  $L_j$  -  
 58 maximal limit of work of  $j$  segment. The limit, as a rule, is caused by a restricted demand for products, works, and  
 59 services of inland water transport organizations. Determination of this limit is made on the basis of demand analysis or  
 60 marketing researches.  
 61

62 Despite the possibility of splitting the argument expressed in machine days, it seems appropriate to impose  
 63 constraints on argument integrality; since, practically, it is difficult to observe the vessels "transfer" from one activity to  
 64 another within one shift.

65 It should be noted that the use of this model is advisable in cases when the same resources (in this case - river  
 66 cargo vessels) may be used in several segments of the river company.  
 67

### 68 3. Result

69 For illustration of the model of maximization of marginal profit of a shipping company through optimal timing of vessels on  
 70 various segments let us consider the "Kamskaya rechnaya kompaniya" (Kama River Company) LLC.

71 The fixed assets of the Company include four push tugs of different powers and four barges of different carrying  
 72 capacities. Specifications of crafts owned by "Kamskaya rechnaya kompaniya" LLC ("KRK" LLC.) are presented in Table  
 73 1.  
 74

75 **Table 1.** Specification of the crafts owned by "KRK" LLC

Tug name	Power, h.p.	Barge name	Carrying capacity, t
Dunaysky 43	1340	Barzha-81300	5000
OT-816	800	Barzha-422	4460
Mekhanik Grafsky	800	Barzha-423	4460
Volgar-34	740	Barzha-1624	3750

76 The management of the organization faces the task of optimal timing of the vessels in each of the following business  
 77 segments:  
 78

- 79 - Transportation of NBM extracted at own expense;
- 80 - Transportation of other cargoes (timber);
- 81 - Vessel lease.

82 The limitation of "Kamskaya rechnaya kompaniya" LLC scope of activities caused by a deficiency of the following  
 83 parameters:  
 84

- 85 - Limitation of the navigation season, constituting 200 days at an average;
- 86 - Limitation of crafts (vessels) available - four tugs with barges.

87 Thus, the organization during the navigation season has 800 machine days ( 200\*4 ).

88 In addition, the demand research and analysis of concluded contracts revealed lower and upper limits of the  
 89 segments scopes.  
 90

- 91 1. The company has signed contracts for the supply of NBM in the amount of 115 thousand tons before the  
 92 navigation season. The materials are extracted in Sakony village located at a distance of 172 km from Kazan.  
 93 The projected maximum volume of NBC extraction during the navigation season will be 312 thousand tons.
- 94 2. Timber cargo transportation market research revealed that the maximum possible amount of carriage will be  
 95 70 thousand tons.

Estimated data on probable volume of different types of cargo transportation in unit time are shown in Table 2.

**Table 2.** Crafts' producing capacity in unit time

Vessel No.	Segments	Delivery of NBM extracted, t	Other cargo transportation, t
	Crafts		
	Segment No.	1	2
1	push tug Dunaysky 43, barge	653.7	381.2
2	push tug OT-816, barge	550.62	319.87
3	push tug Mekhanik Grafsky, barge	550.62	319.87
4	push tug Volgar-34, barge	559.7	336.33

The data on vessel marginal profit obtained from different segments of activity per one machine day are presented in Table 3.

**Table 3.** Crafts' marginal profit in unit time tous.RUR/machine days

Vessel No.	Segments	Delivery of NBM extracted	Other cargo transportation	Lease
	Crafts			
	Segment No.	1	2	3
1	push tug Dunaysky 43, barge	31	29.5	15
2	push tug OT-816, barge	28.5	27	12
3	push tug Mekhanik Grafsky, barge	29	28	12
4	push tug Volgar-34, barge	29	27	11

An optimization model of timing of vessels owned by "Kamskaya Rechnaya Kompaniya" LLC is constructed according types of activities on the basis of the original data.

The objective function of marginal profit maximization will be as follows:

$$MR = 31 \cdot x_{1,1} + 29,5 \cdot x_{1,2} + 15 \cdot x_{1,3} + 28,5 \cdot x_{2,1} + 27 \cdot x_{2,2} + 12 \cdot x_{2,3} + 29 \cdot x_{3,1} + 28 \cdot x_{3,2} + 12 \cdot x_{3,3} + 29 \cdot x_{4,1} + 27 \cdot x_{4,2} + 11 \cdot x_{4,3} \Rightarrow \max$$

Let us present the constraints by the following system of inequalities:

$$\left\{ \begin{array}{l} x_{1,1} + x_{1,2} + x_{1,3} \leq 200, \\ x_{2,1} + x_{2,2} + x_{2,3} \leq 200, \\ x_{3,1} + x_{3,2} + x_{3,3} \leq 200, \\ x_{4,1} + x_{4,2} + x_{4,3} \leq 200, \\ 115000 \leq 653,7 \cdot x_{1,1} + 550 \cdot x_{2,1} + 550 \cdot x_{3,1} + 559,7 \cdot x_{4,1} \leq 312000, \\ 381,2 \cdot x_{1,2} + 319,87 \cdot x_{2,2} + 319,87 \cdot x_{3,2} + 336,33 \cdot x_{4,2} \leq 70000, \\ x_j \geq 0, \\ x_j - \text{integral - valued} \\ i \in [1,4] \\ j \in [1,3] \end{array} \right.$$

The constructed matrices and the results of optimization are shown in Tables 4-6.

**Table 4.** Crafts' producing capacity. bij matrix tones/machine days

Crafts	Segments	Delivery of NBM extracted, t	Other cargo transportation, t	Lease, days
push tug Dunaysky 43, barge		653.7	381.2	-
push tug OT-816, barge		550.62	319.87	-
push tug Mekhanik Grafsky, barge		550.62	319.87	-
push tug Volgar, barge		559.7	336.33	-
Total scope of activity of segment j		311724	64294	62
Minimal scope of activity of segment j		115000		
Maximal scope of activity of segment j		312000	70000	



120 **Table 5.** Marginal profit in unit time. mrij matrix thous.RUR/machine days  
121

Vessel No.	Segments	Delivery of NBM extracted	Other cargo transportation	Lease
	Crafts Segment No.			
		1	2	3
1	push tug Dunaysky 43, barge	31	29.5	15
2	push tug OT-816, barge	28.5	27	12
3	push tug Mekhanik Grafsky, barge	29	28	12
4	push tug Volgar-34, barge	29	27	11

122 **Table 6.** Crafts' time of work. xij matrix  
123  
124

Crafts \ Segments	Delivery of NBM extracted	Other cargo transportation	Lease	Total time of vessel operation, days	Maximal time of vessel operation, days
push tug Dunaysky 43, barge	138	0	62	200	200
push tug OT-816, barge	194	6	0	200	200
push tug Mekhanik Grafsky, barge	5	195	0	200	200
push tug Volgar, barge	200	0	0	200	200

125  
126 **4. Conclusions**  
127

128 According to the results of the analysis, providing the most optimal time allocation of vessels operation by segments, the  
129 maximum profit margin calculated according to the formula 1 amounts to 22 304 thousand rubles. In this case, all push  
130 tugs will be busy transporting the extracted NBM. The push tug "Volgar" will be busy in this segment for the entire period  
131 of the navigation season. The tugs "Dunaysky-43" and OT -816 will be also engaged the most of navigation time in this  
132 segment - 138 days and 194 days, respectively. The tug "Mekhanik Grafsky" most of the navigation time (195 days) will  
133 be busy with the transportation of other cargoes, and 5 days - with the transportation of NBM. It is advisable to offer the  
134 most powerful vessel "Dunaysky 43" for lease for 62 days. The volume of transported NBM will amount to 311,724 tons.  
135 The volume of other cargo will be 64,294 tons with the planned level of demand.

136 Thus, economic-mathematical modelling can help inland water transport organizations to optimize the vessels work  
137 by the types of activities, which will maximize profits.  
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## Small and Medium Businesses Informatization Management: Main Trends of Development in Russia

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### Abstract

The system architecture of a small business must also provide financial management, personnel, procurement, manufacturing, sales, etc. Due to the fact that in small and medium-sized businesses there are combined functions of ownership and management, information management system must provide accurate and up-to-date information about finance and manufacturing resources. We have reviewed the structure of the Russian market of software products for small and medium-sized businesses and explained the leading position of some companies. We conducted a survey of CEOs of SME and employees of the companies ERP systems vendors, who showed quite a symmetric assessment of development informatization of SME.

**Keywords:** SME, Product-Centric Midmarket Companies, branch specialization, efficient implementation of the technology, CRM, SAP ERP, 1C Company, accounting statements, implementation of sectoral programs, computer literacy

### 1. Introduction

As world practice shows, the choice of information management system is an extremely difficult and complex task that requires serious inquiry about the organization and clear stating of the requirements to information architecture in the company. Small and medium-sized businesses represent a very significant amount of the economy in different countries, for example, up to 80% on the number of employed in Japan and about 60% of GDP in the countries of EC. These figures are rising, and consequently the small business is one of the most important consumers of computer technologies and equipment. Considerable potential in this market stimulates manufacturers to develop specialized software, taking into account the specifics of the SME.

Review shows that the most popular destinations of research informatization of SME are following : impact of implementation ERP systems on decision-making and strategic management of companies [1],[2]; assessment of factors that significantly affect the implementation of ERP systems and project management in it-technology [12]; study of competences required employees SME, which use ERP systems [4]; overview of trends, issues and different aspects of SME informatization in certain countries [5], [10]; IT-outsourcing services for small and medium enterprises and implementation cloud computing.

### 2. Theory

The scope of business does not bring about a reduction in management hierarchy of business processes. The system architecture of a small business must also provide financial management, personnel, procurement, manufacturing, sales, etc. [4]. On the other hand, there are objective peculiarities of small and medium-sized businesses, which define the specific nature of such software products.

1. The most significant feature is the limitedness of financial resources, the low availability of borrowing sources.

57 Such companies are limited in their ability of frequent renewal for the manufacturing process of equipment.  
58 Due to the fact that in small and medium-sized businesses there are combined functions of ownership and  
59 management, information management system must provide accurate and up-to-date information about  
60 finance and manufacturing resources [3].

- 61 2. Small businesses have a tough industry specialization and they conduct business in conditions of high  
62 commercial and financial risks compared with corporations, in this respect separate companies have slight  
63 influence on the market environment. Investment in IT-technologies and equipment in this context differs by  
64 clear and reasonably required, rigorous approach to the selection of software solutions.
- 65 3. In many countries, for SME there are used special tax regulations (France, CIS). This fact carries to additional  
66 requirements for information management system, more complex localization in terms of accounting and  
67 reporting [12].

68 Let us see how the above mentioned features influenced on the Russian IT-system market for SME. Limitedness  
69 of financial, manufacturing and human resources on the one hand, and the legal requirements for provision of accounting  
70 control on the other, explain the situation when the main computer based control module is accounting and preparation of  
71 accounting. Implementation of the ERP-systems is not in grassroots, although in the market there is represented a certain  
72 range of software products integrated automation management and oriented for the SME segment [2]. At the same time,  
73 this segment is characterized by the information management architecture and availability of software products created  
74 by specialists of the companies. In the recent past, in the limitedness of the market conditions making their own programs  
75 was a cheap and effective way for information management. Expenditures connected with the creation and maintenance  
76 for such products, if they had not been patented, were treated as operating expenses, making it difficult for them to  
77 integrated assessment. High risks of limited service for such software products cause gradual failure for them and  
78 commitment to technology with guaranteed service.

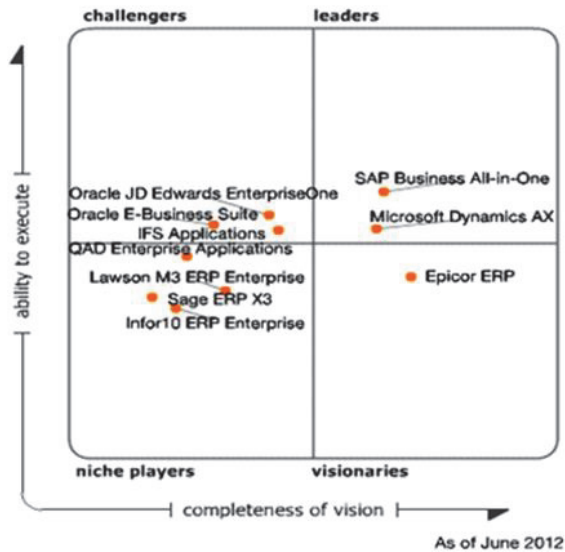
79 The level of automation control within SME depends on the industry specialization. Thus, in particular, the  
80 distributive services and retail as a more resource-intensive activity in terms of information service are characterized by  
81 more progressive and mastered industry technology. The segment of CRM software products is actively developed with a  
82 focus on SME. Modernization of storage technologies allows to solve many organizational and industry technological  
83 objectives and to improve business performance.

84 The development of modern technologies contributes to the emergence of new types of information services for  
85 SME. The use of Saas-technologies provides significant financial and technological benefits: reducing the cost of  
86 equipment and licenses, increase business flexibility, when access to information is provided from any location with  
87 Internet connection, higher information security, because data safety is provided as a separate function of provider [6].

88 The current standard of the company management is ERP-system, with the principal elements, by Gartner's  
89 definition, should be: MRPII; production support, financial accounting; sales management; procurement and SCM ;  
90 human resources human resource management [13].

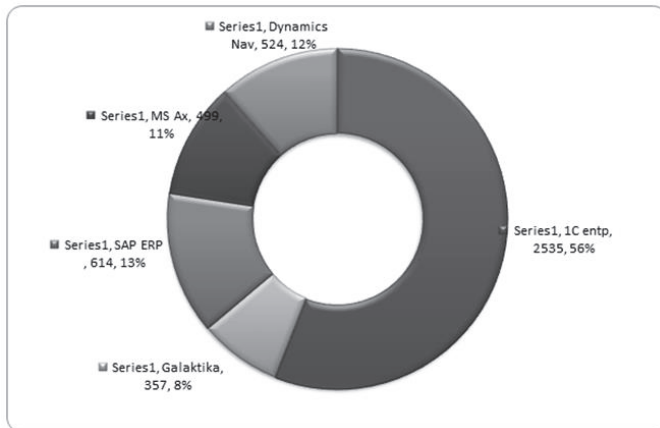
91 Using ERP-system offers company significant advantages to organize its effective management, accelerate  
92 response on the environment changes, improve the quality of customer service. System implementation is an essential  
93 cost item for companies, economic effect of these costs should be carefully analyzed. For this kind of assessment is  
94 offered to use such indicators as: ROI, TCO, cost-benefits analysis [7]. TCO, cost-benefits analysis. We agree with the  
95 concept: the return on investment in ERP-system to enhance the effectiveness of business processes, which it supports.  
96 In other words, the effective implementation of the technology is intended for ultimate development of the market position  
97 for the company and reaching key performance indicators.

98 Gartner Consulting evaluates global market ERP-systems for SME using the Magic Quadrant [14]. World market  
99 leaders are technologies of SAP Business All-in-One and Microsoft "SAP Business All-in-One" и "Microsoft Dynamics Ax"  
100 (Axapta). Ax (Axapta) (Figure 1). There are examples of implementation of technologies such as "Oracle E- Business  
101 Suite", "Sage ERP X3", "Scala", "Infor ERP EntERPrise" in the Russian market also.



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ERP Magic Quadrant for Product-Centric Midmarket Companies Infor In the segment of ERP-products for large businesses leaders in Russia are foreign suppliers of SAP AG, Microsoft, Oracle. These producers are leading the last decade in terms of sales volume. At the same time, in terms of the number of the implemented projects dominates Russian1C company.



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**Figure 2.** The most widespread ERP-products used in Russia

1C company activity is based on the franchising, the main staff for about 1,000 employees is responsible for developing and updating software products. At the same time in Russia and the CIS, there are over 6500 companies implementers, which employs more than 100 thousand it-specialists.

The leading position provide the interaction of 1C company with governmental agencies, that determine the electronic format of the accounting control and tax reporting in the Russian Federation. For a long period of time the company specialized in automation of SME within the financial management and accounting statements. This is the main factor, in our opinion, in explaining the leadership of the manufacturer of software for SME. In definitions, used by IDS [USA] analysts , International Data Corporation (IDC)was "unincorporated" information management product. Since the

introduction of the product line "1C Enterprise Management 8" (2002) the company has been considered as a supplier of ERP-solutions.

### 3. Results

Within the framework of the study on the development trends in the IT-market for SME we conducted a survey among the leaders of 10 companies in this segment, and 10 representatives of the companies - vendors, service providers of SME automation. The main goal of the survey was to identify the general direction of IT-industry within SME segment. CEOs were asked the following questions: Satisfaction with the level of information support of their business management? - Intended Changes to the information system of the company that could bring value to their business?

Specialists from IT-companies were asked the following questions: Evaluation score of PC Estimation of level of computer literacy of their clients? What problems are associated with the implementation of ERP-systems within the scope SME? Determination of the potential requirements for ERP-systems by SME companies?

The most common answers can be summarized in the following table.

**Table 1.** The results of the survey of the CEOs SME companies and employee of it-vendors

SME CEOs	Vendors
1. Contentment Information System depends on industry-specific business processes and features industry-specific software products. There is no complaints setting and completion of accounting, warehouse and HR software. Negative reviews identified for the implementation of sectoral programs such as 1C Catering; 1C Dental offices; 1C Motor transport. In two cases out of 10 stated that their accounting program is not possible to get the current analytics about the state inventories for management decision making.	1. It is impossible to give a clear assessment level of computer literacy executives SME, based on the results of testing it-specialists. However, a trend that Executive Directors of retail and transport companies have great knowledge and are more susceptible to technological changes.
2. Detected trend that retail companies are interested in more in online monitoring of sales and interaction with clients. In three cases out of ten considered the possibility of introducing 1C: CRM. In one out of ten companies discussed contract 1C hosting service.	2. There are no problems during the installation of unified management and accounting software. Difficulties with industry solutions 1C, as well as in companies with complex, specific business processes. 3. All vendors support the need for implementation ERP-systems in small and medium-sized businesses. In this report they saying about lack of qualified ERP-architects, solution managers in the implementation of such projects.
3. In our opinion identified largely symmetric estimates of development it-segment for small and medium-sized businesses from the directors of the companies and technology vendors.	

### 4. Conclusions

The most significant feature is the limitedness of financial resources, the low availability of borrowing sources. Such companies are limited in their ability of frequent renewal for the manufacturing process of equipment. Due to the fact that in small and medium-sized businesses there are combined functions of ownership and management, information management system must provide accurate and up-to-date information about finance and manufacturing resources.

The level of automation control within SME depends on the industry specialization. Thus, in particular, the distributive services and retail as a more resource-intensive activity in terms of information service are characterized by more progressive and mastered industry technology. The segment of CRM software products is actively developed with a focus on SME.

In the segment of ERP-products for large businesses leaders in Russia are foreign suppliers of SAP AG, Microsoft, Oracle. These producers are leading the last decade in terms of sales volume. At the same time, in terms of the number of the implemented projects dominates Russian1C company. For a long period of time the company specialized in automation of SME within the financial management and accounting statements. This is the main factor, in our opinion, in explaining the leadership of the manufacturer of software for SME. The leading position provide the interaction of 1C company with governmental agencies, that determine the electronic format of the accounting control and tax reporting in the Russian Federation now.

We conducted a survey among the leaders of 10 companies in this segment, and 10 representatives of the companies - vendors, service providers of SME automation. The main goal of the survey was to identify the general direction of IT-industry within SME segment. Identified largely symmetric estimates of development it-segment for small and medium-sized businesses from the directors of the companies and technology vendors. Negative reviews identified for the implementation of sectoral programs. There is the trend that Executive Directors of retail and transport companies have great knowledge and are more susceptible to technological changes.

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## Effective Internal Audit Service Organisation in Health Clinics

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### Abstract

*Timeliness of this article lies in consideration of internal audit issues in terms of its concentration on medical institutions. We have proposed methods of internal audit service organisation in health clinics and procedure of performance evaluation of this service.*

**Keywords:** internal audit, internal audit service, outsourcing, co-sourcing, efficiency of internal audit service performance.

## 1. Introduction

At this stage proprietors, executive management, employees of economical services in the field of large-scale entrepreneurship in Russia already have a notion of internal audit. But speaking about commercial healthcare organisations, internal audit is just being introduced in this sphere. In this regard proprietors, executive management of commercial healthcare centers have questions concerning internal audit, its part in an organisation's operations, functions of internal auditors, effective organisation of internal audit service (hereinafter referred to as IAS), accurate recruitment of staff for this service.

## 2. Special Aspects of Internal Audit Service Organisation in Health Clinics

### 2.1 Theory

Proper internal audit service organisation in healthcare organisations will involve supplementary operating costs. That is why the issue of a way of internal audit organisation throws into sharp relief.

Advantages and disadvantages of different forms of internal audit service organisation are under discussion in the academic community a great while. Three main forms of IAS organisation are commonly known: own service, outsourcing, co-sourcing. Among own IAS advantages we shall mention awareness of a medical establishment's employee in issues of core corporate culture and peculiarities of medical activities, preservation of information in a medical establishment, proficiency of senior executives, operational efficiency, personal interest in improvement of the effectiveness of a medical establishment's activities as IAS is its subdivision. Difficulties of staff recruitment and rising scale of expenditures are significant disadvantages of own audit service organisation in Russian in real life. These disadvantages are neutralized in other forms of internal audit organisation, which have other advantages: flexibility concerning amount of audit personnel, access to advanced technologies and procedures of internal audits, "a fresh eye" on activity of medical establishments. Organisation of IAS in form of co-sourcing or outsourcing also have its disadvantages. Thus, an outsourced expert has more difficulties in obtaining an understanding of peculiarities of medical establishments activities, level of confidence of medical establishments' employees to such expert will be lower than to a member of the staff; lower level of personal interest in improvement of the effectiveness of medical establishment's activities is characteristic of the outsourced expert [1].

There is not a single approach to internal audit organisation. Method of arrangement and structure of the service, number of internal auditors shall be determined individually in every concrete medical establishment as it is rather complicated to specify worthiness of internal audit in one or another organisational form.

Internal audit experts distinguish following general criteria as guidelines for selection of a method of internal audit organisation:

- a company's risk exposure level;
  - readiness of control environment in a company.
- They recommend estimating these criteria by expert means.

## 2.2 Method

Frequently, commercial medical establishments do not have experts able to estimate these criteria, as they shall have sufficient competence, experience in the sphere of audit, management, and medicine, in order to express professional judgment. Due to these circumstances, proprietors and executive management have some difficulties in estimation of company's control environment, determination of risks and institution's risk exposure level in the phase of making decision about internal audit organisation in commercial medical establishment. Hereafter, organisations put such estimations in internal audit functions. According to our study of this issue undertaken in commercial medical establishments of the Republic of Tatarstan, we recommend focusing not on the allocated budget but on weight of every abovementioned criterion in the process of internal audit organisation which we offer to estimate using a test suggested by us below. If control environment of a medical establishment is weak and its risk exposure level is high, it appears to be logical to establish own internal audit service. Otherwise it makes sense to organise internal audit in a medical company under the terms of outsourcing.

Definitions "strong" or "weak" control environment, "high or low risk level" are hardly applicable in a scientific research and all the more cannot claim a method convenient for application. In order to develop a test for estimation of a criterion weight we suggest referring to analysis methods. We need to link every criterion to different factors which will have probabilistic connection with this criterion. In capacity of factors we picked questions which we grouped together in Table 1. This Table represents a fragment of the test of selection of the most reasonable form of internal audit organisation for medical establishments. Affirmative answers to suggested questions will give you one point, negative answers will not add any points [2]. In such manner, selecting factors - questions for characterization of readiness of medical establishment's control environment, we take following conditions into account:

- whether establishing discipline for accomplishment of control procedures, acquisition and using of information and communication lines, carrying out monitoring, risk assessment support is available;
- whether control environment is subject to standards;
- whether its procedures, structure, ethical principles are determined;
- whether this element of internal control system depends on internal and external factors including history of a company, its significance (for instance for the country), market, competition, governmental regulation;
- whether it aids in providing efficient management of a company, compliance with legal requirements, asset protection.

Such test is irreplaceable in management of health clinics in the course of internal audit service organisation. Thus, by reference to points in the section "Risk exposure level of a medical establishment" we can estimate that the larger number of points is, the higher risk a medical establishment will be exposed to. Conversely, the larger number of points in the section "Readiness of medical establishment's control environment" is, the readier the medical establishment's control environment is. In such a manner it is possible to define acceptable method of internal audit organisation even not having specialized knowledge in the sphere of audit or internal audit.

We have illustratively characterized such factor as risk exposure level of a medical establishment by six questions, but it is reasonable to amplify the list of proposed questions. If a medical establishment is presented by a franchise or is a large multi-specialized center, than it is fair to say that in such situation an enterprise is most probably exposed to following risks and losses: slowdown of business activities in consequence of information losses and loss of time caused by imprompt decision making. Exposure of a medical establishment to seasonal decline in demand speaks for customer choice risk.

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**Table 1.** Test of selection of the most reasonable form of internal audit organisation in commercial medical establishments

Method of organization	Own IAS	
Factors – guidelines	Questions	Med. clinic
Risk exposure level of a medical establishment	- is a medical establishment presented by a franchise?	1
	- is a medical establishment represents multi-specialized medical treatment center?	1
	- are outpatient, surgical, and inpatient treatment provided in this medical establishment?	1
	- is assortment of services rendered is expanded in this medical establishment?	1
	- is this medical establishment exposed to seasonal decline in demand?	1
	- is this assertion correct for your establishment: "less than 50% of professional employees are highly-qualified or have scientific degrees"?	1
	- other questions.	
Readiness of medical establishment's control environment	- is there a strategy or mission generally accepted in this medical establishment?	1
	- is this assertion correct for your establishment: "have instances of fraud been discovered in this medical establishment"?	1
	- are control measure for detected violations are applied in the medical establishment under study?	1
	- is there a regimented code of conduct for employees in this medical establishment?	1
	- are policies (procedures) for determination of legal competence for operational commitment developed and being applied?	1
	- does the medical establishment under study exist at the medical service market over 3 years?	1
	- is this assertion correct for your establishment: "average bill of a patient amounts to less than 4,000 rubles"?	1
	- is this assertion correct for your establishment: "the establishment does not suffer staff shortage with increase of number of patients every month"?	1
	- whether general taxation system is applied in the medical establishment?	1
	- were facts of sales of services by putting pressure on patients discovered in the medical establishment under study?	1
	- other questions	

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Thus and so, affirmative answers to these questions are indicative of risk exposure of a medical establishment, and negative answers speak for absence of any risks for activities.

Readiness degree of medical establishment's control environment can be characterized by variety of factors such as medical company's history, competence and experience level of medical and administration staff, way of thinking of a managerial staff concerning management, methods of distribution of authority and duties, organisational culture, taxation system, amount of services rendered.

### 3. Estimation of Efficiency of Internal Audit Service in Health Clinics

#### 3.1 Theory

Modern management of commercial medical establishments presupposes estimation of efficiency of performance of all its subdivisions including, with higher priority, internal audit service. Besides, International Standard for the Professional Practice of Internal Auditing (hereinafter referred to as the IIA standard) 1300 – Quality Assurance and Improvement Program includes a subsection devoted to control of efficiency in the order of internal and external check[3].

Let's get down to a complicated and multifaceted definition of a term "efficiency" which relates to production, economic, and other processes of an enterprise. Efficiency shall be understood to mean performance of a process, operation, or project, defined as connection of the effect or the result with expenditures which determined obtaining of such results. Internal audit efficiency lies in the fact that all activities of the internal audit service (division, department, office), from its organisation to its results, shall be conducted with minimal costs, maximal performance, and in accordance with the best practices [4].

Procedure for determination of internal audit efficiency in commercial enterprises is the subject of wide speculation in the academic community. At the moment the legislation does not have a definite set of highlight figure enabling to hand down an opinion concerning efficiency of internal audit subdivision activity in a commercial establishment, including a medical one, although issues of internal audit activity efficiency are considered in Practical Instruction to IIA standards

1300 – Quality Assurance and Improvement Program, 1310 – Requirements of the Quality Assurance and Improvement Program, 1311 – Internal Assessments, 1312 - External Assessments.

Necessity of determination of internal audit activity efficiency is confirmed by variety of factors. Significant changes are in process in establishments which internal audit efficiency has been assessed, and these changes are expressed in: boost in confidence in internal audit; increase of furnished guarantees and consults quality; discovery of the service efficiency enhancement potential; internal audit cost reduction. Thus and so, estimation of internal audit subdivision efficiency promotes profession of internal auditor and overall internal audit functioning to the higher level of quality [5].

IAS performance assurance falls within competence of IAS manager, that is why responsibility for IAS performance is rested upon this manager and a head of this organisation. As proprietors and management of commercial establishments, particularly medical establishments, are interested in effective internal audit functioning, development of efficiency determination procedure, which would include issues of organisation and key indicators, turns to be essential. Structure and target value of indicators of IAS performance evaluation shall be developed by its manager and shall be approved by a proprietor of the business. Internal audit experts are advised to define IAS efficiency at the moment of its arrangement and no less frequently than once every five years afterwards[6].

### 3.2 Method

We propose to adapt and improve segmental efficiency method for medical establishments. The fundamental idea of this method consists of direct determination of the effect which is estimated according to reports of an internal auditor and correlates with expenditures. Among disadvantages of this method we shall mention difficulties arisen in the process of its application: difficulties in designation of an input cost of one labor hour of an internal auditor, segments for efficiency calculations, estimation of results of execution of every internal auditor's task in terms of direct, indirect, and prospective effect. And these difficulties are caused by absence of a general efficiency indicator, as the authors calculate the effect in money terms.

We turn our attention to peculiarities and initial arguments which shall be taken into account in adaptation of the method of determination of internal audit service efficiency with respect to medical private establishments as well as to problems we faced in the course of work. On the grounds of the undertaken study of generation of internal audit functions we have arrived at the conclusion that it is reasonable to perform internal audit in commercial medical establishments by arrangement of own internal audit service, and in form of outsourcing - in small diagnostic centers and dental hospitals. Another important argument in the process of development of internal audit activity efficiency in a medical establishment is that internal audit generation in a commercial medical organization as well as its functioning involve assessment of costs. They will compose an input cost of considered services. Thus and so, an input cost of one labor hour of an internal auditor in a medical establishment can be determined by means of dividing of expenditures for organisation and functioning of an internal auditor by number of his/her working hours. We also propose to withdraw from calculation of the internal auditors work effect by segments for evening-out of abovementioned disadvantages, as medical establishments fall into the category of small and medium-sized enterprises and their organisational arrangement is quite simple. As for profitableness (direct economic effect) provided by internal audit, we suggest to measure it with the aid of a "profit" arisen from "actualization" of internal auditors' consults, i.e. from savings arisen from usage of own services. It stands to mention the main problem which is faced by researchers attempting to measure efficiency of internal audit activities quantitatively. It lies in uncertainty of determination of an "income" of internal auditor's activities, as technically his/her services do not materialize in their pure form. Internal audit experts distinguish a variety of causes preventing estimation of efficiency of internal audit service in an establishment's activities:

- before everything else, internal auditors are engaged in estimation of weak spots of medical establishments' activities and provision of recommendations, rather than calculation of their works results' value;
- imperceptible presence of internal audit service often prevents unwanted events (for example, fraud, corrupt practices);
- certain, and sometimes a greater part of internal audit service's recommendations can not be directly measured by its quality (for instance, improvement of a company's image);
- results of internal audit are frequently implicit, or a long period of time passes between the audit and appearance of notable results [8].

In connection therewith, income of internal auditor's activities in a commercial medical establishments is contingent, so we name it a "contingent income".

However it should be noted that expenditures prepaid into internal audit can be easily determined. Audit service

implementation budget will include three key cost items: wage of internal auditors, insurance contributions, and cost of acquisition and implementation of programs and equipment. Monthly costs for internal audit functioning in efficiency ratio determination are included in full measure. But the question about amount of inclusion of organisational costs in calculations arises. There is not unambiguous answer to the question on which pay-off period we shall focus on. Western financial institutions are ready to consider projects with 7-8 years pay-off periods, Russian banks give preference to projects with pay-off periods for up to 3 years. Focusing on the Russian banking system we recommend to accept three years as an ordinary pay-off period of internal audit organisation.

Let us subdivide costs for internal audit organisation and functioning in a commercial medical organisation in current monthly costs (Ci) and capital costs, i.e. costs carried out in the process of generation of an internal audit function (Cs).

Further, we shall determine a "contingent income" of IAS activities in a medical establishment in money terms. We suggest to calculate the "contingent income" on the assumption of internal auditors' inspection reports. Economic effect of implemented recommendations, saved resources, cut down risks, losses averted shall also be included into the "contingent income" of the internal auditor activity in a medical establishment irrespective of evaluation method for this figure.

**Table 2.** List of internal audit estimated figures

Date	No. of a working paper	Business event contents	Standard time, h.	Performance measures	Sum, thousand rubles
1	2	3	4	5	6
		1. Cost of internal audit operations	219	market value of such services	183
		2. Consultancy service cost	156		130
Jan., 24		Consultations concerning regimentation of diagnostic and treatment process	24	market value of such services	9
Feb., 2		Consultations concerning healthcare service management	8	market value of such services	3
...	..	...	...	...	...
Nov., 25		Consultations concerning medical center budgeting	16	market value of such services	6
...	..	...	...	...	...
	Working papers	3. Economic effect of internal audit events			1,282
Mar., 3	RD 43-56	Internal audit of medical service quality (audit of patients' and experts' opinions and medical records)	40	development of medical service rendering standards, patients flow augmentation by 0.9%	768
May, 30	RD 75, 76, 80	Internal audit of medication utilization efficiency	40	events for tangible cost control improvement, medication cost cutting up to 2%	264
Jun., 25		Internal HR audit	32	no penalties or criticism from labor inspection	50
...	...	...	...	....	...
Total					1,595

### 3.3 Result

Thus, formulas for determination of an annual aggregate "contingent income" can be presented as follows:

le is an income expressed in the amount of economic effect from internal audit events.

$$I = \sum Ie + \sum Ir, (1)$$

where Ir is an income calculated on the assumption of internal auditors' reports;

le is an income expressed in the amount of economic effect from internal audit events.

We recommend to reflect information about income from rendering of internal audit services in medical establishments for one year in cumulative form separately for each IAS employee, area of activity in the next internal audit working document which is presented in Table 2.

Thus, the formula for determination of economical efficiency of internal audit institute activities in medical establishments shall be presented with due regard to time estimate of carried out costs and "contingent income" of organisation and activities of IAS in medical establishments. It will be as follows:

$$K = \frac{\sum_{t=0}^T (A_t - 3i_t)(1+r)^{-t}}{\sum_{t=0}^T 3s_t(1+r)^{-t}}, \quad (2)$$

where K is an economical efficiency ratio;

T is a pay-off period for internal audit service organisation;

t is a number of a time step;

r is a discount coefficient.

#### 4. Conclusion

Approaching examination of international standards for the professional practice of internal auditing, studies of western and Russian scientists, as well as the best western and native practice from a critical standpoint, we have specified the procedure for determination of internal audit efficiency in the light of specific features of medical establishments. Among advantages or the suggested method we can distinguish applicability of this method in medical establishments which do not get profit and high analytic property of obtained results. At that this is particularly important that our algorithms of determination of internal audit efficiency in medical establishments will not be limited to theoretical development but find their practical use. Determination of IAS efficiency in medical establishments' practice allows to reach the best possible internal audit organisation not only from the perspective of its methodology, but also in the context of economical efficiency [9].

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## Methodological Approaches to the Assessing of the Quality of Audit Sampling

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### Abstract

The main objective of this study is to develop methodology of assessing the quality of the audit sampling. The use of the sampling leads to existence of the risks when an auditor's conclusion, made on the basis of a total sample may be different from the conclusion drawn on the basis of the audit procedures carried out in respect of all population elements. To solve this problem we have created the theoretical model, illustrating the following: the relationship between the audit risk and the methods of the unit's selection; the relationship between the efficiency of the audit, evaluation of internal control and audit scope; the use of sampling in the audit for internal control testing and substantive procedures.

**Keywords:** audit, standard, sampling, quality of audit, risk, ISA

### 1. Introduction

The problem of sampling and obtaining appropriate audit evidence discussed in scientific articles at the eighties of the twentieth century. In those years focus was on the development of common fixed standard approaches [1] that would create a methodological framework to develop an audit technology.

A globalization of business, and as a consequence, the occurrence of large volumes of financial data, led to the problem of studying a huge number of audit evidences sources. In the 90-ies of XX century several research studies were devoted to the use of sampling techniques in auditing [2], [3]. The main trend of these studies was the adaptation of the sampling methods used, mainly, in microeconomics. A little later, several researchers have been investigated the problem of the quality of audit sampling [4], [5], including a problem of heterogeneity of sampling.

In 2002 the Sarbanes-Oxley Act (Sarbanes-Oxley Act, SOX) was adopted. In accordance with the SOX for open joint stock companies a new regime for the control and regulation of financial activities was created. And there were significant changes in the management and disclosure requirements. Requirements for auditors have become more stringent: the need to coordinate their actions with the Audit Committee, including the main provisions of accounting to be used in the audit, various options for assessing the financial information under GAAP. These requirements, ultimately, focus an attention on the problem of the quality of audit services. So at the beginning of the XXI century it have become popular to study a linking of this stringent measures [6], [8], [9], [10], written in Sarbanes-Oxley Act, with a quality of auditing. However, in such studies the problem of quality of individual technologies used in the auditing was not widely discussed.

Until now questions of the qualitative sampling, as one of the most important procedures during the audit are remaining unsolved. In the following studies [11,12,13] the individual methods of audit sampling, described their advantages and disadvantages and applicability in different situations are examined. Nevertheless, it is necessary not only to investigate directly sampling methods used in the auditing, but also to develop the methodological aspects of quality assessment conducted to sampling procedures, that also are relevant for the quality control of audit services.

### 2. Audit Sampling

The essence of selective audit procedures is that the less of 100% elements of financial data would be examined by an auditor. The main reason to use a selective approach is the high amount of time to carry out continuous testing and the high cost of audit services. Basic principles of the audit sampling are reflected in the International Standard on Auditing



57 (ISA) 530, "Audit Sampling".

58 The terms "standard", "rule" are applied to information sources that contain requirements to specific conditions to  
59 achieve a certain goal. So auditing standards should include a description of such procedures, the implementation of  
60 which would achieve the main goal - qualitative audit.

61 Consider from this point of view, an important technological aspect of the audit - a selective approach to the study  
62 of verifiable information.

63 According to the ISA 530 Audit sampling – The application of audit procedures to less than 100% of items within a  
64 population of audit relevance such that all sampling units have a chance of selection in order to provide the auditor with a  
65 reasonable basis on which to draw conclusions about the entire population.

66 It is clear, that continuous verification of documents is not an audit sampling. Moreover, the selection of specific  
67 (certain) elements as a method of selection is not an audit sampling. This means that the implementation of audit  
68 sampling takes place only in the case of the selection of the individual (specific) items for testing. From this it follows that  
69 for a continuous screening and selection of specific elements of the accounting, aspects of risk assessment and audit  
70 evidence obtaining must treat separately, given, that the basis of this approach to the selection of elements is the  
71 professional judgment of the auditor.

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### 73 3. Methods

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75 The use of sampling leads to the existence of the risks when auditor's conclusion, made on the basis of the total sample  
76 may be different from the conclusion drawn on the basis of the audit procedures carried out in respect of all elements of  
77 the population.

78 Based on the practical experience of the audit, the authors using scientific methods such as analysis and synthesis  
79 developed a theoretical model which reflects relationship between: the audit risk and the methods of the unit's selection;  
80 the efficiency of the audit, evaluation of internal control and audit scope. The main result of sampling use in the audit  
81 (internal control testing and substantive procedures) we summarized in a form of table.

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### 83 4. Results and Conclusions

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85 The relationship between the audit risk and the methods of the unit's selection is shown in the Table 1.

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87 **Table 1.** The relationship between the audit risk and the methods of the units sampling

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Information about risks	Units sampling methods		
	All units sampling	Specific units sampling	Separate units sampling (audit sampling)
Risks not associated with the use of audit sampling	yes	yes	no
Risks associated with the use of audit sampling	no	no	yes
Audit procedures to reduce the risk	- proper planning tasks, - monitoring of the auditors work, - verification of compliance the procedures.		Increase a sample size

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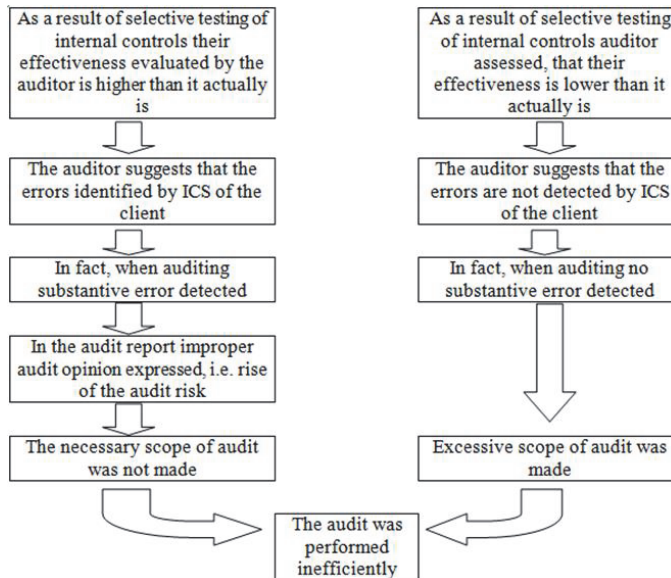
90 Reducing the risk procedures depend on the method of units sampling. As can be seen from the Table 1, reducing the  
91 risk in the audit sample is more specific, while continuous check and selection of specific units suggest the  
92 implementation of procedures of quality content. This required level is provided by the auditors in dependence on the  
93 structure and management system of the audit firm and, ultimately, based on the auditor's judgment. Procedures  
94 designed to reduce the impact of this judgment may be based on two principles: the periodicity of monitoring and  
95 documenting of the work of auditors.

96 Control technique involves the verification of the audit procedures. Thus, it is more logical to designate only two  
97 procedures, proper planning and monitoring of auditors work. In modern conditions fixation the formation of the audit  
98 sampling in the working papers depends on the automation level of the audit process. Audit programs involve selection of  
99 units in a given mode. It allows controlling the sampling procedures. Partial automation of the audit process is more time-  
100 consuming to generate documentation. It is necessary to clarify, that in this case it is a requirement of reflection of  
101 selection methods used by the auditor in the working papers, and not the result set.

102 Thus, the method of selecting the items in the sampling frame has an impact not only on the audit procedures to

103 reduce the risk, but also on the quality control procedures of the audit. Selection of separate units requires less control  
104 procedures than other methods of selection. In addition, detailed documentation of quality control can be formed in  
105 parallel with the sampling procedures. For the other two methods of forming a sample the number of control procedures  
106 and, consequently, the working documentation increases.

107 The risk associated with the use of a sampling depends on the content of the general population. If it is a  
108 substantive test, the risk of sample leads to the increasing in the detection risk. If the sampling approach is applied to the  
109 testing of internal controls, the effect of the risk associated with the use of sampling is greatly enhanced. The occurrence  
110 of these risks is due to the incorrect evaluation of the efficiency level of internal controls. The relationship between risk of  
111 using sampling in evaluating the efficiency of internal controls (the ICS – internal control system) and the scope of audit is  
112 presented in Figure 1.  
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116 **Fig. 1** The relationship between the efficiency of the audit, evaluation of internal control and audit scope.

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118 The efficiency of the audit – is an important problem. Audit as entrepreneurial activity is characterized by all its inherent  
119 problems, including an adequate evaluation. Figure 1 shows one of the indicators for this evaluation: audit scope (extent  
120 of audit procedures). During the audit, this means the optimum combination of the scope of procedures with a confidence  
121 level of auditor in the reliability of financial reporting.

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123 The complexity of the formation of such a measure is to combine quantitative (in scope) and quality (confidence  
124 level) components inspection. Audit activity is usually indicated in the required scope of procedures to ensure the  
125 appropriate level of confidence, which ultimately rests on the professional judgment of the auditor. The solution to this  
126 problem may lie in the replacement of this judgment with deterministic communication considered indicators. The tougher  
127 is this relationship, the more appropriate can be estimated an auditors work.

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129 Internal control testing is a crucial component of external auditing. Aspects of the sample are considered to check  
130 internal controls and operations in order to identify common and distinct sides. This will determine the procedures to  
131 obtain audit evidences, which can then be quantified and ultimately uniquely evaluated in order to determine the quality of  
132 auditing.

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134 General population can be either a set of operations, documents, etc., studied at check essentially or a set of  
135 internal control tools. This affects the methodology of audit sampling, assessment of its risk and results. Application  
136 sampling to internal control testing and substantive procedures in the audit is given in the Table 2.

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**Table 2.** The use of sampling in the audit: internal control testing and substantive procedures

Aspect	The use of sampling	
	to ICS	to substantive procedures
Obtaining audit evidence	Sampling is appropriate if there is evidence of ICS	The sample used in the preparation of proofs of the correctness of one or more prerequisites reporting or evaluation index
The risk associated with the use of sampling	Evaluation ICS at a lower level than is actually	Undetected errors in the selected set of
Procedures to mitigate the risk associated with the use of sampling	Increase in sampling size	
Risk that is not associated with the use of sampling	The use of inadequate audit procedures	
Procedures to reduce the risk that is not associated with the use of sampling	Proper planning tasks Routine inspection of the auditors To verify compliance with procedures	
Consequence of the unexpectedly high error rate in the selected set of	The probability of increasing the level of risk of ICS	Significant misrepresentation of item
Audit procedures to reduce audit risk	Obtain additional audit evidence substantiating the initial lower share of mistakes	

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Thus, the consideration of certain aspects of audit sampling in the context of assessing the quality of the audit revealed the need to develop methods for determining the quality of audit services based on quantitative criteria and indicators.

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## Applying the Category of «Assertions (or Preconditions)» In Audit of Financial Statement

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### Abstract

The article considers the problems of applying the category of financial statement assertions (or preconditions) during the audit of financial statement. It is suggested to apply the financial statement assertions to assess the audit risk' components, test of controls, planning an audit. The purpose of this paper is to present the significance of financial statement assertions in audit practice. In ISA and the Russian standards on audit different aspects of applying preconditions of financial statement by the auditor at all audit stages are presented.

**Keywords:** financial statement assertions, audit risk, International standards on auditing (ISA), financial reporting framework, the preconditions of financial statement.

### 1. Introduction

Researching the category of "financial statement assertions" (or "the preconditions of financial statement") is extremely actual for the developing of audit methodology, in scientific literature the necessity of formulation the whole concept of the preconditions of financial statement is designated. These preconditions are indirectly mentioned as criteria according to which the assessment of auditor evidence is carried out. In 2003 year commenting on Federal standard on auditing No. 5 "Audit evidence" N. A. Remizov emphasized that "... almost all ISA is based on the concept of preconditions of financial statement. Fundamental concepts of materiality, auditor risks, preparation of audit programs (without speaking about audit evidence as those) are based on this concept" [1, p.138].

According to ISA "assertions" means representations by management, explicit or otherwise, that are embodied in the financial statements, as used by the auditor to consider the different types of potential misstatements that may occur.

According to the Order of the Russian Federation Ministry of Finance of 16.08.2011 No. 99n is approved the Federal Standard on Audit (FSA) № 7/2011 "Audit evidence" according to which preconditions of financial statement are assertions in an obvious or implicit form by entity's management concerning recognition, an assessment and disclosure in financial reports. According to this standard as a part of financial statement assertions are presented: completeness, occurrence, accuracy, the rights and obligations, classification, valuation, existence, reference by the period, clearness [2, p.227].

### 2. Theory

The contextual analysis using the concept of "financial statement assertions" ("preconditions of financial statement preparation"), implemented by Vasilenko A.A. showed that the preconditions of financial statement are connected first of all with risk of material misstatement (38 mentions), audit evidence (37 mentions), audit procedures (28 mentions) [3, p.35].

Auditors are obliged to assess risks of material misstatement at two levels. First, at the level of financial statement as a whole. It concerns risks of material misstatement which are mentioning financial statements as a whole and potentially affect many assertions. The second level is related to the risks identified with specific assertions at the class of transactions, account balance, or disclosure level. It means that for each account balance, a class of transactions and disclosure, the risk assessment (such as high, moderate, or low) has to be made according to each separate assertion.

Generalization of points ISA 315 "Identifying and assessing the risks of material misstatement through understanding the entity and its environment" about the preconditions of financial statement confirming appropriate

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categories of financial information is given in table 1.

**Table 1.** The link between financial statement assertions and confirmed categories of financial information

Categories of financial information	Financial statement assertions which confirmed categories	Description
Classes of transactions and events for the period under audit	Occurrence	Transactions and events that have been recorded have occurred and pertain to the entity
	Completeness	All transactions and events that should have been recorded have been recorded.
	Accuracy	Amounts and other data relating to recorded transactions and events have been recorded appropriately
	Cutoff	Transactions and events have been recorded in the correct accounting period
	Classification	Transactions and events have been recorded in the proper accounts
Account balances at the period end	Existence	Assets, liabilities, and equity interests exist
	Rights and obligations	The entity holds or controls the rights to assets, and liabilities are the obligations of the entity
	Completeness	All assets, liabilities and equity interests that should have been recorded have been recorded.
	Valuation and allocation	Assets, liabilities, and equity interests are included in the financial statements at appropriate amounts and any resulting valuation or allocation adjustments are appropriately recorded.
Presentation and disclosure	Occurrence and rights and obligations	Disclosed events, transactions, and other matters have occurred and pertain to the entity
	Completeness	All disclosures that should have been included in the financial statements have been included
	Classification and understandability	Financial information is appropriately presented and described, and disclosures are clearly expressed.
	Accuracy and valuation	Financial and other information are disclosed fairly and at appropriate amounts

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The importance of assertions is traced in definition of the audit risk components presented in ISA and Guide to Using International Standards on Auditing in the Audits of Small- and Medium-Sized Entities.

The inherent risk is a susceptibility of an assertion about a class of transaction, account balance, or disclosure to a misstatement that could be material, either individually or when aggregated with other misstatements, before consideration of any related controls [4, p.32].

For example, if the subject has the high cost inventories which could be easily stolen, there will be an inherent risk concerning the assertion about existence. This assessment of risk ignores an installed system of internal control for protection of such inventories.

Responding actions to an inherent risk are undertaken both at the level of financial statements, and at the level of assertions.

Control risk - risk that a misstatement that could occur in an assertion about a class of transaction, account balance, or disclosure and that could be material, either individually or when aggregated with other misstatements, will not be prevented, or detected and corrected, on a timely basis by the entity's internal control.

It belongs to the risk of that the entity's controls (are developed to reduce any concrete risk) won't be able to work properly, leading to misstatement. Thus the entity's management has to identify and estimate the enterprise and other risks (such as fraud) and to make response it by organization and introduction of internal control system. Entity's controls of a certain level, such as supervision from board, the general controls in information technologies, and management policy of human resource extend on all assertions whereas controls of activity on a certain level usually concern certain assertions.

Detection risk means risk of that the auditor will not detect a misstatement which exists in the assertion and that could be material, either individually or when aggregated with other misstatements.

The acceptable level of detection risk for this level of audit risk is inversely proportional to the risks of material

misstatements at the level of assertions.

### 3. Results

For identification and assessment of audit risk components it is offered to be guided by financial statement assertions that can be reflected in a working paper such form (table 2) [5].

**Table 2.** The register of risks

No	The risk factor	Assertion	Probability (from 1 to 5)	Assessment of risk (the influence on assertion) (from 1 to 5)	Risk value
1	2	3	4	5	6= 4*5
	The new technology considerably reduces production expenses on some products.	Valuation	3	4	12
2	...	...	...	...	...

Note: 0-10 – low level of risk; 11- 18 – average level of risk; 19-25 – high level of risk.

"The register of risks" can be also used to document risk factors of fraud (table 3).

**Table 3.** The register of risks concerning fraud

№ n/n	The identified risks	That can go not so as a result of fraud	The influence on financial statement assertions			Risk assessment		
			Assets	Obligations	Report on financial results	Probability	Influence	Risk value
1	Intense situation with cash flows because of overdue delivery according to the large contract	The owner can try to hide losses	valuation	completeness	accuracy	3	3	9
2	...	...						

In case such list is documented in a spreadsheet, risks can be sorted on the basis of probability values, influence, or the combined risk value. For determination a documenting way of these matters it is necessary to use professional judgment.

For testing assessment of risks and internal controls we also suggest to consider financial statement assertions. As an example tests of risk assessment and the controls connected with derivative financial instruments are submitted (table 4 and 5 respectively) [6, p.1189].

**Table 4.** Test of risk assessment connected with derivative financial instruments (fragment)

No	Financial statement assertions	Test of risk assessment	Test result	Symbols Y1-Y4	Auditor conclusions
1	Completeness, accuracy, occurrence	Does entity have commercial risks?	Yes	Y1	Low level of risk
2	Valuation	Is it checked correctness of assessment model used for determination of the price of a concrete financial instrument?	No	Y4	High level of risk
3		Is it used credit risk in a model of assessment of financial instruments?	Yes	Y1	Low level of risk
...	...	...	...	...	...

Note: Y1 – Low level of risk, Y2 – risk level is lower than an average, Y3 – average level of risk, Y4 – High level of risk.

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**Table 5.** Tests of entity's controls connected with derivative financial instruments (fragment)

№ n/n	Financial statement assertions	Tests of entity's controls	Test result	Criteria	Estimate (from 0 to 100)
<b>Control environment</b>					
1	Valuation, rights and obligations, classification	Do organization's employees have a sufficient level of professional competence for an assessment of financial instruments?	average	high average low	55
2	Valuation, rights and obligations, classification	Does organization have branches or business?	no	yes no	80
3	Valuation, rights and obligations, classification	Does organization have clear formulated and approved by owner policy in the field of financial instruments purchase and sale?	yes	yes no	85
...	...	...	...	...	...
<b>Entity's risk assessment process</b>					
...	Valuation, rights and obligations, classification	Does management carry out a preliminary estimate of transactions proportionally to the risks connected with concrete financial instruments?	no	yes no	15
...	Valuation, rights and obligations, classification	Is it established the limits of the risks connected with use of financial instruments?	no	yes no	18
...	...	...	...	...	...
<b>Entity's information system</b>					
...	Valuation, rights and obligations, classification	Does the entity have functionality or an appropriate configuration for operations with financial instruments?	yes	yes no	82
...	Valuation, rights and obligations, classification	Does entity use the electronic trading platforms for transactions with financial instruments?	no	yes no	81
...	...	...	...	...	...
<b>Entity's control activities</b>					
...	Completeness, accuracy, occurrence	Is it carried out monitoring of trade transactions of individuals?	yes	yes no	86
...	Completeness, accuracy, occurrence	Is it carried out regular verification with banks and depositaries?	not regularly	yes no not regularly	50
....	Completeness, accuracy, occurrence	Is it existed the appropriate division of duties between responsible for carrying out operations and for their verification?	no	yes no	10
...	...	...	...	...	...
<b>Monitoring of controls</b>					
...		Is it carried out monitoring of operational statistical data?	no	yes no as necessary	10
...		Is it existed at organization's computer systems function of generation reports on deviations?	no	yes no	10
...	...	....	...	...	...

Note: from 0 to 10% - no reliability of controls, from 11 to 40% - low reliability of controls, from 41 to 80 - average reliability of controls, from 81 to 100 – high reliability of controls

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Besides, it is offered to be guided by financial statement assertions on planning an audit. The example of the audit plan of derivative financial instruments is provided in table 6.



126 **Table 6.** The audit plan of derivative financial instruments (fragment)  
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No	Financial statement assertions	Audit procedures	Document	Expended time (hour)	Method of audit	Performer
1	Rights and obligations, occurrence,	1.1. Legal assessment of contracts 1.2. Expertise of contracts	Contract, agreements; copies of correspondence or the expert opinion (in case of its attraction)	4	Tests of controls, substantive procedures	Petrov A.A.
2	Completeness, Valuation, accuracy	2.1. Audit of the organization of primary accounting operations with derivative financial instruments 2.2. Check of reliability (completeness and accuracy), registration efficiency of transactions with derivative financial instruments	Contract, agreements; copies of correspondence or the expert opinion (in case of his attraction)	4	Tests of controls, substantive procedures	Petrov A.A.
...	....	...	...	...	...	...

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**4. Conclusions**

131 The concept development of financial statement assertions is a separate large methodological problem of audit along  
132 with research of the audit evidence concept and others concepts, known in the audit theory. In the last years researches  
133 develop about material characteristics and different aspects of financial statement assertions. Enhancement of audit  
134 methodology assumes detail reviewing of audit evidence and the preconditions of financial statement in the context of  
135 standards on auditing. Collection of audit evidence in accordance with the preconditions of financial statement increases  
136 reliability of audit evidence and efficiency of an audit inspection as a whole.

137 It is possible to recognize financial statement assertions as independent category of the audit theory along with the  
138 categories "audit evidence", "audit procedures", "materiality", etc.

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## Income Distribution and Market Demand: The Case of Heterogeneous Preferences

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### Abstract

In this note, we obtain sufficient conditions under which changes in income inequality lead to an increase or decrease in the market demand elasticities in the case of heterogeneous preferences among the consumers. In this paper, we applied majorization theory to study dependence of market demand elasticity on the inequality in income distribution among the consumers. In this note, we extend the results obtained to the case where consumers' preferences are heterogeneous and the condition on equality of individual demand functions does not necessarily hold. This case is more realistic because consumers' preferences are affected by a variety of different factors.

**Keywords:** Income inequality, market demand, elasticity, heterogeneous preferences

In recent years, a number of studies have focused on modeling income inequality using majorization relation (see, e.g., Marshall and Olkin [6]) and applications of the latter concept to the problems in economics. The approach to the analysis of income inequality based on majorization which dates back to Lorenz [5] has been used, among others, by Atkinson [1], Dasgupta, Sen and Starrett [2], Shorrocks [8] and, more recently, Sapoznik [7]. Using related concepts and methods, Lambert and Pfahler [4] presented an analysis of the effects of income (re-)distribution on the market demand for a good or service.

In [3], the authors applied majorization theory to study dependence of market demand elasticity on the inequality in income distribution among the consumers. However, in [3] it is assumed that consumers' preferences are the same for given prices on goods independently of their income levels. In this note, we extend the results obtained in [3] to the case where consumers' preferences are heterogeneous and the condition on equality of individual demand functions does not necessarily hold. This case is more realistic because consumers' preferences are affected by a variety of different factors.

Let there be  $K$  consumers and  $M$  goods in an economy. Denote by  $\varphi_{mk}(P, I_k)$  the function of the  $k$ th consumer's demand on the  $m$ th good, by  $I = (I_1, \dots, I_K)$  the vector of incomes of the consumers and by  $P = (p_1, \dots, p_M)$  the vector of prices on goods.

Let  $\Phi_m(P, I) = \sum_{k=1}^K \varphi_{mk}(P, I_k)$  be the function of market (aggregate) demand on good  $m$  and let  $e_m(I) = \partial \log \Phi_m(P, I) / \partial \log p_m$  stand for its own-price elasticity. Denote by  $S_{mk} \subset \mathbf{R}_{m+1}$  the domain of definition of the function  $\varphi_{mk}(P, I_k)$  and by  $S_m = \{(P, I) = (P, I_1, \dots, I_K) \in \mathbf{R}^{M+K}, (P, I_k) \in S_{mk}, k = 1, \dots, K\}$  the domain of definition of the function  $\Phi_m(P, I)$ ,  $m = 1, \dots, M$ .

According to the idea going back to Lorenz [5] (see Marshall and Olkin [6]), a vector  $I^{(1)} = (I_1^{(1)}, \dots, I_K^{(1)})$  represents a more uniform distribution of the total income  $Y$  among  $K$  consumers than a vector  $I^{(2)} = (I_1^{(2)}, \dots, I_K^{(2)})$  if  $\sum_{i=1}^l I_i^{(1)} \leq \sum_{i=1}^l I_i^{(2)}$ ,  $l=1, \dots, K-1$ , and  $\sum_{i=1}^K I_i^{(1)} = \sum_{i=1}^K I_i^{(2)} = Y$ , where  $I_i^{(j)}$ ,  $j = 1, 2$ , are the income levels of the  $i$ th consumer and  $I_{[1]}^{(j)} \geq I_{[2]}^{(j)} \geq \dots \geq I_{[K]}^{(j)}$  denote the components of the vectors  $I^{(j)}$ ,  $j = 1, 2$ , in decreasing order (if the above conditions hold, it is said that the vector  $I^{(1)} = (I_1^{(1)}, \dots, I_K^{(1)})$  is majorized by  $I^{(2)} = (I_1^{(2)}, \dots, I_K^{(2)})$ , written  $I^{(1)} < I^{(2)}$ ).

A function  $f(I)$  is called Schur-convex (resp., Schur-concave) in  $I$  if  $(I^{(1)} < I^{(2)}) \Rightarrow (f(I^{(1)}) \leq f(I^{(2)}))$  (resp.  $(I^{(1)} < I^{(2)}) \Rightarrow (f(I^{(1)}) \geq f(I^{(2)}))$ ).

Theorem 1. (i) Let the individual demand functions  $\varphi_{mk}(P, I_k)$  be twice continuously differentiable and let, for all  $(P, I) \in S_m$  such that  $I_r \leq I_s$ , the following conditions hold:

$$\frac{\partial \varphi_{mr}(P, I_r)}{\partial I_r} \leq \frac{\partial \varphi_{mr}(P, I_s)}{\partial I_s}, \quad (1)$$

$$\frac{\partial^2 \phi_{mr}(P, I_r)}{\partial p_m \partial I_r} \leq \frac{\partial^2 \phi_{mr}(P, I_s)}{\partial p_m \partial I_s}, \quad (2)$$

where  $p_m$  is the price of the  $m$ th good in consideration. Then the absolute value of the elasticity  $|e_m(I)|$  is Schur-concave in  $I$  on the set  $S_m$ . That is, the more non-uniform is the distribution of the total income among consumers in the economy, the smaller is the elasticity of the aggregate demand on the considered good by the absolute value.

(ii) If in conditions (1) and (2) the inequality sign  $\leq$  is replaced by  $\geq$ , then the absolute value of the elasticity  $|e_m(I)|$  is Schur-convex in  $I$  on  $S_m$ . That is, the more non-uniform is the distribution of the total income among the consumers, the larger is the elasticity of the aggregate demand on the considered good by the absolute value.

Proof. (i) Let  $g_m(P, I) = \partial \Phi_m(P, I) / \partial p_m = \sum_{k=1}^K \partial \phi_{mk}(P, I_k) / \partial p_m$  be the derivative of the function of aggregate demand on the  $m$ th good with respect to its price. If conditions (1) and (2) are satisfied, then the following inequalities hold:

$$(I_r - I_s) \left( \frac{\partial \Phi_m(P, I)}{\partial I_r} - \frac{\partial \Phi_m(P, I)}{\partial I_s} \right) = (I_r - I_s) \left( \frac{\partial \sum_{k=1}^K \phi_{mk}(P, I_k)}{\partial I_r} - \frac{\partial \sum_{k=1}^K \phi_{mk}(P, I_k)}{\partial I_s} \right) = (I_r - I_s) \left( \frac{\partial \Phi_{mr}(P, I_r)}{\partial I_r} - \frac{\partial \Phi_{ms}(P, I_s)}{\partial I_s} \right)$$

and

$$(I_r - I_s) \left( \frac{\partial g_m(P, I)}{\partial I_r} - \frac{\partial g_m(P, I)}{\partial I_s} \right) = (I_r - I_s) \left( \frac{\partial^2 \Phi_{mr}(P, I)}{\partial p_m \partial I_r} - \frac{\partial^2 \Phi_{ms}(P, I)}{\partial p_m \partial I_s} \right) \geq 0$$

In addition, from the definition of the functions  $\Phi_m(P, I)$  and  $g_m(P, I)$  it follows that they are symmetric on the set  $S_m$ , that is,

$$\Phi_m(P, I_1^{(1)}, \dots, I_K^{(1)}) = \Phi_m(P, I_{\pi(1)}^{(1)}, \dots, I_{\pi(K)}^{(1)})$$

$$g_m(P, I_1^{(1)}, \dots, I_K^{(1)}) = g_m(P, I_{\pi(1)}^{(1)}, \dots, I_{\pi(K)}^{(1)})$$

for all permutations  $\pi: \{1, \dots, K\} \rightarrow \{1, \dots, K\}$  of the set  $\{1, \dots, K\}$

Consequently, according to Theorem 3.A.4 in [6], the functions  $\Phi_m(P, I)$  and  $g_m(P, I)$  are Schur-convex in  $I$ , that is,  $I^{(1)} < I^{(2)}$  implies  $\Phi_m(P, I^{(1)}) \leq \Phi_m(P, I^{(2)})$  and  $g_m(P, I^{(1)}) \leq g_m(P, I^{(2)})$ .

Since the function  $g_m(P, I)$  is non-positive, from  $I^{(1)} < I^{(2)}$  it thus follows that

$$\frac{g_m(P, I^{(1)})}{\Phi_m(P, I^{(1)})} \leq \frac{g_m(P, I^{(2)})}{\Phi_m(P, I^{(2)})}$$

or, equivalents

$$e_m(I^{(1)}) = \frac{\partial \Phi_m(P, I^{(1)})}{\partial p_m} \cdot \frac{p_m}{\Phi_m(P, I^{(1)})} \leq \frac{\partial \Phi_m(P, I^{(2)})}{\partial p_m} \cdot \frac{p_m}{\Phi_m(P, I^{(2)})} = e_m(I^{(2)})$$

That is,  $I^{(1)} < I^{(2)}$  implies  $|e_m(I^{(2)})| \leq |e_m(I^{(1)})|$ , as claimed.

(ii) If in conditions (1) and (2) the inequality sign  $\leq$  is replaced by  $\geq$ , then the functions  $\Phi_m(P, I)$  and  $g_m(P, I)$  are Schur-concave in  $I$ , that is,  $I^{(1)} < I^{(2)}$  implies  $\Phi_m(P, I^{(1)}) \geq \Phi_m(P, I^{(2)})$  and  $g_m(P, I^{(1)}) \geq g_m(P, I^{(2)})$ . The rest of the arguments is completely similar to part (i).

Example 1. Suppose that the function of market demand for good  $m$  has the CES form:  $\Phi_m(P, I) = \sum_{i=1}^K \phi(P, \alpha_{[i]}, I_{[i]})$ , where  $I[1] \geq I[2] \geq \dots \geq I[K]$ ,  $1 \geq \alpha_{[1]} \geq \alpha_{[2]} \geq \dots \geq \alpha_{[K]} > 1/2$ ,  $\phi(P, \alpha, I) = \psi(P, \alpha, I)$  and

$$\psi(P, \alpha, I) = \frac{p_m^{-1/(1-\alpha)}}{\sum_{j=1}^M p_j^{-\alpha/(1-\alpha)}}$$

are the factors at the individual CES utility functions (that is, the consumers with a higher income  $I$  have a higher elasticity of substitution  $-1/(1-\alpha)$ ). We have

$$\frac{\partial \phi(P, \alpha_r, I_r)}{\partial I_r} = \frac{1}{p_m \left( \sum_{j=1}^M (p_j/p_m)^{-\alpha_r/(1-\alpha_r)} \right)}$$

$$\frac{\partial \phi(P, \alpha_r, I_r)}{\partial p_m \partial I_r} = \frac{(\alpha_r - \sum_{j=1}^M (p_j/p_m)^{-\alpha_r/(1-\alpha_r)})}{p_m^2 (1-\alpha_r) \left( \sum_{j=1}^M (p_j/p_m)^{-\alpha_r/(1-\alpha_r)} \right)^2}$$

Since the function  $\left( \sum_{j=1}^M (p_j/p_m)^{-\alpha_r/(1-\alpha_r)} \right)^{-1}$  is increasing in  $\alpha \in (0, 1)$  for  $p_j \geq p_m$ ,  $j = 1, \dots, M$ ,  $j \neq m$ , we have that  $\Phi_m(P, I)$  satisfies conditions (1) if  $p_j \geq p_m$ ,  $j = 1, \dots, M$ ,  $j \neq m$ . Further, since the function  $h(x) = \alpha x^2 - x$  is increasing in  $x$  for  $x \geq 1/(2\alpha)$ , we get that  $\Phi_m(P, I)$  satisfies conditions (2) if  $p_j/p_m \geq \max_{i=1, \dots, K} \left( \frac{M-1}{2\alpha_i-1} \right)^{(1-\alpha_i)/\alpha_i}$  for  $j = 1, \dots, M$ ,  $j \neq m$ . From part (i) of Theorem 1 we obtain that, in this domain, an increase in income inequality leads to a decrease in the absolute value of the market demand elasticity.

Similarly, in the above domain, the market demand function  $\Phi_m(P, I) = \sum_{i=1}^K \phi(P, \alpha_{(i)}, I_{[j]})$ , where  $\alpha_{(1)} \leq \alpha_{(2)} \leq \dots \leq \alpha_{(K)}$  and  $I_{[1]} \geq I_{[2]} \geq \dots \geq I_{[K]}$  are ordered in the opposite ways, satisfies conditions (1) and (2) with the inequality signs  $\leq$  replaced by  $\geq$ . From part (ii) of Theorem 1 we conclude that, in this case, an increase in income inequality leads to an increase in the absolute value of the market demand elasticity.

Example 2. Suppose that the function of market demand for good  $m$  has the form

98  $\Phi_m(p, I) = \sum_{i=1}^K \phi(p, \alpha_i, \beta_i, I_{[i]})$ , where  $\phi(p, \alpha, \beta, I) = \frac{\alpha I}{(I + \beta p)}$  is a typical function on goods of first  
99 necessity,  $\alpha_i, \beta_i > 0, i = 1, \dots, K$ , are some constants and, as in Example 1,  $I_{[1]} \geq I_{[2]} \geq \dots \geq I_{[K]}$ . It is not difficult  
100 to check that conditions (1) and (2) of part (i) of Theorem 1 are satisfied if and only if, for  $r \geq s$ ,

101 
$$\frac{\alpha_r \beta_r}{(I_{[r]} + \beta_r p)^2} \leq \frac{\alpha_s \beta_s}{(I_{[s]} + \beta_s p)^2} \quad (3)$$

102 
$$\frac{\alpha_r \beta_r (I_{[r]} - \beta_r p)}{(I_{[r]} + \beta_r p)^3} \leq \frac{\alpha_s \beta_s (I_{[s]} - \beta_s p)}{(I_{[s]} + \beta_s p)^3} \quad (4)$$

103 Let  $r \geq s$ . Assume that the vector  $I = (0, 0, \dots, 0)$  belongs to the domain of definition of  $\Phi_m(p, I)$ . Suppose that  
104 conditions (1) and (2) of Theorem 1 are satisfied. Then from inequalities (3) and (4) for  $I = (0, 0, \dots, 0)$  it follows that

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$$\alpha_r / \alpha_s = \beta_r / \beta_s \quad (5)$$

106 It is easy to see that condition (3) is thus equivalent to  $\beta_r / (I_{[r]} + \beta_r p) \leq \beta_s / (I_{[s]} + \beta_s p)$  or  $I_{[r]} / \beta_r \geq I_{[s]} + \beta_s / \beta_s$ .  
107 Since  $I_{[r]} \leq I_{[s]}$  we conclude that, for conditions (3) and (4) to be satisfied it is necessary that (5) holds for all  $r \geq s$   
108 and, in addition, for all  $r \geq s$ ,

109 
$$\beta_r \leq \beta_s, \alpha_r \leq \alpha_s \quad (6)$$

110 Suppose that the satiation level for good  $m$  is the same for all the consumers, that is, for  $p = 0$  and all  $r, s$ ,  
111  $\phi(0, \alpha_r, \beta_r, I_r) = \phi(0, \alpha_s, \beta_s, I_s)$ . Then from the definition of the individual demand functions  $\phi$  and (5) it follows that  
112  $\alpha_r = \alpha_s$  and  $\beta_r = \beta_s$  for all  $r, s$ . Since, as is easy to see, from the above analysis it follows that inequalities (6) are  
113 strict for  $|r| < |s|$  if conditions (1) and (2) are satisfied, we conclude that part (i) of Theorem 1 cannot hold.

114 As above, we get that part (ii) of Theorem 1 holds if and only if (3) and (4) are satisfied with the inequality sign  $\leq$   
115 replaced by  $\geq$ . For  $|r| = |s| = 0$  this implies conditions (5). Assuming that the satiation level for good  $m$  is the same for all  
116 the consumers, we get that, as above,  $\alpha_r = \alpha_s$  and  $\beta_r = \beta_s$  for all  $r, s$ . Thus, it is easy to see that part (i) of Theorem 1  
117 holds if and only if, for all  $r \geq s$ ,

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$$(I_{[r]} - \beta p) / (I_{[r]} + \beta p)^3 \geq (I_{[s]} - \beta p) / (I_{[s]} + \beta p)^3 \quad (7)$$

119 where  $\beta = \beta_r = \beta_s$ . Similar to Example 1 in [3], it is not difficult to check that conditions (7) are satisfied if  $(I_{[K]} \geq$   
120  $2\beta p)$ , that is if the income levels of all the consumers are not less than  $2\beta p$ .

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## Legal Status of an Appraiser in the Russian Federation under Globalization

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### Abstract

This paper studies the functioning of the professional appraiser institute in the Russian Federation, the problems of legal regulation of appraisal activities in the Russian Federation, explores the experience of regulating appraisal activities in the United States. In view of the foregoing, and the gaps in the regulation of this sector of the economy in our country, the experience of developed countries in this area seems interesting, particularly in the United States. At the moment in every European country, which is a member of the IVSC or TEGOVA, there are national regulatory regimes for valuation. In this case, the regulation of valuation in the United States is different, for example, from the regulation of valuation in the UK or Germany. In all countries with a market economy, governmental organizations of appraisers are operating actively. The regulatory experience of valuation activity in the United States is rather indicative, the leading professional organizations are Appraisal Institute and the American Society of Appraisers (ASA). In 1987 they founded the Appraisal Foundation, which should serve the purpose of achieving uniformity and professionalism in the valuation and training. The operation of two independent bodies - Appraisal Standards Board and Appraisers Classification Board contributes to the latter. State regulation in the United States is organized both at the federal level and at the level of individual states. According to Financial Institution Reform, Recovery and Enforcement Act (FIRREA), adopted by Congress in 1989, the authority to regulate the valuation activities at the federal level, is given to the Appraisal Foundation. Simultaneously with the Foundation the structure of the United States Government includes the agency in charge of supervising the enforcement of appraisal laws - Appraisal Subcommittee. Appraisers Classification Board develops, interprets and amends the Uniform Standards of Professional Appraisers Practices - USPAP, required for use by practitioners (certified and licensed) appraisers throughout the United States. Appraisers Classification Board provides a minimum level of education experience and examination requirements for real estate appraisers.

**Keywords:** appraiser, self-regulatory organizations, market value, professional activity, legal regulation.

### 1. Introduction

Russia has recently experienced the process of transformation in methods and principles for regulating individual sectors of the economy, namely appraisal activities, auditing, operations of turnaround managers, etc. An alternative way of state regulation for these sectors of the economy is assigned at the legislative level, such as self-regulation, withdrawal of the state from direct regulation by a licensing mechanism, the concept of "private practice." However, a range of issues related to the legal regulation of these sectors of the economy, still does not have a unique solution

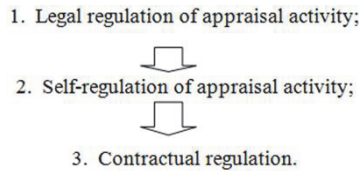
**Table 1.** Stages of Appraisal Activity Development in the Russian Federation.

Stages of Development	Description of Appraisal Activity Development
1 Stage	From XV century to 1883 – establishment of appraisal activity and the appraisal mechanism for tax purposes From 1883 r. to 1917 - reappraisal of real estate.
2 Stage	From 1917 to 1991 - appraisal activity ceased to exist because of transition to a centrally-planned economy. From 1991 to 2006 – establishment of appraisal activity in modern Russia together with introduction of market relations, licensing of appraisal activity.
3 Stage	From 2006 to the present day the current stage of appraisal activity development is underway, self-regulation of appraisal activity.

Self-regulation as a means of legal regulation in Russia is not new and is used in the regulation of lawyers and notaries, which can be attributed according to the accepted legal doctrine to the law enforcement authorities, which are

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assigned a number of public functions.



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**Fig 1. Levels of Legal Regulation for Appraisal Activity**

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Features of these changes lie in the transfer of certain regulating, controlling and supervising functions in the stated sectors of the economy from the federal regulation body to non-governmental, self-regulatory organizations, and the formation of a mechanism to ensure the proper implementation of a number of regulating, controlling and supervising functions by non-government organization.

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A self-regulatory system in the industrialized countries has long been present in many areas of public life. It has evolved and existed in parallel with state regulation of economic activity. This conversion of legislation affects all areas of law in Russia, but to a greater extent it has influenced the civil law.

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It should be noted that the issue of professional valuation of property rights takes on new importance in the context of globalization. The need for international comparability of appraisal reports is increasing, not only in connection with the development of international investment funds, but also because of the increased mobility of private capital. One of the manifestations of these processes is the desire to develop and adopt common standards of appraisal activity, for example in the framework of a united Europe. However, the available results of this activity are estimated by most experts as skeptical, since the abandoning of prevailing unique requirements for the appraisal practice by each country seems a complexity.

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At the current stage of appraisal institute development the following problems that hinder the establishment of a unified and efficient appraisal services market can be indicated:

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- update legislation on appraisal activity due to changes in the regulatory system, Russia's entry into the international economic community;
- clarification of related legislation rules dealing with matters of the independent appraisal to ensure completeness and consistency of legislation on independent professional appraisal, enhancing the role of the appraiser in the economic turnover.

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## 2. Theory

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Considering the situation in the Russian Federation, in 2014 there were about 17,000 appraisers - members of the 11 self-regulatory organizations, with 80% of appraisers carrying on a professional appraisal on the basis of an employment contract with a legal entity.

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In accordance with Art. 3 of the Federal Law "On Appraisal Activities in the Russian Federation» # 135-FZ appraisal activity refers to the professional activities of valuation, while the subject of the appraisal activities under the Art. 4 of the Law are individuals who are members of one of the self-regulatory organizations of appraisers and insure their liability in accordance with the requirements of this Federal Law.

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With respect to members of the self-regulatory organizations of appraisers, the concept of "professional activity" can be deployed as an independent and voluntary activity of individuals with vocational training (on the basis of higher education), carried out as a private practice or under an employment contract to provide services to assess the market (other) value of the property (assessment), and to obtain systematic income.

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The main feature of the professional activity of the business is that the cost of the services provided by the citizen engaged in professional activities is determined by calculating the time spent on the provision of services rather than by the market (economic) categories of "demand" and "supply", with pricing and time-expenditures coordinated with the state body exercising supervision or control over the said activity (charged).

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Unlike citizens engaged in business as a sole proprietor, a citizen engaged in professional activities in the form of private practice, may also engage in such activities as an employee under an employment agreement. That is, the regulation of professional activity has a shifted character.

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Thus, the subject of regulation of professional activities (private activity) is the activity of providing professional

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98 services by the subject of the activity.

### 99 3. Results

100 At the moment one can distinguish the following conflicting issues in the regulation of the legal status of appraiser's  
101 professional activity:

102 Firstly, it is a question of regulating the work of appraisers under a labor contract. The contract for the valuation  
103 concludes a legal entity, and it is accordingly responsible for the contractual commitments. The valuation is performed by  
104 an appraiser - a physical person who is responsible to the customer and third parties to carry out this valuation and is  
105 obliged to insure such liability. In this case, an appraiser has contractual relationship only with the legal entity.

106 It turns out that the responsibility of an appraiser, even to the client comes from the fact of the valuation, i.e. is non-  
107 contractual, and the contract for valuation only makes sense if a legal entity could take on additional responsibility for the  
108 obligations of an appraiser.

109 Secondly, these special provisions precludes the possibility of using the provisions of the Civil Code on liability of  
110 legal persons for the actions of their employees to these cases. Based on the general Article 402 of the Civil Code  
111 actions of the debtor's employees in the performance of his obligations are considered the actions of the debtor. It is the  
112 debtor who is responsible for these actions, if they cause any failure to perform obligations.

113 With regard to the indemnity obligations the Art. 1068 of the Civil Code establishes the same approach. According  
114 to this a legal person compensates the damage caused by its employee in the performance of labor (employment, official)  
115 duties. In this case, employees are recognized as citizens performing work under an employment agreement (contract),  
116 as well as citizens performing work under civil law contracts, if they act or should have acted on the instructions of the  
117 relevant entity or citizen under its control for safety of work.

118 It also should be noted that the appraiser may be subject to civil liability and disciplinary liability for violation of  
119 legislation on appraisal activity in the preparation of the valuation report on the part of the self-regulatory organization of  
120 appraisers in accordance with Art. 24.4 of the Federal Law "On Appraisal Activities in the Russian Federation", as well as  
121 on the part of an employer, in the flesh to the termination of the employment contract by the employer in the cases under  
122 Art. 81 of the Labour Code of the Russian Federation.

123 At the same time grounds for dismissal may also include inconsistency with a position or job due to lack of  
124 qualifications, thereby under the current legislation the principle of appraiser independence can not be performed in full.  
125 An appraiser, working under an employment contract can become dependent on the employer, the interest of which is  
126 profit, not a professional activity. The said conflict of interests, in our opinion can be resolved, of one divides the powers  
127 of bringing an appraiser to disciplinary liability between self-regulatory organizations and an employer. In this case, an  
128 employer holds the grounds to bring an employee to a disciplinary responsibility, such as violation of labor regulations by  
129 an appraiser and issues of compliance to the legislation on appraisal activity should be hold by self-regulatory  
130 organizations.

131 In view of the foregoing, and the gaps in the regulation of this sector of the economy in our country, the experience  
132 of developed countries in this area seems interesting, particularly in the United States.

133 The main regulator of the valuation activities at the international level is the International Valuation Standards  
134 Committee (IVSC). The Committee was established by the Royal Institute of Chartered Surveyors (RICS), the American  
135 Society of Appraisers (ASA), professional organizations from Australia, New Zealand, Malaysia, India and Canada in  
136 1981. Subsequently, the Committee also joined the majority of the TEGOVA (appraisers community of Europe). The main  
137 objectives of the International Valuation Standards Committee is to harmonize and consider the opinions of appraisers in  
138 the preparation of financial reporting standards, bringing the opinions of appraisers and advocacy of their interests in  
139 such organizations as the International Monetary Fund, Organization for Economic Cooperation and Development, the  
140 World Bank and the Basel Banking Committee.

141 At the moment in every European country, which is a member of the IVSC or TEGOVA, there are national  
142 regulatory regimes for valuation. In this case, the regulation of valuation in the United States is different, for example,  
143 from the regulation of valuation in the UK or Germany. In all countries with a market economy, governmental  
144 organizations of appraisers are operating actively.

145 The regulatory experience of valuation activity in the United States is rather indicative, the leading professional  
146 organizations are Appraisal Institute and the American Society of Appraisers (ASA). In 1987 they founded the Appraisal  
147 Foundation, which should serve the purpose of achieving uniformity and professionalism in the valuation and training.  
148 The operation of two independent bodies - Appraisal Standards Board and Appraisers Classification Board contributes to  
149 the latter. State regulation in the United States is organized both at the federal level and at the level of individual states.  
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152 According to Financial Institution Reform, Recovery and Enforcement Act (FIRREA), adopted by Congress in 1989, the  
153 authority to regulate the valuation activities at the federal level, is given to the Appraisal Foundation. Simultaneously with  
154 the Foundation the structure of the United States Government includes the agency in charge of supervising the  
155 enforcement of appraisal laws - Appraisal Subcommittee. Appraisers Classification Board develops, interprets and  
156 amends the Uniform Standards of Professional Appraisers Practices - USPAP, required for use by practitioners (certified  
157 and licensed) appraisers throughout the United States. Appraisers Classification Board provides a minimum level of  
158 education experience and examination requirements for real estate appraisers.

159 At the state level valuation activities are regulated on the basis of local legislation by Regulatory Commission of  
160 valuation entrusted with the requirements for licensing and certification of real estate appraisers. Requirements for  
161 licensing and certification in some states are different, and to work in a particular state it is necessary to obtain the  
162 appropriate license, passing the qualifying examination.

163 It is noteworthy that in the United States the market valuation services were self-regulated until 1989. The  
164 transition to state licensing has been associated with the real estate crisis in the United States. Valuation of property is  
165 out of public authorities control, which resulted in massive unbiased appraisals for mortgage lending, placing municipal  
166 orders construction and in some other cases. It can be assumed that this situation is likely to develop in Russia during the  
167 financial crisis, given the generally accepted trends of overvaluation of real estate prices, especially in big cities.

168 Nevertheless, currently professional organizations of appraisers are very significant in the United States. They offer  
169 their members professional education at a high level and the possibility to affect the legislation for practicing professionals  
170 A professional organization can protect its members accused of any violations, if the result of the case may affect the  
171 profession as a whole.

172 It is very important that the association may impose disciplinary sanctions to those members whose behavior does  
173 not meet the highest professional standards. Of great importance is the opportunity to develop relationships with the  
174 people involved in the same business in the country and around the world

175 Uniform standards of professional appraisal practice (USPAP) are required for use in the United States and in  
176 other countries (Canada, Mexico, and others). They are developed and approved by the Appraisal Standards Board of  
177 Appraisal Foundation, non-profit educational organization founded in 1987 by the leading professional organizations of  
178 the USA.

#### 180 4. Conclusion

182 Thus, summing up the research, we can conclude that the process of globalization affects the legal development of  
183 valuation activities in the Russian Federation: the update of the legislation in the field of valuation takes place due to  
184 changes in the regulatory system, the rules of related legislation dealing with matters of independent valuation are  
185 clarified to ensure the completeness and consistency of legislation on independent professional valuation.

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# Mechanism of State Tax Regulation in the Global Economy

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## Abstract

The article offers a step-by-step model for the formation of a single interstate tax regulation in existing cross-national alliances; identifies and systematizes impacts on interstate tax regulation; proposes measures of competitiveness for existing alliances. In this paper, the authors point out that one can observe the convergence of tax systems in the context of growing international economic integration, which is expressed in the approximation of the levels of taxation in the economies of individual countries. It is the harmonization of tax legislation that reflects this process. In this paper the authors draw conclusions about the impact of variations in VAT rates on macroeconomic indicators in the event of possible harmonization of tax legislation: the case of the Russian Federation, Kazakhstan and Kyrgyzstan.

**Keywords:** Economy, globalization, integration, harmonization, regulation, transformation, taxes, budget, competition, risks, experience, factors, rate, trends, revenues, results.

## 1. Introduction

Under the conditions of activation in the processes of internationalization and integration of the world economy, there is an increasing globalization of national economies, which should lead to a reduction of the state influence on the economy on the one hand, and there are new forms of the world economy, where government regulation has to adapt to the new conditions, on the other hand. In the past two decades, the dualistic nature of the state's role in regulating the global economy can be particularly observed on the example of the tax regulation.

Currently, the most relevant is the question of the development of uniform international standards to regulate economic activity, which, however, will have fundamentally different implications for different groups of countries and will be associated with an increase in conflicts among them, as well as within individual groups (Kuptsova, 2004). That is why in recent years due to the acceleration of integration in Europe, the process of reforming the tax structures of the European Union is underway and is aimed to harmonize by means of developing joint efficient tax mechanisms, which to some extent have to compensate for the abolition of trade barriers within the EU. At the same time the Russian government is taking measures to enhance the economic union of the Russian Federation and the development of relations with the countries of the former CIS. The use of tax instruments is becoming an important tool in the optimization of tax structures.

In the context of globalization, where the problem of choosing the rational tax mechanisms regulating the economy remains unsolved and relevant, the need for further reform of the tax regulation is of particular importance.

## 2. The Main Part

In the context of growing international economic integration, the harmonization of the main indicators of the tax system is to unify the structures and principles of taxation, the overall direction of tax reform, tax policy and the harmonization of national tax laws of different states. The trend towards tax harmonization has its objective market conditions due to

57 qualitative changes in the global economy, namely the globalization of international economic relations. According to  
58 Mason, R., increased mobility of production factors and the internationalization of production and management of  
59 corporations lead to blurring of the boundaries between individual countries and the emergence of global markets for  
60 goods, services, and capital (Mason, 2011). It is obvious that due to the development of these processes, the regulation  
61 of taxation actually moves to the supranational level. Empirical evidence of this impact of globalization on taxation is the  
62 convergence of tax systems, as expressed in the approximation of the levels of taxation in the economies of individual  
63 countries.

64 Value-added tax has been changed almost in all countries that joined the EU. The rate of VAT varies according to  
65 the list of already existing taxes. Tables 1 and 2 provide information on the EU-27: year of VAT introduction, initial rate,  
66 current rate.

67 **Table 1.** Introduction of VAT rates in European Union countries (Government finance statistics, 2013; Kireeva, 2012)  
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Country	Year of introduction	Standard initial rate, %
Austria	1973	16
Belgium	1971	18
Bulgaria	1994	18
United Kingdom	1973	10
Hungary	1988	25
Germany	1968	10
Greece	1987	18
Denmark	1967	10
Ireland	1972	16,37
Spain	1986	12
Italy	1973	12
Cyprus	1992	5
Latvia	1995	18
Lithuania	1994	18
Luxembourg	1970	8
Malta	1995	15
The Netherlands	1969	12
Poland	1993	22
Portugal	1986	16
Romania	1993	18
Slovakia	1993	23
Slovenia	1999	19
Finland	1994	22
France	1968	16,66
Czech Republic	1993	23
Sweden	1969	11,11
Estonia	1991	10

70 Table 1 shows that the highest rate of 25% was in Hungary, whereas in Cyprus it was only 5%. By 2012, the standard  
71 rate of tax in Slovakia dropped to 20%, whereas in Cyprus the standard rate rose in 2012 to 20%. In the UK, the rate has  
72 grown from 10% in 1973 to 20% by 2012  
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**Table 2.** The current rate of VAT for 2000-2014 (Government finance statistics, 2013; VAT Rates Applied in the Member States of the European Union, 2014)

Country	2000 r.		2010 r.		2012 r.		2014 r.	
	Stand.	Preferen-tial	Stand.	Preferen-tial	Stand.	Preferen-tial	Stand.	Preferen-tial
Belgium	21	6/12	21	6/12	21	6/12	21	6/12
Bulgaria	20	-	20	7	20	9	20	9
Czech Republic	22	5	20	9	20	14	21	15
Denmark	25	-	25	-	25	-	25	-
Germany	16	7	19	7	19	7	19	7
Estonia	18	5	20	9	20	9	20	9
Ireland	21	12.5/4.2	21	13.5/4.8	23	13.5/4.8	23	13.5/9 (4.8)
Greece	18	8/4	23	5.5/11	23	6.5/13	23	6.5/13
Spain	16	7/4	18	8/4	18	8/4	21	10
France	19.6	5.5/2.1	19.6	5.5/2.1	19.6	5.5/2.1(7)	20	5.5/2.1(10)
Italy	20	10/4	20	10/4	21	10/4	22	10/4
Cyprus	10	5	21	5/8	22	5/8	19	5/9
Latvia	18	-	21	10	22	12	21	12
Lithuania	18	5	21	5/9	21	5/9	21	5/9
Luxembourg	15	6/12(3)	15	6/12 (3)	15	6/12 (3)	15	6/12 (3)
Hungary	25	0/12	25	5/18	27	5/18	27	5/18
Malta	15	5	18	5	18	5/7	18	5/7
The Netherlands	17.5	6	19	6	19	6	21	6
Austria	20	10	20	10	20	10	20	10
Poland	22	7/3	22	7/3	23	5/8	23	5/8
Portugal	17	5/12	21	6/13	23	6/13	23	6/13
Romania	19	-	24	5/9	24	5/9	24	5/9
Slovenia	19	8	20	8.5	20	8.5	22	9.5
Slovakia	23	10	19	6/10	20	10	20	10
Finland	22	8/17	23	9/13	23	9/13	24	10/14
Sweden	25	6/12	25	6/12	25	6/12	25	6/12
United Kingdom	17.5	5	17.5	5	20	5	20	5
The EU average	19.2		20.4		21		21.4	

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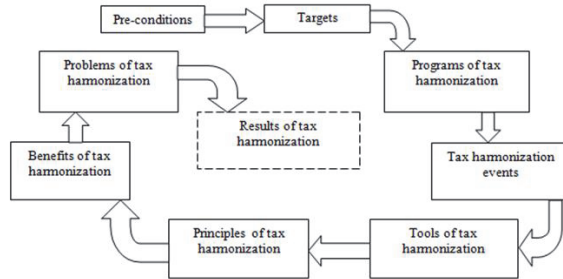
Currently, no country in the EU has elevated rates, although earlier in some countries (about 1991), their level ranged from 22-25% in France to 38% in Italy. Reduced rates are available in all countries except Denmark. In all countries, there is also a 0% rate, except Portugal, where exports are taxed at a rate of 6%. The highest rates today are 27% in Hungary and 25% in Sweden and Denmark. The lowest rate is 15% in Luxembourg, 18% in Spain and Malta. The average rate for EU countries is 20.7%. Newmark Committee has found that the differences in the overall tax burden can not affect the conditions of competition within the Community. In contrast, differences in tax bases and tax structures have such an effect. Thus, harmonization in the field of direct taxation is a consistent and logical step in relation to the following:

- Taxes on income of companies subject to a "two-tier method" or "method of the separate rate" taxation of distributed and retained earnings as a result of which the corporation tax is partially compensated in respect of distributed profits.
- Taxes, having a direct impact on the movement of capital, such as a tax on equity transactions, the tax on interest and dividends.
- An example is the dynamics of gross domestic product from 1995 to 2013, where the loss of revenue in the national budget can be observed. As long as countries participated in the EU economy VAT rate was forced to change, causing significant damage to the established economy. The initial goal of tax harmonization is to eliminate all tax barriers to the movement of capital in order to create a single market and increase investment.
- Tax harmonization brings the following benefits to the countries involved in the process of economic integration:
  - minimizes the adverse effects, which are the result of differences in the tax systems;
  - limits the distortion of competition in the commodity and financial markets, creates more favorable conditions for the economically efficient allocation of production factors and optimization of cross-country movement of goods and services, labor and capital;

- 112 - helps to prevent undesirable cross-country tax competition;
- 113 - is needed to remove internal customs controls and promotes the development of cross-country trade and
- 114 economic relations among the countries participating in this process.

115 The main risk of tax harmonization for the states participating in integration is due to the fact that in the case of its  
116 implementation, they lose the right to establish or preserve their tax treatment and tax rates. When tax harmonization is at  
117 a too low level, the state may not be able to properly fund its spending, which has a negative impact on the state of the  
118 national economy. The country may also lose the ability to impose taxes, which are needed for its political or social  
119 standing.

120 The mechanism of tax harmonization can be described as a complex process, which includes a variety of elements  
121 that affect the final result of all delivered events. (Fig.1)



122 **Fig. 1. Mechanism of tax harmonization**

123 Thus, we say that the harmonization of taxation can be characterized as "market tax harmonization", as it is viewed as a  
124 reaction to the ongoing globalization of cross-country economic relations and reflects the ongoing process of  
125 convergence of tax systems of the member states.

126 Adopting foreign experience, says van Hulst A., the proposal for a cross-country union for the former CIS  
127 countries and the Russian Federation would be appropriate (van Hulst, 2012). This integration grouping will be based on  
128 the signing of the accession treaty to the Customs Union. Currently, the customs union comprises three countries -  
129 Russia, Belarus and Kazakhstan. Interaction in the form of integration association in our opinion should be implemented  
130 in phases. The first and one of the fundamental steps should be tax harmonization in the member states, leading to a  
131 unified tax system. In the context of this stage, it is particularly important to apply uniform rates for indirect taxation, as  
132 only indirect taxes can be imposed at the same rate.

133 One of the taxes playing an important role in the composition of budgets tax revenue is a value-added tax (VAT).  
134 The specifics of the national economies in the structural and sectoral context is quite clearly seen in the structure of the  
135 national tax systems (Table 3).

136 **Table 3. The structure of tax revenues by the main types of tax payments of the Customs Union, %**

Tax type	The Republic of Belarus		The Republic of Kazakhstan *	The Russian Federation**
	Tax revenue	Tax revenue + Social protection fund taxes		
Value added tax	36,1	25,7	21,7	15,6
Excise duties	7,6	5,4	1,9	3,1
Corporate income tax	11,8	8,4	26,4	9,9
Personal income tax	12,7	9,0	9,4	9,6
Social protection fund taxes	-	28,7	7,5	16,9
Property tax	3,5	2,5	2,9	3,3
Tax on international trade and foreign operations)	20,6	14,7	20,4	22,4
Proceeds from the use of natural resources	-	-	7,4	9,9

141 \*State budget, including National fund

142 \*\* ГСБФ Consolidated budget GSVF

143 In the Customs Union countries the structure of tax systems are substantially different, and in the first place, of course,  
144 the distinction is in the income derived from the use of natural resources. In Russia, this is one of the main items of the  
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146 formation of the state budget. Republic of Belarus, unlike its partners exports mainly finished products that make us look  
147 for opportunities to improve the tax system and to attract investment within a structural component. One of the problems  
148 that affects the activity of mutually beneficial trade relations is the uneven distribution of the tax burden among economic  
149 entities.

150 Different VAT rates in the states - members of the Customs Union are explained primarily by differences in  
151 economic systems, as well as by advances in economic reforms. A special feature is the presence of a reduced VAT rate  
152 of 10% in the Republic of Belarus and the Russian Federation for the group of goods of social value.

153 The result was four scenarios of changes in macroeconomic indicators in relation to the application of uniform VAT  
154 rates for the selected countries. The rates have been proposed taking into account the VAT rate in the former CIS  
155 countries, i.e. the most common: 18%, 12%, 20% and 15% as an alternative. Each scenario presents the data taking into  
156 account a uniform rate for the three selected countries and describes the consequences of the introduction of the  
157 proposed rates as well as the relationship of VAT with macroeconomic indicators based on a selected uniform rate. The  
158 study was performed with the assumption that other economic indicators do not change.

160 **Table 4.** Identification codes (symbols) - macroeconomic indicators.

Indicators	
GDP	Gross domestic product, bln rubles
EXP	Volume of export, bln rubles
IMP	Volume of import, bln rubles
EMP	Employment of population, mln of people
TREV	Tax revenue, bln rubles
INFL	Inflation, %
VAT	Value added tax collections, bln rubles

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162 The matrix of correlation coefficients was constructed to determine which factors are most closely associated with the  
163 VAT. Table 5 shows the correlation coefficients for the countries studied. Regression models were constructed based on  
164 the matrix of pair correlation coefficients.

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166 **Table 5.** Summary correlation matrix of 3 countries

Indicators	Russia	Kazakhstan	Kyrgyzstan
		VAT 18%	
GDP	-0,1427	-0,3370	0,0082
EXP	0,5116	0,1425	0,3690
IMP	0,5065	0,6449	0,3881
EMP	0,5162	0,9185	0,9657
TREV	0,7958	0,9735	0,9467
INFL	-0,8341	0,5917	-0,0771
		VAT 12 %	
GDP	-0,2885	-0,3368	0,0077
EXP	0,5343	0,1469	0,3749
IMP	0,5352	0,6480	0,3685
EMP	0,5616	0,9295	0,9657
TREV	0,7975	0,9712	0,9774
INFL	-0,8659	0,6057	-0,0776
		VAT 20 %	
GDP	-0,1353	-0,3368	-0,0106
EXP	0,5505	0,1466	0,3585
IMP	0,5431	0,648	0,3705
EMP	0,5691	0,9295	0,19656
TREV	0,8251	0,9712	0,9466
INFL	-0,8399	0,6058	-0,0871
		VAT 15 %	
GDP	-0,1427	-0,3368	0,0082
EXP	0,5116	0,1469	0,3695
IMP	0,5565	0,648	0,3689
EMP	0,5162	0,9295	0,9657
TREV	0,7958	0,9712	0,9467
INFL	-0,8341	0,6057	-0,0779



167 Applying these rates to Kazakhstan and Kyrgyzstan at the rate of 18%, 12%, 20% the closest direct relationship is  
168 observed for such factors as TREV and EMP. Such indicators as IMP and EXP have a direct significant relationship with  
169 the test indicator. Indicators INFL (inverse link) and GDP (direct link) have little correlation.

170 On the basis of these results (in terms of the dynamics since 1999), it is possible to draw conclusions about the  
171 impact of rates variations on the main macroeconomic indicators. Applying the 18% rate in Russia GDP and inflation  
172 have 0.24 percentage points decreasing trend: The following indicators have a rising trend: exports - 25.3%, imports -  
173 16.4%, employment - 0.4%, tax revenues by 2,8319 bln. rub. For Kazakhstan, the use of 18% rate will have the following  
174 effect: GDP will tend to decline by 0.4%; rising trend will be observed for exports - 2.4%, import - 8.8%, employment -  
175 0.18%, inflation - 0, 61% and tax revenues by 2,7799 bln. tenge. Considering the application of the same rate to  
176 Kyrgyzstan, the following dynamics can be identified: GDP and employment remain unchanged, such indicators as  
177 exports, imports and tax revenues have a slight increase: 0.17%; 0.28% and 1.6033 bln. som respectively. The only  
178 indicator that has a decline of 0.01%, which is negligible, is inflation.

179 Applying the 20% one can identify the following dynamics of macroeconomic indicators in the Russian Federation.  
180 A decreasing trend will be observed for GDP - by 0.2 percentage points and inflation by 2.12 percentage points The  
181 following indicators have a rising trend: export -23.89%, imports - 15.42%, employment - 0.41% tax revenues by 2,5775  
182 bln. rub. For Kazakhstan, the use of 20 % rate will affect the following indicators: GDP will tend to decline by 0.36%, a  
183 rising trend will be observed for exports -2.19%, import -7.9%, employment - 0.16% inflation - 0 , 55% and tax revenues  
184 by 2,5022 bln. tenge. Considering the application of the same rate to Kyrgyzstan, the following dynamics can be  
185 identified. GDP and employment remain unchanged, and such indicators as exports, imports and tax revenues have a  
186 slight increase: 0.15%; 0.26% and 1.4466 bln som respectively. The only indicator that has a decline of 0.01%, which is  
187 negligible, is inflation.

188 Given the behavior of macroeconomic indicators, described above, it can be concluded that applying the rate of  
189 20%, the economies of all three countries are subject to major changes that can cause negative economic impact, as well  
190 as the rate of 18% in Kazakhstan and Kyrgyzstan. On this basis, the optimal rate of VAT will be the rate ranging from  
191 12% to 18%. Thus an alternative rate of 15% is proposed.

192 Applying the 15% rate one can identify the following dynamics of macroeconomic indicators in the Russian  
193 Federation. A decreasing trend will be observed for GDP by 0.29 percentage points and inflation by 2.88 percentage  
194 points The following indicators have a rising trend: export - 30.35%, imports - 19.66%, employment - 0.5%, and the tax  
195 revenues by 3,3983 bln. rub. For Kazakhstan, the use of 15 % rate will affect the following indicators: GDP will tend to  
196 decline by 0.49%, a rising trend will be observed for exports -2.92%, imports -10.53%, employment - 0.21%, inflation -  
197 0.74% and tax revenues by 3,3363 bln. tenge. Applying this rate in Kyrgyzstan, the indicators are subject to the smallest  
198 changes. GDP and employment remain unchanged, and such indicators as exports, imports and tax revenues have a  
199 slight increase: 0.21%; 0.34% and 1,9249 bln. som respectively. The only indicator that has a decline of 0.01%, which is  
200 negligible, is inflation.

201 In our opinion, taking into account the dynamics of the four scenarios the use 15% VAT rate for the three countries  
202 looks rational. The chosen rate is optimal for economic development in the countries studied, and the effects of the  
203 transition to it will be the least painful, as a compromise solution to the three selected countries. The use of such a rate  
204 opens up the possibility of joining the union by former CIS countries and Russia, many countries with the lagging  
205 economy (as shown by the example of Kyrgyzstan), as well advanced countries, thus increasing competition of the  
206 Union. Applying the rate of 15%, a gradual transition to a unified tax system for Russia and former CIS countries  
207 becomes smoother, simplifying further actions on tax harmonization.

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### 3. Conclusion

211 With globalization, the transformation of taxation occurs in view of the specific nature of the countries integrating into the  
212 global economy. Open and topical issue is the choice of rational tax mechanisms to regulate the economy through further  
213 reform of the tax regulation. Through tax regulations the state may affect the level and the rate of inflation, stimulate the  
214 development of innovative processes, regulate supply and demand, adjust the level of economic development of  
215 individual regions of the country, etc. In practice, the tax regulation is achieved by the use of special tools. Tools of tax  
216 regulation can be stimulating and constrain, strategic and short-term, economic and socio-oriented.

217 Four scenarios of changes in macroeconomic indicators in relation to the application of uniform rates of VAT for the  
218 selected countries were developed based on the multifactor model, relied on the analysis of the possible use of a uniform  
219 VAT rate, as a first step towards tax harmonization within the Union including countries of the former CIS countries and  
220 the Russian Federation. Rates have been proposed taking into account the rate of VAT applicable in the territory of the

221 former CIS countries, i.e. the most common: 18%, 12%, 20% and 15% as an alternative. Each scenario presents the  
222 data, taking into account a uniform rate for the three selected countries and describes the consequences of the  
223 introduction of the proposed rates, the relationship of VAT with macroeconomic indicators based on a selected uniform  
224 rate.

225 Based on the analysis of the functioning of national tax systems and built-in mechanisms for tax regulation, the  
226 practice of creating and developing a uniform system of tax regulations in the existing cross-country alliances, a  
227 theoretical step-by-step model for building a unified cross-country system of tax regulation is proposed. The factors  
228 influencing interstate tax regulation are identified and systematized

229 The main purpose of the development and further implementation of the proposed model is to provide a  
230 mechanism of tax regulation, which would be aimed at the elimination of tax barriers, optimization of taxes, strengthening  
231 tax audit on the basis of an integrated information system of taxpayers in the partner- countries, increased foreign and  
232 domestic tax competition under globalization.

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## Assessment of Pension Coverage in the Russian Federation

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### Abstract

This article discusses the evaluation of the pension coverage in the Russian Federation in comparison with other countries. Despite the increase in pension benefits, the pension level does not reach the established targets of the International Labour Organization and other international standards. One of the indicators of the pension coverage in all countries is the replacement rate for lost earnings of the insured person, which shows the ratio of the average pension to the size of the average wage. The article presents a comparative analysis of the method for calculation of this ratio in the Russian Federation and in the European countries; the replacement rate for lost earnings in the Russian Federation is recalculated on the basis of European standards.

**Keywords:** Pension coverage, pension system, average wage, replacement rate for lost earnings, insurance premiums, cost of living.

### 1. Introduction

The standard of living in different countries is estimated inter alia in terms of pension coverage [1]. Pension system varies from country to country. Russia is significantly inferior to most members of the European Union by the level of pension coverage, with the gaps in the level of old age pensions being more than in incomes per capita. Convention #102 of the International Labour Organization (ILO) "Minimum Standards of Social Security, states that " with the 30 years of work record the old-age pension should be not less than 40% of wages in the country, and with a longer work record - not less than 40-55% [2]. The key parameter, which determines the level of pension schemes in the country, is the replacement rate for lost earnings of the insured person. However, the Convention has not been ratified by the Russian Federation, and the replacement rate, which is calculated in the Russian pension practice, differs from the prescribed norms of the International Labour Organization in a number of parameters. Therefore, a comparison of this indicator for the Russian Federation and other countries needs correction. In most countries, the total amount of insurance old-age pensions for long work record is usually 50-70% of a salary [3] (Table 1).

**Table 1.** The replacement rate for lost earnings in some countries in 2013

Countries	Average salary in US dollars.	Replacement rate %
USA	3504	41
Germany	2865	60
France	2845	50
Italy	2368	80
Japan	2313	30
Sweden	2726	60
Russia	841	36

In Russia, the replacement rate with average earnings currently stands at around 36%, but with earnings twice the average the replacement rate is lower than 20%. However, when comparing the solidarity replacement rate in Russian with the international standards, it should be born in mind that it takes into account the pension of persons who have not reached the end of 30 years insurance, which in Russia is 23% of the number of recipients of old-age pension [4]. But the most important thing is the level of population wages in other countries which many times exceed the wages of the Russian population. That is why the size of the replacement rate in Russia is 40% that corresponds to the level of poverty, i.e. 2.5-3 of the subsistence minimum. The state guarantee of the material security for the Russian pensioners

49 does not even reach the level of poverty in most countries of the world [5]. Each sixth subject of the Russian Federation  
50 has the ratio of workers to retirees of not more than 1 to 1 This is primarily due to the demographic aging of the  
51 population, leading to an increase in the number of pensioners and reduction of employment in the economy [6]. To keep  
52 the pensions at the rate of 40% of the current average nominal accrued wage in the forecast period with such ratio of  
53 workers to pensioners the premiums should be 33.6% of the salary (without size limit for the base calculation of insurance  
54 premiums, the overall rate of insurance contributions into the state non-budgetary funds in this case is 42%).

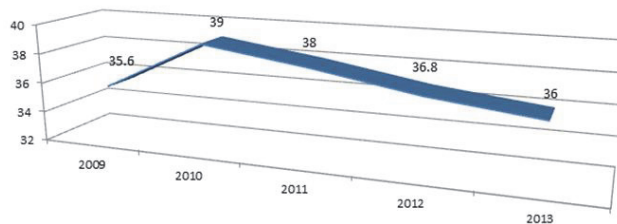
55 In addition, not all employees in the Russian economy pay the premiums to the Pension Fund of the Russian  
56 Federation, and individual entrepreneurs, whose number is constantly growing, form their own pension rights on  
57 preferential basis - on the basis of the minimum wage. As a result, the value of contributions of this group of citizens is  
58 more than 3 times lower than average employee contributions. Thus, the main burden of financial support of statutory  
59 pension insurance system is on the employed citizens.

## 61 2. Result

62  
63 In recent years, Russia has experienced a downward trend in the replacement rate (see Fig. 1). In late 2009, the value of  
64 solidarity in the replacement rate for a medium-sized old-age pension in the Russian Federation was 35.3%, while in 20  
65 subjects of the Russian Federation, this value was between 30% and 40% of average earnings in the region, and in 55  
66 subjects it exceeded 40% [7].

67 The growth rate in 2010 was due to the fact that the size of pensions increased significantly in relation to the  
68 revaluation of pension rights (valorization of pensions), the beginning of surcharges payment to reach the social  
69 subsistence level established in the subject of the Russian Federation, and the establishment of new rules for pension  
70 indexation. As a result, the replacement rate has increased to 39%, but then its decline has resumed, despite the ongoing  
71 annual indexation of pensions and increasing the level of the average wage.

72

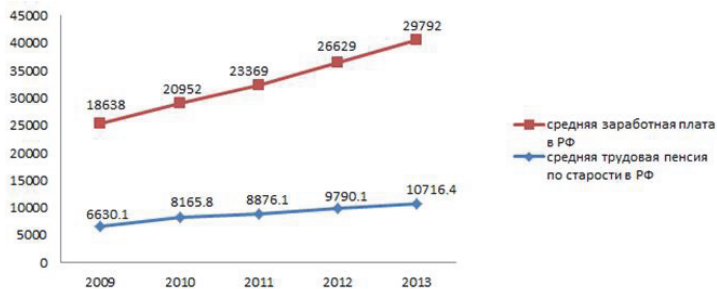


73  
74

75 **Fig.1.** Replacement rate for lost earnings of the insured person in the Russian Federation in 2009-2013, %

76 One of the reasons for the decline is that from 2010 to 2013, the growth rate of the average wage (1.42) lagged behind  
77 the growth rate of the average labor pension (1.31), as shown by the data in Figure 2.

78  
79



80  
81

82 **Fig.2.** The average salary and the average size of old-age pension in the Russian Federation in 2009 - 2013, in rubles

83  
84 The reasons for the influence of this factor on the level of pensions becomes clearer if one explains the formula for  
85 calculating the replacement rate for lost earnings of an insured person employed in the Russian Federation (Rr):

86  $R_r = P_{av}/S_{av}$ , (1)  
87  $P_{av}$  – average size of old-age pension in the whole country,  
88  $S_{av}$  – average wage in the country.  
89 The size of the average old-age pension in the whole country ( $P_{av}$ ) is calculated using the following formula:  
90  $P_{av} = (S_{av} \times l_r \times N_i)/N_{pen}$ , (2)  
91  $l_r$  – insurance premium rate for statutory pension insurance,  
92  $N_i$  – number of insured persons in the statutory pension insurance (in fact, it is the entire working population of the  
93 country),  
94  $N_{pen}$  – number of old-aged pensioners.  
95 When converting the formula (1) the following is obtained:  
96  $N_i = (l_r \times N_i)/N_{pen}$  (3)  
97 It can be concluded that the larger is the ratio of the number of employed people who pay insurance premiums,  
98 and the number of pension recipients, the greater is the value of the replacement rate for the lost earnings of an insured  
99 person.

100 Currently ¾ or 71% of the Russian population are paid below the average in the economy (Table 2). And if one  
101 takes the median wage, that is, to exclude from its calculation the highest-paid and lowest-paid categories, the salary in  
102 the country would be on average only 17,000 rubles per month instead of 26,000 rubles. The simplest calculation shows  
103 that a 40% replacement rate of such wages will be 6800 rubles, which exceeds the subsistence level established in the  
104 Russian Federation in 2013 only by 669 rubles.

105  
106 **Table 2.** The structure of paid employment, depending on the amount of earnings in the Russian Federation in 2012-  
107 2013  
108

Indicator of number	2012		2013	
	number mln.people.	ratio %	number mln.people.	ratio, %
The number of paid employers - all of them with wages::	46,55	100	46,35	100
Below average in the economy	30,35	65,2	30,22	65,2
Equal to average in the economy	3,13	6,7	3,11	6,7
Above average in the economy	13,07	28,1	13,02	28,1

109  
110 Russia has used the solidarity replacement rate, which is calculated as the ratio of the average pension for all recipients  
111 in the current year and the average wage in the economy over the same period, expressed as a percentage. ILO  
112 Convention # 102 "Minimum Standards of Social Security" [2] and the European Code of Social Security [8] provide the  
113 calculation of the replacement rate as the ratio of a typical beneficiary pension and his previous income. The replacement  
114 rate is set at 40% only for typical recipients the main requirement to whom is 30 years of insurance employment (for old-  
115 age pensions)

116 The typical pension recipients usually include the majority of people; they can be regarded as the middle class in  
117 the general population and retirees. The typical pension recipient according ILO Convention # 102 is, in particular, a  
118 skilled manual male employee whose salary is equal to 125% of the average wage of all the persons to be provided, who  
119 at the same time, has 30 years of insurance contributions or employment. For the rest of pensioners the norms of  
120 replacement rate are proportionally reduced. In this case, the pension should not correlate with wages of other people  
121 working at the moment, as is the case of Russia in the calculation of the solidarity replacement rate. Instead it should  
122 match the past earnings (income) of the individual in the period prior to the pension [2].

123 If we calculate the individual replacement rate of a typical recipient of old-age pension using the method of  
124 calculation of old-age pension in the Law "On labor pensions in the Russian Federation", when the insurance period is 30  
125 years, while monthly wage is 30 000 rubles, then we obtain the following results. Estimated pension assets for the year  
126 will be 4800 rubles (16% of earnings), and for 30 years - 48 monthly salaries. Their sum (144 000) should be divided by  
127 228 months (the expected period for receiving the pension). The typical pension will be 21% of monthly earnings. Given a  
128 fixed base size (and it is about one third of the pension) pension will be about 30% of the salary, which is 10% less than  
129 the international standard [9]. For high-income segment of the population the individual replacement rate will be even less  
130 [10].  
131

### 3. Conclusion

Currently it is very difficult to give a reliable estimation to the level of pensions in Russia by international standards. Firstly, it is impossible to calculate the replacement rate for current recipients of pensions using international methodology, since during the Soviet period payroll accounting was not organized for the entire length of service, and only the best 2 or 5 years were taken for calculating the pension. This indicator can be applied to insured persons who started to form their pension rights after 2002 not until 2032.

Secondly, it is not right to assess the level of pensions on the basis of the average wage in the country and the average pension of all recipients, as it is done in Russia, because currently more than 70% of the population receive a salary lower than its average size in the country. Besides, the size of different pension types vary significantly (for example, in 2013 the average social pension was 6,446.4 rubles and pension to test-pilots was 67,704.0 rubles).

Of course, in order to ensure the comparability of the calculation of the pension replacement rate for lost earnings with international standards it is necessary to reconsider the existing Russian methodology for calculating this coefficient [11]. In addition, we believe that under current conditions it would be more correct to assess the level of pension income of retirees by the ratio of pension to the subsistence level, which is calculated on the basis of the consumer goods value. According to the experts of the Pension Fund of the Russian Federation, today the ratio of average pension to the subsistence level is about 180%. By 2018 this figure is expected to exceed 200%, and in 2030 - 250%.

But this raises the question of comparing the calculation methods for subsistence minimum in Russia and in other countries, as there are differences in the methods of evaluation. Thus, upon ratification of the ILO Convention # 102 by the Russian Federation the method of calculating the replacement rate for lost earnings of the insured person will be reviewed and, respectively, comparison of the Russian Federation with other countries will be more correct.

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## Issue Activity of Subjects of the Russian Federation and Municipalities: Tendencies of the Beginning of the XXI Century

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### Abstract

The article is devoted to research of practice of issue of the state securities of the subjects of the Russian Federation and securities of municipalities during the period from 2000 to 2014. The work purpose – research of dynamics of issue activity of subjects of the Russian Federation and municipalities, definition of the tendencies which have developed for the analyzed period in issue activity. The group of territorial subjects of the Russian Federation - issuers of the state bonds on the degree of investment activity was carried out, the directions of use of means from issue of bonds are allocated. Besides, suggestions for improvement of practice of the issue activity of regional and municipal authorities are made.

**Keywords:** subfederal bonds, municipal bonds, regional economy, debt, budget, Russian Federation, region.

## 1. Introduction

Among the main actions in a state program of the Russian Federation "Management of public finances and regulation of the financial markets" monitoring of a condition of a public debt of the subjects of the Russian Federation and a municipal debt, and also providing the admission is allocated for the market of financial and steady issuers of securities" [5].

Being a source of a covering of a budget deficit, subfederal loans bear in themselves the budgetary risks. The policy of unreasonable building of a debt can worsen debt stability of the budget and lead to decrease in quality of management by public finance. Increase of reliability of subfederal borrowers and their budgets in the national financial market is an actual problem of a modern state policy [5]. In this regard the analysis of practice of issues of the bonds, which are carried out by regional and municipal authorities of Russia, will allow not only to allocate the main tendencies and parameters of already carried out loans, but also to estimate the prospects of development of this sphere. Information base of research includes the data published on the official sites of the federal ministries and statistical bodies.

## 2. Theory

The main document regulating the sphere of the state and municipal loans, the Budgetary code of the Russian Federation, which has been put into operation since January 1, 2000 is. The methodology on research of processes of issue of the state securities of regions and securities of municipalities was formulated in works of foreign and domestic scientists. Among the authors who made a powerful contribution to the solution of methodological problems in this sphere, M. Aguiar, M. Amador [1], A. N. Dankov [2], E. Dobson [3], F. D. Fabozzi [4], X. Feng [5] and others.



### 3. Results

According to the Ministry of Finance of the Russian Federation, on January 1, 2014 the public debt of territorial subjects of the Russian Federation made 1,74 trillion rub, having increased in a year almost by 30% (with 1,35 trillion rub), the volume of a debt of municipalities grew by 18% (from 245 billion rubles in 288,9 billion rubles) [9].

In 2013 the structure of a public debt of territorial subjects of the Russian Federation changed: the share of obligations for the budgetary credits decreased, and the specific weight of the credits from commercial banks increased [10]. The main debt of municipalities is issued bank (more than 50% of a total debt) and the budgetary credits (about 32%), only 4% were the share of municipal bonds. The relation of a public debt of territorial subjects of the Russian Federation to the income (without gratuitous receipts) following the results of 2013 made 33%, and the relation of the sum of payments for repayment and service of a debt of territorial subjects of the Russian Federation to the income of regional budgets (without gratuitous receipts) – 13% [10].

For January 1, 2014 debt papers of 36 territorial subjects of the Russian Federation and 5 municipalities are traded on the market of regional bonds. Their share of the total amount of the market of ruble bonds - 5,3% (5,6% - in 2013) that is connected with a rather small number of issuers — territorial subjects of the Russian Federation which use the tools of a public debt for financing.

In figure 1 dynamics of issues of the state securities of territorial subjects of the Russian Federation and municipal securities during 2000-2014 is shown.

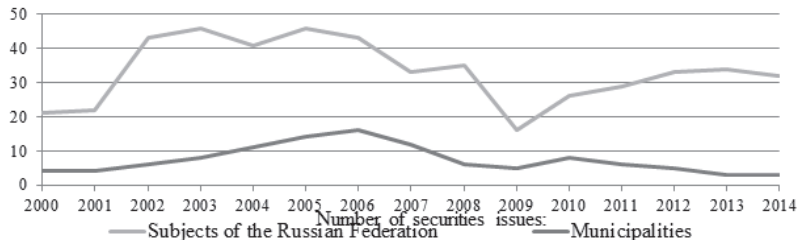


Fig. 1. Dynamics of issue of the state bonds of territorial subjects of the Russian Federation and municipal bonds in Russia in 2000-2014.

Apparently on figure 1, the greatest issue activity of regions was observed in 2005 (48 releases), and municipalities - in 2006 (16 issues), the smallest number of issues of securities of territorial subjects of the Russian Federation was registered in 2009 (16), municipal bonds – in 2013 (3). It should be noted that during 2000 - 2014 issue of the state securities of territorial subjects of the Russian Federation carried out in 53 regions. Dynamics of participation of territorial subjects of the Russian Federation an issue of the state securities are presented in figure 2.

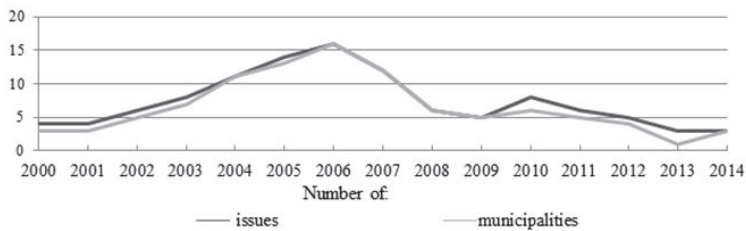


Fig. 2. Number of issues of the state bonds of territorial subjects of the Russian Federation in 2000-2014.

Figure 2 illustrates high issue activity of regions during 2002-2006, and the number of issues grows higher rates, then number of issuers. Since 2009, the schedule of dynamics of issues of bonds has begun to come nearer to the number of regions issuers, i.e. the majority of territorial subjects of the Russian Federation carries out no more than one bonded loan in a year. At the same time the total of subjects issuers steadily increases. The leader by number of issues of

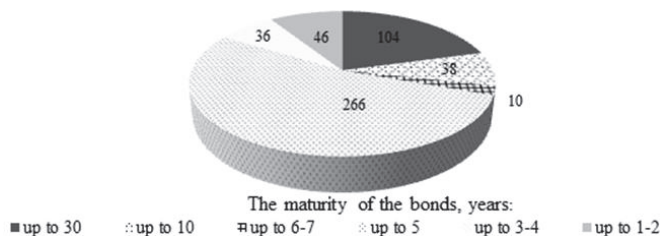
95 securities is St. Petersburg: for 2000-2014 81 issues of bonds were registered. The Tomsk region carried out 54 issues of  
96 bonds, in Moscow 38 issues are carried out. At other subjects issuers the number of the registered issues of bonds didn't  
97 exceed 30, and at 40 of them - no more than 10. If to address to the analysis of participation of certain territorial subjects  
98 of the Russian Federation in attraction of resources by the placement of the state bonds, it is possible to allocate 4  
99 groups: the first included the issuers who are annually registering issues (for 15 years - the Volgograd region; 14 years -  
100 St. Petersburg, Karelia, Chuvashia, the Tomsk region); in the second group - that bonds for 10-14 years (Krasnoyarsk  
101 Krai, the Republics of Sakha (Yakutia) and Komi, Moscow, the Tverskaya, Nizhny Novgorod and Yaroslavl areas) let out;  
102 in the third – emitting bonds within 6-10 years of the analyzed period (Irkutsk, Samara, Belgorod, Lipetsk, Voronezh,  
103 Kostroma, Moscow, Novosibirsk areas; Bashkortostan, Udmurtia, Mari El); other territorial subjects of the Russian  
104 Federation issuing the state bonds no more than 5 years, made the fourth group.

105 When carrying out the analysis of issue activity of municipalities it was revealed that in 2000-2014 bonded loans let  
106 out only in 33 of them. Thus the most active were: Volgograd (17 issues within 12 years), Novosibirsk (14 issues of  
107 securities in 9 years), Tomsk (9 bonded loans in 8 years), Yekaterinburg and Krasnoyarsk (on 8 issues in 8 years), and  
108 also Kazan (6 issues within 6 years) (fig. 3).  
109



110  
111  
112 **Fig. 3.** Number of issues of municipal bonds in 2000-2014.  
113

114 The analysis of structure of issues of the state bonds of territorial subjects of the Russian Federation on circulation  
115 periods is submitted in figure 4. In the analyzed period more than a half of bonds were issued for up to 5 years (266  
116 registered issues since 500). The considerable part is made by issuers of bonds for a period of up to 30 years.  
117



118  
119  
120 **Fig. 4.** Structure of issues of the state bonds of territorial subjects of the Russian Federation on circulation periods in  
121 2000-2014.  
122

123 The results of the analysis of the directions of use of the funds raised by the issue of the state securities of territorial  
124 subjects of the Russian Federation are presented in table 1.  
125

126 **Table 1.** The directions of use of means from issue of bonds of territorial subjects of the Russian Federation  
127

Use directions	Number of issues bonds of subjects of the Russian Federation
Financing the budget deficit	447
Restructuring of debts (2000 and 2002)	15
Repayment of debts	408

128 Calculations are executed on the basis of data of the Ministry of Finance of the Russian Federation [11].

According to table 1, the main direction of use of borrowed funds is the financing of a budget deficit of the territorial subject of the Russian Federation, and the smallest - restructuring of debt which was applied only in 2000 and 2002.

According to data on registration of conditions of issues of the state securities of territorial subjects of the Russian Federation from variation of the face values of bonds (ranging from 100 rub to 100000 rub) since 2009 issuers passed to the uniform face value of the bond of 1000 rub. In the last years and an order of definition of the income on bonds I became uniform (the constant (fixed) coupon and a price difference, an exception make separate issues of discount bonds of St. Petersburg) [11]. The average profitability at placement of subfederal bonds in 2013 — 8,25% per annum, thus the maximum rate of profitability reached 9,61% per annum on bonds of the Ryazan region, a minimum level of profitability in 7,1% per annum on bonds of Moscow [11].

#### 4. Conclusions

On the basis of detailed studying of practice of issue of subfederal and municipal securities in Russia in 2000-2014 it is possible to allocate the following:

1. The process of formation of a system of crediting of municipalities by means of implementation of bonded loans is in Russia at an early stage of the development. So, for the considered period of 2000-2014 bonded loans let out only in 33 municipalities.
2. The purpose of the issue of regional bonds isn't development of territories, the use of borrowed funds has no investment character. The main declared direction of the use of means from issue of regional bonds is the financing of a budget deficit of the territorial subject of the Russian Federation, except this means from the issue of bonds of territorial subjects of the Russian Federation went for repayment of debts and debt restructuring.

On the basis of the conducted research the following conclusions were drawn:

1. It is necessary to reconsider the directions of use of means from issues of bonds of territorial subjects of the Russian Federation. In our opinion, today placement of such forms of subfederal loans which allow to carry out development of certain branches of economy of the region, for the purpose of increase the taxable base of the territorial subject of the Russian Federation, creation of new workplaces, decrease in social tension is actual.
2. In medium-term prospect for financing of deficiency of regional budgets primary use of the budgetary credits which will promote replacement of the expensive commercial (bank) credits is supposed that, eventually, has to reduce the risk of the budgetary instability. It should be noted that from the middle of 2014 the rate on the budgetary credits from the federal budget for a covering of deficiencies of the budgets of territorial subjects of the Russian Federation is established on 0,1% per annum. However, thus, according to authors, regional and local authorities have to and develop further the issue activity, form the public credit history as constantly to count authorities of regions and municipalities on the cheap budgetary credits can't, and in the long-term period bonded loans have become the most demanded instruments of debt financing of the budgetary expenses.

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## Financial Risks of Constituents of the Russian Federation

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### Abstract

The Russian Federation comprises of 83 constituents which vary not only in territory, climate zones, resource endowment, but also in economic indicators which have influence on their investment attractiveness. While making decisions of investment, investors make allowances for investment attractiveness of regions and assess financial risks. Comparative analysis of ratings of constituents of the Russian Federation according to valuations of international and Russian rating agencies, as well as of the Ministry of Regional Development of the Russian Federation and the Ministry of Finance of the Russian Federation is presented in this study. It has been identified that only international rating agencies and some Russian rating agencies assess risks. Besides, many rating agencies do not have indicators of evaluation of non-systemic risks in their system of estimated figures of investment attractiveness of regions. The authors propose to include these indicators into estimated figures of investment attractiveness of constituents of the Russian Federation.

**Keywords:** Constituents of the Russian Federation; rating agencies; investment attractiveness; financial risks; systemic risks; non-systemic risks

### 1. Introduction

In the process of selecting investment objects in Russia, investors examine not only projects and risks specific to these projects, but also a constituent of the Russian Federation where this object is located considering attractiveness and risks of investment in this constituent. Investment attractiveness of constituents of the Russian Federation varies enormously. Primarily it is connected with current territorial position, environment conditions, industrial structure differentiation formed over the years, which have influence on economic strength of regions. The Russian Federation as the federal state comprises of constituents distinguished by their statuses. It is composed of 83 constituents which were predominantly formed during the soviet period; 21 of them have statuses of republics, there are also 9 territories, 46 regions, 2 cities of federal importance, 1 autonomous region, and 4 autonomous districts. The said constituents of the Russian Federation vary in sizes of territory and number of population. Thus, statistics shows that as of January 1, 2013, the largest territories belong to: the Sakha (Yakutia) Republic (3,083.5 thousand sq. km, population is 956 thousand people), the Krasnoyarsk Territory (2,366,8 thousand sq. km, population is 2,838 thousand people), the Tyumen Region (1,464.2 thousand sq. km, population is 3,480 thousand people). The smallest territories belong to: the Republic of Ingushetia (3.6 thousand sq. km, population is 430 thousand people), the Republic of Adygea (7.8 thousand sq. km, population is 443 thousand people), the Republic of North Ossetia (8.0 thousand sq. km, population is 709 thousand people). In addition to the above Russian regions have different economic strength and accordingly different investment climate, and it has influence on financial risks. For example, volume of gross regional product of constituents of the Russian Federation with the biggest and the smallest indicator values (Moscow and the Republic of Ingushetia) differs by 384-fold. Even if we put Moscow aside, the scatter will remain significant; for instance, indicators of the Moscow Region and the Republic of Ingushetia differ in 86-fold, and they differ in 49-fold we compare the Moscow Region with the Republic of Tatarstan. The scatter is significant for other economic indicators. It is very hard to select a constituent of the Russian Federation for investing under these circumstances. That is why it is essential to analyze current ratings given by international and Russian rating agencies, as well as ratings of other organizations for the purpose of their comparison.

## 2. Analysis of Primary Publications

Scientific literature pays considerable attention to the issue of financial risks, for example Hommel U., M. Frenkel, M. Rudolf [1] But most of the studies are devoted to the examination of corporate risks. Particularly, studies of such authors as Paudyn, B. which learned the problem of budgetary health assessment by credit rating agencies [2], Li, C., C. Balding and M. Lee explored an influence of political risk on the public finance [3], Arnold, B., C. Borio, L. Ellis and F. Moshirian in their research paper analyzed various issues that need to be tackled when promoting financial stability, reviewing the progress made in certain key areas and the remaining challenges [4]. Less attention is paid to issues of financial risks in public sector, though this aspect of financial risks is illustrated in studies of R. Musgrave [5] and other researchers. But to our opinion not enough attention is paid to issues of evaluation of financial risks of constituents of the Federation in federal states, and especially in Russia.

## 3. Research Objective

To examine investment attractiveness of constituents of the Russian Federation in terms of comparison of ratings of international and Russian rating agencies, as well as the Ministry of Regional Development of the Russian Federation and the Ministry of Finance of the Russian Federation, and evidentiare availability of indicators of evaluation of systemic and non-systemic risks.

## 4. Key Findings

The Russian Federation and particularly its constituents are interested in attracting investments. First of all it is important to note that size and population of considerable part of constituents of the Russian Federation are larger than some European countries. According to the Constitution of the Russian Federation they have status of fully legitimate and independent economic entities. All of them shall be interested in development of their regions and accordingly apply efforts for building economic relations with other regions, attraction of investors including foreign investors either. Investors may diversify into private sector and public sector projects. In the first case investors are concerned about general economic and investment climate in the region, and accordingly about general risk. In the second case investors are concerned about trust in public authorities of this constituents of the Russian Federation, and accordingly about risk. That is why we suppose that risks of the public sector can also be divided in systemic and non-systemic.

Rating agencies are engaged in evaluation of attractiveness and risks of different economic entities including credit risks of public-law entities. That is why when investors select a region for investment, they may be guided by ratings assigned to constituents of the Russian Federation by rating agencies. The Ministry of Finance of the Russian Federation has included Fitch Ratings, Standard & Poor's, Moody's Investors Service into the register of accredited rating agencies. Such Russian rating agencies as Expert, AC&M (Analysis, Consultations and Marketing), Rus-Rating NRA (National Rating Agency) are also included in this register. The Ministry of Regional Development of Russia, as well as such magazines as Director General, public opinion foundations, etc. also makes independent assessment of development of constituents of the Russian Federation. The Ministry of Finance of the Russian Federation assesses regional financial management quality. All these data can be a basis for making financial decisions of investment in one or another region.

Foreign rating agencies assign credit ratings to regions upon respective request. Request to one of international rating agencies is an exclusive requirement of the Bank of Russia which is necessary for issuance of securities and their allocation in the Lombard List (Directive of the Central Bank #2861-U dated August 10, 2012). Decision about putting the Bank of Russia on the Lombard List is made by the Board of Directors of the Bank of Russia including and with due regard to one of the following rating agencies: Fitch Ratings, Standard & Poor's, Moody's Investors Service. But in a number of instances some constituents of the Russian Federation address international rating agencies even in the absence of issuance of regional securities. We can exemplify it by the Republic of Tatarstan which has not effected issuance of regional securities, but it has ratings of international rating agencies. Thus, in January 2014, international rating agency Fitch Ratings confirmed long-term foreign and local currency issuer default rating (IDR) of the Republic of Tatarstan of the Russian Federation at BBB and short-term foreign currency IDR at F3. National long-term rating has been confirmed at the rate of AAA(rus). Long-term rating outlook was considered as sustainable. In this case the Republic of Tatarstan needs these international ratings for presenting the republic as a region with congenial investment climate.

When international rating agencies assess regions, they do not disclose their methodology, so we do not know what indicators form their basis, and if non-systemic risks are taken into account. It is possible that these risks are not

taken into account. Assessments are made with the aid of both international and national scale. Thereat performed analysis has revealed that 48 of 83 constituents of the RF had international ratings (33 constituents in Fitch Ratings, 16 constituents in Standard & Poor's, 21 constituents in Moody's). But all these ratings are at different days and it is hard to match them. Considerable part (videlicet 35) of constituents of the Russian Federation has not addressed international rating agencies over the last five years, accordingly it is impossible to evaluate their investment attractiveness. Until 2012 rating of a constituent of the RF was valid within one year, but the statute about ratings was altered in 2013, and now rating has to be confirmed on a twice a year basis. We have carried out an analysis of evaluations of credit risks of constituents of the Russian Federation given by international rating agencies. According to evaluation of such international agencies as Fitch Ratings and Moody's such regions as city of Moscow, St. Petersburg, the Republic of Tatarstan, the Republic of Bashkortostan, the Khanty–Mansi Autonomous District are inside the top five of constituents of the Russian Federation with ratings BBB and Baa1 correspondingly. This rating means that these regions has satisfactory credit worthiness, currently low credit risk expectations, appropriate aptitude to discharge financial obligations in due time. International rating agency Standard & Poor's gives similar BBB rating to such constituents of the RF as cities of Moscow and St. Petersburg, the Khanty–Mansi Autonomous District, the Republic of Bashkortostan, and the Yamalo-Nenets Autonomous District. Therefore, it may be noted that evaluations of credit risks of constituents of the Russian Federation given by different international rating agencies coincide. Reasons of such coincidence are quite understandable: Moscow and St. Petersburg are Russian financial hubs, the Khanty–Mansi and the Yamalo-Nenets Autonomous Districts are main suppliers of oil and gas for export. The Republics of Tatarstan and Bashkortostan also produce oil, but other industrial fields are developed either.

For the sake of completeness of our research we made analysis of constituents of the Russian Federation included into one of the most developed federal districts of the Russian Federation, namely the Volga Federal District (Table 1).

**Table 1.** Credit rating of constituents of the Russian Federation included into the Volga Federal District given by international rating agencies\*

Constituents of the RF	Fitch	Standard and Poors	Moody's
Perm Territory	-	-	Withdrawn in 2009
Republic of Bashkortostan	-	BBB-(April, 2013)	Baa3 (June, 2013)
Orenburg Region	BB (October, 2012)	-	-
Ulyanovsk Region	BB- (November, 2008)	-	-
Samara Region	-	BB+ (November, 2013)	Ba1 (July, 2013)
Chuvash Republic	BB+ (January, 2014)	-	Ba2 (September, 2013)
Udmurt Republic	BB (November, 2013)	-	-
Republic of Tatarstan	BBB (January, 2014)	-	Baa3 (November, 2013)
Kirov Region	BB- (August, 2013)	-	-
Penza Region	BB (September, 2013)	-	-
Mari El Republic	BB (November, 2013)	-	-
Saratov Region	-	-	Revoked in February, 2013
Republic of Mordovia	-	-	B1 (February, 2013)
Nizhni Novgorod Region	BB- (September, 2013)	-	Ba2 (November, 2007)

\*(the latest date of an update is stated within the brackets)

The table is made according to data from official websites of financial authorities of the RF entities included into the Volga Federal District.

In 2013 only 10 of 14 constituents of the Russian Federation included into the Volga Federal District had international ratings. Four constituents of the RF do not have ratings: the Ulyanovsk Region confirmed its last rating in 2008, the Orenburg Region - in 2012, rating of the Perm Territory was withdrawn in 2009, rating of Saratov region - in February, 2013. That is why we cannot assess credit ratings of these constituents of the RF. Two constituents of the RF - the Republics of Tatarstan and Bashkortostan - have the high credit ratings. Such constituents of the Russian Federation as Kirov, Penza, Samara, Nizhni Novgorod Regions, Republics of Chuvashia, Mordovia and Mari El have BBB rating. This is a speculative rating which means default risk exposure. Thus, it may be noted that considerable part of the Volga Federal District regions are in zone of credit risk.

Russian rating agencies usually make evaluation of economic and social situation or investment attractiveness of regions assigning relevant ratings. Thereat they take into account different indicators including scope and efficiency of economy, budget and social sphere, etc. Rating agencies Expert and NRA make evaluation of investment risks of constituents of the Russian Federation. Thereat only Expert rating agency defines general investment risk per totality of



151 social, economic, finance, ecological, criminal and administrative risks. I.e. in this case we can take that non-systemic  
152 risks are taken into account when risks are evaluated. Other rating agencies show only a place of a region in  
153 attractiveness list, and we do not know what types of risks are taken into account. Constituents of the Russian Federation  
154 with the highest ratings of Russian rating agencies at the end of 2012 are presented in Table 2, and constituents of the  
155 RF with the lowest ratings are presented in Table 3.  
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**Table 2.** Constituents of the Russian Federation with the highest ratings at the end of 2012

Expert RA (rating agency)		RIA-Rating RA		AC&M RA		NRA	
Constituents of the RF	Risk	Constituents of the RF	Place	Constituents of the RF	Place	Constituents of the RF	Place
Moscow	1A	Moscow	1	Moscow	1	Moscow	IC1
Moscow Region	1A	St. Petersburg	2	Khanty–Mansi AD	2	Sakhalin Region	IC1
St. Petersburg	1A	Khanty–Mansi AD	3	Nenets AD	3	Belgorod Region	IC2
Krasnodar Territory	1A	Tyumen Region	4	Yamalo-Nenets AD	4	Moscow Region	IC2
Republic of Tatarstan	1A	Moscow Region	5	Tyumen Region	5	Republic of Tatarstan	IC2
Belgorod Region	2A	Sverdlovsk Region	6	St. Petersburg	6	St. Petersburg	IC2
Rostov Region	2A	Republic of Tatarstan	7	Sakhalin Region	7	Tyumen Region	IC2
Voronezh Region	3A1	Yamalo-Nenets AD	8	Moscow Region	8	Kaliningrad Region	IC3
Lipetsk Region	3A1	Samara Region	9	Perm Territory	9	Kaluga Region	IC3
Tambov Region Leningrad Region	3A1	Leningrad Region	10	Sverdlovsk Region	10	Kamchatka Territory	IC3

The table is made according to data from Russian rating agencies [6] - [10].

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159  
160 According to the majority of rating agencies, city of Moscow has the best rating among Russian regions at the end of  
161 2012. As for ratings of other constituents of the Russian Federation, rating agencies do not evaluate them identically. For  
162 instance, rating agency Expert made expert evaluation of economic strength and risks for all 83 constituents of the  
163 Russian Federation summarizing the results of their activity at the end of 2012. Thereat such constituents of the Russian  
164 Federation as Moscow, the Moscow Region, St. Petersburg, the Krasnodar Territory, and the Republic of Tatarstan  
165 joined the ranks of regions with maximum potential and minimum risk. Thereat Republics of Ingushetia, Chechnya, and  
166 Tyva have low potential and extreme risk. Rating agency RIA-rating makes similar expert evaluation of constituents of the  
167 Russian Federation, but situation in this list is somewhat different at the end of 2012. The list is headed by cities of  
168 Moscow and St. Petersburg, the Khanty–Mansi Autonomous District, the Tyumen Region, the Moscow Region. The  
169 Republic of Tatarstan is only on the seventh place. The Altai Republic (83 place), the Tyva Republic (82 place), the  
170 Republic of Ingushetia (81 place) are classified as weak regions.  
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**Table 3.** Constituents of the Russian Federation with the lowest ratings at the end of 2012

Expert RA (rating agency)		RIA-Rating RA		AC&M RA		NRA	
Constituents of the RF	Risk	Constituents of the RF	Place	Constituents of the RF	Place	Constituents of the RF	Place
Tyva Republic	3D	Altai Republic	83	Republic of North Ossetia–Alania	83	Tyva Republic	IC9
Republic of Ingushetia	3D	Tyva Republic	82	Republic of Mordovia	82	Republic of Kalmykia	IC9
Chechen Republic	3D	Republic of Ingushetia	81	Chechen Republic	81	Karachay–Cherkess Republic	IC9
Chukotka AD	3C2	Jewish AD	80	Kabardino-Balkar Republic	80	Republic of North Ossetia–Alania	IC8
Jewish AD	3C2	Republic of North Ossetia–Alania	79	Republic of Ingushetia	79	Mari El Republic	IC8
Magadan Region	3C2	Kabardino-Balkar Republic	78	Altai Republic	78	Republic of Ingushetia	IC8
Kamchatka Territory	3C2	Republic of Kalmykia	77	Republic of Dagestan	77	Kirov Region	IC8
Altai Republic	3C2	Chechen Republic	76	Karachay–Cherkess Republic	76	Kabardino-Balkar Republic	IC8
Republic of North Ossetia–Alania	3C2	Chukotka AD	75	Tyva Republic	75	Zabaykalsky Territory	IC8
Kabardino-Balkar Republic; Karachay–Cherkess Republic; Republic of Kalmykia	3C2	Karachay–Cherkess Republic	74	Kostroma Region	74	Chechen Republic	IC7

The table is made according to data from Russian rating agencies [6] - [10].

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174 Rating agency AC&M in spite of Moscow includes the Khanty–Mansi Autonomous District, the Nenets Autonomous  
175 District, the Yamalo-Nenets Autonomous District, and the Tyumen Region into top five. Republics of Altai (83 place), Tyva  
176 (82 place), Ingushetia (81 place), the Jewish Autonomous Region (80 place), the Republic of North Ossetia–Alania (79  
177 place) are classified as the weakest regions. Rating agency NRA in spite of Moscow includes the Sakhalin Region (with  
178 rating similar to Moscow), the Belgorod Region, the Moscow Region, and the Republic of Tatarstan into top five.  
179 Republics of Tyva, Kalmykia, Karachay–Cherkess, North Ossetia–Alania, and Mari El are classified as the weakest  
180 regions. Therefore, expert evaluation of constituents of the Russian Federation made by Russian expert agencies differs.  
181 Reason of such evaluation diversity lies in their methodologies which in most cases are not disclosed.

182 To make the picture complete we carried out more detailed analysis of ratings and risks of constituents of the  
183 Russian Federation included into the Volga Federal District (Table 4).  
184

185 **Table 4.** Rating of constituents of the Russian Federation included into the Volga Federal District given by Russian rating  
186 agencies at the end of 2012  
187

Constituents of the RF	Expert RA (rating agency)	RIA-Rating RA	AC&M RA	NRA
Perm Territory	2B	11	9	IC4
Republic of Bashkortostan	2B	13	12	IC4
Orenburg Region	3B1	22	25	IC4
Ulyanovsk Region	3B1	46	41	IC5
Samara Region	2B	9	14	IC3
Chuvash Republic	3B1	51	54	IC6
Udmurt Republic	3B1	44	44	IC5
Republic of Tatarstan	1A	7	23	IC2
Kirov Region	3B1	58	57	IC8
Penza Region	3B1	57	71	IC6
Mari El Republic	3B2	71	73	IC8
Saratov Region	3B1	43	61	IC5
Republic of Mordovia	3B2	66	82	IC6
Nizhni Novgorod Region	2B	17	31	IC4

The table is made according to data from Russian rating agencies [6] - [10].

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190 The study has revealed that Expert, NRA and RIA-Rating assigned minimum risk to the Republic of Tatarstan at the end  
191 of 2012, though AC&M rating agency assigned just the third place to the Republic of Tatarstan. Per totality of ratings (3 of  
192 4) the second place belongs to the Samara Region, and the third place belongs to the Republic of Bashkortostan.  
193 Therefore, it is important to note that Russian rating agencies assign quite high rating to the Perm Territory, though it  
194 does not have rating from international rating agencies. Therefore, AC&M rating agency gives it the 9th place which is  
195 above the Republic of Tatarstan, the Samara Region, and the Republic of Bashkortostan. According to the data of Expert  
196 rating agency, the highest investments risk is observed in the Mari El Republic and the Republic of Mordovia (3B2), and  
197 according to data of NRA rating agency - the Kirov Region and the Mari El Republic (IC8). In the rating of RIA-Rating last  
198 places belong to the Mari El Republic (71), the Republic of Mordovia (66), and the Kirov region (58), and in the rating of  
199 AC&M - the Republic of Mordovia (82), the Mari El Republic (73), and the Penza Region (71). Conclusion concerning  
200 investment attractiveness and risks of the Volga Federal District regions is obvious. Both international and Russian rating  
201 agencies acknowledge that two constituents of the RF, namely the Republic of Tatarstan and the Republic of  
202 Bashkortostan, are the most attractive and the least risk-related. Russian rating agencies acknowledge that Republics of  
203 Mari El and Mordovia are the least attractive regions.

204 In the process of evaluation of investment attractiveness and risks of regions, investors may use ratings of the  
205 Ministry of Regional Development of the Russian Federation. Every year the Ministry estimates summary index of  
206 economic and social situation of regions. At that, development of the real sector of economy, investment attractiveness,  
207 incomes and employment of population, indicators of budgetary system of a region are evaluated. According to the  
208 evaluation of the Ministry of Regional Development of the RF for 2012, the Tyumen Region, the Khanty–Mansi  
209 Autonomous District, the Yamalo-Nenets Autonomous District, the Sakhalin Region, the city of Moscow are included into  
210 top five. The Republic of Altai (83), the Altai Territory (82), the Republic of North Ossetia–Alania (81), the Ivanov Region  
211 (82), the Kurgan Region (79) are included into last five places. The Ministry of Regional Development of the Russian  
212 Federation evaluates regions by also their investment attractiveness. This rating differs from general rating of economic

and social situation of Russian regions. The rating of investment attractiveness is estimated on the basis of such indicators as construction, construction growth rate, accommodation deployment, investments into nominal capital, proportion of profit-making companies. Such regions as the Tyumen District, the Krasnodar Territory, the Khanty–Mansi Autonomous District, the Leningrad Region, and the Nenets Autonomous District are in the top five of this rating. The Ivanov Region (83), the Republic of North Ossetia–Alania (82), the Chechen Republic (81), the Kurgan Region (80), the Republic of Tyva (79) are included into last five places. Comparison of two abovementioned ratings gives evidence that rating of evaluation of economic and social situation and rating of investment attractiveness slightly differ. The Tyumen Region and the Khanty–Mansi Autonomous District are in the top five of both ratings. The Republic of North Ossetia–Alania, the Ivanov Region, and the Kurgan Region are also included into last five places in both ratings. Moreover these ratings do not coincide with ratings of some Russian rating agencies. Certainly, this divergence is connected with divergence in evaluation methodology. But in contradistinction to rating agencies, the Ministry of Regional Development of the Russian Federation discloses its rating methodology. Analysis of methodology of making of summary index of economic and social situation and rating of investment attractiveness of regions has revealed that there are not any indicators characterizing non-systemic risks. These are risks considering management quality in a region. We suppose that these indicators shall be also evaluated. In that vein we note that annual evaluation of regional finance management quality published by the Ministry of Finance of the Russian Federation is of interest. The Ministry of Finance of the Russian Federation divides all constituents of the Russian Federation into three groups. These are regions with:

- high regional finance management quality;
- proper regional finance management quality;
- bad regional finance management quality.

There are 23 constituents of the Russian Federation in the first group, 54 constituents in the second group, 6 constituents in the third group. What's interesting is that regions, which were in the last five in all ratings, are in the first group with high regional finance management quality. They are, for instance, the Kurgan Region, the Republic of Tyva, the Altai Republic, the Altai Territory. At the same time constituents of the RF, which are among last constituents in other ratings, are in the group with bad regional finance management quality: the Republic of North Ossetia–Alania, the Republic of Mordovia, the Republic of Ingushetia. Of course we understand that this evaluation is single-ended and connected with evaluation of activities of financial authorities of constituents of the Russian Federation. In this evaluation they used following 7 criteria: budget planning, budget execution, debt management, financial arrangements with municipal units, government property management and state service delivery, budget process accountability, as well as indicators characterizing execution of Russian Federation Presidential Decrees dated May 7, 2012. To our opinion, there are criteria referring to evaluation of systemic and non-systemic risks and at the same time to the budget sphere in this evaluation system. These rating may be useful for investors in evaluation of their risks, especially in case of investment in publicly owned projects.

## 5. Conclusion

Having analyzed various evaluations of credit risks, economic and social situations, investment attractiveness of constituents of the Russian Federation made by international and Russian rating agencies, the Ministry of Regional Development of the Russian Federation, the Ministry of Finance of the Russian Federation, it can be noted that ratings differ. It is conditioned by differences in their methodologies. But as a rule rating agencies do not disclose their methodologies. Nevertheless, speak by disclosed information, indicators of regions dependence on business cycle revenues, activeness and participation in co-financing program, amount of public investments are not taken into account in evaluation of regions. On the one hand business cycle revenues provide advantages to constituents of the Russian Federation which have such revenues. For example, only 3 of 14 constituents of the Russian Federation in the Volga Federal District have business cycle revenues, and these regions are the Republic of Tatarstan, the Republic of Bashkortostan, and the Samara Region. These revenues are connected with oil and gas component of their economies. It explains their high rating just as among constituents of the district so generally in the Russian Federation. But along with this it shall be understood that their business cycle risks are higher. We also suppose that in the process of evaluation of risks of regions we shall take into account investment activity of public authorities in the context of their participation in different investment projects on co-financing programs. Besides, rating agencies generally use indicators of investment amount in their evaluation. But we suppose that indicators of amount of public investments including investments from own funds are of interest for evaluation of non-systemic risks.

The fundamental problem of Russian regions lies in lack of concern in increasing their capabilities for attraction of investors into regions. Participation in co-financing programs, amounts of public capital contributions from own funds give

267 evidence of regional authority's active stand in enhancement its investment climate. Although a requirement for  
268 participation in co-financing programs is availability of own financial resources, and many constituent of the RF do not  
269 have them. And when investors select a region for investment, they have to take into account all ratings, as international,  
270 so Russian rating agencies, despite of their sometimes different evaluation.

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## Debt Burden of Constituents of the Russian Federation and Its Determinant Factors

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### Abstract

Expansion of expenditure obligations of the Russian Federation constituents and municipalities, which results in growing pressure on expenditure of territorial budgets, with preservation of current practice of revenue distribution between budgets of Russian budgeting system and reduction of cheap budget credits granted to regions - the situation when debt finance of budget expenditure and, accordingly, the increasing debt burden on regional budgets, are of current concern. This article analyses debt burden of Russian regions taken in conjunction with its prime budget and economic indices. On the basis of analysis we draw certain conclusions on factors that determine the level of debt burden and tendencies in regional debt behaviour, raise problems which, if solved successfully, will provide for improvement of debt situation in constituents of the Russian Federation.

**Keywords:** public debt of constituent of the Russian Federation; municipal debt; total regional debt; debt burden; regional and municipal debt management; loan and debt management system; regional debt policy

### 1. Introduction

The Russian State Programme of Enhanced Management of Public Finance (hereinafter referred to as the State Programme) was approved by Directive of the Government of the Russian Federation of August 30, 2013; the date of December 31, 2020 was specified as project finalization date. The document has specified eleven major targets of state policy in the sphere of public finance management, one of stated priorities is "effective management of public debt and financial assets of the Russian Federation, aimed at preservation of high-scale debt solvency that had been reached in the recent years and maintaining Russia's credit ratings of investment category at a high level. But it is important to realize that maintenance of debt solvency of the Russian Federation is a problem which can not be considered without regard to debt situation in constituents and municipalities of the Russian Federation That's why regular monitoring of budget debt burden of the Russian Federation constituents and local budgets with full compliance of budget restrictions set forth by the Budget Code of the Russian Federation, debt optimisation is an "additional condition" of successful implementation of State programme events within the framework of the above stated priority. Moreover, formation of conditions for minimization of state debt growth risks of RF constituents and municipal debt was defined in the above document as one of the "principal tendencies" of public finance management development.

The recent years situation with growth of debt burden on budgets had predestined considerable academic interest to debt management problems in the following research papers: Schularick, M. in his paper concluded that the costs of wars have been the main driver of public debt in the Western World during the modern era [1], Maltritz, D., A. Böhn and S.Eichler learned that the simultaneous consideration of sovereign yield spreads and Standard and Poor (S&P) ratings may help to improve the identification of the latent country default risk [2], Bernoth, K., J. Von Hagen, L. Schuknecht in their paper studied bond yield differentials among EU government bonds on the basis of a unique data set of issue spreads in the US and DM (Euro) bond market [3], Paudyn, B. explored the contribution of credit rating agencies to the constitution of the politics of limits underpinning the European sovereign debt crisis [4], Mody, A. detected the necessity of debt restructuring to compensate for the inflexibility due to fixed exchange rates [5].

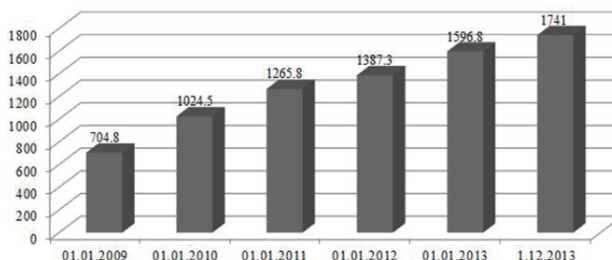
Different aspects of regional debt policy were represented in papers by E.A. Ermakova, A.D. Andryakov [6, 7] and others. However, the changing debt situation, specific nature in different regions necessitate further deep research in this sphere.

57 **2. The Main Part**

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Most constituents of the Russian Federation and municipal formations always had some scope of debts, but till financial crisis of 2008-2009 the situation with debts was not so crucial. After 2008 debts of constituents of the Russian Federation and municipal formations were rising constantly, which is shown in Figure 1.

For the whole considered in Figure 1 period, total state debt of constituents of the Russian Federation and municipal formations increased by 2.3 times. Only for the year 2009 debt had increased half as much. Further on we can observe some reduction of total debt growth rates of constituents of the Russian Federation and municipal formations (in 2010 debt increased to 23,6%, in 2011 – to 9,6%). In 2012 we see increase of debt growth rates, for the said year debt increased to 15,1%. So, the situation with debts of regions and municipalities had changed for worse in 2012 as compared with 2011: total state debt of constituents of the Russian Federation and debt of municipal formations had increased to 209,5 billion rubles. (for comparison, in 2011 the increase was 121,5 billion rubles).



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**Figure 1.** Total state debt dynamics of constituents of the Russian Federation and debt of municipal formations

In Table 1 we have presented the dynamics of main budget and debt indices of Russian regions and municipalities for 2011-2012. According to represented data, rates of debt growth (115,1%) had exceeded the rates of total tax and non-tax revenues of consolidated budgets of constituents of the Russian Federation (109,6%).

**Table 1.** Dynamics of basic budget and debt indices of Russian regions\*

Indices	2011	2012	Index growth rate, %
<i>1. Revenue of consolidated budgets of constituents of the Russian Federation</i>			
1.1.Total revenue, billion rubles	7,643.9	8,064.5	105.5
1.2.Revenue net of inter-budgetary transfers from the federal budget, billion rubles	6,174.0	6,624.3	107.3
1.3. Tax revenue, billion rubles	5,273.1	5,800.3	110.0
1.4.Non-tax revenue, billion rubles	554.1	584.2	105.4
<i>2. Expenditure of consolidated budgets of constituents of the Russian Federation</i>			
2.1.Total expenditure, billion rubles	7,679.3	8,343.2	108.7
2.2. Expenditure net of inter-budgetary transfers from the federal budget, billion rubles	6,208.9	6,903.0	111.2
2.3.Investment expenditure, billion rubles	1,157.6	1,118.7	96.6
2.3. Share of investment expenditure, %	15.1	13.4	x
2.4.National and municipal debt service expense, %	0.99	0.89	x
<i>3. Borrowings of constituents of the Russian Federation and municipal formations</i>			
3.1. Public budget loans raised from federal budget, billion rubles	128.4	129.5	100.9
3.2.Raising loans of credit organizations, billion rubles.	419.9	580.4	138.2
<i>4. Debt indices</i>			
4.1 Total state debt of constituents of the Russian Federation and debt of municipal formations, billion rubles.	1,387.3	1,596.8	115.1
4.2.State debt of constituents of the Russian Federation, billion rubles, including:	1,171.8	1,351.4	115.3
4.2.1. Government securities of constituents of the Russian Federation.	343.9	375.4	109.2
4.2.2. Loans raised by constituents of the Russian Federation from credit organizations	300.0	438.2	146.1
4.2.3. Budget loans taken out by RF constituent budget from other budgets of Russian budget system.	419.2	426.1	101.7
4.2.4. State guarantee of the RF constituent	108.5	111.5	102.8
4.3.Debts of municipal formations, billion rubles	215.5	245.3	113.8

\* Compiled by authors on the basis of [8], [9]

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In many respects growth of debt may be explained by increased social commitments, which for most of RF constituents turned to be impossible to meet, thus regions had to borrow money to fulfil their budget commitments. Total loan raised by regions and municipalities from credit organizations had increased in 2012 to 160,5 billion rubles, while budget loans raised from the federal budget had increased only to 1,1 billion rubles.

The scope of tasks imposed on regions have been expanding in recent years. The Russian President's Budget Message on Budget Policy 2014-2016 says about the increased burden on regional and local budgets. The document also states the tendency of negative changes in regional budget expenditure structure, slump of expenditures that have the nature of an investment. Data submitted in Article 1 show that in 2012 expenditure of consolidated budgets of constituents of the Russian Federation, that have the nature of an investment, decreased to 38,9 billion rubles as compared to 2011; their share in total expenditure has decreased from 15,1% to 13,4%. With reduction of budget investment the total amount of expenditure of consolidated budgets of constituents of the Russian Federation increased to 8,7%.

In total state debt volume of constituents of the Russian Federation and municipal formations, the main part falls on state debt of the Russian Federation constituents - 85%. In conformity with budget legislation of the Russian Federation, debt commitments of the RF constituent may exist in the form of :

- 1) obligation for state securities of the RF constituent;
- 2) budget loans taken out by RF constituent budget from other budgets of RF budget system;
- 3) credits raised by constituent of the Russian Federation from credit organizations, foreign banks and international financial organizations;
- 4) obligation for state guarantees of the RF constituent.

Professor E.A. Ermakova offers, (and authors of this paper share her point of view) to grade conditionally specified types of debt commitments in terms of "preferability" and service cost as follows [6]. The first type is state guarantees, which, if present in general scheme of state debt of constituent of the Russian Federation, show the investment nature of debt, that appropriate authorities work with business, thereat region has tangible benefit, since tax revenues increase, new workplaces open, as a rule, actual budget expenditure with such debt are minimal and notional. The second type of debt obligations is budget loans raised by regions from the federal budget; such loan service charges are minimal; budget loans share in total debt amount of the RF constituent may be indicative of both degree of belief on the part of state financial authorities, and of their willingness to strongly support economy of some regions. The third type of debt obligations is government securities of constituents of the Russian Federation (bonds); bonded loan service charges are considerably higher than debt service of the first two types of debt commitment. According to E.A. Ermakova, bonded loans should be the main (if not the only one) source of long-term financial resources raising for regional financial managers. The latest in desirability rating, the most non-transparent and expensive type of loans for constituents of the Russian Federation is bank loan.

Data given in Table 1 show that in state debt profile of the RF constituents at the year-end 2012, loans raised by RF constituents from credit organizations, i.e. "most non-transparent and expensive" come first (33%); while budget loans raised from federal budget take the second place (32%), and government securities of RF constituents take the third place (28%). It is worth to note, that in 2012 government securities of only 32 RF constituent circulated in cumulative portfolio of region debts. Government securities of RF constituents showed 8% in total debt commitments of the RF constituents. Certainly, region-wise, the debt profile differs considerably.

Against the general growth of total debt of RF constituents and municipalities, debt dynamics in certain regions has a competing character. Our research held on the basis of data given by the Ministry of Finance of Russia, showed that in 2012 only 18 regions of 83 could reduce total debt volume of RF constituent and municipalities (further on referred to as region's cumulative debt, region's consolidated debt): for more than 30% debt volume has reduced in the Nenets Autonomous District (to 46,7%), the Irkutsk region (to 46,6%), Khanty-Mansiisk autonomous district - Yugra (to 39,4%), the Perm Territory (to 37,4%), the Tyumen region (to 31,9%); the Kamchatka Territory reduced its cumulative debt to 20,4%, the Republic of Buryatia - to 20%, Moscow - to 19,5%, the Chechen Republic - to 15,5%, the Republic of Kalmykia - to 12,5%, the Magadan region - to 11,3%, Republic of Sakha (Yakutia)- to 6,9%, the Moscow region - to 6,6%, the Rostov region - to 5,4%, the Republic of Adygeya - to 4,3%, the Republic of Altai - to 1,9%; minor decrease of cumulative debt (0,3%) is shown by the Kursk region and the Kaliningrad region.

"The leader" in debt increase was the Republic of Ingushetia; due to state guarantees, the total debt of this region increased by 16 times. There is considerable growth of cumulative debt of the Yamalo-Nenets Autonomous District (by 3,3 times), the Republic of Tuva (by 3 times), Saint Petersburg (by 2,5 times), the Chukotka Autonomous District (by 2,2 times).

As we have noted it before, in general in the Russian Federation debts showed larger growth than tax and no-tax



134 revenue of consolidated budgets of the RF constituents, but the said tendency was characteristic for just some of regions.  
135 So, positive dynamics of tax and non-tax revenue may be observed in all above mentioned constituents of the Russian  
136 Federation, which managed to reduce the cumulative debt of the region. Besides, exceeding growth rate of tax and non-  
137 tax revenue of consolidated budget over growth rate of cumulative debt of region may be observed in the following RF  
138 constituents: the Vladimir region, the Sakhalin region, the Sverdlovsk region, the Voronezh region, the Bryansk region,  
139 the Astrakhan region, the Arkhangelsk region, the Kaluga region, the Kostroma region, the Republic of Tatarstan and the  
140 Republic of North Ossetia-Alania. The volume of tax and non-tax revenue of consolidated budgets of the Rostove region,  
141 the Magadan region, the Astrakhan region, the Arkhangelsk region, the Kaluga regions, the Republic of Tatarstan had  
142 grown for more than 20% as compared with 2011. Tax and non-tax revenue to the budget of the Republic of Kalmykia  
143 and budgets of republican municipalities had grown to 65% in 2012 as compared to 2011; in the Sakhalin region such  
144 increase made 50%.

145 When analysing the dynamics of tax and non-tax revenue of consolidated budgets of the RF constituents, it is  
146 worth to note that in 2011 incentive mechanism was tested in regards to RF constituents that showed best results in  
147 increasing their taxable capacity. In 2012 incentive programme for top-performance constituents continued. At the end of  
148 the 2011 year 20 regions received grants of the federal budget for best practice in increasing their taxable capacity, and  
149 25 regions receives the same at the end of the 2012 year. In 2012 among 25 prizewinner constituents only 6 regions of  
150 18 had increased receipt of tax and non-tax payments in their budgets and decreased their cumulative regional debt  
151 volume, those were Moscow, the Moscow region, the Tyumen region, the Kursk region, the Magadan region and the  
152 Republic of Adygeya. From among the rest 11 RF constituents that demonstrated exceeding growth rate of tax and non-  
153 tax revenue of consolidated budget over growth rate of cumulative debt of region, only 5 regions were prizewinners, those  
154 were the Vladimir region, the Sverdlovsk region, the Voronezh region, the Kaluga region and the Republic of Tatarstan.  
155 The rest 14 RF constituents, that received their grants for best practice in increasing their taxable capacity in late 2012  
156 are 12 regions, where debt growth exceeded their tax and non-tax revenue of consolidated budgets, and 2 regions (the  
157 Belgorod and Murmansk regions), where cumulative regional debt increased by 1,7 times, while tax and non-tax revenue  
158 of consolidated budgets decreased in 2012 as compared to the year 2011(the Belgorod region – to 7%, the Murmansk  
159 region – to 3%). So, we may draw a conclusion that exceed of growth rate of regional cumulative debt over growth rate of  
160 tax and non-tax revenue of regional consolidated budget of RF constituent is not considered a negative trend and does  
161 not serve a ground for non-application of incentives in regards to region.

162 First of all, regions and municipalities should treat loan raising as an effective investment expenditure facility,  
163 aimed at meeting strategic goals of socioeconomic development of their territories. Our study showed, that among 65 RF  
164 constituents with increased cumulative regional debt, only 33 of them demonstrate positive dynamics of budget  
165 investments, 32 regions that increased their debt, have reduced expenditures that have the nature of an investment.  
166 Among RF constituents that decreased their cumulative regional debt, demonstrate diverse situation: among 18 regions,  
167 8 demonstrate growth of investment expenditure, and 10 regions show reduction of the same.

168 In terms of constantly increasing demand in additional financial resources, including investments, which is  
169 characteristic to practically all regions and municipal formations of the Russian Federation, waiving loans is impossible to  
170 imagine. Moreover, waiving loans in such conditions may result in conversion of debt commitments into overdue accounts  
171 payable; such so-called latent loans in the form of outstanding budget commitments cause the chain of creditor  
172 indebtedness of economic entities, which adversely effects the economy of region; on the other hand, in case of waiving  
173 loans, investment demands in capital expenditure can not be satisfied to the fullest degree due to unavailability of  
174 financial resources [10].

175 In debt burden rating of constituents of the Russian Federation, determined here as ratio of total debt of RF  
176 constituent and municipalities to total tax and non-tax revenue of consolidated budget of RF constituent  $P\Phi$ , the first  
177 position is held by Nenets Autonomous District with its minimal debt burden of 0,1%, we should note here that debt of this  
178 region is represented only be municipal debts. The last in the rating is the Republic of Mordovia with debt burden of  
179 139,9%. The volume of cumulative regional debt exceeds 50% of the total total tax and non-tax revenue of consolidated  
180 budget in 19 constituents of the Russian Federation.

181 Appraising in general the situation with debts in Russian regions, authors come to a conclusion that high level of  
182 debt burden and positive rates of debt growth can not serve as decisive evidence of ultimate debt situation in one region  
183 or another, since much depends on temporal debt structure, on ratio of debt payments and their serviceability in each  
184 period of time. Estimate of regional finance management quality in each of RF constituents by the Ministry of Finance of  
185 the Russian Federation may serve as indirect prove of our conclusion. At the conclusion of 2012, the following  
186 constituents of the Russian Federation with high debt burden have high quality rating of finance management: the  
187 Kaliningrad region (74,6%), the Smolensk region (69,1%), the Astrakhan region (64,4%), the Republic of Altai (59,9%),

the Novgorod region (51,2%). And, on the opposite, the number of RF constituents with debt burden index less than 50%, are characterized by low finance management quality: the Republic of Ingushetia (33,7%), the Oryol Region (38%), he Chukotka Autonomous District (48,2%). It is fair to say, however, that not only debt situation is taken into consideration by Ministry of Finance of the Russian Federation in its assessment of regional finance management quality. Comprehensive assessment is done with consideration of the following aspects in regional finance management in RF constituents:1) budget planning; 2) budget administration; 3) state debt management; 4) financial relations with municipal formations;5) public property management and rendering of state services;6) transparency of the budget process.

Our research showed, that not all Russian regions having high level of debt burden are characterized with economic parameters degradation. So, the Astrakhan region with its debt burden of 64,4%, has high industrial index (coming second only to the Voronezh region) – 125,8%; on the contrary, the Nenets Autonomous District with the lowest debt burden (0,1%) shows negative output indices movement (the lowest industrial production index among all regions - 89,3%). For the "rate of investment growth in capital assets" we may give similar examples. The Primorsk Territory is characterized with decrease of capital investments in 2012 as compared with 2011 to 41%, while debt burden of the region is only 5,7%. On the contrary, the Republic of Tuva and the Pskov region with their rather high debt burden (49% и 48,8%, accordingly), show high capital investment growth rates, as compared with other regions – 131,8% и 128,2%, accordingly.

Within the frame of this work, in view of its limited volume, it does not seem possible to carry out analysis of more parameters, describing economic situation of constituents of the Russian Federation.

For the purpose of general apprehension of how economic specialization of regions effects their debt burden, we have arranged all RF constituents in four groups with due regard to economic specialization: "Financial and Industrial Centres", "Export-Oriented Regions", "Rural and Industrial Regions", "Industrial Regions". This grouping is used by RIA Rating Agency when making up social and economic rating of the RF constituents. The study proved that mean debt burden calculated for regions in the group "Export-Oriented Regions" reached only 9,1%; for regions of "Financial and Industrial Centres" – 16,2%; for regions of "Industrial Regions" mean debt burden reached 37%; "Rural and Industrial Regions" group has the highest rate – 43,2% (though within groups, especially in industrial and rural-industrial regions, we can see a wide spread of rate values).

### 3. Conclusion

Constituents of the Russian Federation differ widely in terms of debt burden. Current debt burden and tendencies in regional debt development are estimated by effect of a group of factors, including:

- first, economic specialization of region, which in large part determines the level of its fiscal capacity. In virtue of historical, geographical, climatic and other objective factors, siting of labour forces in the territory of the Russian Federation was notably uneven, which explains differentiation in the level of regions' fiscal capacity, and, consequently, level of debt burden;
- second, rates of economic development of region. Solution of debt problem directly depends on solution of regional economic growth problem;
- third, approach to state debt management (municipal debt) of RF constituent.

In our opinion, high level of debt burden should not considered as cause of financial problems of regions, the root cause is economic and financial region undermanagement (including debt undermanagement). We can't but agree that the current Russian system of income sources and expenditure commitments differentiation has its downsides. But we should not consider the matters of debt situation in regions and search for solutions only in terms of inter-budget relations reforming.

Development and implementation of measures aimed at investment climate facilitation and improvement of region's investment attractiveness, by authorities of RF constituents is currently top priority task, which, when solved, would result in improvement of debt situation. The Russian President's Budget Message on Budget Policy 2014-2016 says, that "expenditures of constituents of the Russian Federation should be to the fullest extent secured by their own sources of income. Thereat all decisions taken should be thought ahead and cashed-up. Additional financial assistance to constituents of the Russian Federation should go with economical advancement from their own resources". Thus it stresses the importance of regional measures on attracting investments and increase of taxable capacity.

For most Russian regions another important task is to enhance debt management effectiveness, which is impossible without formation of a relevant loan and debt management system. In this connection we should note that within the framework of joint "Regional Fiscal Technical Assistance Project" of the Ministry of Finance of the Russian Federation and the International Bank for Reconstruction and Development, in 2002-2004 consortium composed of

"Economic Expert Group" Closed Joint-Stock Company and FitchRatings Global Rating Agency had implemented sub-project "Regional and Municipal Debt and Contingent Commitment Management System" (the project was implemented with participation of administration of three regions: the Chuvash Republic, the Vologda region and Chelyabinsk region). Experts of consortium have worked out:

- Concept of regional and municipal debt management system reform,
- Standards of regional and municipal debt management (complete package of regulatory and methodology documentation required for introduction of debt management mechanism and procedure),
- Regional and municipal debt management best practice code.

Therefore, all recommendations on formation and functioning of regional and municipal debt management system have been developed in 2004 jointly by Russian and foreign experts on the basis of best foreign practice and considering the Russian context. In the light of the above, we share point of view of A.D. Andryakov, that reforming of regional and municipal debt management institutional system and decision-taking system in debt policy requires political will of regional authorities.

Taking into account debt management method development, in order to create in practical terms a transparent, effective system of regional (municipal) debt management, in the opinion of authors, the following is essential:

- approval of regulatory and methodological documents governing different aspects of debt management;
- use of automation aids for debt obligations recording, servicing and discharge, as well as strategic and operational decisions taking process in development and realization of debt policy;
- training courses for specialists of financial authorities of RF constituents and municipal formations, responsible for debt management in loan raising and debt management.

Only comprehensive approach to all specified above tasks would afford to solve problems of regional budget balance and build up debt capability of RF constituents and municipal formations.

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## Assesment of the Impact of Assets Value on Financial Statuses of Regions

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### Abstract

We offer to supplement existing approaches to evaluation of financial statuses of governmental units with an index of assets availability which are the basis of their activities. Necessity for consideration of assets dynamics, their structure, as well as quality of their management is proved in the course of evaluation of financial statuses of governmental units. The article makes the evaluation of influence of various assets of constituent entities of the Russian Federation, included into the Volga Federal District, on their financial statuses level; they have been graded with a glance to assets dynamics changes.

**Keywords:** assets, Volga federal district, region, budget, incomes, non-tax incomes, financial statuses, correlation, rating

### 1. Introduction

Rating agencies, ministries, and agencies employ such indexes as revenues, expenditures, budgetary gaps, government debt, etc. in making an evaluation of financial statuses of constituent entities of the Russian Federation [1, 2, 6, 10]. At that, such an important factor as assets availability is not taken into account, though this is an activity base of every governmental unit. First, they can serve as a source of an extra budget revenue from non-tax revenues; second, they can be considered as a guarantee in financial operations of a governmental unit. In the course of evaluation of the financial status of the governmental unit it is important to consider not only their availability, but also their dynamics, structure and management quality, and this will be a guarantee of the region financial sufficiency. The issue of evaluation of the financial status of the governmental unit and regions in particular is not a new one: it has been worked out for many years [3, 4, 5, 7, 8, 9].

### 2. Methods

Estimation of assets indexes influence on non-tax revenues and financial statuses of governmental units at large has been performed with reference to the data from review of budget and balance execution of constituents of the Russian Federation included into the Volga Federal District. We have conducted a correlation analysis for assessment of influence of different groups of assets on the amount of non-tax revenues of regions of the Volga Federal District. We have taken all Volga Federal District regions data for the last five years as a basis. Analysis findings are shown in the Table 3.

We have employed a rank method for evaluation of the financial status of the region: rating of every region of the Volga Federal District has been defined on the basis of the sum of relative values volume (coefficients). Indexes summary has been performed according to the following formula:

$$R_j = x_{ij} / x_{i\text{cp}} \quad (1)$$

Where,  $R_j$  – is a relative value of every index in the Volga Federal District region;

$x_{ij}$  – is an actual value of every region's indexes;

$x_{i\text{cp}}$  – is an average value of indexes;

$i$  – is a number of indexes;

$j$  – is a number of regions under analysis.

### 3. Results

Analysis of statistical data for 2009-2013 has revealed that revenues of all Volga Federal District regions have a steady tendency to the budget increase. Over a period of five years budget revenues of the Volga Federal District constituents

56 increased 37%, and differentiation among regional revenues remained: the smallest revenues for the stated period were  
57 evidenced in the Republics of Mari El, Mordovia, Chuvashia, and in the Ulyanovsk Region; and the Republics of  
58 Tatarstan and Bashkortostan, the Samara and the Nizhni Novgorod Regions had the biggest revenues. Primary revenues  
59 derived by the Volga Federal District regions are arisen from tax proceeds, which is an evidence of favorable economic  
60 climate and good industry development level in constituents of the Russian Federation. An average performance of tax  
61 proceeds rate in revenues of the Volga Federal District regions are the following: 52.1% in 2009 and 65.8% in 2013. The  
62 highest tax proceeds level in the budget revenue structure can be observed in the Samara and Nizhni Novgorod Regions,  
63 the Republic of Bashkortostan and the Perm Territory (65-72% in 2009 and 72-84% in 2013). At that 1 region of 14  
64 constituents of the Russian Federation, namely the Republic of Tatarstan, did not obtain an equalization transfer in 2013  
65 (the same is true for 2009); other constituents of the Russian Federation included into the Volga Federal District obtain  
66 the stated transfers. Non-tax revenues of the majority of constituents of the Russian Federation, included into the Volga  
67 Federal District, generally have a tendency to growth (amount of non-tax revenues in absolute terms, as well as their rate  
68 in budget revenues of constituents increased in five constituents of the Volga Federal District, for instance more than  
69 fourfold in the Republic of Mordovia). However, non-tax revenues dropped off in such constituents of the Russian  
70 Federation, as the Kirov, Penza, and Saratov Regions, the Perm Territory, and the Republic of Bashkortostan.

71 Non-tax revenues of governmental units come from a range of sources including assets (according to the  
72 Budgetary Code of the Russian Federation, these revenues may include revenues from use and sale of public property).  
73 At that, decrease of non-tax revenues rates can be an evidence of assets management quality as well (for example in the  
74 trade of unprofitable objects).

75 The performed analysis of assets dynamics for the period of 2009-2013 for balances of constituents of the Russian  
76 Federation, included into the Volga Federal District, showed their increase. But this increase is connected with financial  
77 assets in a greater degree. And non-financial assets of constituents decreased in eight constituents of the Russian  
78 Federation (Table 1). Regionwide, assets increased, but such increase occurred due to financial assets, while non-  
79 financial assets decreased.

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81 **Table 1.** Assets Dynamics in the Volga Federal District Regions for the period of 2009-2013 mln. rub.  
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Index Name	Assets			
	Total	Financial Assets	Non-Financial Assets	
			Total	Incl. Non-Financial Treasury Assets
Republic of Bashkortostan	19437,03	27952,11	-8515,08	4353,35
Republic of Mari El	12940,91	14497,26	-1556,35	1866,44
Kirov Region	18389,16	19046,74	-657,57	6345,41
Republic of Mordovia	41643,38	31922,01	9721,36	4423,49
Nizhny Novgorod Region	92273,01	49337,80	42935,21	64572,11
Orenburg Region	20580,24	30272,07	-9691,83	-18,01
Penza Region	22323,91	32151,03	-9827,12	3479,20
Perm Territory	1158,83	39505,20	-38346,4	1502,31
Republic of Tatarstan	162010,7	147948,30	14062,37	7000,77
Samara Region	64052,99	60996,44	3056,54	12047,19
Saratov Region	16800,58	25989,38	-9188,80	474,84
Republic of Udmurtia	9443,21	27659,87	-18216,7	30,12
Ulyanovsk Region	18044,15	16645,02	1399,13	12609,31
Republics of Chuvashia	24928,54	24193,36	735,19	8385,00
<b>Volga Federal District</b>	<b>524026,6</b>	<b>548116,57</b>	<b>-24090</b>	<b>127071,52</b>

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84 Rate of non-financial assets as part of assets of the said constituents of the Russian Federation also decreased from  
85 80% in 2009 to 45% in 2013, and rate of financial assets increased correspondingly (Table 2).  
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**Table 2.** Composition and Profile of Assets of the Volga Federal District Constituents in Percentage Terms

Index Name	2009 year			2013 year		
	Non-Financial Assets		Financial assets	Non-Financial Assets		Financial Assets
	Total	Incl. Non-Financial Treasury Assets		Total	Incl. Non-Financial Treasury Assets	
Republic of Bashkortostan	43,73	6,83	56,27	34,94	8,40	65,06
Republic of Mari El	93,05	1,89	6,95	50,85	6,92	49,15
Kirov Region	88,09	16,87	11,91	45,06	25,15	54,94
Republic of Mordovia	86,40	15,04	13,60	50,96	12,56	49,04
Nizhny Novgorod Region	95,62	6,74	4,38	70,37	39,27	29,63
Orenburg Region	76,98	0,27	23,02	28,30	0,13	71,70
Penza Region	95,93	5,16	4,07	39,59	9,35	60,41
Perm Territory	71,49	0,28	28,51	15,15	2,43	84,85
Republic of Tatarstan	52,61	5,75	47,39	34,57	5,16	65,43
Samara Region	83,18	4,25	16,82	55,83	9,33	44,17
Saratov Region	96,91	0,41	3,09	65,19	0,92	34,81
Republic of Udmurtia	79,94	2,20	20,06	26,10	1,83	73,90
Ulyanovsk Region	97,42	1,13	2,58	68,47	23,34	31,53
Republics of Chuvashia	91,10	15,70	8,90	46,25	24,83	53,75
<b>Average Value in the Volga Federal District</b>	<b>82,32</b>	<b>5,89</b>	<b>17,68</b>	<b>45,12</b>	<b>12,11</b>	<b>54,88</b>

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Our correlation analysis has revealed that there is heavy reliance between non-tax revenues and assets, including financial assets as well (Table 3). High correlation value can also be observed between non-tax revenues and an aggregate value of financial assets and non-financial treasury assets. Thus, we can observe heavy reliance of non-tax assets with treasury property which is not secured to governmental enterprises and agencies. At that the correlation turns firm with the increase of years.

**Table 3.** Correlation of Non-Tax Budget Revenues of the Volga Federal District Regions for the period of 2009-2013

Year	Correlation of Non-Tax Revenues with:				
	Assets	Financial Assets	Non-Financial Assets	Sum of Non-Financial Treasury Assets and Financial Assets	Non-Financial Treasury Assets
2009	0,7	0,76	0,51	0,74	0,54
2010	0,73	0,8	0,52	0,81	0,58
2011	0,83	0,8	0,63	0,84	0,46
2012	0,86	0,91	0,59	0,89	0,18
2013	0,9	0,94	0,69	0,94	0,33

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For the purpose of finding an ordered estimate of financial statuses of regions we have taken indexes in rubles: regional incomes per capita (one of key indicators of economic development of a region), non-tax revenues entered to the budget of the constituent of the Volga Federal District (they show constituent's assets management quality), assets on balance of every region, as well as quota of revenues exclusively of equalization transfers, in percentage terms.

We have compared real value of index of every region with average value in the Volga Federal District, following which we will make a table defining contribution of every index to the final coefficient. Every constituent will be given a number from 1 to 14 in the rank table according to the value of the final coefficient (Table 4).



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**Table 4.** Ordered Estimate of Financial Statuses of Volga Federal District Regions for 2013

Index Name	Regional Incomes Per Capita	Non-tax revenues	Revenues Exclusively of Transfers	Assets	Final Coefficient	Region Rating
Republic of Bashkortostan	0,93	2,91	1,07	1,80	1,7	12
Republic of Mari El	0,94	0,22	0,80	0,30	0,6	14
Kirov Region	0,92	0,62	0,89	0,36	0,7	13
Republic of Mordovia	1,20	0,56	0,91	0,69	3,4	6
Nizhny Novgorod Region	1,00	1,31	1,08	1,67	5,06	3
Orenburg Region	0,97	0,91	1,09	0,49	3,5	5
Penza Region	0,92	0,29	0,91	0,52	2,64	11
Perm Territory	1,04	1,02	1,10	0,65	3,8	4
Republic of Tatarstan	1,39	3,53	1,10	3,67	9,7	1
Samara Region	1,19	1,09	1,09	1,71	5,08	2
Saratov Region	0,78	0,27	1,00	0,75	2,8	8
Republic of Udmurtia	1,02	0,41	1,08	0,44	3	7
Ulyanovsk Region	0,81	0,39	1,01	0,52	2,73	9
Republics of Chuvashia	0,89	0,46	0,88	0,46	2,69	10

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So, we have graded constituents of the Volga Federal District according to the level of their financial self-sufficiency. Let us estimate financial prosperity of the Volga Federal District regions in order to make a matrix. For that end we shall define to what extent expenditures of every constituent of the Volga Federal District are safeguarded by their own revenues (i.e. exclusive of equalization current grants) (Table 5).

**Table 5.** Financial Prosperity of the Volga Federal District Regions for 2013

Index name	Expenditures	Revenues (Exclusively of Current grants)	Revenues - Expenditures	% of Insufficient Prosperity
Republic of Bashkortostan	139180,21	119389,90	19790,32	14,22
Republic of Mari El	22684,69	15295,55	7389,15	32,57
Kirov Region	44587,27	31550,28	13036,98	29,24
Republic of Mordovia	35465,88	26512,29	8953,59	25,25
Nizhny Novgorod Region	114850,05	104778,16	10071,89	8,77
Orenburg Region	74174,28	62723,43	11450,85	15,44
Penza Region	46655,67	33707,70	12947,98	27,75
Perm Territory	96049,82	88886,73	7163,09	7,46
Republic of Tatarstan	172304,96	171997,48	307,48	0,18
Samara Region	134267,31	123524,67	10742,64	8,00
Saratov Region	69758,40	57288,16	12470,24	17,88
Republic of Udmurtia	57878,77	49183,87	8694,90	15,02
Ulyanovsk Region	38547,42	30720,92	7826,50	20,30
Republics of Chuvashia	36791,84	28584,18	8207,67	22,31

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#### 4. Conclusion

Every constituent of the Russian Federation is an economic entity which owns and disposes of assets and revenues in its own name, enters into economic relationship with other economic units, assumes financial obligations, makes economic decisions for which it is responsible in accordance with the applicable legislation. Financial assets and non-financial assets of treasury property are strongly interrelated with non-tax revenues. At that our analysis has revealed that decrease or increase of total assets does not always influence directly on the amount of non-tax revenues of the region. In order to understand if financial status of the region becomes better or worse (at that it is essential to consider influence of various factors, for example, revaluation of assets, etc.) and to evaluate assets management quality, it is necessary to



conduct deeper analysis of assets dynamics and structure, which will be the subject of our further research.

We have made the matrix of financial statuses of the Volga Federal Districts regions based on the results of the conducted analysis (Table 6). Authors have offered results gradation. The level of financial prosperity: poor - 25% and higher, medium - 10-25%, high - from 10% and lower. The level of financial self-sufficiency: poor - up to 2%, medium - 2-5%, high - from 5% and higher. The level of financial self-sufficiency reflects influence of assets on the amount of non-tax revenues of regions.

**Table 6.** Matrix of Financial Statuses of the Volga Federal Districts Regions

The Level of Financial Prosperity	The Level of Financial Self-Sufficiency		
	Low	Medium	High
Low	Republic of Mari El, Kirov Region	Republic of Mordovia, Penza Region	
Medium	Republic of Bashkortostan	Saratov, Ulyanovsk, Orenburg Regions, Republics of Chuvashia and Udmurtia	
High		Perm Territory	Nizhny Novgorod and Samara Regions, Republic of Tatarstan

Results of our research are the following: the highest level of financial self-sufficiency is observed in the Republic of Tatarstan, the Nizhny Novgorod and Samara Regions. The Republic of Mari El and the Kirov Regions hold the lowest positions.

Effective social and economic development of any region becomes possible only upon continuous monitoring of regional budgets revenues including their structures, as well as expenditures. It will help to understand how much revenues arrive from every territory, as well as percentage of tax and non-tax revenues. Non-tax revenues of regions in a greater degree arise due to revenues from assets management, but quality of this management is almost not taken into consideration. In reliance on such information we could estimate financial self-sufficiency of every region and its financial capability to ensure its development. And in its turn this will allow making individual decisions concerning each region.

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## Small Business Innovation in Russian Universities

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### Abstract

*This article describes the problems of small innovative businesses, established in universities. Based on the analysis of the legal framework, the study of small innovative enterprises identified and critically evaluated the practical problems of compliance with the legislation, the purpose of their creation in relation to economic activities. The directions of development improve the efficiency of their operation. The study based on the survey of leading Russian Universities and the number of the most efficient small innovative enterprises operating today.*

**Keywords:** University scientific educational institution, a small investment company, investment, business

### 1. Introduction

Innovative potential of high school traditionally assessed at a high level: an intellectual cadres, material and technical base, the ability to organize and carry out serious research, international connections. Legally it is possible for schools to create their own business entities applying results of intellectual activity, the exclusive rights to which belong to these institutions. Thus, the Russian government planned to create an "innovation zone" around Russia's state institutions of science and higher education. However, as the study shows that only a third of the established organizations really works, a third exists only on paper, and the rest - are in an intermediate state.

### 2. Methods

According to the Federal Law dd. 22.08.1996 N 125-FZ "Concerning Higher and Postgraduate Vocational Education" the main target of developments is to provide real implementation of scientific and technological activity's results in production which are created at cost of budget money. [1.2] According to the Law budgetary scientific establishments, scientific establishments of national science academies, state funded educational institutions of higher professional education, higher vocational education institutions of national science academies (hereafter referred to as scientific and educational institutions) are authorized to create business entities without the consent of property owner. [3] Nevertheless, disposal of interests (shares) in equity capitals of these business entities can be performed only with advanced consent of relevant holders. It is set forth in the Law that scientific and educational institutions are responsible for notifying federal executive authority, which carries out functions involving formulation of State police and normative legal regulation in regard to scientific and scientific and technological activities (Federal Educational Agency of Russia) when creating this kind of institution. [4.5] Notification of the fact that this institution has been created has to be directed to the Agency during 7 days from the moment of its legal registration. Also there should be information sent to this legal body about including the newly created institution to Uniform State Register of Legal Entities. Business entities can be created as limited liability company or joint company. Scientific and educational institutions can create business entities solely or with the involvement of others as founders. The share of scientific and educational institutions in the equity capital of the business entities that they create has to be more than 25 % (for joint companies) and more than 1/3 (for limited liability corporations). Interest (share) of others participating in the equity capital of business entity has to be paid with money not less than in half. [7] The Law has it that business entity does not lose its status of small business entity regardless of share that scientific and educational institutions have in its equity capital. Herewith its activity has to consist of practical usage (implementation) of results of intellectual activity and exclusive rights on these results belong to founders (participants) – scientific and educational entities. Scientific and educational entities can bring rights to use results of intellectual activity according to license agreements to equity capitals of business entities. Herewith exclusive rights on

56 intellectual activity's results are beyond alienation according to the second paragraph of the first part of the article 1233 of  
57 Civil Code of Russian Federation. Also scientific and educational institutions can bring into equity capital of business  
58 entities the money, equipment and other property which are under operational management of enterprises in manner  
59 required by Code of Russian Federation. Equity capital formation order for joint company and limited liability company is  
60 regulated by the articles 90, 99-101 of Civil Code of Russian Federation, chapter 3 of Federal Law dd. 8<sup>th</sup> of February  
61 1998 № 14-Ф3 «Concerning Limited Liability Companies» and chapter 3 of Federal Law dd. 26<sup>th</sup> of December 1995 №  
62 208-Ф3 «Concerning Joint Companies». Scientific and educational institutions perform management of interests (shares)  
63 in equity capital of business entities as participants according to order set by civil legislation. In this case the Law sets  
64 restriction to disposal of interests (shares) in business entities' equity capital. [8,9,10] Thus, alienation (disposal) of  
65 interests (shares) belonging to scientific and educational institutions in business entities created with their participation is  
66 allowed only with advanced consent of property owner of these entities [11,12]. This restriction refers only to contributions  
67 to equity capital as to rights to use results of intellectual activity with license agreements and money, equipment and other  
68 property  
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### 70 3. Discussions

71  
72 So despite scientific and educational institutes transfer objects of state property which are under their operational  
73 management, in return the state receives the ownership of interest (share unit) in equity capital of created business  
74 entities. Also the Law regulates that earnings from disposal of interests (shares) in equity capitals of business entities as  
75 well as share of profits of business entities received by scientific and educational institutions pass to their individual  
76 disposal and go only to legal protection of intellectual activity's results, remuneration payment to their authors and  
77 performing statutory activities of these entities.[13,14] In the table 1 there is an overview of small innovative enterprises  
78 (SIE) number in a range of top higher education institutes of Russia.  
79

80 **Table 1.** Number of small innovative enterprises of top Universities of Russia  
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No	Name of University	Number of SIE, units.
1	Tomsk State University of Control Systems and Radioelectronics	120
2	Belgorod State Technological University named after V.G. Shukhov	67
3	Kazan Federal University	39
4	Lomonosov Moscow State University	38
5	Kazan National Research Technical University named after A.N.Tupolev - KAI (KNRTU-KAI)	23
6	Saint-Petersburg Electrotechnical University "LETI"	14
7	Tambov State University	14
8	Michurinsk State Agrarian University	12
9	N.P.Ogarev Mordovia State University	10
10	Kazan State University of Architecture and Engineering	10
11	Tambov State Technical University	9

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83 Distribution of small innovative enterprises by sectors shows in Table 2, according to the table have the highest economic  
84 priority enterprises operating in the chemical and petrochemical industry as well as technology transfer.  
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86 **Table 2.** Functioning of small innovative enterprises (SIE) by sectors  
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Sectors	Functioning SIE, %			
	2010	2011	2012	2013
Management, marketing, business planning	9,09	0,0	20	7,14
Chemicals, Petrochemicals	36,36	13,6	10	21,43
Information Technology	4,55	4,5	20	7,14
Medicine and Biology	4,55	31,8	10	14,29
Physics, mechanics, measuring and control devices and systems	9,09	18,2	10	7,14
Others, including the transfer of technologies	36,36	31,8	30	42,86
Total	100	100	100	100

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89 Currently in Russia there is a range of restrictions which prevent small innovative enterprises from developing and  
90 effective functioning.

#### 91 92 **4. Results**

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94 Upon that analysis of regulations of the Law has the following main practical problems occurring during its  
95 implementation. All those of problems is divided in two main groups. The first group of problems is connected with  
96 creation of small businesses the equity capital of which contains results of intellectual activity. The second group of  
97 problems is connected with entities which equity capitals contain rights to use tangible assets.

98 The first and the main problem is to show what privatization of scientific assets gives to various groups of  
99 participants and above all to managers of higher institutes and other state funded organizations. It is quite difficult to  
100 apply the Law and it requires certain expenses even before investor is found. Currently state funded organization is more  
101 attracted to signing an economic contract as a part of funding source other than the public purse than to bear additional  
102 expenses for organizing and managing independent entity further on. This happens due to specificity of budget  
103 regulations of Russia according to which state funded organizations do not have free money and can spend financial  
104 resources only on purposes defined by budget financing targets.[17]

105 The second problem occurs when trying to bring existing developments to shape applicable to including it into  
106 created small businesses. The main point is to enter results of intellectual activity in the company's book minimizing  
107 emerging income tax. Expenses of creation are already written off and the appeared asset falls under taxation. [18]

108 The third problem is to find an investor. In order to find an investor, it is necessary to improve results of intellectual  
109 activity so that they reach the condition of innovative project, make calculation and define what share state funded  
110 organization wants to receive in a created small business. Apart from that this information has to be given to investor.  
111 This work requires certain expenses which state funded organizations will bear. [19]

112 The forth problem is transfer of non-exclusive rights to exclusive rights. Investor is very careful with non-exclusive  
113 rights. At the same time legislator gave an opportunity for state funded organizations to bring only non-exclusive rights  
114 into small business. Thus one of the targets of small business which will be created is to transfer non-exclusive rights into  
115 exclusive. [20]

116 Among ways of solving these problems presence of special department can be recommended, but it is better to  
117 have individual legal entity which organizes work starting from commercially perspective results of intellectual activity and  
118 ending with certain control of work of already created small businesses.[21]

119 The presence of investor depends on the target of creating small businesses and what assets are put into them.  
120 There are five main targets. The first target is to legalize current business. There are enterprises which produce products  
121 basing on technologies developed in state funded organizations. Before the law 217-Φ3 was adapted it had been illegal.  
122 Now there is a possibility to legalize this situation. Here the state funded organization and investor already exist in  
123 principle.[22]

124 The second target is privatization of tangible assets which are already being used to manage business and bring  
125 profit due to incomes from budgetary sources. For instance, production of state funded organization which has  
126 experience and which is in demand. Transfer of corresponding assets into small business makes it investment-attractive  
127 which is beneficial both for organizers of this business and for state fund organizations.

128 The third target is to privatize assets with the help of which it is possible to create small business within a short  
129 time. Most likely this is various repair shops, information database maintenance etc.

130 The forth target is to redistribute financial flows of state funded organizations, receive additional grants etc. Small  
131 businesses are created by state funded organization and investor; however, they will have state money as main financial  
132 source. Most likely maximum in one year initial investor will siphon off funds invested firstly and small business will carry  
133 on working. This is exactly the way to encourage most valuable employees, perform small applied research etc., which is  
134 now difficult to do because of existing budget financing targets.

#### 135 136 **5. Conclusions**

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138 The analysis of small innovative enterprises universities led to the following conclusions and recommendations to  
139 improve the functioning.

140 Small businesses are the budgetary institutions and investors, however, as the main source of finance are public  
141 funds. Most likely, a maximum of one year initial investor will lead initially invested funds, and small business will continue  
142 to operate. It is thus possible to encourage the most valuable employees, perform small applied research that is now

143 quite difficult to make due to the existing budget revenue and expenditure.

144 Outlined options will allow expanding application of mechanism of innovative entrepreneurship in the sphere of  
145 higher school, to create additional working places, to improve investment climate in Russian Federation.

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148

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# Revisiting the Application of the Abc System in the Packaging Industry Companies

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## Abstract

*This article discusses issues related to the characteristics of the application of cost systems by activities at the packaging industry companies. Special attention is paid to the ability of ABC accounting system usage and its practical adaptation at the one of the fastest growing packaging market sectors – the flexible packaging production. The paper presents a method of presentation of information for the purposes of managerial decision making in terms of activity-based accounting method.*

**Keywords:** cost system by the type of activity, cost driver, type of activity, costs.

## 1. Introduction

The packaging market is one of the fastest growing industries in the Russian Federation. This situation is directly related to the situation on the markets with adjacent consuming industries, primarily in the food industry, which accounts for about 50% of the packaging market in general, and about 70% of consumer packaging market [1].

We would like to highlight the flexible packaging among all kinds of packaging, as it is the most common packaging material, and most widely used type of packaging.

Flexible packaging production is one of the fastest growing sectors in the packaging market and is quite different from a number of other sectors. Together with the large number of features in common, flexible packaging sector differs from other sectors of the packaging industry by the fact that the creation of the finished products involves a large amount of raw materials. Also the production of modern flexible packaging requires the use of equipment, which is the state-of-the-art technology. Therefore, the flexible packaging production is a complex process involving a variety of information and material flows, providing the process [2, 3, 4].

To succeed in the competitive global environment a careful analysis of the company in order to reduce unnecessary or duplicate functions is required. Companies are pursuing the goal of reducing costs; accept the total cost cutting policy. This type of policy reduces the performance of the main work, which leads to a deterioration of the overall quality of the company. Of special importance is the use of advanced forms and methods of work organization and production management, applied in different countries [5, 21, 22].

The methodology of cost systems by the type of activity (Activity-Based Costing, ABC), combined with an analysis of the value delivery chain, allows the company to not only cut costs, item by item, but also to identify and reallocate potential reserves and excess resource consumption [6].

Currently ABC system is increasingly being used in management accounting and in the domestic market production analysis at Russian companies [7].

## 2. Methods

Implementing the concept of cost systems by activities at the flexible packaging producing enterprises overhead costs should be allocated to homogeneous groups. Each group gets a cost driver (cost driver - an indicator of a causal relationship between the cost and the object of calculation), the most correlates with the cost of the group. For example, the equipment repair expenses are distributed to the number of repairs base. Supply department expenses are recommended to distribute proportionally to the number of orders placed for the purchase of raw materials, sales department expenses are distributed to the number of purchase orders. Costs of production operations monitoring are



56 allocated according to the number of control checks, etc. [8].

57 Before selecting the individual operations, as well as classification the overhead activities, we consider the process  
58 of flexible packaging materials production and highlight the main steps to be carried out. All operations (activities) can be  
59 divided into direct production, indirect production and non-production [9, 10].

60 The structure of the production process of flexible packaging materials production, depending on the method most  
61 widely used for printing on packaging material - flexographic or rotogravure printing - requires a certain sequence of  
62 actions and equipment to ensure the implementation of these actions [11]. Thus, the process of flexible packaging  
63 materials production is subdivided, typically by several stages:

- 64 - Packaging design development and the layout file prepress;
- 65 - Production, assembly and disassembly of printing forms;
- 66 - Overprinting;
- 67 - Lamination;
- 68 - Cutting, marking-out and packaging.

69 Thus, depending on the purpose and the composition of the finished product, the production process may include  
70 some or all of the above steps [12, 13]. For example, in the certain products manufacture, one or another laminating  
71 method may be applied, or this stage may be completely omitted [14, 15, 16].

72 Therefore, depending on the application and customer requirements manufactured products can be monolayer or  
73 multilayer film material (consisting of several polymer layers and manufactured by the coextrusion method), or a  
74 multilayer composite material (consisting of layers of different origin and manufactured by the lamination). In connection  
75 with this, the structure of the cost of packaging materials and the cost level is strongly influenced by characteristics of the  
76 products.

### 77 3. Results

80 In and of itself, all of these stages of flexible packaging materials production are separate activities and can be, without  
81 enlargement in homogeneous groups, used in the practice of ABC system.

82 On the author's opinion, the use of peer groups, combining the operation with the same cost drivers as the  
83 activities is more cost-effective and appropriate (see Table 1).

84 The selection of each cost driver is due to the presence of a causal relationship between the costs of the activity  
85 and the distribution base [17].

86 **Table 1.** Cost drivers to the production activity types

Types of activity	Cost driver
Packaging design development	Amount of man hours of prepress area employees
The layout file prepress	Amount of man hours of prepress area employees
Printing form production	Hours of the equipment operation
Ink dispensing	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Mixing of ink volatiles	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Preparations of the ink combination at the ink mixing station	Amount of man hours of the ink mixing station employees, hours of the equipment operation
Preparations roll raw material to the sealing	Amount of man hours of print area employees
Preparation of PCA to printing	Amount of man hours of print area employees
Preparation and approval of the first impression	Hours of the equipment operation
Print	Hours of the equipment operation
Image quality control through a system of surveillance	Amount of man hours of print area employees
Monitoring compliance with the technological parameters	Amount of man hours of print area employees
The lamination process (solventless, solvent, wax or waxing)	Hours of the equipment operation
Quality control of the finished product	Amount of man hours of employees
Cutting the packaging material webs ready	Amount of man hours of employees, hours of the equipment operation
Marking-out and packaging	Amount of man hours of employees



89 Production and organization management servicing expenses form a non-production and indirect production activities.  
90 For example, most of the administrative and management costs can be grouped into homogeneous non-production  
91 operations.

92 With the introduction of cost systems by the type of activity production overhead costs should be collected by type  
93 of activity but not by support unit or the main production departments (Table 2).  
94

95 **Table 2.** The use of ABC system for production overheads classification  
96

Types of activity	Overheads content by the type of activity	Cost driver
Equipment maintenance	Equipment depreciation Supporting materials expenses Salaries expenses Energy consumption expenses	Equipment operation hours
Equipment setting up	Supporting materials expenses Salaries expenses	Fettling hours
Current repair of equipment	Items expenses Salaries expenses	Repair hours
Transport service	Equipment depreciation Supporting materials expenses Salaries expenses Outsourced services	Orders for transportation according distance
Repair of vehicles	Replacement part expenses Salaries expenses Maintenance department service expenses	Orders for transportation according distance
Units management	Salaries expenses	Direct labour costs
Potential trouble measures	Salaries expenses Supply and coveralls expenses	Direct labour costs
Loss	Shortfall and material damage	Relate directly to the product
Units maintenance (mains, heating systems, water supply maintenance)	Salaries expenses Supply expenses Maintenance department service expenses Outsourced services	Proportional to the special coefficient by regard to the volume, complexity of the work, the power of the used equipment, type of equipment, and other factors

97  
98 As long as a consistent flow of products through the production areas and units is customary for the flexible packaging  
99 materials producing companies, the management units' expenses should be taken in account with the cross-sectional  
100 areas [18].

101 General business expenses as a part of ABC system are also considered by activity. For companies, producing  
102 flexible packaging materials, the following overheads group and cost drivers for them can be offered (Table 3).  
103

104 **Table 3.** Overheads cost drivers in the ABC system-wide usage.  
105

Overheads classified by the type of activities	Cost driver
Production and Technology department	Operational time
Department of Logistics	Direct hard cost
Quality control department	Checkout time
Personnel department	Direct labour costs
Labour and wages department	Direct labour costs
Accounting	Direct labour costs
Planning department	Direct labour costs
Maintenance department	Accrued fees
Marketing department	Sales
Pricing department	Sales
Engineering services	Accrued fees
Chief Technologist office	Equipment operation hours
Chief Power Engineer office	Equipment operation hours
Warehouse	Direct hard cost

Safety department	Direct labour costs
Legal department	Direct labour costs
The Security Service	Direct labour costs
Secretariat	Direct labour costs
The overhead	Relate directly to the product
Management staff expenses, non-functional units	Direct labour costs

The complexity of determining the cost drivers of the system is due to the fact that not all general expenses can be traced back to the product. Therefore, the distribution of most of them we propose to carry out with the help of cost drivers such as direct labour costs. And it should be noted that the costs of such cost drivers should be distributed immediately on shipment of goods, bypassing productive activities, since the distribution both through productive activities, as well as directly on the product gives the same results. In addition, the use of a large number of cost drivers increases the cost of implementing the ABC system [19].

Here is an example of calculation the cost of packaging for confectionery. Primary costs of production activities are labour costs and hard costs (Table 4).

**Table 4.** Overheads related to the cost of packaging for confectionery, ths. Rub.

Types of activity	Hard cost	Labour costs
1. Packaging design development	19,72	11,57
2. The layout file prepress	47,88	26,12
3. Printing form production	133,04	22,90
4. Preparations of the ink combination at the ink mixing station	453,70	94,50
5. Print on the flexible packing	1431,65	290,03
6. Cutting the packaging material web and receiving finished product reels	239,00	54,87
Total	2324,99	499,99

Overhead costs are classified by the type of activities and are distributed in a certain sequence. It is rather difficult to present cost-sharing arrangements productive activities graphically, as well as production and non-overhead costs separately, as they are very closely linked.

First of all, the cost of such activities as the content of electricity, heating and water supply network should be classified; then the transport service expenses are allocated to activities consumed transport services; further the administrative department services are distributed; then production overheads are allocated, and finally, the cost of production activities and non-production costs are grouped by operations.

The results of the last stage of the apportionment of the cost of packaging for confectionery products are shown in Table 5.

**Table 5.** The distribution of costs of confectionery packaging collected by activity.

Types of activity	Full costs, rub.	Distribution base size, rub.	The magnitude of the cost drivers for the production of packaging for confectionery products, rub.	The amount allocated to the cost of the package, rub.
Packaging design development	11220,21	97	1,18	136,49
The layout file prepress	34000,90	97	1,8	630,94
Printing form production	68760,43	140	2,3	1129,64
Preparations of the ink combination at the ink mixing station	261000,60	432	16,1	9727,11
Print on the flexible packing	440007,30	2996,02	21,03	3088,55
Cutting the packaging material web and receiving finished product reels	51745,36	424,10	1,40	170,82
Production and Technology Department	41990,33	23240,99	1980,00	3577,34
Personnel department	12640,43	3190000,73	499,99	1,98
Labour and wages department	26000,55	3190000,73	499,99	4,08
Accounting	90431,01	3190000,73	499,99	14,17
Planning department	41700,30	3190000,73	499,99	6,54

Marketing and pricing department,	32000,88	19000788,00	220000,00	370,52
Engineering services	40200,23	17760,00	0,00	0,00
Chief Technologist office	21450,66	4110,00	17,00	88,73
Chief Power Engineer office	24478,11	4110,00	17,00	101,25
Safety department	8090,00	3190000,73	499,99	1,27
Legal department	27150,00	3190000,73	499,99	4,26
The Security Service	9100,00	3190000,73	499,99	1,43
Secretariat	17790,00	3190000,73	499,99	2,79
Management staff expenses, non-functional units	112794,00	3190000,73	499,99	17,68
Total				4362,83

Thus, the cost of the confectionery products packaging instalment using the ABC-system is 4,362.83 rubles. Using the traditional system of calculation, the cost of the confectionery products packaging instalment is 4832.91 rubles. In our opinion, the effectiveness of the implementation of the ABC system is obvious [20, 21, 22].

It should be noted that the introduction the ABC system in this case does not imply a complete rejection of the accounting system for the structural subdivisions. Grouping overheads by the activities generally coincides with the group on structural divisions.

#### 4. Conclusion

The use of the ABC system allows determining ways to reduce overhead costs. Reduction of product tends to reduce the amount of cost drivers, which turns to reducing the overhead data expressed by drivers.

Each stage of the flexible packaging material manufacture has the proper cost structure, depending on the level of mechanization and automation of production processes, the used materials. Besides, the range of flexible packaging materials is constantly changing; the products differ in the complexity of manufacturing.

Of course, the process of separation a significant amount of peer groups from the set of overhead costs, selecting its driver costs and calculation of the corresponding rate allocation is very laborious. Even using only the basics of ABC systems requires a lot of calculations to determine the cost of products or services. However, the necessity of a reliable analysis of costs and profitability of individual products and making a management decisions based on the results of the analysis makes this approach economically feasible.

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## Fuzzy Forecasting of the Cash Flow Statement Based on Accounting Data

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### Abstract

This article is devoted to the practical aspects of the cash flow statement forecast. The proposed formation method is based on the fuzzy logics and the procedure of expert evaluations. As the result of premade theoretical analysis of the financial statements fuzzy forecast, a computer program has been developed to support the formation of the forecasted cash flow statement. The article describes the software's working algorithm and presents its main windows.

**Keywords:** Cash flow statement forecasting, fuzzy sets, expert evaluations, computer software.

### 1. Introduction

Universally, the term "cash flow management" refers to a guarantee of independence and a state of stability and efficiency within a company - the key to financial success. Therefore, accounting and cash flow analysis are some of the top priorities of the firm.

The forecasted cash flow statement is highly useful. Most notably, we can employ its use in the budgeting process. Budgeting, refers to the tactical (both short-term and medium-term) business actions planning [1, 2].

Secondly, another obvious utility of the forecast report may be clearly evident upon examination of investment designs. As a result, the prediction of cash flow from the implementation of a specific project can be deduced and a calculation of its efficiency can be thus acquired [4].

Additionally, another useful aspect that the cash flow statement may provide for interested users would lie in the prospect of financial structure evaluation (including stability, liquidity and solvency) of the enterprise, providing feedback about the rhythm of the operating process, the rate of funds turnover, etc. [4].

As a result, the upper management of the company will always be able to dictate the volume and the timing of the cash flows in order to adapt to the constantly changing circumstances and conditions of the financial world. Use of the cash flow statement also provides companies with an upper hand in capitalizing on future prospects and possibilities as they arise.

It should be also noted, that there is an increasing tendency to include superfluous amounts of forecasted information into formal financial statements [5]. Pure financial indicators related to profit generation alone, cannot always provide the investors and financial analysts with a truly reliable information base for predicting the long term value of an organization into posterity. Therefore, the value and credibility of financial statements is now determined more by its predictive components and not as much by the previously achieved results during past periods [6].

### 2. Method

The accounting information is the basis for the formation of a forecasted report, which determines the management decisions (Table 1).

56 **Table 1.** Transformation of accounting information into a forecast  
 57

Level	Stage	Description
Operational	Business event	Gathering and simple summation business events data
	Data	
Operational → Strategic	Information	The transformation of this data into accounting and analytical information which then goes into the hands of trained professional for expert evaluation
Strategic	Forecast	The received information is combined with previously accumulated statistics and past statements which are thus evaluated and followed to transform this accumulation of data into a form of forecast report
	Decision	At the final stage, this form is then used for management tasks

58  
 59 Now let us consider the existing methods (approaches) of financial and economic forecasting. Conventionally, they can  
 60 be divided into two major groups: factual (formal) and expert (intuitive). Factual (formal) methods are based on actual  
 61 available information with regard to a prediction. The expert (intuitive) methods employ the opinions of specialists and  
 62 experts and are used when it is impossible to formalize the studied processes, or in case of varying degrees of  
 63 uncertainty within the data. However, as a rule, different experts have different opinions about evaluating an index and  
 64 often find it difficult to give exact estimates. The nature of estimation is one that relies on subjective perception and thus  
 65 is difficult to be defined in terms of absolutes. For situations such as these we suggest using the method of fuzzy-sets,  
 66 which works with the indicators in the form of fuzzy numbers.

67 Let us give the theoretical description of the algorithm for constructing the membership function (MF) of fuzzy  
 68 numbers represented in Formula 1 [7]. Using the function of the form

$$69 \mu_K(u) = e^{-\alpha(K-u)^2}, u \in U, \tag{1}$$

70 where: U - universal set (in the general case, the set of real numbers), then we build numbers' MF approximately  
 71 equal to some number K, where the parameter (Formula 2) depends on the fuzzy degree . Value is determined from the  
 72 expression

$$73 \alpha = \frac{-4 \ln 0.5}{(\beta(K))^2} \tag{2}$$

74 where: - the distance between the transition points where the MF is set to 0.5 (we denote these points by a and b,  
 75 assuming that ).

76 In order to ensure full and well-timed forecasting of financial indicators we suggest using computer programs to  
 77 automate this process [8, 9, 10, 11].

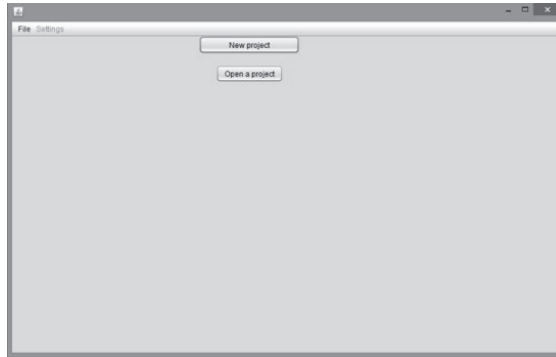
78 Therefore, after the analysis of the theoretical model of decision-making based on fuzzy initial information, we have  
 79 implemented it in the form of a computer program [12, 13, 14, 15].

81 **3. Result**

82  
 83 We developed an algorithm for a special computer program to support the process of fuzzy forecasting of financial and  
 84 economic indicators based on expert evaluations method. The software has been written in Java language in NetBeans  
 85 7.3 environment.

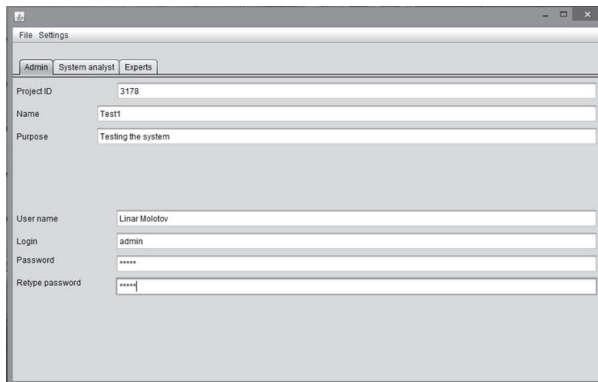
86 The program works in three modes: administrator, system analyst and expert [16]. The administrator is responsible  
 87 for the initial operations of the program, such as making up usernames / passwords for the rest of the project's members.  
 88 System Analyst regulates the work of experts, checking the iteration process, but does not have access to the passwords  
 89 of experts and therefore cannot arbitrarily change their decision [17]. Experts work independently from each other and  
 90 cannot see the projections of other experts [18].

91 Now let us describe the steps of working with the program. In the start window the user is prompted to create a  
 92 new project or to select a project from the saved ones (Figure 2).  
 93



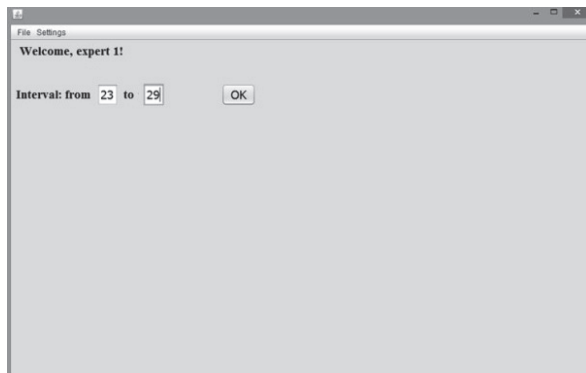
94  
95  
96 **Fig. 2** Start window  
97

98 New projects are started by the administrator who assigns the project ID, name / login / password for system analysts  
99 and experts and sets the name and purpose of the project (Figure 3) [19].  
100



101  
102  
103 **Fig. 3** Editing a new project  
104

105 Then each expert writes their initial intervals (Figure 4); systems analyst checks and analyzes them; decides whom to  
106 include in the main experts group and whom to ask to change the interval values, or even exclude [20, 21].  
107

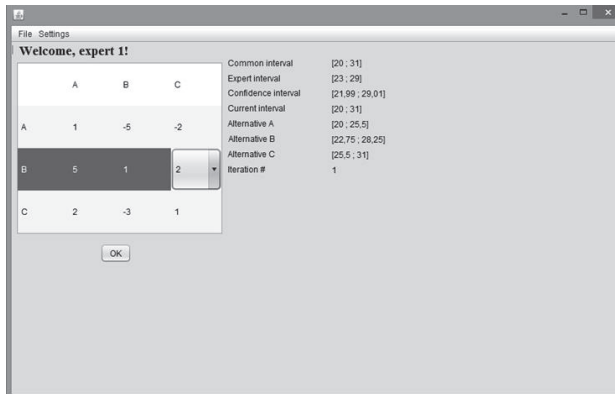


108  
109  
110 **Fig. 4** Filling the interval values by an expert



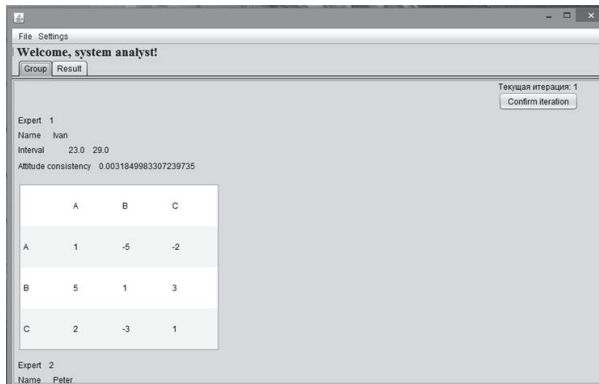
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113

In the next step, each expert independently fills a matrix of priorities (Figure 5), after which the system analyst upon reexamining the data, combines matrices and carries out the first iteration (Figure 6).



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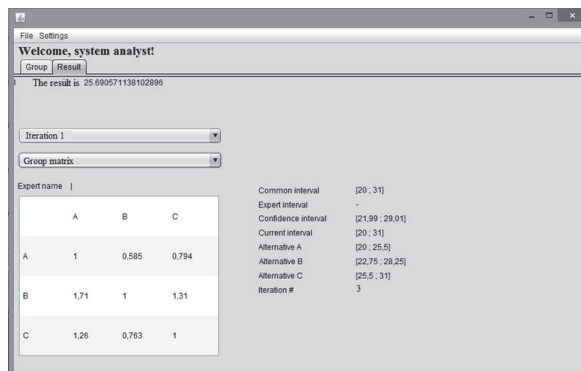
Fig. 5 Filling matrix of priorities by an expert



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119  
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121  
122  
123

Fig. 6 Checking data by systems analyst. Conducting iteration

Then, following the fuzzy forecasting algorithm, the program checks whether or not the predicted interval fits in the confidence interval. If the condition is satisfied, then we can define the fuzzy forecast (Figure 7), otherwise, experts and systems analysts continue the iteration process.



124  
125

Fig. 7 Result window

126 The program is built according to the MVC pattern – the object-oriented method for the separation of presentation logic,  
127 business logic and data model.

128 The main components are the Model, View and Controller. The Model is the aggregate data model domain,  
129 implemented in the application, in this case, for example, the model of the interval (Interval) or users model (Person). A  
130 major role is played by the model matrix (Matrix), which holds all the basic computation.

131 View - is the component responsible for displaying models and realizations of the user interface (Graphics User  
132 Interface). The project uses a standard package of Swing, as this library provides more flexible interface components  
133 than its predecessor, AWT.

134 The third component is the Controller. It focuses all the working logic of the application, binding Model and View  
135 together. The application includes many controllers. The most significant of which are XMLCreator, XMLParser,  
136 MatrixUnifier, IntervalUnifier. The first two process data stored in xml while the others deal with the main calculations.

137 The program uses both standard library of JDK and complement-enforcement, particularly the XOM library, which  
138 works and saves projects in the files of type «.xml» and Commons-Math for formatting matrixes.

#### 140 4. Conclusion

142 Building an effective business system is impossible without proper and timely formatted forecast statements. The  
143 proposed tool (the computer software) provides the necessary mechanism for this process.

144 It should also be noted that the described method of fuzzy forecasting and the associated computer program  
145 presented in this article are sufficiently universal and will increase the reliability of the decision making process in a wide  
146 range of financial and economic systems.

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# Features of Russian Companies Real Estate Appraisal in the Accounting System

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## Abstract

The article is concerned with current requirements to determining the value of accounting items and the order of cadastral value formation. The authors found out differences in fair value definitions; researches its distinction from cadastral and market value; justified an interest in a specific variant of the object appraisal of different groups of internal and external users of financial information by the example of land valuation. Accession of Russia to the WTO dictates new requirements for determining the value of accounting items[1], and, thus, the choice of optimal valuation approach to reflect the actual value of the accounting items through methods understandable to internal and external users. Attraction of investors to the production branches is possible only when business entities provide adequate reflection of financial performance and property status.

**Keywords:** Cadastral value, fair value, market value, accounting and tax accounting.

## 1. Introduction

Under current economic conditions a great emphasis is placed on problems of rational use of material resources. Among most important resources of business entities there are land and capital facilities.

What type of value should be applied for the purposes of accounting or financial accounting and taxation? Should it be cadastral, market, or probably fair value? Let's try to gain insight into possible positive aspects of each particular value.

This article is referred to land or, rather, its appraisal approaches.

## 2. Literature Review

Currently, there are several approaches to land value appraisal:

- Book value was used for taxation purposes. It is subject to Russian Accounting Standards.
- Market value is used in some cases, for example, when determining the size of participants' contribution. It is subject to the Federal Valuation Standards.
- Cadastral value is currently used for taxation purposes. It is subject to the RF Government Decree, the Land Code of the Russian Federation, Federal Valuation Standards and a number of other regulatory documents.
- It is typical that recently - a fair value has been associated with the implementation of IFRS in national accounting practices. It is subject to the International Financial Reporting Standards[2].

The book value approach is more or less clear: it is formed as a result of acquisition. But other approaches should be considered more closely.

Real estate appraisal is a process of determining market value of property or certain rights therein. The real estate appraisal includes: valuation of property rights or other rights, such as a right to lease, a right to use, etc. for various real property items. [3]

Determination of market value of the subject property presumes determination of the most probable price at which the property may be alienated on an open and competitive market as of the valuation date, provided that parties to the transaction act reasonably and possess all the necessary information, and assuming the transaction price does not depend on any extraordinary circumstances. That is when:

- one of the parties is not obliged to dispose of property being valued, and the other is not obliged to accept

- 56 performance;
- 57 • parties to the transaction are aware of the subject of the transaction and act in their own interests;
- 58 • subject property is brought to the open market through a public offer, typical of similar properties being
- 59 appraised;
- 60 • transaction price is a reasonable consideration for the property being appraised with no compulsion of the
- 61 parties to transaction settlement from third parties;
- 62 • payment for the subject property is expressed in monetary terms.

63 Determination of cadastral value of the subject property presumes determination by methods of mass appraisal of  
64 market value established and approved in accordance with laws governing the cadastral valuation conduction. Cadastral  
65 value is determined by an appraiser[4], in particular, for tax purposes. [5] The essence of cadastral value of property its  
66 determination on the basis of average value of objects in each cadastral unit. With no consideration for specific individual  
67 features of land plots, such as: legal history of the plot; access features; encumbrances and restrictions on economic  
68 activity of the plot, special importance of real estate located on the plot. As a result, practically, the difference between  
69 actual market value of a particular object and its cadastral value can be very significant. [6]

70 There is another definition of cadastral value supplementing the first one. Cadastral value is a fixed market value of  
71 property determined in the process of state cadastral valuation by the mass appraisal method, or market value  
72 determined individually for a specific property in accordance with the legislation on appraisal activity in cases, where the  
73 appliance of mass appraisal method is impossible. [7]

74 Meanwhile, in case of determining market value of the land plot, its cadastral value is set as equal to its market  
75 value. [8]

76 In recent times a revaluation in the process of arguing cadastral value of the land plot has become frequent. This  
77 revaluation takes into account individual characteristics of the subject property. This results in a reduction in the value of  
78 the subject property, and, hence, in the size of tax payments. But this procedure is costly (evaluation, appraisal expertise  
79 [9], court costs and etc.) and time consuming.

80 In current accounting practice cadastral value has no effect on the data recognized in the financial statements. And  
81 market value is used:

- 82 • in determining the value of allotted shares of the Company purchased by the Company[10] by the decision of  
83 the General Meeting of Shareholders or of the Board of Directors (Supervisory Board) of the Company;
- 84 • in determining the value of non-cash contributions to the authorized (share) capital;
- 85 • in determining the value of donated property;
- 86 • and in other cases not affecting directly the financial statements.

87 On the grounds of concepts of cadastral and market value it is obvious that market value has wider application.

88 According to IFRS 40 *Investment Property*[11], a fair value is the price that would be received to sell an asset or  
89 paid to settle a liability in an orderly business transaction between market participants at the measurement date. That is  
90 the price at which a company would sell an asset or debt of a third party. [12]

91 This formulation is close to the definition of the market price given in the Russian valuation standards mandatory  
92 for practitioners of valuation activities and, therefore, for all market participants. Thus, according to the said standards,  
93 market value of the subject property is the most probable price at which it can be sold on the open market in a  
94 competitive environment [13].

95 According to IFRS 13 *Fair Value Measurement*[14], there are three approaches to fair value measurement (market  
96 approach, income approach, and cost approach) and three levels of hierarchy of the inputs used to measure the fair  
97 value of assets and liabilities based on the application of judgement. [12] All of the foregoing complies with requirement of  
98 the clause 20 of the Federal Valuation Standard No. 1 "General Valuation Concepts; Approaches and Requirements to  
99 Valuation (FVS No. 1)", according to which the appraiser must apply market, income and cost approaches in the process  
100 of value measurement [15].

101 As can be seen from the definitions, the market and fair values are similar enough and essentially duplicate each  
102 other.

103 The similarity of market value and fair value concepts are typical for the world practice of accounting. IFRS 16  
104 *Property, Plant and Equipment* states [16] fair value is the price that would be received to sell an asset or paid to transfer  
105 a liability in conducting operations on a voluntary basis between market participants at the measurement date.

106 Thus, a similar concept of market value (which is used in the cases mentioned above) appeared in domestic  
107 practice.

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### 3. Unresolved Issues

In general, considering the above mentioned types of value it is possible to build the following sequence of values (in descending order): cadastral value → market (fair) value → balance-sheet value (this hierarchy is typical of market functioning conditions in the case of property overcosting as it currently happens to be).

This provision also will be typical in the near future for measurement of cadastral value of capital facilities.

Let us create a table 1 "Identification of the value types in relation to the intended use" for illustration of defined value types and preferences of its users:

**Table 1.** Identification of the object value type in relation to the intended use

User	Value for accounting purposes	Value for tax purposes
Owners	Market (fair) value - reflects the real value of financial assets	Balance-sheet value - reduces the burden in the form of tax payments
Tax authorities	Balance-sheet value - is supported by primary accounting documentation	Cadastral value - increases the amount of budget revenues
Investors	Market (fair) value - reflects the real value of financial assets	Market (fair) value - reflects the real value of financial assets
Banking structures	Market (fair) value - reflects the real value of financial assets	Market (fair) value - reflects the real value of financial assets
Creditors	Market (fair) value - reflects the real value of financial assets	Have no preferences

As the table shows, the greatest preference should be given to market (fair) value which satisfies the maximum interests of the most of users.

But for budgetary policy cadastral value would be preferable despite the increase in the tax burden on a market participant even under the stipulation that it does not reflect the real value of the property being appraised.

Thus, to increase tax revenues we need to use cadastral value.

What are the solutions?

### 4. Conclusion

More effective, in our opinion, will be determination of market value within statutory prescribed intervals by a business entity itself [17]. Firstly, the material cost will be significantly lower (appraisal price for Kazan is about RUR6,000-15,000 without a mandatory requirement for expert examination of the appraisal report, the cost of which in a number of Russian self-regulatory organizations of appraisers amounts to RUR80,000 - 100,000). Secondly, each business entity will be personally interested to meet the deadlines of market value determination; otherwise the value will be determined by the state without the right of appeal up to the next period which, according to current legislation, is 5 years [13].

No less effective method is to determine cadastral value using a method lying in its definition, namely, through interaction with the Federal Service for State Registration, Cadastre and Cartography as related to a regular exchange of information contained in the Uniform State Register of Real Property Rights and Transactions Therewith. Statistical data can be obtained on the basis of the results of specific real estate transactions which are recorded by the Registration Chamber on a daily basis. [18]

An average price within a specific cadastral unit will be the most reliable one as it is a result of the needs of the buyer and seller. Also, the price of the transaction will correspond to the definition of fair value, which, within the accounting reform, contributes to easy transition to IFRS, and the property status of business entities will increase their attractiveness to investors.

And the objects' value determined by state bodies will cease to be considered as extremely overpriced, i.e. a kind of quit rent.

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## Analysis of Using Capital Asset Pricing Model for Assessing Companies Return

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### Abstract

The article reveals the possibilities of using the bottom-up beta method in the Capital Asset Pricing Model (CAPM) as an alternative to regression analysis because of its limited using in the Russian realities. For this reason, the article presents the comparative analysis of methods for estimating the beta parameter. Having analysed the benefits and shortages of the approaches, in further calculations the authors focused on bottom-up beta approach for analogue companies, which takes into consideration fundamental parameters of company. To prove consistency of estimation of return of equity using the bottom-up beta method in the Capital Asset Pricing Model instead of "raw" beta, analysis of return of equity has been carried out in two ways. In confirmation of the advanced assumption, return of equity estimated by bottom-up beta method was more precise than using regression analysis in comparison with the real return of company's equity. Despite consistency of obtained estimation, it should be noted that this method requires further and deeper research and corrections due to a number of critical remarks made in the course of comparative analysis. In conclusion the authors propose recommendations for solving contradictory points identified during the analysis.

**Keywords:** Capital Asset Pricing Model, Bottom-up Beta Method, Risk and Uncertainty, Forecasting Stock Returns.

### 1. Introduction

It is well known that growth of investments in different sectors of national economy is of the essence for high rates of economic growth. Investments most actively provide for primary goal of financial management that is maximization of welfare of business owners by forming effective opportunities for its market value growth (Sharpe et al., 2007). Stable growth of capitalization of the company is one of the main indicators of its investment attractiveness. In this connection in the course of business it is important to monitor value fluctuations, which may be done with assessment of return of equity.

Requirement for definition of correct methods for assessment in Russian market is determined by low activity of foreign and domestic investors in terms of high risk and uncertainty. Such circumstances stipulate timeliness of the chosen subject.

In the wide sense, uncertainty implies the impossibility of event probability's calculation based on scientific background. Risk is a situation when an investor can evaluate the spread of possible returns of the investments and the certain event probability based on historical data or experts' opinion (Brealey et al, 2013).

Undoubtedly, the experience of the largest foreign investment companies and information agencies in the assessment of the equity's return must be carefully studied, analyzed and adapted to Russian condition (Damodaran, 2010).

### 2. Methods

In academic circles and in corporate financial management practice the most common method of ROE calculation is Capital Asset Pricing Model (CAPM), developed by W. Sharpe and J. Lintner (Sharpe, 1964; Lintner, 1965).

Expected return of equity capital (R) we may express in terms of the following formula:

$$R = R_f + \beta * (R_m - R_f) \quad (1),$$

where:  $R_f$  – risk-free rate of return;

$\beta$  – coefficient characterizing systematic risk measure

$R_m$  – market rate of return;

$(R_m - R_f)$  – mean market risk premium.



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Beta coefficient expresses sensitivity of financial assets return to market risks and is calculated by the formula:

$$\beta = \frac{\text{Cov}(K_s, K_p)}{\sigma_p^2} \quad (2),$$

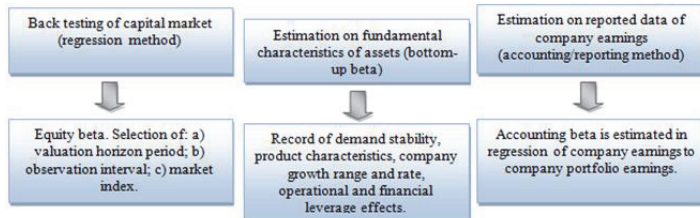
where:  $\text{Cov}(K_s, K_p)$  – covariation between return on equity of a company and market return;

$\sigma_p^2$  – variance of market rate of return.

Impropriety of using the model is seen mostly in developing markets because of the lack of informational effectiveness and low liquidity of assets. The distinctive feature of the developing markets is confined in the significance of the specific risks, related to government policy in regulation of the economy, institutional protection of investors and corporate management (Estrada, 2002).

Criticism towards CAPM model on the part of academic circles is focused mainly on inconsistency of its assumptions and practical application of regression analysis, which results in a so called "raw" beta (Blume, 1975; Levy, 1971). Taking into consideration specific nature of Russian capital market, which is characterized with low liquidity of small-cap stocks and dominance of some major companies, in many cases beta coefficients obtained by means of regression analysis are non applicable or require significant adjustments (Hwang and Pedersen, 2002; Barry et al., 2002). Therefore, the need arises to detect another method of beta coefficient assessment, that would allow to mitigate disadvantages of a traditionally used one.

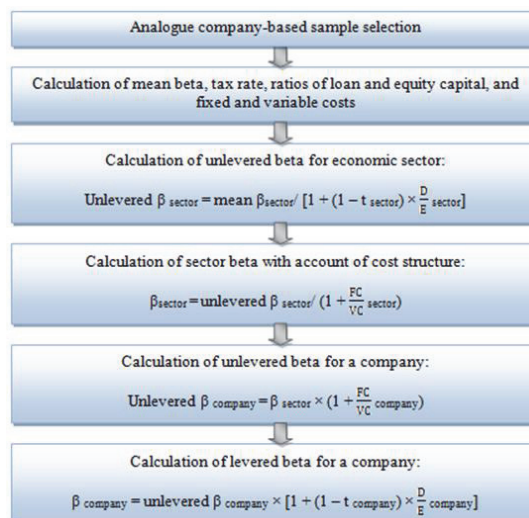
Alternative approaches in estimation of beta parameters spread in emerging markets (including Russian market): Bottom-up beta method for analogue companies by R. Fuller and G. Kerr (Fuller and Kerr, 1981) and Accounting beta approach by N. Hill and B. Stone (Hill and Stone, 1980). Major differences are presented in Figure 1.



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Figure 1. Beta coefficient structuring in fundamental effect characteristics (Teplova, 2013)

Having analysed the benefits and shortages of the said approaches, in further calculations we focused on bottom-up beta approach for analogue companies, which takes into consideration fundamental parameters of company, such as: specific nature of activity (range of activity, market value, life-cycle stage etc.); financial and operational leverage.



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Figure 2. Bottom-up method computation algorithm (Guseinov, 2009)

Such approach enables to take into account the tendencies of sector and specific nature of analysed company.

To prove consistency of estimation of return of equity using the bottom-up beta method in the CAPM instead of "raw" beta, analysis of return of equity of Russian telecommunication company MTS has been carried out in two ways.

Mobile TeleSystems Company OJSC (MTS) is a leading telecommunication operator in the Russian and CIS markets. It provides services to more than 102 million subscribers. From 2000, MTS securities are publicly traded on the NYSE. In 2013, MTS brand was in Top 100 Most Valuable Global Brands according to BRANDZ™ rating and was recognized the most expensive telecommunication Russian brand (MTS, 2014).

Bloomberg data selection method has been used in the analysis: period: 2 years, stock price fixation frequency: weekly, observations quantity: 104 (Bloomberg, 2013).

Estimation by bottom-up beta approach for analogue companies may be presented as step-by-step algorithm shown in Figure 2. D should be understood as loan capital, E - equity capital, t - effective tax rate, FC – fixed costs, VC - variable costs of company.

### 3. Results

Required data on stock quotes is on the open access in many Internet resources (Finam, 2013; Nasdaq, 2013). Regression method was used for "raw" beta calculation (0,67). On the basis of statistical data calculation of average annual market return was carried out for the similar period (68,12%) and risk-free rate (average annual government bond return) - 1,14%.

Then expected return of MTS equity is:

$$R = 1,1403 + 0,6714 * (68,1227 - 1,1403) = 46,11 \%$$

By algorithm shown in Figure 2, an analysis of telecommunication sector has been made and most successful public companies, as analogues of MTS, have been revealed. The list of indices required for further calculation is represented in Table 1.

**Table 1.** Data of analogue companies for bottom-up beta calculation

Company	Country	Market capitalization, USD million	Raw betas	Effective tax rate, %	FC/ VC	D/E
MTS	Russia	17 228,00	x	29,35	0,69	1,21
China Mobile	Hong Kong	172 600,00	0,70	32,54	0,41	0,51
AT&T	USA	137 380,00	0,61	33,98	0,28	1,39
Vodafone Group	Great Britain	147 230,00	0,74	24,91	0,30	0,63
Verizon Communications	USA	108 720,00	0,64	27,39	0,23	2,70
Comcast Corporation	USA	88 030,00	1,05	41,39	0,32	1,74
France Telecom	France	72 200,00	0,75	16,32	0,23	2,39
America Movil	Mexico	71 125,00	1,26	27,66	0,22	1,77
Deutsche Telekom	Germany	69 906,00	0,70	26,88	0,64	1,56
Telecom Italia	Italy	40 320,00	1,02	41,02	0,28	2,37
BCE Inc.	Canada	27 272,00	0,84	14,58	0,29	1,19
Average mean	x	86 546,45	0,83	28,73	0,35	1,59

Data of market capitalization and beta coefficients were drawn from publicly open Internet sources (Bloomberg, 2013). Other calculations of the table are drawn on the basis of analogue companies' financial reporting (Ycharts, 2013). Effective tax rate for each company was determined by ratio of paid profit tax to profit before tax for the period.

As a result we have obtained the following industry-average indicators: "raw" beta (0,83), effective tax rate (28,73), fixed costs to variable costs ration (0,35) and debt to equity ratio (1,59).

Following the algorithm formulas, all sub-aggregates have been obtained: unlevered beta for sector (0,39); beta for sector (0,29); unlevered beta for MTS (0,49) and beta for company (0,90).

Basing on the data obtained, the results of expected return of MTS equity calculations are as follows:

$$R = 1,1403 + 0,9035 * (68,1227 - 1,1403) = 61,66 \%$$

To determine correctness of returns assessment, calculation of actual return of equity has been performed. Return of MTS equity for the period made 67,48 %.

Variance analysis shows that analyst who selected the use of "raw" beta would mistake in expected return appraisal (estimated value 46,11 %) to 21,37 points in absolute terms. Forecasting return is lower than an actual one to

128 31,67 %. In case, if analyst prefers bottom-up beta approach, forecasting return would be equal to 61,66 %, which is  
129 below the actual one just to 5,82 points in absolute terms. In this case return of MTS equity is underestimated only to 8,62  
130 %.

131 Computational data confirmed consistency of put forward assumption and rate of return, calculated by bottom-up  
132 beta method, is closer to actual returns than calculation by means of classical regression analysis. "Raw" beta matched  
133 confidential interval (0,67), but final returns estimation was much lower than the actual one.

134 According to bottom-up method, taking into consideration the trends in telecommunication and specific nature of  
135 company activity, the coefficient has been estimated at 0,9, which has corrected the predicted returns and maximally  
136 brought it towards its actual value.

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#### 138 4. Discussion

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140 Despite consistency of obtained estimation, it should be noted that this method requires further and deeper research and  
141 corrections due to a number of critical remarks made in the course of comparative analysis:

142 1. Betas of analogue companies are calculated traditionally and can not fairly present the real state of companies  
143 and the sector (Collins, 2006; De Swaan and Liubych, 1999).

144 This problem is less evident and critical due to error smoothing in beta estimation by specification of sector  
145 average beta. So, average error mean is lower than beta error for one company.

146 2. During correction of average sectoral beta with consideration of operational and financial leverage and  
147 calculation of beta for company, the recent reporting data were used, thus neglecting the possibility of  
148 significant changes in capital structure or company expenditure in the following period (Serra, 2003).

149 This disputable moment is characteristic for estimation of capital structure and costs of analogue companies, the  
150 values of which effect the average sector mean values and beta for analysed company, consequently. It is possible to  
151 resolve differences by calculation of mean value of such correlations for companies for several preceding periods, but  
152 such analysis would take long and unlikely correct the final beta for the company.

153 3. Many companies do not disclose the structure of expenditure in their reports, that is why it takes a deeper  
154 analysis of expenditure items to specify expenditure character (Feldman, 2005).

155 Usually, the company's profit and loss account is used for analysis, where amortization and managerial costs are  
156 treated as fixed costs, while operating and selling costs are treated as variable costs. Although managerial costs may  
157 also depend on production volume, then cost structure value will be different.

158 4. Annual mean market return and financial instruments return, which are considered risk-free, also effect the  
159 forecasting return estimation. Values of those parameters directly depend on the period selected for data  
160 analysis, the frequency of price fixation by relevant instruments indices, which is another contradictory  
161 moment in estimation (Fernandez, 2004; Roll, 1977).

162 According to crisis period analysis, after-crisis returns are always understated, since it is based on data dynamics  
163 for previous periods, which reflect generally recession in stock market. And degression of return on equity, which is not  
164 stipulated by the general recession in the market or in the sector, is faintly detected by bottom-up beta method of  
165 analogue companies.

166

#### 167 5. Conclusion

168

169 At present there is a need for adjustments to the methodology for assessing the return of equity of Russian companies in  
170 connection with the necessity of taking into account peculiarities of the Russian market as a whole.

171 It is known that there are a number of critical remarks concerning prerequisites of the Capital Asset Pricing Model  
172 and traditional algorithm for calculating the parameter beta. Therefore there is a need to use another method for  
173 calculating the beta that provides more correct results.

174 Analysis of alternative methods for the assessment of return of equity allows to select the bottom-up beta method  
175 for analogue companies, which takes into account specifics of the company and trends of the industry.

176 In confirmation of the advanced assumption, return of equity estimated by bottom-up beta method was more  
177 precise than using regression analysis in comparison with the real return of company's equity.

178 We have developed recommendations for leveling controversial issues detected in the process of the beta  
179 estimation. But it should be noted, that detailed analysis of all factors affecting the final index of forecasting return is  
180 required.

181

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## Methodological Approaches of Formation of Evaluative Indicators of Quality of Life

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### Abstract

The article deals with methodological approaches for the essence of quality of life. More precise definition of conceptual framework and definition of the notion of quality of life. The components of quality of life, such as, for example, the level of education, social integration and social consensus, health, life time, security assurance, etc., are described. It is shown that the paradigm of human life and activities which is understood as continuous interaction of individual with his inner and outer world in order to sustain his existence, to pursue abilities and opportunities of a person, is in the basis of the notion of quality of life. Evaluative indicators of quality of life are given. Economic development and quality of life mutually reinforce each other. Actually, they are the elements of one paradigm. Quality of life is the instrument of economic transformations and structural changes.

**Keywords.** Quality of life, economic growth, Human Development Index.

### 1. Introduction

Today the Russian economy has an urgent need for an immediate and deep profound social maneuver towards a particular person, change of conditions of his existence, guarantee of a decent standard of living and opportunities for social and professional development.

The paradigm of the quality of life comes from the fact that social groups with significant qualification and employment potential, high social activity and mobility, the ability to adapt legally to established conditions and to implement effective models of its activities, are the engine of economic dynamics. To create conditions to stimulate mobilization and the economic efficiency of these groups, should be the focus of reforms [1,2].

Economic development and quality of life mutually reinforce each other. In fact, they are members of the same paradigm. Quality of life is a tool of economic reforms and structural changes.

Quality of life is defined as a set of social values that characterize creative activities, satisfaction of needs and human development, people's satisfaction with life, social relations and the environment. Thus, the quality of life is a whole complex of characteristics of life of a person, or a group of people, or all population in general, that determine optimal course of life at a particular time and under certain conditions and that assure adequacy of its parameters to the main human activities and needs [3,4,5].

Quality of life as an integral characteristic of the climate of society and its individuals reflects the condition and trends of development of educational and health services, the pension and social security sphere, the contents of savings strategies of economic agents. The level of development of labor potential is one of the key factors determining the parameters of quality of life of population [6]. Development of market institutions, on the one hand, provided a variety of forms of employment, labor mobility and the effect of price signals in sphere of wages, on the other hand, the gap

57 between the quality of education and increasing requirements to the scope of knowledge and professional skills of  
58 graduates increased, the aging of the staff of enterprises of the real economy sector is continues, differentiation between  
59 regional segments of the national labor market is increasing [7,8].

60 Currently, there is certain fragmentation in the study of problems of quality of life. The changing socio-economic  
61 situation constantly enriches the subject of study and requires generalization of new economic phenomena and  
62 processes that affect the quality of life of population[9,10].  
63

## 64 2. Methodology

65  
66 Methodological approach to the process of monitoring of quality of life, that reflects the cumulative result of the economic  
67 system performance and its accumulated potential consists, firstly, in a sequential study of indicators of the quality of life  
68 of population in the statistical sense (the description of the level, structure, and ratio of elements), secondly, in the  
69 evolutionary movement (development and change in the interconnection, the form of evolutionary and cyclical motion, the  
70 determination of internal patterns and trends), and, finally, thirdly, in the forecast of the development (self-preservation  
71 and self-development) of life under different conditions of socio-economic environment [11].

72 The paradigm of human life, which is defined as the continuous interaction of individual with his internal and  
73 external world in order to maintain his existence, to implement human capacities and capabilities, is in the basis of the  
74 idea of the quality of life [12,13].

75 Internal components are determined by personal characteristics, psychological, spiritual, creative qualities of a  
76 person.

77 External components of quality of life are the complex of material, environmental, communication, infrastructural,  
78 social and safety conditions of the international, national and regional levels.

79 Thus, formally the quality of life is a set of characteristics that define the dynamics and stability of human  
80 development, the conservation of previously established elements of human potential and the formation of its adaptation  
81 elements to the environment.

82 At the macro level, the objective reality of market development, globalization and internationalization of world  
83 economic relations requires the scientific and methodological basis and justification of quantitative and qualitative  
84 determination of the human factor.

85 The peculiarity of approach to the selection and scope of the set of indicators of quality of life consists in the  
86 formation of a coherent hierarchical system as a unity of objective (measurable) and subjective (unmeasurable)  
87 parameters that characterize the quality of life of the population of the whole country, region, city, etc., as well as the  
88 quality of life of an individual member of society (family, group of people) [14].

89 The European Union countries have already accumulated the experience and theoretical developments in the  
90 following spheres:

- 91 - human development assessment problems (Human Development Index – HDI, by the program of United  
92 Nations development);
- 93 - Measurement and evaluation of population welfare (Quality of life satisfaction index — LCI, developed by the  
94 international and European organizations: World bank, European Foundation for Quality Management –  
95 EFQM, International Foundation for Customer Focus – IFCF);
- 96 - the development of quality standards of ISO 9000, SA 8000 social standard and other standards of the next  
97 generation, where there are norms of rational structure of industrial relations, the humanization of the  
98 production process and the influence on human factor;
- 99 - the main provisions of the modern conception of improvement of the quality of working life on the basis of  
100 democratization and humanization of the labor process and labor relations in the context of social partnership  
101 and satisfaction from the achievements of labor as a result of self-realization and self-expression of an  
102 employee.

103 HDI has four paradigms and is measured by three indicators. The most important paradigms of human  
104 development are the following: productivity as a result of effective activities aimed at increase of income and economic  
105 growth; equality which is understood as equality of opportunity in implementation of abilities and Fruition (the use of  
106 benefits); stability which allows to provide access to the achievements of civilization for current, as well as for future  
107 generations; empowerment, suggesting that the development is carried out not only in the interests of the people, but  
108 also thanks to their efforts;

109 Enhancement of abilities suggests that the development is carried out not only in the interests of people, but also  
110 thanks to their efforts.  
111



111 There are three main indicators among the leading indicators that determine the Human Development Index: life  
112 expectancy; level of education; real gross domestic product per capita. Taken together, they represent three main  
113 qualities: healthy lifestyle, the level of knowledge, decent social standard of living [15,16].

114 However, it was recognized that just one index is not able to reflect such a complex notion as human potential and  
115 therefore afterwards it was supplemented and improved, primarily due to the disaggregation of the whole population into  
116 social, regional or ethnic groups, into groups by gender (men and women), by income distribution level, etc. This  
117 smoothed national discrepancies when comparing HDI of different countries.

118 Components of the main index – especially the methodology of calculation of education and income level – were  
119 also modified. Thus, from 1994 the level of income - the average gross domestic product per capita – became to be  
120 adjusted for purchasing power parity of dollar (PPP).

121 A new way of combining HDI components is one of its innovations. Each indicator is described by separate items:  
122 life time – by years of life, education – by years of education, income – by purchasing power, the adult literacy – by  
123 percentage. In order to be able to use these indicators in the unified system, we use the 0-1 scale, where 0 is the  
124 minimum, and 1 is the maximum.

125 In this case, according to the new method the minimum values are formed historically, for about 30 years.  
126 Maximum values are calculated for 30 years ahead. Researches in the field of demography and medicine show that in  
127 the next 30 years life expectancy will be about 85 years.

128 In establishing the new minimum and maximum standards of HDI indicators there is a large discrepancy between  
129 the minimum values (25 years of life expectancy instead of 42 years, 0% of adult literacy instead of 12%) and maximum  
130 values (85 years of life expectancy instead of 78.6 years, 15 years of education instead of 12.3 years).

131 The established minimum and maximum values for HDI are the following: life expectancy (years); adult literacy rate  
132 (%); average number of years of education; income (real GDP per capita in the power of dollar).

133 When socio-economic conditions change worldwide, the boundaries and scope of the minimum and maximum  
134 values of the components of HDI, as well as the methodology of calculation can change as well.

### 135 3. Results

136  
137  
138 In order to determine the role of the state in the international community it is necessary to determine the social standard  
139 of living of people, or, in other words, their well-being. In order to measure the standard of living, it is necessary to  
140 determine the indicators it is defined by. Here are some of them: income, purchasing power, wealth or indicators that  
141 define the quality of life, such as level of education, social integration and social consensus, health, lifetime, security, etc.  
142 in reality, many welfare indicators can be used in as a scale for measuring the standard of life of individual.

143 Besides, the following indicators are also considered as indicators of welfare: average income, average costs, the  
144 average number of calories consumed, quality of food, dependency ratio on households, access to health care system  
145 services, location and quality of housing, the distance between medical aid centers, the number of years of school  
146 education, the distance between water and gasoline supply points, quality of water sources, human rights, the degree of  
147 equality of opportunity between men and women, social participation, social exclusion of individual from society and  
148 social dependence, heated housing, literacy, life expectancy.

149 The welfare indicators that are usually used in practice can be divided into four groups: indicators of income;  
150 combined indicators including indicators of income and non-income indicators; indicators of social participation; subjective  
151 indicators.

152 The most commonly used indicators to assess the standard of life are the indicators of income based on available  
153 data of revenues and expenditures of population. For example, the standard of living of the individual A is higher than the  
154 standard of living of the individual B, because his income and the amount of food consumed is higher than that of the  
155 individual B. Measurement of welfare by using the indicators of consumption expenditures can often be found in multi-  
156 purpose surveys on poverty conducted by the World Bank in a number of countries.

157 The statistical data on income, literacy, health, nutrition, state housing, water supply and sanitation is used to  
158 calculate the combined indicators. It is difficult to compare this data, so combined indexes are created, and this allows to  
159 present the standard of well-being in the form of a summary indicator. Such indicators are rarely used to measure poverty  
160 in a particular country, although such use is quite acceptable. Such indicators are mainly developed to compare the  
161 standard of living of population in different countries.

162 The third way of measuring the well-being, the indicator of social participation, received great popularity among  
163 sociologists, considers the well-being, at least, partly, as a function of social integration. In this case the ability of a certain  
164 family to follow the accepted in the society traditions, such as food patterns, giving and taking the gifts, participation in



165 national holidays, regular consumption of certain products, etc., is the indicator of the standard of its life. For the country it  
166 is difficult to calculate this indicator, as far as the whole complex of special surveys is necessary to determine the national  
167 welfare.

168 The method of subjective indicators is the following: individual identifies who is considered to be poor and what is  
169 the standard of living of the poor. Having made such conclusion, individual should describe his own standard of living and  
170 to compare it with the described level of poverty.

171

#### 172 4. Discussion

173

174 Indicators of living standards, as well as the category of living standards, reflect population welfare, consumption of goods  
175 and services, socio-demographic condition of the society. Quality of life is determined not only by consumption, but also  
176 by job satisfaction, living conditions, opportunities for human development, environment, etc.

177 One of the possible variants of the system of quality indicators was proposed by V.T. Smirnov who thinks that  
178 economic and political freedoms create conditions for the formation of various life orientation and assessments of quality  
179 of life; he presents the system of indicators in three spheres: spirituality, social status and material wealth. In each sphere  
180 there are several indicators that, in our opinion, do not always refer to the specified sphere. For example, a health  
181 indicator is related to the sphere of material prosperity and well-being. We believe that it is an independent sphere of  
182 social security (medical) services.

183 The following indicators can be health indicators: dynamics of the overall fertility and mortality, fertility and health of  
184 the newborn; infant mortality; number of newborn babies with birth congenital malformations; overall morbidity of  
185 population (respiratory diseases, cardiovascular diseases); life expectancy of present of future life, etc.

186 V.Bokov and P.Mstislavsky were the first who attempted to introduce a foreign method for determining the living  
187 standards of population into the Russian reality. They propose to use the following groups of indicators:

- 188 - health condition of people (life expectancy, mortality level (death rate), duration and severity of diseases,  
189 physical and mental abilities of people, their health, quality and regularity of nutrition);
- 190 - area and arrangement of habitation, i.e. furnishings, convenience of planning, etc.;
- 191 - condition of education (duration and level of education, level of mastery of scientific knowledge, moral content  
192 and artistic level of literature, availability of libraries, museums, etc.);
- 193 - conditions and nature of work (work intensity and performance, compliance of work to personal inclinations of  
194 individual abilities of people; freedom of choice of profession and specialty; duration of the working day; the  
195 proportion of manual and automated labor; frequency and nature of occupational traumatism; microclimate in  
196 the team; material and social evaluation of labor);
- 197 - conditions of rest (rest period, availability of vacation houses homes and health resorts, culture and sports  
198 institutions);
- 199 - employment and the guarantee against unemployment;
- 200 - well-being of family life (appropriate behavior, high morality, a sense of life satisfaction and happiness).

201 It should be noted that the proposed method of determining the standard of living is focused more on social  
202 indicators than on economic ones.

203 Economic roll is in the classification of indicators of standards of living proposed by I. Domnina. Five groups of  
204 indicators are in the basis of the proposed system: population; labor market; standard of living; social security and social  
205 services; environment and public safety.

206 Each of the proposed groups is further detailed on a more specific set of indicators that reflect the particular socio-  
207 economic problem.

208 The group of indicators that evaluate the demography of population is the most numerous one: the demographic  
209 situation in the region, health issues; education. The following indicators are used to estimate these parameters: life  
210 expectancy (years); mortality; infant mortality; the mortality from homicide and suicide; morbidity by sex, age; kinds of  
211 diseases, duration of diseases, the availability of hospital beds and the number of physicians; public expenditures of  
212 medical institutions; level of education of population; availability of pre-school institutions; expenditures on education,  
213 government payments to educational institutions.

214

#### 215 5. Conclusion

216

217 The system of indicators of standard of living should include basic indicators of general economic development of person  
218 that characterize the welfare, health, education, science and culture of the society, the development of social

219 infrastructure, demographic situation and social activity of population, the environmental component. Based on values of  
220 these parameters, it is possible to judge the levels of human potential development, the effectiveness and conditions of  
221 its reproduction.

222 Each indicator of standard of living consists of a group of indicators, including the integrating indicator; focusing on  
223 this indicator, it is possible to assess, control, even the levels of development and to improve the efficiency of definite  
224 territories and regions.

225

## 226 6. Statements

227

228 Considering the available methods of formation of the system of indicators of standard of living, we can conclude that all  
229 of them need to be clarified, updated, organized, as far as, on one hand, a lot of indicators are determined by the  
230 simplified scheme, for example, the integral HDI is estimated by only three factors (life expectancy, education and  
231 income per capita), on the other hand, they do not sufficiently take into account the specific character of the Russian  
232 economy with its diverse regional way of life, different levels of rating of territories concerning business and innovative  
233 climate, investment and financial attractiveness, information and institutional economic security, organizational diversity,  
234 technological, resource and environmental condition.

235 Therefore, we can come to conclusion that significant progress in the systematic methodology of construction of a  
236 model of quantitative and qualitative evaluation of standard of living will be needed.

237 Such models should include a unified nomenclature of indicators of standard of living that focuses on different  
238 levels of use – federal, regional and municipal.

239

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# The Role of Meteorological Factor in Long-Term Variability of the River Streamflow of the Territory of North of the Russian (East European) Plain

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## Abstract

As is well-known, the river stream-flow as the main source of water resources, is formed and changed under the influence of climate conditions and physiographic characteristics of watershed basins. Snow storage, liquid precipitation in the period of snow-melt flood, degree of moisture of the area, etc. are the main hydro-climatic factors determining the amount of the annual river flow. On the territory under consideration, in this case the region of the North of the Russian Plain is selected as which, flow fluctuations are well-defined as a result of changes in space and time of the main forming it factors and, mainly, the meteorological factor. In this regard, the main objective of the work is to find the connection between rainfall and river flow, as well as to identify patterns of spatial and temporal changes of river flow and precipitation. During the study, the authors identified the dependencies between precipitation and the layer of the run-off in hydrological seasons. In particular, the closest connection was established between precipitation and the flow of summer-autumn period, where the correlation coefficient ( $r$ ) for posts of Soyana - Soyana, Mudyug - Patrakeevskaya is  $r = 0,7 - 0,8$ , reaching  $r = 0,9$  (Codina - Codino). Comparison of precipitation of the winter-spring period and the spring run-off did not reveal very close connection, except the site location of Sysola - Pervomajskij (the basin of the Northern Dvina), where  $r = 0,86$ . It is determined that during a year there are two maxima and two minima in the distribution of precipitation, while in the overland runoff they do not fully coincide with precipitation in time. Synchronous increase of share of precipitation and runoff was observed from May to July and in October, except August (precipitation) and April (run-off), where these periods did not coincide.

**Keywords:** Precipitation, run-off, hydrological season, gauging station.

## 1. Introduction

As is well-known, the river run-off exposed to natural and anthropogenic space-time variability, is its most important characteristic (Berezovskay et al., 2004). As it has already been mentioned, fluctuation of the river run-off is a function of many factors, but meteorological conditions are of the greatest importance. Amount and nature of precipitation, the temperature and humidity deficit are the most important meteorological factors in terms of their influence on run-off, i.e., the river run-off is an indicator of climate, and rhythms revealed in its long-term fluctuations reflect variations of climatic characteristics (Musaelyan, 2002).

In the light of the subject of research, the authors show a special interest for the study of the flow of rivers of the Arctic basin. Specific character of the hydrological "structure" of the region under consideration – the northern part of the Russian Plain – is determined by the influence of meteorological predictors, as well as by conditions of formation of run-off flow within lowland areas. Hydrological potential of the region consists of 138000 rivers with a total length of 521200 kilometers; about  $\frac{3}{4}$  of the territory is covered by water areas of the following rivers: the Northern Dvina, Pechora, Onega, Mezen. Change of long-term average annual run-off flow complies to the zonal character, and this is clearly seen in the general pattern of change of the layer of surface runoff which decreases in the direction from north to south, and in the change of the regime of water stream-flows connected with latitudinal change of the "energetic" base of geographical processes (Filenko, 1974). Earlier studies showed that in the last 60 years the average annual run-off flow of rivers of the

57 Arctic basin has increased by 7%, there is also an increase of the winter component of these rivers (Shiklomanov et al .,  
58 2007). Other authors believe that annual fluctuations of the Arctic stream-flow are the stationary process, but they also  
59 say about change of amplitude of long-term stream-flow fluctuations (Smith et al ., 2007).

60 Within the region the annual precipitation as the stream-flow forming element varies from 550-600 mm (north-east)  
61 to 750-800 mm (south-west), and it is characterized by unevenness of precipitation in annual cycle. Maximum  
62 precipitation (65-70%) is during the warm season, which is predetermined by the cyclonic activity in this period, minimum  
63 precipitation – on the great part of the territory – is in the period from February to March. Here the average annual air  
64 temperature is low and it decreases from the south-west (+3°C) to the north-east (-8°C).

65  
66 **2. Methodology**  
67

68 Material of long-term observations of the Northern Territorial Administration of the Federal Service for Hydrometeorology  
69 and Environmental Monitoring (Sevgidromet) of 11 hydrological stations on the sub-basins with long-term series of  
70 observations are used in this study to establish the spatial-temporal patterns of river run-off flow. Basic data on  
71 precipitation of 6 meteorological stations in the region were obtained from the official website of the Russian Research  
72 Institute of Hydro-meteorological Information - World Data Center (Obninsk) for the study period from 1995 to 2007.

73 Water streamflows related to the basins of the rivers Onega, Mezen, Northern Dvina, were selected as subjects of  
74 research. Weather (meteorological observing) Stations where the amount of atmospheric precipitation and air  
75 temperature are monitored, were selected on the territory of the river basins or near them (table 1).

76  
77 **Table 1.** Watershed storage sub-basins of the rivers Onega, Mezen, Northern Dvina  
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#	River basin	Hydrological station	Watershed basin area, km <sup>2</sup>	Meteorological station
1	Kena	Korovy Dvor	5550	Onega
2	Bol. Loptuga	Butkan	2010	Sura
3		Vozhael	3940	Syktyvkar
4	Kodina	Kodino	1800	Onega
5	Mudyuga	Patrakeevskaya	305	Mudyug
6	Soyana	Soyana	5570	Mudyug
7	Syamzhena	Syamzha	1700	Vologda
8	Dvinitza	Kotlaksa	869	Vologda
9	Sysola	Pervomaysky	11700	Syktyvkar
10	Vym	Vesliana	19100	Ust-Vym
11	Yarenga	Tokhta	4970	Ust-Vym

79 Available long-term data of the flow of water of the rivers under study were differentiated into the so-called hydrological  
80 seasons: winter (December-March), spring (April-June), summer-autumn (July-November). For each item the dates of  
81 hydrological seasons were individually identified from 1995 to 2007. Then the volume values (km<sup>3</sup>) (1) and the layer of  
82 flow values (mm) (2) were calculated by the following formulas:

83  
84  $W=86400 \cdot 10^{-9} \cdot \sum_{i=1}^n Q_i$  (1),

85 where  $Q_i$  - average daily flow of water, m<sup>3</sup>/s, n- number of days in the season

86  $y= \frac{W}{F} \cdot 10^6$  (2), where F – area of river basin (km<sup>2</sup>)

87 F

88 For all meteorological stations the annual, annual average and monthly average amount of precipitation, seasonal  
89 maximums and minimums of precipitation were calculated, and for the calculation of their annual distribution the year is  
90 divided according to the identical in the case of water stream-flow principle, i.e. according to the hydrological seasons.  
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### 3. Results

**Table 2.** Amount and peculiarities of the seasonal distribution of atmospheric precipitation of the meteorological stations of the North of the Russian Plain for the period from 1995 to 2007

#	Meteorological station	Annual amount of precipitation, mm	Seasonal distribution of precipitation (month), mm	
			Maximum, mm	Minimum, mm
1	Onega	350-620	V-VII, VIII-X	II, IV
2	Sura	350-548	V-VII, VIII-X	XII-I, II-IV
3	Sykytyvkar	409-576	VI-X, XI-XII	XII-I, II-IV
4	Mudyug	400-697	VII-IX	II, IV
5	Vologda	344-567	IV-V, VI-IX	I-III, XI-XII
6	Ust-Vym	358-492	V- VIII, IX-X	II-III

**Table 3.** Long-term average annual value of the layer of stream-flow by hydrological stations of the North of the Russian Plain for the period from 1995 to 2007

#	Hydrological station	Long-term average annual value of the layer of stream-flow (h), mm, by hydrological seasons		
		winter	spring	summer-autumn
1	Kena – Korovy Dvor	75,5	109,2	154,9
2	Bol. Loptuga – Butkan	41,8	126,5	101,4
3	Vesliana – Vozhael	96,6	156,1	149,0
4	Kodina – Kodino	47,7	132,4	159,5
5	Mudyuga – Patrakeevskaya	81,6	193,1	158,7
6	Soyana – Soyana	80,1	73,9	141,6
7	Syamzhena – Syamzha	21,4	151,3	57,5
8	Dvinitza – Kotlakska	13,7	103,3	61,5
9	Sysola – Pervomaysky	44,9	118,3	131,2
10	Vym – Vesliana	42,2	111,4	143,3
11	Yarenga – Tokhta	43,2	160,4	98,3

**Table 4.** Dependence between precipitation and stream-flow for hydrological seasons for the period from 1995 to 2007

#	Hydrological station	Amount (r) of precipitation (winter-spring) / layer of stream-flow (spring), mm	Amount (r) of precipitation (summer-autumn) / layer of stream-flow (summer-autumn), mm
1	Yarenga – Tokhta	0,71	0,59
2	Vym – Vesliana	0,64	0,52
3	Sysola – Pervomaysky	0,86	0,17
4	Syamzhena – Syamzha	0,37	0,77
5	Soyana – Soyana	0,12	0,78
6	Mudyuga – Patrakeevskaya	0,15	0,81
7	Kodina – Kodino	0,12	0,9

**Table 5.** Distribution of hydro-meteorological parameters in the river basin of Onega in the summer-autumn hydrological season for the period from 1995 to 2007 (on the example of the hydrological station Kodina – Kodino)

Parameter	Years												
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Layer of stream-flow, mm	196,7	173,6	71,1	219,2	115,1	160,9	74,8	83,9	256,5	161,5	169,9	191,0	199,5
Amount of precipitation, mm	384,0	314,8	190,9	403,1	290,6	288,8	211,3	286,2	418,2	312,4	277,9	382,1	389,9

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**Table 6.** Distribution of hydro-meteorological parameters in the river basin of Mezen in the summer-autumn hydrological season for the period from 1995 to 2007 (on the example of the hydrological station Soyana – Soyana)

Parameter	Years												
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Layer of stream-flow, mm	170,5	173,7	86,3	178,8	117,0	198,4	118,9	94,5	152,2	99,4	136	86,8	229,5
Amount of precipitation, mm	374,4	334,4	215,6	481,5	303,7	258,1	203,4	204,6	326,2	280,8	284,8	211,9	501,7

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**Table 7.** Distribution of hydro-meteorological parameters in the river basin of Severnaya Dvina in the winter-spring hydrological season for the period from 1995 to 2007 (on the example of the hydrological station Sysola – Pervomayskiy)

Parameter	Years												
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Layer of stream-flow, mm	85,2	35,0	200,9	87,0	110,1	132,6	149,4	107,3	123,9	119,9	142,9	69,5	174,7
Amount of precipitation, mm	172,5	91,2	284,6	192,8	160,1	210,0	211,3	227,1	174,7	203,9	169,3	87,7	281,4

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#### 4. Discussion

Long-term trends of annual precipitation in the region under studies are characterized by variability in the range of 350 - 400 mm up to 550 - 700 mm (table 2). And during the period under consideration the largest share of precipitation was fixed by the MS of Onega and Mudyug (up to 700 mm), which have the seaside location, and their fewest number – by MS of Ust-Vym. Over the last years we can observe the periods of increase and reduction of atmospheric precipitation in turns at all meteorological stations.

Annual distribution of atmospheric precipitation has definite maximums in May - July, August - October and minimums in December, February and April. In general, there is the predominance of precipitation of the summer-autumn period (162 - 393 mm) over the winter (54 - 180 mm) and spring (31-219 mm) seasons at all meteorological stations.

For the period from 1995 to 2007 the analysis of the dates of hydrological seasons at the selected gauging stations revealed the following trends. Depending on the location of the analyzed gauging stations, there is a slight displacement of the date of the beginning of the winter season, in some years falling on the end of October at some stations, but in the majority of cases it falls on the first or second decade of November. At all – without any exception – observation stations under studies the period of the middle of April – the beginning of May can be accepted as the so-called "hydrological" spring, and in these conditions the beginning of the summer-autumn period falls on the beginning-middle of May, in some years – the beginning of June.

Comparison of the dates of the beginning of hydrological seasons at different observation points shows the following. For example, at the gauging stations Yarenga-Tokhta and Vym-Veslyana with intra-state which are located intercontinentally and which are relatively close to each other, an earlier oncoming of the spring season is observed at the station Yarenga-Tokhta with a maximum difference of maximum 11 days. At the gauging station Sysola-Pervomayskiy which is located to the south from Yarenga-Tokhta, it was possible to record an earlier start (decade) of spring processes on rivers. On "the inland" station Syamzhena-Syamzha, also with respect to the station Yarenga-Tokhta, an earlier oncoming of spring with a difference of 15 days was observed.

In other hydrological seasons it is necessary to mention the following facts concerning the gauging stations under research: for example, a later start of the winter season for 28 (in 1999), maximum for 56 days (in 2001) days at the station Mudyuga-Patrakeevskaya in relation to the located slightly to the north station Zolotica-Verkhnyaya Zolotica. Later dates of the beginning of the "hydrological" winter in comparison with the station Yarenga-Tokhta during the period under consideration could be observed at the station Syamzhena-Syamzha with a difference of 33 - 35 calendar days.

Earlier dates of the beginning of the summer-autumn season – for 23 - 25 days – were observed during the analyzed period at the station Sysola-Pervomayskiy rather than at Yarenga-Tokhta. In general, comparison of the dates of the beginning of summer-autumn period at the stations Yarenga-Tokhta and Vym-Veslyana shows a slightly later start of the season at the first of them, although in some years this tendency was broken (in 1999 - 2000, 2002 - 2004).

Analysis of hydrological indicators at the selected stations of observation, such as the level and flow of water, allows to conclude that, for example, the spring-level rise and, consequently, an increase of river flow water, occurs at the beginning and – with the highest values – at the end of April-May. Thus, at the gauging station Vym - Veslyana the maximum flow rate were recorded on April, 24 - 25 and May, 10 reaching 1960 - 2020 m<sup>3</sup> / s. Increase of river flow water in April and its highest values at this time are probably connected with the period of snow melt at the water storage basin

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164 (Agafonov, 2010).

165 In analyzing the river flow layer its seasonal changes, which show a trend for increase in the spring and summer-  
166 autumn seasons, are the most significant ones. At the same time, it is possible to distinguish gauging stations at which  
167 during the period under consideration there was predominance of the share of spring runoff over the summer-autumn one,  
168 in particular, Bolshaya Loptyuga – Butkan, Mudyug – Patrakeevskaya, Syamzhena – Syamzha, Yarenga – Tokhta (table  
169 3). The analysis of the distribution of the amount of the river flow layer by the stations in the winter season allows us to  
170 speak about its greatest value at the gauging stations Veslyana – Vozhael, Mudyug – Patrakeevskaya, Soyana - Soyana,  
171 where the average annual rate  $h$  was in the range of 80 - 97 mm, and its smallest value was at the station Dvinitsa –  
172 Kotlakska – 13.7 mm in the period from 1995 to 2007.

173 In the spring period, as with the case of the winter runoff, the values were large Photo for the stations Mudyug –  
174 Patrakeevskaya, Veslyana – Vozhael, Yarenga – Tokhta (160 - 193 mm), with minimum values at the station Soyana –  
175 Soyana (74 mm). Finally, in the summer-autumn hydrological season during the analyzed period the largest values of  $h$  –  
176 about 160 mm – were recorded at the gauging stations Kodina – Kodino, Kena – Koroviy Dvor, Mudyuga –  
177 Patrakeevskaya, and the minimum values – 57 - 60mm – at the gauging stations Syamzhena – Syamzha, Dvinitsa –  
178 Kotlakska.

179 Relationship between atmospheric precipitation and the river flow layer by hydrological seasons were identified  
180 during the research study. In particular, the closest connection was established between atmospheric precipitation and  
181 runoff of the summer-autumn period where the correlation coefficient ( $r$ ) for the stations Soyana – Soyana, Mudyuga –  
182 Patrakeevskaya  $r = 0,7 - 0,8$ , reaching  $r = 0,9$  (Kodina - Kodino). Comparison of precipitation of the winter- spring period  
183 with the spring run-off did not reveal such close connection, with exception of the station Sysola – Pervomayskiy (the  
184 basin of the Northern Dvina), where  $r = 0,86$  (table 4).

185 It is mentioned that by the annual period there are two maxima and two minima in distribution of atmospheric  
186 precipitation, while they do not fully coincide in time with atmospheric precipitation in overland runoff. Synchronous  
187 increase of the share of atmospheric precipitation and the runoff are recorded from May to July and in October, with  
188 exception of August (precipitation) and April (runoff), where these periods do not coincide. The least amount of  
189 precipitation was in December, February, and this accordingly reflected on the rate of the stream flow. However, the  
190 decrease of runoff was also during the period from August to September, contrasted to the increase of atmospheric fall at  
191 this time. Decrease of the flow was clearly recorded in this period, for example, by the stations Mudyuga –  
192 Patrakeevskaya, Dvinitsa – Kotlakska.

193 When examining the connection “precipitation – runoff” for some gauging stations for the period from 1995 to 2007,  
194 we can generally say about synchronous increase (decrease) of these indicators. But, in some years, such connection  
195 was asynchronous in nature and, for example, at the stations Kodina – Kodino, Soyana – Soyana, Sysola – Pevomajskij  
196 asynchrony in the form “reduction of precipitation – increase of runoff” and vice versa was observed in 1996, 1999, 2000,  
197 2002 - 2004 (tables 5,6,7).

198 асинхронность в виде уменьшение осадков – увеличение стока и наоборот наблюдалась в 1996, 1999,  
199 2000, 2002 – 2004 гг. (табл. 5,6,7).

200

## 201 5. Conclusion

202

203 The river run-off, which is the result of interaction of the climatic factor and physical-geographic conditions of the river  
204 basin, is the main source of water resources (Muraschenkova, 2007). Occurring in the last decade climate change, which  
205 is mostly manifested in the change of the regime of atmospheric precipitation and other meteorological parameters,  
206 greatly influence the change of the hydrological regime of water bodies (Moritz et al., 2002).

207 In this work the review and analysis of the main hydrological indicators, mainly runoff and atmospheric  
208 precipitation, their interconnection and spatial-temporal variability was made on the example of the region of the North  
209 of the Russian Plain. The subject region is characterized by extensive river network, about 138000 rivers with a total length  
210 of 521200 km, belonging to the basins of the Northern Dvina, Pechora, Onega, Mezen.

211 The aim of our study was mainly to establish connection between precipitation and runoff, as well as to identify  
212 patterns of spatial-temporal changes of the river runoff and atmospheric precipitation in the subject region. To achieve  
213 this goal of the work the atmospheric precipitation and water flow rate data obtained from the site of the All-Russian  
214 Research Institute of Hydro-meteorological Information – World Data Center (Obninsk) and Sevgidromet (Arkhangelsk)  
215 was used. The presence and work with the material allowed to make calculations of the amount and the run-off layer  
216 rates, as well as the amount of atmospheric precipitation in seasons and annually, with the subsequent analysis of the  
217 results obtained.



The analysis results of the work done are the following. On the territory of the region the annual precipitation is variable, ranging from 350 - 400 to 550 - 700 mm. At all meteorological stations of the territory under study there is predominance of precipitation of the summer-autumn period over the winter and spring periods. Besides, depending on the location of hydrological stations the change of the date of the beginning of the winter season, in some years falling on the end of October at some stations, and in the majority of the stations – on the first or second decade of November, was identified. Spring processes on the rivers of the region fall on the beginning of months, reaching maximum at the end of April – May. For example, at the hydrological station Vym – Veslyana the maximum flow rates were recorded on April, 24 - 25 and May, 10, reaching the value of 1960 - 2020 m<sup>3</sup> / s.

The amount of the run-off layer shows the tendency for increase in the spring and summer-autumn seasons. At the same time, for example, at the gauging stations Bolshaya Loptyuga – Butkan, Mudyuga – Patrakeevskaya, Syamzhena – Syamzha, Yarenga – Tokhta there is the dominance of the share of the spring runoff over the summer-autumn one. Besides, the connection between atmospheric precipitation and runoff was established, and the closest dependence between the parameters is observed in the summer-autumn period, when the correlation coefficient (r) for the stations Soyana – Soyana, Mudyuga – Patrakeevskaya is  $r = 0,7 - 0,8$ , reaching  $r = 0,9$  (Kodina – Kodina). Dependence of precipitation of the winter-spring period with the spring run-off did not reveal such close connection. Synchronous increase of the share of precipitation and runoff was observed from May to July and in October, with the exception of August (precipitation) and April (run-off), when these periods do not coincide. When examining the connection "precipitation – runoff" for some gauging stations for the period from 1995 to 2007, we can generally say about synchronous increase (decrease) of these parameters. But in some years such connection was asynchronous in nature and, for example, for the stations Kodina – Kodino, Soyana – Soyana, Sysola – Pervomayskiy asynchrony in the form "decrease of precipitation – increase of runoff" and vice versa was observed in 1996, 1999, 2000, 2002 - 2004.

## 6. Statements

1. in the long-term period of several years the amount of precipitation on the territory under study is rather variable, and it is in the range from 350 to 700 mm.
2. The starting date of the so-called "hydrological" winter on the territory of the North of the Russian Plain are different at different gauging stations. For example, the difference in the dates of the beginning of the season is from 28 to 56 calendar days between relatively closely located observation stations Mudyuga – Patrakeevskaya and Zolotica – Verkhnyaya Zolotica.
3. Connection between atmospheric precipitation and run-off layer is the closest in the summer-autumn hydrological season, when at some stations, for example, Kodina – Kodina, the correlation coefficient reaches 0.9. In other hydrological seasons such close connection between the analyzed parameters is not observed.
4. In annual terms in the distribution of atmospheric precipitation two maxima and two minima are stood out, while in the overland run-off they do not coincide with atmospheric precipitation in time. Synchronous increase of the share of atmospheric precipitation and the run-off was observed from May to July and in October, with the exception of August (precipitation) and April (run-off), when these periods do not coincide.

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## Positioning of the Republic of Tatarstan in the Volga Federal District

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### Abstract

At the moment the struggle of the regions for investment and innovations has increased. In this struggle the regions that try to increase their competitiveness in the frames of various territorial associations, get the advantage. In connection with this the question of evaluation of competitiveness and positioning of the regions is becoming rather urgent. At that both the purely economic, as well as the complex approaches to the assessment of competitiveness of regions are possible. But taking into account that the increase of competitiveness of the region must be accompanied by the improvement of the quality of life which is impossible without improving social and environmental conditions, the assessment of competitiveness should be carried out taking into account both economic and non-economic indicators. The concept of competitiveness should be built up with inter-balance of all principles of social-economic development. Competitiveness of the region should be considered by the whole complex of indicators that are components of the subsystems: population, economy, infrastructure and ecology. The aim of this work is to review the positioning of the Republic of Tatarstan in the framework of the Volga Federal District, as well as the analysis of changes of the position of the Republic for the period from 2007 to 2011. The Republic of Tatarstan is one of the most developed regions of the Volga Federal District which unites fourteen regions of Russia. The method based on a diagnostic set of indicators, including twelve indicators, is used for assessment. These indicators characterize the gross regional product, the turnover of companies, innovative activities of companies, density of the transport network, emission of pollutants into the atmosphere, the capital assets of companies, life expectancy, population morbidity, the level of education of population, household income, coverage of television broadcasting, fixed capital investment.

**Keywords:** region, competitiveness, positioning, assessment (evaluation), Tatarstan.

### 1. Introduction

Nowadays evaluation of the competitiveness of territorial entities has become one of the most urgent problems of economic life. It is particularly important in connection with the deepening of the globalization process and the start of the transition of society to the post-industrial stage of development. In conditions of the post-industrial development of the regions the role of their positioning and competitiveness in the struggle for investment, innovation, high technologies has significantly increased (Porter, 1990; Enright, 1993).

Recently years, a lot of works devoted to the study of the concept of competitiveness have appeared (Конкурентоспособность России..., 2003; Пилипенко, 2006; Kaliuzhnova, 2011; Bagautdinova *et al.*, 2012). In some of these works there are attempts to develop the methodology for assessment of competitiveness. But in the majority of cases, the assessment of competitiveness either includes only the economic indicators, or is directed towards the economic perspective.

The study of competitiveness of the region only from the economic perspective cannot be completely objective. The concept of competitiveness should be built up with inter-balance of all principles of social-economic development. It is important to assess not only the condition of the economy of the region, but the influence of the economic activity on the environment of the region as well, i.e. it is necessary to assess the condition of ecological and economic systems of the region (Trofimov *et al.*, 2010). It is also important to take into account the demographic potential of the territory (Gabbrakhmanov and Rozhko, 2014; Gabdrakhmanov and Egorov, 2013; Denmukhametov and Zjablova, 2014). Assessment of the region should be made with the account of the study of quality of life of the population (Фахрутдинова, 2011).

Competitiveness of the regional economic system should be viewed by such essential parameters as population, economy, infrastructure and ecology. There is no doubt that the main aim of any concept connected with the

development of territorial entity, its positioning and assessment of the degree of competitiveness should be attended with improvement of the quality of life which is provided by the stable economic growth, increase of income of population, increase of investment in the economy, improvement of quality of social services.

Assessment of competitiveness and positioning can be made from the position of economic-geographical zoning, and at different levels – of the countries, regions, and other smaller regional systems (Трофимов, etc. 2011).

## 2. Methodology

Competitiveness of the region should be considered by the whole complex of indicators that are components of the subsystems: population, economy, infrastructure and ecology.

In the work devoted to the competitiveness and positioning of regions (Трофимов & other authors, 2008), the structured system of blocks – components of competitiveness was developed. On the basis of this system a set of diagnostic parameters was formed.

Assessment of competitiveness and positioning can be made from the position of economic-geographical zoning, and at different levels – of the countries, regions, and other smaller regional systems.

The aim of the work is to review the positioning of the Republic of Tatarstan in the framework of the Volga Federal District.

Calculation is made on the basis of the diagnostic set of indicators (it was formed in the previous works) (Трофимов and others, 2009) It includes twelve indicators:

1. Gross regional product per capita (roubles);
2. Indicator of the turnover of companies unrelated to exploitation of natural resources (bln. rubles) (POONPR);
3. Degree of innovative activities of companies (%);
4. Density of the transport network (km for 1000 m<sup>2</sup> of the territory);
5. Emission of pollutants into the atmosphere per capita (tons);
6. Indicator of the capital assets of companies;
7. Expected life expectancy at birth (years);
8. Morbidity for 1000 people;
9. Indicator of the level of education of working population (ILEWP);
10. Share of population with income below poverty line (%);
11. Share of population who have coverage of television broadcasting (%);
12. Fixed capital investment per capita (rubles).

The score rating method at which the total score was obtained by summing of the weighted scores of all indicators, was used for the assessment and rate setting of indicators.

The indicator of GDP per capita as the roundup indicator characterizing the economic activity of the region, was chosen as a roundup indicator.

The five-point scale was used for assessment. For each indicator, the reference points, the distance between which was divided into five parts, were determined. Depending on the segment the value of the indicator was in, the value from one to five was assigned to it. The inverse scale was used for negative exponents.

As a result, the total sum of scores was found for each region. Based on this sum of scores, the regions were ranked from 1 to 14.

For the calculation we used the data of State Statistics (Regions of Russia, 2012).

## 3. Results

On the basis of the data of 2011, in terms of scores the Republic of Tatarstan was first among the regions of the Volga Federal District. The Republic received a total score 32.26.

Nizhny Novgorod region with a total score 26.82 is closest pursuer of Tatarstan. Permsky region (23,86), Samara region (23,13) and the Republic of Bashkortostan (22,79) Coming up with a slight delay follow it.

The Republic of Tatarstan managed to take the first place in the Federal District due to the fact that by 9 of 11 analyzed parameters the Republic gained the maximum score. In this case, the Republic of Tatarstan is a leader in the Federal District by six parameters: the republic has the highest values of POONPR, of the level of innovation activity of companies, of the indicator of the capital assets, of life expectancy at birth, and investment in fixed capital per capita, as well as the lowest –among the subjects of the district – share of population with income below poverty line.

Such high figures show the high levels of socio-economic development and competitiveness of the Republic of

112 Tatarstan.

113 However, such high results by 9 indicators do not mean that the republic has no problems. From the remaining two  
114 indicators Tatarstan got just 1 point in terms of the level of education of the working population. By this indicator, the  
115 republic takes the 10<sup>th</sup> place in the district, it is ahead only of the Chuvash Republic, the Republic of Bashkortostan, the  
116 Kirov Region and the Udmurt Republic.

117 Low value of PUORN is explained by the fact that despite the relatively high percentage of workers with higher  
118 education (29.7%), the percentage of workers with secondary vocational education is very low in the republic (19.2%,  
119 which is the worst figure in the Volga Federal District ). As a result, the lag of the Republic of Tatarstan from the leading –  
120 by this indicator – Samara region is very significant (in Tatarstan, the total share of the working population with higher and  
121 secondary vocational education is 50%, in the Samara region it is 67.3%).

122 It is also interesting to compare the calculations made on the basis of the data for 2011 with the earlier studies  
123 using the statistical data for 2007 and 2010.

124 In 2007, the Republic of Tatarstan was a part of the group of leaders, taking the 2<sup>nd</sup> place in the Volga Federal  
125 District by the total score and lagging only from the Samara region. Then the Republic of Tatarstan received the highest  
126 score in 5 indicators, and by all indicators received at least 2 points.

127 In 2010, the Republic of Tatarstan took the 1<sup>st</sup> place in the Federal District by the total score, with the highest score  
128 by 8 indicators and the lowest score by one indicator.

129 Let's consider the rating change of the Republic of Tatarstan by some indicators.

130 In all three studies the Republic of Tatarstan received the maximum score by five indicators: emissions of  
131 pollutants into the air, per inhabitant; life expectancy at birth; share of population with income below poverty line; share of  
132 population who have coverage of television broadcasting; capital investments per capita.

133 By 2010, the Republic had increased its rating by such indicators as POONPR, density of transport routes, the  
134 indicator of capital assets. In this case, the republic has lost 1 point by the indicators of PUORN and morbidity for 1000  
135 people. The latter circumstance can cause some concerns about the quality of human resources available in the  
136 Republic.

137 Comparing the results of the Republic of Tatarstan for 2010 and 2011, it is possible to say about an increase of the  
138 number of scores by the level of innovation activity. For example, in 2007 and 2010 the Republic had only 3 points by this  
139 indicator, and in 2011 it became a leader with 5 points. This is a very positive development, as far as in the previous  
140 studies the level of innovative activity was one of the weak points in the positioning of the Republic of Tatarstan.

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#### 142 4. Discussion

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144 Today the study of competitiveness of the regions, their positioning is very relevant. The regular reports on this topic at  
145 various conferences of different levels are the evidence of it. In particular, a lot of provisions of this article were discussed  
146 at several conferences on various aspects of development of the regions.

147 At that the evaluation method of ranking of the regions with relation to their competitiveness is the main discussion  
148 point in most cases. As a rule, there are different points of view on this issue in the framework of the discussion. But in  
149 our opinion, only an integrated approach can provide an objective assessment of the competitiveness of the region.

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#### 151 5. Conclusion

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153 In the frames of the work the assessment of the positioning of the Republic of Tatarstan in the framework of the Volga  
154 Federal District was made, the changes of positions held by Tatarstan in the District from 2007 to 2011 were analyzed. In  
155 the future, it is necessary to examine the results obtained with the account of positioning of the Republic of Tatarstan in  
156 the framework of the territorial associations of a higher – in comparison with the Federal District – rank, as well as to  
157 study the differences within the region.

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#### 159 6. Statements

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161 In 2011 the Republic of Tatarstan took the first place in the Volga Federal District. Tatarstan is the leader in the Federal  
162 District by six from eleven analyzed indicators, but it has a problem with one of the analyzed indicators.

163 In 2007 Tatarstan took the second place in the District, but by 2010 was able to climb to the top and again took the  
164 1<sup>st</sup> place.

165 In general, we can come to conclusion that today the Republic of Tatarstan is the most developed region of the

166 Volga Federal District from the point of view of the level of socio-economic development and competitiveness, and it also  
167 tends to develop their leadership.  
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## Peculiar Features of the Tatar People Migration on the Territory of Tatarstan

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### Abstract

A specific feature of the Tatarstan Republic is the fact that the people living there are characterized by polyethnicity and multireligiousness. The development of the locals is predetermined by close ethnic and cultural interconnections and interpenetration of traditions the people of various nations living on this territory observe. Traditionally the leading role in this process was and is still played by Tatars and Russians, Muslims and Christians constituting the majority of the population there. In the recent decades the intensified migration processes in Tatarstan resulted in formation of numerous groups of people coming from former Soviet Republics (the Azerbaijani, the Armenians, the Uzbeks, the Tadjiks, the Kazakhs, the Georgians, the Moldavians, the Turkmens) as well as national groups from the regions of the Russian Federation and distant foreign countries (the Turks, the Vietnamese, the Arabs, etc.) which are a little smaller in population (several hundred people). The role of the ethnic factor in the demographic potential hasn't been properly investigated mostly because of the lack of the published demographic statistics concerning the ethnic aspect and also because of the difficulty to reveal the interrelations of this factor with other ones. The aim of the research has been identified as to reveal the territorial and historical peculiarities of the Tatar population settling on the territory of modern Republic of Tatarstan, to reveal its tendencies, to estimate the significance of the ethnic factor in formation and development of the demographic potential. This research has revealed the rapprochement of the demographic behaviour of the people of different nationalities (especially Russians and Tatars) as one of the most important tendencies of the demographic development of the population. The reason for this has been the rapprochement of the results of the demographic behaviour of the people of different nationalities (especially Russians and Tatars) as the result of the loss of national values and traditions, religious background assumptions, customs, ceremonials, etc.

**Keywords:** the Kazan Khanate, Tatars, system of migration, Tatarstan Republic, ethnic demography.

### 1. Introduction

The nations living on the territory of Tatarstan are presented by the following Volga Region peoples: 126.5 thousand (3.3%) Chuvashes, 24.2 thousand (0.6%) Udmurts, 23.7 thousand (0.6%) Mordovians, 18.8 thousand (0.5%) Mari and 14.9 thousand (0.4%) Bashkirs, i.e. 5.1% of the population of Tatarstan. The Ukrainians 24 thousand people (0.6%), Byelorussians - 6.1 thousand (0.2%), Jews - 3.5 thousands (0.1%), Germans - 2.9 thousands (0.08%), Polish - 620 people (0.02%) and others have been living on the territory for a long time (Gaisin and Biktimirov, 2014).

We should note the works of such researchers as N.Biktimirov, E.Busygin, G.Galiyeva, G.Galiullina, F.Ildarkhanova, D.Iskhakov, D.Kurganova, N.Makhmutova, M.Mustaphin, L.Khadieva, Ch.Shafranskaya, etc. who paid their utmost



58 attention to the demographic behaviour of different ethnic groups inhabiting the Tatarstan Republic.

59 M.Mustaphin gave a detailed characteristics of the settlement of the main nations (Мустафин, 1993). At those  
60 times the Tatar population constituted 48.5%, and the Russian – 43.5%. During the period of 1979-1989 the proportion of  
61 the Russians lowered from 44% to 43.5%, and of the Tatars grew from 47.6% to 48.5%. Mostly it was connected with a  
62 smaller migration activity of the Tatar people and higher rates of their natural population growth (Gaisin *et al.*, 2014).

63 In accordance with the results of the All-Russian nationwide census of 2002 Tatarstan is presented by 115  
64 ethnicities. On the territory of Tatarstan there live 3.8 million people, 52.9% of whom are Tatars, 39.5% - Russians. These  
65 two ethnicities whose languages are proclaimed as the state ones constitute the absolute majority (92.4%) of the republic  
66 population.

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## 68 2. Methodology

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70 A thorough study of ethnic and demographic problems of the modern territory of the Tatarstan Republic is only possible  
71 when using the methodology of sociology, geography, mathematics. Such approach gives an opportunity to reveal the  
72 role and the place of ethnic and demographic problems in the societal development. The methodology applied in this  
73 research substantiates the opportunity and necessity to modernize the sociological study of ethnic and demographic  
74 problems in the Tatarstan Republic by singling out ethnodemography as a separate sociological theory on the borderline  
75 of ethnography, demography and sociology.

76 Using the best practice and experience of geodemography and ethnodemography we define the essence of  
77 ethnogeodemographic research as the study of demographic processes and structures differentiated by an ethnic  
78 attribute from the geographic aspect. The geographic positions presuppose the analysis of territorial differences of  
79 homotypic demographic indicators of a particular ethnic group and the analysis of ethnic differences of homotypic  
80 demographic indicators on a particular territory. In a broad sense ethnodemography as any other science has to deal with  
81 the development in methodology beside the geographic analysis. The application of geographic principles to  
82 ethnodemography brings us to the uprise of such specific concept as an ethnodemographic situation. We could define an  
83 ethnodemographic situation as a complex qualitative and quantitative estimation of ethnodemographic processes and  
84 structures of a particular territory interacting with the surrounding natural and social environment (Орнов, 2009).

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## 86 3. Results

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88 The geography of Tatar settlements on the territory of the Republic of Tatarstan has its peculiarities. Even in the 20s of  
89 the 20<sup>th</sup> century it was impossible to find Tatar settlements in the Volga basin and in the cities located on the territory of  
90 this area. The explanation comes from the historic events which happened after the Kazan Khanate joined the Russian  
91 State in 1552. The Edict of Ivan the Terrible ordered to send Tatars 50 versts (a Russian unit of distance equal to 1.067  
92 km or 0.6629 mile) into the depth of the area.

93 There existed 3 main natural areas for settling, or territorial concentration of people in this period. Firstly, it's  
94 Zakazanye (North-Western part of the Kazan Khanate), which historically is the territory of Tatar people, the arena for  
95 forming its national community. Secondly, Tatars have been living in the western part of Predvolzhye (Western part of the  
96 Kazan Khanate) for a long time. This is the reason to see this territory as the second largest array for Tatars settling.  
97 Historically, the main belt for Tatars settling – Zakazanye, Predkamye (the northern part of the Kazan Khanate, quite a  
98 scanty region of the republic) – was formed in the period of XV-XVI centuries.

99 The third array is located in the outermost Eastern part of the Tatarstan Republic. By the way, nowadays in many  
100 administrative districts of these regions the number of inhabitants exceeds 90%. The accumulation of the net of Tatar  
101 settlements in the eastern part of the republic is closely connected with the spontaneous migration of Tatars from  
102 Zakazanye and Predvolzhye after the Kazan Khanate was joined to the Russian State.

103 The consistent pattern of the dependence of the peoples settlement on the ethnic composition is still preserved.  
104 For example, the location of settlements depending on the geomorphological peculiarities of the territory had ethnic  
105 differences at the end of XVIII century. So in Sviyazhskiy Uyezd there were 69% Russian rural settlements, 50%  
106 Chuvash and only 26% Tatar located on banks, 26% - at springs, wells and swamps, 5% - at ravines. Across most Tatar  
107 villages there flew small rivers or springs. Some ethnologists mentioned that Tatars disliked to dig out wells.

108 The development of the Soviet system had a positive effect on the migration processes of Tatar people. It might be  
109 explained by the fact that provinces were the administrative settlement units in Russia before the revolution. The  
110 administrative-territorial division in pre-revolutionary Russia didn't take into account the conditions of dense inhabitancy of  
111 non-Russian ethnic groups on the territory of Russia. At that time certain districts on the territory of modern Tatarstan

belonged to 5 provinces: Kazan, Vyatka, Ufa, Samara and Simbir. At this period the leading ethnic groups in Kazan province were Tatars and Russians, then there prevailed Chuvashes, Bashkirs, Mordovians and Votyaks (Udmurts) living in all territorial subdivisions. In 1920 after the Tatar Republic was formed Tatars constituted more than half the population (table1).

**Table 1.** Ethnic composition of the population of Tatarstan Republic according to the census of 1920.

Groups of people	Number (thousands of people)	Including (%)						
		Tatars	Russians	Chuvashes	Mordovians	Udmurts	Marii	others
Rural	2639	54,8	36,9	5,3	1,5	0,9	0,5	0,1
Urban	253	16,3	78,3	0,3	-	-	0,1	5,0
Total	2892	51,6	40,4	4,9	1,5	0,8	0,4	0,2

The most important event of the 20s of XX century is certainly the famine in 1921-1923, which brought the most harm to people and their migration in the Kalmyk and Tatar Republics, Chuvash and Marii regions, Chelyabinsk province where 90% of people suffered, 70%-90% of population starved in the Bashkir Republic.

As it has been mentioned, the Tatar Republic was among the regions which suffered greatly from the famine. The population composition changed greatly between the two censuses, which was conditioned by a big population decline.

Firstly, we paid our attention to the year of 1921, the time for mass spread of drought on the studied territory. According to the statistics the rural population of Tatarstan, which constituted the major part of the republic inhabitants from 1920 to 1926, decreased for 326.1 thousand people due to the rise of mortality. Among them there were 77.7% of Tatars, 16.9% of Russians and 5.4% of national minorities. Due to the geographic factor, the specifics of the ethnic groups settlement (low percentage of Tatars in cities and on the adjoining territories which got food aid) and economic indicators (absence of material assets and underdevelopment of vegeculture) the number of Tatars decreased by 17.5% (253.5 thousand people), Russians - by 5.7% (55.3 thousand people) and national minorities - by 8% (17.3 thousand people).

Especially big was the harm brought to the people living in the south regions of the republic. Differentiating greatly in regions the maximum growth in mortality of Tatars (35.7%) was found out in Spasskyi Canton in the south of Tatarstan Republic. Nearly 300-500 thousand of famine refugees left the republic. These figures exceed largely the people loss during the World War II (450 thousand). Such a high degree of national differentiation of demographic statistics wasn't marked even in the years of 1941-1945.

Underdevelopment of vegeculture for Tatars could be explained by a little usage of vegetables; for example, Tatar peasants rarely cooked vegetable soup and didn't make pickles. Besides, the marketable products were unprofitable due to the remoteness of Tatar areas from cities.

#### 4. Discussions

The problem of stability or changeability of ethnic and regional identity in the conditions of globalization of the world development gets the leading position in the ethnodemographic researches. However, subtlety and delicacy of the very fact of the ethnicity change hinder regular statistics researches and publication of results, for example, in the materials of population census. It's worthy to note some of the works which reveal the essence of the assimilation processes in polyethnic environment. First of all, these are the works of outstanding ethnologists of Soviet and post-Soviet periods (Бромлей, 1983; Брук, 1986; Гумилев, 2001; Тишков, 2003). The most significant researches of the processes of changing of ethnic identity in the demographic aspect which revealed the degree of the assimilating role of the Russian ethnos were made in the Institute for Socio-Political Research RAS and the Centre for Demography and Human Ecology of Institute of Economic Forecasting RAS. For the first time the scientists documented the level of interethnic nuptiality. The correlation between natural, migration and identification growth of the number of ethnic groups determines the dynamics of ethnodemographic composition of the population of the region. The pace of the dynamics of ethnodemographic structure of the population (which takes into account the changes for a unit of time) plays an important role as the indicator characterizing the tendencies of ethnodemographic processes. Besides, the dynamic measurement in ethnodemography implies the spread of the types of demographic regimes of reproduction of population. For this it will be important to compare the tendencies for demographic transformations in geographic space.

161 **5. Statements**

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Studying the demographic statistics for the two main nations in the Republic of Tatarstan it might be noted that for a long time the birthrate among the Tatar population was 1.4 times higher and the death rate was 1.5 times lower than among Russians. The differences in the level of mortality among Russian people in cities 1.8 times exceeded the similar rates for urban Tatars. There also might be observed the differences in the rates of nuptiality and divorces. So the divorce rate among Tatars was 1.7 times lower than among Russians. Concerning the balance of migration various stages of republic development there marked by essential ethnic differences mainly in favour of Tatars. For example, in 1992 the balance of migration of Tatars 4.7 times exceeded the balance of migration of Russians.

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These advantages in ethnodemographic development of Tatars played their compensating role as the response to the utterly negative consequences of the drought, and even to the consequences of the events of the year of 1552. Tatars started to migrate everywhere. The number of inhabited localities with plural population has been growing from the 20s of the XX century. For example, 55 inhabited localities with plural population (7.6%) were recorded in 1948 in Predvolzhye alone. These were mainly workers settlements.

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During the years of the Soviet government in the valley of the Volga and the Kama there appeared a whole range of new Tatar settlements reviving the historical picture: Vatan, Idel, Nariman, Kzyl Bairak, Bakcha-Sarai.

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While studying the objective laws of changing of the national composition of rural inhabited localities during the period of two censuses from 1970 to 1989 we processed the statistical data to study the objective laws of the population dynamics. We found out that in rural inhabited localities (in 55 of which Russian population prevailed earlier), Tatar population started to prevail in number by the year 1989. It is proved by their growth from 27034 to 28473 people. Among the studied objects there are 29 plural settlements with Tatars prevailing (52.7%), 5 of them are located close to railways, 18 are close to drainage network, and almost all of them are located close to administrative centres (1-3 km). While analyzing we found out another variant of the change in national composition, for example, Tatars – Russians. The number of people in 15 inhabited localities of the republic lowered from 4364 to 3170 people during the studied period. 10 inhabited localities out of the 15 mentioned above have mixed composition (66%), 5 of them are relatively monoethnic.

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There exist 19 cases of the changes in national composition. We suggest the most widespread:

Russians → Chuvashes + Russians (6 is the number of inhabited localities)

Chuvashes → Russians + Chuvashes (6)

Chuvashes → Tatars (3)

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The biggest number of inhabited localities subject to changes in the case “Russians – Tatars”(12) have the population size of 200-500 people (27.3%), in the case “Tatars – Russians” (5) – 100-200 people (33%), in the case “Russians – Tatars” the maximum population growth is observed with 2-times increase in variant II (50-100 people), the maximum population decrease is characteristic for variant II (0-50 people) with the 4.5-times decrease. In the case “Tatars – Russians” the maximum (500-1000 people) is 1.07 times and the minimum (50-100) is 2.59 times (table 2).

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**Table 2.** Changing of the population of human settlements according to ethnic composition during 1970 – 1989 (absolute measures).

Groups of inhabited localities	Russians – Tatars		Tatars – Russians			
	Number of changes	Change in the number of inhabitants		Number of changes	Change in the number of inhabitants	
I ( 0-50 ) people.	3	123	27	-	-	-
		- 4,5 times.			-	
II (50-100) people.	8	585	1215	4	321	124
		+ 2,07 times.			- 2,59 times.	
III (100-200) people.	12	1552	1485	5	689	566
		- 1,04 times .			- 1,22 times.	
IV (200-500) people.	15	4563	5716	3	1015	641
		+ 1,26 times.			- 1,58 times.	
V (500-1000) people.	10	7074	5935	2	1295	1395
		- 1,2 times.			+ 1,07 times.	
VI (1000) and more people.	7	13050	14841	1	1044	444
		+ 1,14 times.			- 2,35 times.	

## 6. Conclusion

1. Urbanization of Tatars will continue to grow quickly, the places for their settlement will become big cities and agglomerations. A substantial growth of the number of Tatars in big cities and regions with relatively high living standards is forecasted.

If we compare the statistics of 1989 and 2002 within Tatarstan, we'll see that the part of urban inhabitants among Tatars has become bigger by 3.5%, and Russians only by 0.5%.

2. Russians are less inertial in their demographic behavior than Tatars (Gabbrakhmanov, 2011). And Tatars have a bigger influence on the formation of new tendencies in the demographic development of the republic population. The new generations of Tatars still have a feebly marked national conscience, and, on the other hand, the popularization of Islam and the support of the Muslim world can also play an important role in strengthening of the Turkic and Muslim identity of Tatars.
3. The most favourable places for the population growth of Tatars should be considered the inhabited locations with the population of 50-100 and 200-500 people, and those where the population is bigger than 1000 people (Gabbrakhmanov and Rozhko, 2014). And vice versa, these very groups of settlements show negative statistics for Russians. The only favourable place for the population growth of Russians is the settlement with the population of 500 - 1000 people.
4. Settling of people on the territory of modern Tatarstan was ethnically determined (Bagautdinova *et al.*, 2013). The investigation of the changes of ethnic composition of rural inhabited locations of Tatarstan during 1970-1989 shows the tendency to revive the historical picture of people settling by creating a whole range of new Tatar settlements on the place of the Russian ones.

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## Analysis of Life Expectancy Rate at Birth in the Republic of Tatarstan

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### Abstract

The current economic growth rate in the Republic of Tatarstan cannot serve as the only progress and welfare index of the region. This can be due to the fact that the continual economic growth of public welfare caused a number of adverse effects, such as environmental disorder, social strain intensification, etc. that is why it is necessary to reinforce another measure of our further well-being. This article specifies a particular criterion, forming part of the integral "life quality" rate, i.e. the expected life expectancy at birth. To complete this task a profound scientific research at a regional level is required. This article presents results of an analysis of life expectancy rate at birth as a way to evaluate life quality in the Republic of Tatarstan. The research results show that there is a territorial and gender disparity. The authors make this fact conditional on job distinctive features, unhealthy lifestyle, carelessness which leads to disregard one's own health. So, they suggest including this rate as an indicative one while assessing the heads of the Republic of Tatarstan municipal units. This research aims to assess life quality from the perspective of life expectancy at birth. This work presents a monitoring of expected lifespan for the Republic of Tatarstan population as compared to other regions of the Volga Region Federal District. It also considers the situation within the republic at a municipal level. Practical implementation of the recommendations drawn up in the course of the research will promote development of a reasonable regional programme to maintain and improve public welfare. This research is based on traditional methods: cartographical (methodologically founded on subject and complex mapping and advances in geoinformation technologies), comparative and descriptive, spatial analysis method and the statistical one. Processing and analysis of fact sheets was carried out with the help of special geoinformation, cartographic and statistic software.

**Keywords:** life quality, life expectancy at birth.

### 1. Introduction

Nowadays economic growth in the Republic of Tatarstan cannot be the only progress and welfare index of the region. This can be due to the fact that the continual economic growth of public welfare caused a number of adverse effects, such as environmental disorder, social strain intensification, etc. that is why it is necessary to reinforce another measure of our further well-being (эта фраза уже была в аннотации) (Bagautdinova *et al.*, 2013). This statement was supported by Rustam Minnikhanov, the President of the Republic of Tatarstan, during the "United Russia" public primary elections in August, 2011 in Musliumovo, when he declared: "The basic authorities efficiency criterion in Tatarstan is life quality of the population, and it is its improvement that makes the primary goal of the regional authorities". Hence, we can say that life quality is the modern paradigm of civilization development (Fakhrutdinova *et al.*, 2013). This implies a need to find out the relation between life quality elements and new approaches to creation and implementation of life quality evaluation methods. The notion of "population life quality" can be defined as "assessment of the complex of living conditions characteristics, as it arises in public consciousness" (Boitsov B.V. and others, 1997).

Average expected lifespan in the country is largely contingent on social living standards (Gabdrakhmanov, 2011).

58 Life expectancy depends on numerous factors, such as: lifestyle (one of the most important ones), income level,  
59 upbringing and education, genetic background, environmental contamination, diet quality, healthcare system  
60 development level, crime rate, possibility to freely earn one's living and many others (Gabdrakhmanov and Egorov,  
61 2013).

62 Scientists from various fields of knowledge have long been using the index of expected lifespan or average life  
63 expectancy which equals to an arithmetical average of survival distribution up to an x-age (the resting length of life) in  
64 accordance with the frequency of deaths, as recorded in mortality tables (Kvasha, 1994). The idea of a loss meter based  
65 on ill health is comparatively recent, it was suggested by B. Sanders in 1964 (Sanders, 1964). The calculation  
66 methodology and the name "Healthy life expectancy" or "Disability free life expectancy" were offered by D. Sullivan in  
67 1971 (Sullivan, 1971).

## 68 2. Methods

69

70 It has long been proved that it is not only socio-economic environment that impacts public health, but public health  
71 impacts the national economy to a large extent as well (Safiullin *et al.*, 2013). This influence continually grows and is  
72 present in almost all countries. In the recent years socio-economic relations have changed, which resulted in social and  
73 economic instability. The latter in its turn had a profound effect on national health, both directly and indirectly. Since the  
74 health of the current generation bears the impress of life quality in the past and depends on multiple present day factors,  
75 we should use a package approach to its evaluation to get reasonable prospects for the nearest future (Fakhrutdinova *et al.*,  
76 2013).

77 It is evident both from the literature on the subject and our own research that under relatively stable environmental  
78 conditions national health declines: death rate grows as well as functional deviations; infant physical growth rate goes  
79 down; there are substantial discrepancies in morbidity rate between children living in the same ecological area but in  
80 different living conditions.

81 Thus we can infer that ecology has a minor effect as compared to social factors, and the main negative impact is  
82 exerted by socio-economic environment of the country, related to the process of social reforming.

83 In accordance with the Federal plan of statistical efforts, due to different time frames of information availability, the  
84 "life expectancy at birth (years)" index is presented on a phased basis within the following time periods:

85 1<sup>st</sup> assessment (preliminary) – March, 15;

86 2<sup>nd</sup> assessment (final) – August, 15.

87 1<sup>st</sup> assessment (preliminary) – to be reported before March, 15.

88 The rate is calculated on the basis of preliminary data on age and gender composition of the deceased (ignoring  
89 the final medical evidence), grouped by age, and preliminary assessment of age and gender composition of the  
90 population.

91 The algorithm to get the rate is the following: to calculate future life expectancy we should calculate the number of  
92 man-years, which those who have lived up to the given age are expected to live during the whole period of the  
93 forthcoming life (up to the given age and up to the maximum age). The received total of man-years is divided by the  
94 number of those who lived up to the given age.

95

$$96 e(x) = \frac{T(x)}{I(x)},$$

97 Where :

98 x – is age

99 e(x) – is life expectancy;

100 T(x) – number of man-years;

101 I(x) – number of those who lived up to the given age.

102 Life expectancy at birth – the index for x = 0.

103 The source of information is a preliminary assessment of age and gender composition of the population, the  
104 number of the deceased grouped by age, received as a result of the Federal Statistic Efforts N 1-Y "Accounts of death"  
105 without including the final medical certificates of death, issued following the results of the forensic medical examination in  
106 exchange for the preliminary ones.

107 The 2<sup>nd</sup> assessment (final) – to be reported before August, 15.

108 The index is calculated by the algorithm described above, taking into account the final assessment of the age and  
109 gender composition of the population and the detailed age composition of the deceased basing on the final medical  
110 certificates of death (Procedure for approving the rate calculation methods for operational evaluation..., 2013).



### 3. Results

Between 1995 and 2010 death rate in able-bodied population was rather high. Despite a relative decline in 1996-1999 (597.4; 573.7; 538.9 and 557.0 per 100,000), in 2000 (613,6 per 100,000) the mortality rate in able-bodied population increased again and in 2005 it achieved its peak over this period (671,8 per 100,000). In the following years, between 2005 and 2009 death rate decreased by 22.5%.

It should be stressed that the leading causes of death in able-bodied population were injuries, intoxication and external factors. However, starting from 2005 the pattern changed and by 2010 circulatory diseases (63,4 %) became the first leading cause of death, followed by injures and intoxication (10,5 %), the third leading cause of death being tumors (13,4 %). By contrast, in 1995 injures and intoxication accounted for 39,6% of deaths, circulatory disease was responsible for 29,5% and tumors - 12,6%. The mortality rate for males and females was the following:

Injures and intoxication - 41,1% and 31,8%;  
circulatory diseases – 30,1% and 26,1%;  
malignant tumors – 11,2% and 20,2%.

In the mortality rate for the Republic of Tatarstan population circulatory diseases is the leading cause of death (63,4%), the second leading causes are tumors (13,4%) and external factors (accidents, intoxications, injures, etc.) – 10,5%. In 2009 this number surpassed 834 individuals per 100,000, where the deaths by accidental alcohol intoxication over the given period range from 10.67 to 14.9 per 100,000. Rural inhabitants are 1.2-1.9 times more likely to die by these reasons than citizens. In 2009 in the Republic of Tatarstan were recorded 160 deaths by drowning and 137 deaths by alcohol intoxication.

There is a number of factors to account for this phenomenon, which cannot be treated separately. Among the causes of low life span in some of the Republic of Tatarstan municipal areas are smoking, mental and social stress, faulty diet, and especially excessive alcohol consumption. It should be noted that every year tens of thousands of people die by consuming defective alcohol or alcohol-containing medical products not intended for internal use.

The Republic of Tatarstan dominates among other territorial entities of the Volga Region Federal District in life expectancy at birth (Gabbrakmanov and. Rozhko, 2014). (Fig.1).

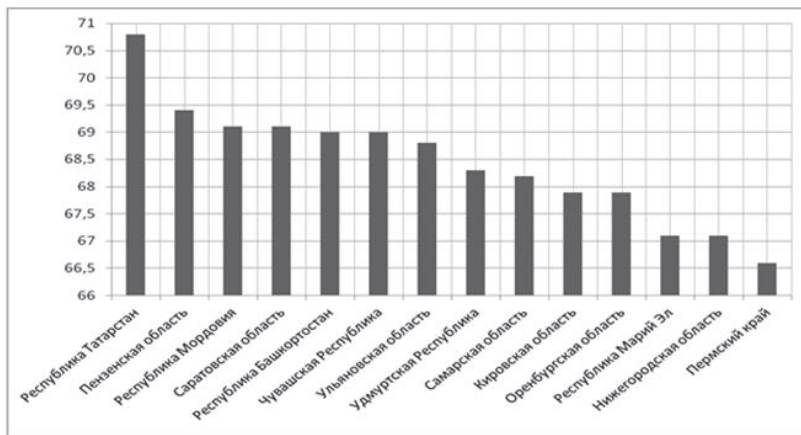


Figure 1. Life expectancy rate in the Volga Region Federal District in 2009.

Therefore an average baby, born in 2009 can expect to live 70.8 years, while in the Perm Territory the expected life span is only 66.6 years. If we analyze this index as it develops between 1990 and 2009 (Fig.2) we can notice a decrease by 4.2 years between 1990 and 1995, followed by a rise up to 1998 when the average life span was 68.9 years; in the next four years the index showed another decline. Starting from 2002 there is a gradual growth in life span and in 2009 it achieved its peak, which is commensurate with 1990 (70.9 years). Analyzing life expectancy at birth we can observe an undulate tendency with the minimum value between 1994 and 1995 (66.7 years), and 2001 and 2002 (67.5) and the maximum value in 1990 and 2009 (70.9 and 70.8 accordingly).



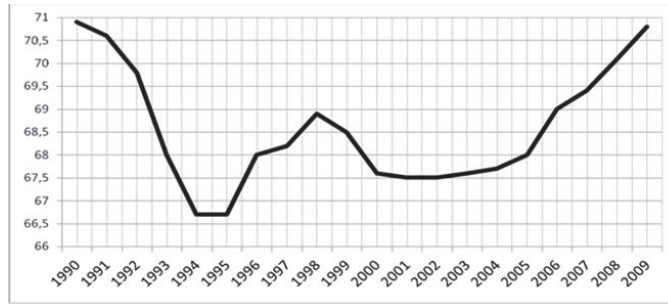


Figure 2. Trends in life expectancy rate at birth in the Republic of Tatarstan.

A specific feature which characterizes the present situation in the Russian Federation is a huge difference in life expectancy at birth between men and women. In highly developed European countries as well as in Muslim countries with an extensive healthcare network the difference in life span between men and women is 3 - 5 years. The majority of Russian women have an assured 12 years difference in life span. In 2009 this difference was 11.62 years which just confirms the all-Russia index. This rating is irregularly distributed in space, for example districts with the maximum disparity are located in the western regions of the republic while those with the minimum disparity are to the east (map chart 2). The minimum disparity in life span between men and women in 2009, which is commensurate with the European rating, was recorded in the Mamadysh district (3.58 years). The maximum disparity was reported by the Cherepshansky district (17.49 years).

Another point to be noted is life expectancy in urban and rural areas (Fig. 3). In the cities men are expected to live longer than in the country. Among females the situation is quite different, that is women live longer in the countryside than in the cities. This is primarily due to the lifestyle and social habits which result in heavy mortality (death rate for working age people is high especially among males).

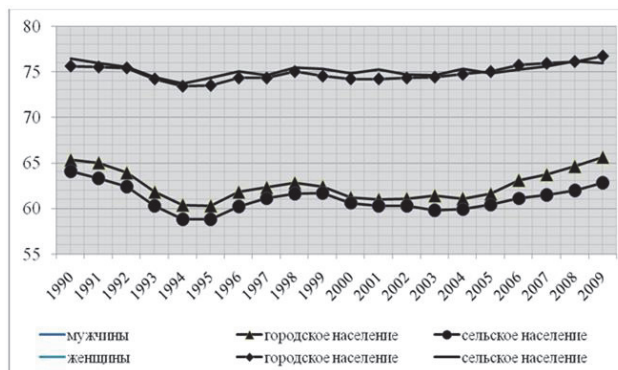


Figure 3. Variations in male and female life expectancy at birth between urban and rural areas.

#### 4. Discussion

It stands to reason that life expectancy rate at birth is included into the check list to assess the Republic of Tatarstan Ministry of Healthcare performance. In order to control the implementation of the agreement with the municipal units this rate is included as an indicative to rank the municipal healthcare providers. In view of relevance and importance of life expectancy rate at birth and its relation to social factors, as well as lack of motivation to lead a healthy life among the population of the republic, we consider it expedient to include this index as an indicative while assessing the heads of the Republic of Tatarstan municipal units.

## 5. Inference

Analyzing working age male mortality rate by place of residence (urban or rural area) it is necessary to note that this rate is 1.3 times higher in the countryside than in the city. At the same time, male mortality is 3.9 times higher than female mortality in the city, while in the rural area this rate equals to 4.4 times.

While for working age urban males death rate by all diseases went down, there is a growth in death by cancer among rural working age population (by 13.9 %).

Death rate by injures, intoxication and some other external factors is 5.1 times higher for men than for women in the city and 5.6 in the countryside; circulatory diseases – 5.1 and 5.4, and tumors – 1.9 and 2.3 accordingly.

At that, working age population death pattern is approximately the same in both communities, the leading causes of death being circulatory diseases, injures, intoxication, external factors and tumors.

Death rate among working age females by the place of residence (urban or rural area) shows almost the same tendency. Both in the cities and in the countryside the most common cause of death is circulatory disease, the second leading causes are injures and intoxication, the third major cause is tumor.

The present public health crisis in Russia is driven not only by the "old" causes of death, such as communicable diseases, but also by "new" types of disorders, circulatory diseases being the major one. Social problems lead to convergence of endogenous and exogenous causes of death (Panasyuk *et al*, 2013).

Other social and psychological risk factors are: low level of social and behavioral culture, lack of motivation to lead a healthy life in popular mentality, low public awareness.

## 6. Conclusion

Analyzing the trends in life expectancy rate at birth we have found the following. The minimum rate in 2009 was reported in Pestrechinsky district (59,765 years), and the maximum was is Leniogorsk (80,385 years). The majority of municipal areas, except Pestrechinsky, Atninsky, Mendeleevsky, Muslumovsky, Nizhnekamsky, Spassky, Cheremshansky, Baltasinsky, Kaibitsky and Kamsk-Ustinsky, reported an increase in life expectancy between 2007 and 2009. Taking into consideration space factor we can notice that the last on this list are the western areas of the republic, where the rate is below average. In the Eastern areas of the republic the present situation is more favorable. Another point to be noted is low rate of life expectancy at birth in the areas located on the Kama and Volga rivers.

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## Geodemographic Potential of the Republic of Tatarstan: Analysis, Evaluation, Territorial Differences

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### Abstract

Modern international scientific community recognizes that the territorial paradigm is of great importance for development of the region. Its essence is in the fact that the territory is considered as an arena of interaction of various driving forces, the components of nature and society, i.e. as a resource, as well as the space organized in a particular way. In this sense territoriality leads to the formation of a special socio-economic landscape which is the reflex of the content of this concept. In its turn, territoriality – from the comprehensive point of view – is the performance potential of the territory. To fulfil the demographic potential of the territory is the aim of the research. The article gives the author's definition of geo-demographic potential of the region based on the theory of geo-demography. The methodology of evaluation of the demographic potential of the territory from the perspective of the demographic situation and the demographic setting was developed. Since the analysis of the balance of labor resources is at the core of economic-demographic research, and already in the 60s V.V. Pokshishevsky and M.Ya. Sonin emphasized the importance of geographical study of the population and their relationship with manufacturing on the basis of the regional balance of labor resources which take into account changes of population, as well as production, the need to analyze the typology of the geo-demographic situation of the Republic of Tatarstan and to identify corresponding zones of formation of the demographic potential is required. On the basis of the proposed methodology, typological zonation of the demographic potential the directions of further development of the demographic situation of the relevant typological zones were identified, the forecast of population size in them was calculated. The presented typology is consistent with the program of the demographic development of the Republic of Tatarstan.

**Keywords:** geo-demography, geo-demographic situation, geo-demographic setting, geo-demographic potential, typology.

### 1. Introduction

A great part of the scientific and practical problems of geography of population is devoted to the study of large-scale integrated systems (Bagautdinova *et al.*, 2013). According to A.G. Vishnevsky, the term "demographic system" indicating the systemic nature of population stands for the synonym of the notion "population" (Vishnevsky, 1982). Based on this notion, territorial systems should be considered to be material tangible research objects in the study of geography (Bagautdinova *et al.*, 2012).

In the course of the geographical research of spatial-temporal organization of human activity the idea of population and forms of its settlement, of market economy, of service and infrastructure provision increased significantly. The notion "territorial community of people" (TCP) and the idea of the identification of society with the settlement and the territory appeared. The search for new forms of spatial-temporal organization of society led investigators to the category of "territorial social system" (TSS). Content of TSS is much wider than of TCP due to the "inclusion" of spiritual, psychological, moral, and other aspects of people's lives. TSS become the main object of cognition of economic and

58 social geography, in connection with which the new definition of science appeared. Among many definitions the following  
59 definition is the most common one: "Economic and social geography as a complete integrated-synthetic science studies  
60 the spatial organization of the society in specific conditions of the environment. Territorial (spatial) social systems are the  
61 main subject of its research"(Chistobaev and Sharygin, 1990). MD Sharygin stated that TSS is "the space-temporal form  
62 of the organization of the ocumene in which all spheres of life of people who are included in processes of social  
63 development and reproduction are relatively and interdependently combined."

64 Demographic potential starts to be considered as an important part of the national wealth. In a series of works the  
65 demographic potential is interpreted as exclusively reproductive capabilities of society which are determined by the  
66 number of reproductively active members of the community and their fertile activity. In the broader interpretation the same  
67 approach is represented in the works of T. Romashova who understands the demographic potential as "the rate of  
68 potential population growth on the basis of already established sex & age structure and dynamics of fertility, marriage and  
69 other special characteristics" (Romashova, 2006).

70 The idea of the demographic potential of society through the concept of population or life potential which is  
71 measured by the number of people with the account of total time of life they have lived, becomes more common. A  
72 consolidated list of approaches to the interpretation of the demographic potential was proposed M.V. Igoshev (Igoshev,  
73 2011) (table 1).

74  
75 **Table 1.** Main approaches to the interpretation of the demographic potential (Igoshev, 2011).  
76

Characterization	Approach (author)
The number of inhabitants of the country	Vishnevsky A.G. Vasin S.A. Zayonchkovskaya J.A.
The number of inhabitants of the specific territory	Center for Strategic Studies of the Volga federal district
Population size and population makeup according to sex and age	Motrich E.L.
Set of quantitative and qualitative indicators of population groups – now and in the near future	Filimonov N. Krasnolobtsev V.
The number of people with the account of total time they have lived	Petrakova Y.N.
Life Potential	E. Filroze L. Hirsch
Quantitative and qualitative potential of reproduction of population of the designated area (country)	Fedotovskaya T.A.
Total population, its sex and age composition, dynamics of growth (decline) of population, migration processes	Shalmuev A.A.
Reproductive performance of the ethnic group, of the community	Koreshkin A.
Index of potential growth of population on the basis of already established age-sex structure and dynamics of fertility, marriage and other specific indexes	Romashova T.V.
Index of characteristics of the dynamics of population reproduction, as well as its demographic perspectives at the aggregate level	Ediev D.M.

77  
78 Based on the above, the definition of the demographic potential of the area requires further clarification. In our opinion,  
79 the demographic potential of the area is a set of human resources of the territory, formed in conditions of the current  
80 demographic situation, and which can be used in the development of the territory with the account of the demographic  
81 situation.

## 82 83 2. Methodology

84  
85 In the scientific, as well as in the educational literature which is devoted to the question of demographic development, it is  
86 possible to find some methodological approaches, as well as the methodology for assessing the demographic potential.  
87 In particular, as it has already been mentioned, while analyzing the interpretations of the concept of demographic  
88 potential (Table 1), the main methodological approach of determination of demographic potential value is based on its  
89 quantitative assessment, or as a simple calculation of the country's population, or as the calculation of the number of  
90 inhabitants with the account of total time they have lived, or through life potential. However, in our opinion, such vision  
91 requires not the clarification, but the explanation relating to deeper understanding of the essence of the assessment

92 method of the demographic potential of the area.

93 As it has already been mentioned, in relation to the economy the population acts both as a wealth producer, as  
94 well as a consumer of material goods at the same time. Such two-sidedness of relations determines the complexity and  
95 sometimes the contradictory relations of population and economy. Population cannot exist outside the economy, and the  
96 economy cannot exist without population, they are two parts of one social organism (Gabdrakhmanov and Egorov, 2013).  
97 Consequently, for the in-depth study of geo-demographic situation it is necessary to study all the elements of TSS which  
98 influence it. To do this, G.M. Fedorov proposed to carry out the research in several stages: 1) regional-demographic: the  
99 study of the structure of demographic processes as such, the analysis of structural changes of demographic processes,  
100 their interaction and interdependence; 2) geo-demographic: the analysis of the impact of socio-economic factors on  
101 demographic processes, the analysis of indexes that characterize the connection of demographic processes and socio-  
102 economic factors, the study of the socio-economic dependence of connections of demographic processes with socio-  
103 economic factors (Fedorov, 1984).

104 Since the geo-demographic situation is formed under the influence of territorial socio-economic systems, and in  
105 their subordination the fundamental role belongs to the territorial-manufacturing system (of course, with the relative  
106 independence of all other systems), as far as exactly economic-demographic relations have a leading role with respect to  
107 the regional demographic, social-, population settling-, ethnic and ecological-demographic relations – the leading, but not  
108 the only one (Safiullin *et al.*, 2013). On this basis, the demographic potential is considered by us as a complex  
109 demographic, social, economic, population settling, ethnic, ecological phenomenon, which is the reflection and a complex  
110 characteristic of the most important interrelated features of TCP. In this work, the complex characteristic which includes  
111 various indexes of the demographic situation was offered to use as an integral measurer of demographic potential of the  
112 territory. In our opinion, this integral measurer consists of six large blocks: demographic, economic-demographic,  
113 population settling and demographic, socio-demographic, ethno-demographic and ecological-demographic  
114 (Gabdrakhmanov and Rubtzov, 2014).

115 The proposed methodology of analysis which includes the system of objective and subjective typological  
116 indicators, can become the basis for assessment of demographic potential of the area. The following categories are  
117 considered to be the main categories that form the demographic potential of the territory: demographic situation, labor  
118 resources, settlement system, demographic behavior, physical health and ethnic composition. As a result, the system of  
119 indicators used to assess the demographic potential of the area was developed (Table 2).  
120

121 **Table 2.** The system of indicators used to assess the demographic potential of the area  
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Key figures blocks	Aggregates	Objective performance indicators
Demographical block	Dynamics of population	- population, - total growth (decrease) of population, - population growth rates and population increase, - share of natural population increase in general population growth
	Birth-rate (fertility rate)	- number of births, - the general fertility rate, - age fertility rates, - the total fertility rate, - the fertility rate by birth order, - age rates of marital fertility
	Mortality	- the number of deaths, - general mortality rate, - age mortality rates, - the infant mortality rate, - age mortality rates by major causes of death, - the average life expectancy
	Natural growth	- natural growth (decrease) - general rate of natural growth
	Migration of population	- Number of arrived migrants, - Number of left migrants, - net balance of migration, - general rate of net balance of migration, - age rates of net balance of migration

	Age-sexual structure of the population	- number of men and women, - the proportion ratio of men and women, - demographic burden, - the proportion of different age groups in the population, - the rate of demographic aging
	Family structure of the population	- the number of registered marriages, - general rate of marriage, - total number of registered divorces, - general divorce rate, - the proportion ratio of marriages and divorces
Economic block	Labor resources	- population number of working age, - average number of employees, - distribution of labor resources by industry sector, - value of industrial products per capita
Social block	Standard of living	- average income per capita, - the average monthly nominal wage of workers, - the average growth rate of gross wage, - number of the unemployed, - Life expectancy at birth, - The registered unemployment rate
	Educational level of the population	- the share of people with higher education, - the share of persons with specialized secondary education
Population settling block	The level of urbanization	- Proportion of urban and rural population, - Density of rural population, - The average distance between settlements, - Population size of settlements
Ecological block	Physical health of population	- Sickness rate of population by major disease groups - Sickness rate of population by age groups, - Sickness rate of children of the first year of life, - mortality of population by causes; - mortality of population by age groups - level of techno-genic burden
Ethnic-cultural block	Ethnic structure	- share of the Tatar population, - share of the Russian population, - share of other nationalities, - ethnic diversity (the number of people in the community) - changes in the share of the national population; - time of living of ethnic groups in the area

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### 3. Results

The main differences of the demographic situation formed the basis of the typology of geo-demographic situation of the Republic of Tatarstan on the basis of two groups of features: production-economic and socio-demographic (Gabbrakhmanov and Rozhko, 2014). Thus, the following types and subtypes of the geo-demographic situation the Republic of Tatarstan and the corresponding types of demographic potential were identified:

- I type – city districts
- II type – district-side
- 2.1 – Chelny-side
- 2.2 – Kazan-side
- III type – oil
- IV type – the industrial-agrarian one with population decline
- 4.1 – areas with "deteriorating" demographic situation
- 4.2 – areas with "unfavorable" demographic situation
- 4.3 – areas with "crisis" demographic situation



#### 142 4. Discussion

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144 The study of the demographic potential of the region, their positioning and competitiveness based on the labor resources  
145 are currently of great importance. The regular appearance of reports on this topic at various conferences of various levels  
146 is the evidence of this. In particular, a lot of statements of this article were discussed at several conferences devoted to  
147 various aspects of the development of regions. And the methodology of assessment of demographic resources of the  
148 regions with relation to their potential is the main discussion point in most cases. As a rule, in the frames of the discussion  
149 there are different points of view on this issue. But in our opinion, only the complex approach can provide an objective  
150 assessment of the demographic potential of the region.

#### 152 5. Conclusion

153  
154 I type – city districts – Kazan and Naberezhnye Chelny. In general, this type is characterized by “favorable” demographic  
155 situation. In 2010 1646867 people lived here (Kazan – 1136566, Naberezhnye Chelny – 510301). There is positive  
156 dynamics of natural and mechanical movement of the population. The highest population density is exactly here. A higher  
157 proportion of people of working age is the feature of the age structure of this type, the demographic burden is was - 0.57  
158 which is below the republican indicator. This type refers to the old industrial areas where the proportion of the  
159 accumulated past labor is high. The current situation is due to the concentration of population, high standard of living, the  
160 considerable volume of industrial production, the development of market and transport infrastructures, the tertiary sector  
161 of the economy is actively developing, the performing of functions of the capital by Kazan also contributes to this. This  
162 type is characterized by the peculiar features of post-industrial society.

163 II type – district-side. This type is formed by municipal areas surrounding urban districts, it consists mostly of  
164 industrial cities and regions.

165 2.1 – Chelny-side (Mendeleevsky, Elabuzhskij, Nizhnekamsky, Tukaevsky, Zainsky municipal districts).

166 12.6% of the population of the Republic of Tatarstan live in these regions. This subtype is characterized by “good”  
167 demographic situation. Mechanical engineering (automobile manufacturing, electrical engineering industry), as well as the  
168 chemical and petrochemical industry, are the main industries. The population is distributed unevenly, mainly in urban  
169 areas. Regions of this subtype are characterized by favorable age-sex structure of population which determines high  
170 demographic potential. The average demographic burden was 0.62 (with minimum in Nizhnekamsky and Elabuzhsky  
171 areas - 0.55). in addition to the low demographic burden, the fact that the proportion of people of younger working age is  
172 higher than the proportion of people of retirement age is rather encouraging. In general, the regions of this subtype are  
173 characterized by average level of social welfare. However, deteriorating ecological situation is the main threat for the  
174 demographic situation; it is explained by concentration of a large number of industrial enterprises of chemical industry.  
175 Now Solution of environmental problems has led for improvement of health of the population, which results in a decrease  
176 of sickness rate and mortality.

177 2.2 – Kazan-side (Verkhne-Uslonsky, Vysokogorsky, Zelenodolsky, Laishevsky, Pestrechinsky, Atninsky, Arsky  
178 municipal regions). Its share is 9,3% of population of the Republic of Tatarstan. In general, the demographic situation can  
179 be characterized as “good”. Despite the negative performance indicators of natural population movement the migration  
180 growth rate in the region, on the contrary, was positive, and this compensated the loss of natural population decline, and  
181 also ensured its increase. In all regions of this subtype the number of people of younger working age is less than the  
182 number of people of retirement age, and this negatively influences the formation of the demographic potential. However,  
183 the low value of the resource potential of the Capital Economic Area (equal to 0.684) convincingly demonstrates the most  
184 efficient use of production potential and other resources of the region in comparison with the other economic regions and  
185 points to the existing potential for economic growth with more efficient use of available resources.

186 III type – oil – (Aznakaevsky, Almetyevsky, Bavlinsky, Bugulminsky, Leninogorsky, Yutazinsky municipal regions):  
187 the economy of regions of this type has strongly marked specialization: oil extraction and production of oil equipment.  
188 Average urbanization rate is 73.28%, which is slightly lower than the national indicator, despite the presence of a large  
189 number of towns and urban-type settlements. This type is characterized by “relatively good” demographic situation.  
190 Negative natural population growth is worsened by the negative migration balance.

191 IV type – the industrial-agrarian one with population decline: the economy of cities and regions of this type is based  
192 on the agricultural enterprises, building materials industry, the food industry. The regions of this type are characterized by  
193 the natural population decline, which is worsened by migration outflow.

194 4.1 – areas with “deteriorating” demographic situation. This subtype united 5 municipal regions – Agryzsky,  
195 Aktanyshsky, Menzelinsky, Muslyumovsky, Sarmanovsky. 156,004 people live here, it is 4.1% of the population of the

Republic of Tatarstan. The economy is based on agricultural enterprises, building materials industry, food industry. The number of the employed in the economy is 6% of all the employed people in the economy of the Republic. The level of population demographic burden is higher than the republican level. This subtype is characterized by gradual decline of population. Natural population decline that occurs in all municipal regions, makes the main contribution to the decrease of population. However, the natural decline is compensated by positive migration balance.

4.2 – areas with "unfavorable" demographic situation. This subtype consists of 6 municipal districts – Baltasinsky, Kukmorsky, Mamadyshsky, Rybnoslobodsky, Sabinsky, Tyulyachinsky. Its share is 1.2% of the population of the Republic of Tatarstan, the total number of people is 44798 residents. The economy of the regions is based on agricultural enterprises, building materials industry, food industry. The number of the employed in the economy is 6% of the number of all employed people in the economy of the Republic. This subtype is characterized by a generally long life time and low standard of living. The proximity of the city of Kazan causes the high level of techno-genic burden, and only the remote Rybnoslobodsky region is characterized by favorable situation from the ecological point of view.

4.3 – areas with "crisis" demographic situation. The largest number of regions of the Republic of Tatarstan (Apastovsky, Buinsky, Drozhzhanovsky, Kaybitsky, Kamsko-Ustyinsky, Tetyushsky, Aksubaevsky, Alkeyevsky, Alekseevsky, Novosheshminsky, Nurlatsky, Spassky, Cheremshansky and Chistopolsky municipal regions) belong to this subtype. Despite the significant occupied area (one fourth of the area of the Republic of Tatarstan), only 427,602 inhabitants live here, which is 11.3% of the population of the Republic of Tatarstan. Regions of this type have the limited – on a republican level – potential of natural resources; this potential is represented mainly by land resources (soils of mainly chernozem type), resulting in the economy based on the food industry, agriculture, building materials industry. The small share of working-age population is the peculiar feature of the age structure of the region, this is typical for all rural areas. Demographic burden is 0.79 on average is. High proportion of people of retirement age is the second peculiar feature which follows from the first one. Such situation allows to speak about possible difficulties to provide workforce, specialists of the new industries, as well as of traditional agriculture.

## 6. Statements

Thus, the geo-demographic typology allows to make the conclusion about the impact of the two "points of growth": Kazan and Naberezhnye Chelny. Territorial peculiarities of formation of the demographic potential greatly depend on the peculiarities of the industry of economic development of the region (the predominance of the secondary and tertiary sectors of the economy).

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# Modern Principles of Financial Services Markets Regulation as a Response to the Financial and Economic Crisis of 2008

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## Abstract

The financial and economic crisis of 2008 revealed lack of tools and inefficiency of methods used by regulators of leading states to predict and prevent crisis of global proportions. In this regard, national and supranational regulators are trying to introduce new principles for regulation of financial services markets, based on the philosophy of macro-prudential regulation. The paper presents a comparative analysis of institutions and methods of regulation in the USA, UK and European Union. The authors critically analyze the effectiveness of new models of regulators, questioning the benefits of new ones in comparison with previous. They emphasize the necessity to reform not only institutional structure of regulators but methodology of their activities too, as well as, the absence of universal prescription of reforms, coming to conclusion, that each country must choose its own, based on their legal traditions, regulatory system.

**Keywords:** financial services markets, regulator of securities, qualified investors, financial regulation, principles of financial regulation, systemic risk, prudential rules, macro-prudential regulation, models of macro-prudential regulation, micro-prudential regulation.

## 1. Introduction

Development of modern principles of regulation arising in the financial services markets was influenced by the complex global economic process of the twentieth century. The impetus for the formation of the legislation on securities was the financial crisis of 1929. For instance, as said Bernanke: 'To understand the Great Depression is the Holy Grail of macroeconomics.' [1] Three legislative acts as a response to the financial crisis of 1929-1934 reformed the financial market in the USA. The principles underpinning these acts have provided formation of stable financial market and influenced on the development of European legislation [2]. First of all, it was the Glass-Steagal Act of 1933, which separated investment and commercial banking. Secondly, it was the Securities Act of 1933, which regulated the issuance of new securities. Thirdly, it was the Securities and Exchange Act of 1934, which regulated issued securities; for instance, prohibition of insider trading [3]; and established the Securities and Exchange Commission (SEC). In turn, the SEC is a special state body responsible for the securities market and subordinated directly to the President of the USA. This Commission established the procedure of accessing to the conduct of professional activities on the securities market, carrying out the control over the activities of brokers, dealers, asset managers and other professional members providing services to third parties. Access to professional services could be obtained on the basis of the license or through membership in self-regulatory organizations or stock exchanges. In addition, the SEC was responsible for registration of securities, primarily stocks and bonds, which had to be sold to the public. In other words, the American 'post-Great Depression' legislation created the framework of micro-prudential regulation, which was progressive and efficient until the 2008 financial crisis.

## 2. Development of Modern Principles of Financial Regulation

Despite some criticism of establishing a regulator of securities from proponents of 'light touch' regulation [4], these principles have defined the framework of state regulation of the financial market. Moreover, it can be stated that these principles are almost universal and found reflection in the EU directives and national legal acts of the EU Member States [5]. However, by setting stringent requirement in respect of the procedure of issue of securities held for proposals to public, the legislative may provide for a more liberal regulatory regime in respect of other financial instruments. For instance, it may be securities held for offer to professional participants of the financial market [6]. These persons usually

referred to as 'qualified investors' that include professional participants of the securities market, such as asset management companies of investment funds or credit organizations. It is assumed that these organizations have ability to properly and adequately assess the risks associated with investments in instruments that are not registered in the authorized state body. Moreover, the state establishing special requirements for professional securities market participants also has the ability to keep them from being too risky, thereby protecting their clients – investors. After all, violations of investors' rights undermine the credibility of the national financial market, destabilizing it. This approach determines the ratio of civil law norms and special administrative norms regulating legal relations that arise in financial markets. Hence, this balance of self-regulation or decentralization and state or centralized regulation depends on the legal traditions and understanding of the nature of law. For instance, in civil law countries, it is more centralized regulation. In contrast, in common law countries, it is more decentralized regulation. However, the last financial debacle shifted regulation towards more centralization.

Compliance with requirements relating to the securities and financial instruments held for qualified investors has become a worldwide practice. Undesirable effects occur not only for purchasers of securities but primarily for professional market participants. As noted in the report of the group investigating the causes of the 2008 crisis, regulation should become more intelligent and not allowing to go on about professional investors [7]. In the world practice, there is a prohibition for professional market participants to offer financial instruments to non-qualified investors. In the USA the rules of issue and distribution of securities intended for qualified investors were established under the Securities Act of 1933 rule 144-A [8],[9],[10]. Meanwhile, in the UK self-regulation prevailed until 1987, when Financial Services Act of 1986 came into force [11]. Such regulation exists in the EU too. In particular, the distribution of the securities by means of offering them to the qualified investors is carried out by means of direct indication that the paper should fulfill the requirements of EC Directive 2003/71/EC [12] establishing the compulsory registration of prospectuses of securities. The prospectus of the relevant type of securities is prohibited to offer this security to unqualified investors. However, the current financial market with modern policies of complicated financial instruments and massive and interconnected financial institutions demands a new level of regulation, a macro level.

Modern system of macro-prudential regulation. Current system of financial regulation is unable to provide managed volatility of the financial market. Consequently, achieving relative stability of functioning of financial institutions is a very relevant question. Events at the world financial markets will make one to rethink the basic concepts and hypotheses of the system of financial regulation [13], particularly issues related to systemic risk posed by 'too big to fail' financial institutions. Moreover, modern financial and economic markets are characterized as a global complex open system. In other words, when a fault occurs in one of the elements of this system, problems can spread throughout the system and may lead to stagnation of the system as a whole.

### *2.1 Models of macro-prudential supervision*

To keep control over the development of world and national financial systems and prevent further systemic crises, leading world states focused on macro-prudential regulation and supervision. Simplifying, it is 'to help prevent the build-up of bubbles' [14]. For instance, to provide macro-prudential regulation the USA, the UK and the EU created new systemic risk agencies: the Financial Stability Oversight Board (FSOC), the Financial Policy Committee (FPC) and the European Systemic Risk Board (ESRB) respectively. Thus, as a response to financial crisis the leading states changed rules and institutional structures of financial regulation [15]. In addition, it would be better if these high-level financial supervisors were compatible and collaborated to each other [16]. These decisions are based on the already proved its fallacy opinion of the leading countries that to deal with the crisis is enough to have a regulatory system.

Modification of the system of macro-prudential analysis is expressed in the rejection of the model of a 'single regulator', which has proven inability to regulate the threats of the market, because of lack attention to the 'issues of systemic risk, systemically significant firms and systemic resilience' [17], in favor of 'twin peaks' model (for instance, the UK). This separation of functions enables greater concentration on particular management objectives. For instance, it can be management of systemic risk or protection of the consumers and investors rights separately. This innovation is aimed to reduce overlapping of functions and risk of competition targets inside the regulatory body. Thus, it can be expected increasing of the efficiency of response to emerging threats. However, the offered model may contribute to regulatory arbitrage between different sectors of the financial market.

In addition, it cannot be excluded that risks will concentrate in the less regulated sectors of economy. This fact is of particular importance because uncontrolled growth of risky assets of the least regulated financial operators in the USA is a result of active trade in the market of financial derivative instruments. Similarly, these uncontrolled derivatives became one of the causes of the last financial crunch, which spread to the entire global financial and economic system [18]. It is

therefore pertinent to state that, in the world practice there is no a universal model of the macro-prudential system of regulation. It can be explained by different legal traditions and understanding of the nature of law. Thus, currently, each country seeks and accepts its own, sometimes different, approaches. These solutions are based on the adoption of international experience of the established legal and institutional system of the country.

### 2.1.1 The USA model

The USA, in accordance with the Dodd-Frank Act [19], holds the most radical reforming of financial regulation since the Great Depression [20]. This is understandable, since the scale of the recent crisis comparable with the crisis of the first third of the twentieth century. The only difference is in the nature of crises. The recent one is a banking or credit crisis, while, the Great Depression was a stock-market crisis [21]. In connection with that, the Dodd-Frank Act requires changes in the current institutional structure for regulation of financial system by more centralization [22]. It provides a system of supervision and monitoring systemic risks to 're-impose controls' [23]. The main aim of the Act is 'To promote the financial stability of the United States..., to end 'too big to fail' [24]. It moves in the direction of strengthening of control over systemically important companies. For instance, the Act addresses special leverage ratios on SIFIs [25]. In addition, regulators get power for the rehabilitation and liquidation of problematic financial companies, which can be risky for the financial stability of the USA. It is particular important including in the scope of regulation non-banking financial institutions and other companies which are the parts of the holding and, consequently, can bear risks for the whole financial system.

However, in spite of having progressive ideas, the Dodd-Frank Act was criticized for being lengthy and complicated [26]. Similarly, Baber states that the Dodd-Frank Act 'have been finalized too quickly, without a full review of the potential implications within the financial sector' [27]. Moreover, currently, it is quite difficult to state the full compliance of new legislative initiatives to the goals of reforms. For instance, the Act does not contain instruments of size decreasing of 'too big to fail' institutions [28]. Consequently, in the case of crisis the government will bail-out big banks again [29],[30]. This policy laid the groundwork for future crises by reducing financial discipline and formation expectations of mandatory SIFIs support [31]. As a result, the problem of 'too big to fail' is unresolved and the probability of potential financial crises is not minimized.

### 2.1.2 The UK model

In the UK, the regulatory reforms lead to building more centralized system of regulation. The policy of transition to the new structure of macro-prudential regulation is based on the ideas of accounting of individual behavior for regulation [32],[33]. The tripartite system of regulation: The Financial Services Authority (FSA), Bank of England, HM Treasury, is replaced by a new structure, consisting of: Financial Policy Committee (FPC), Prudential Regulation Authority (PRA), Financial Conduct Authority (FCA). In comparison with the previous ones, the credentials of new regulators are broader. For instance, FPC, a committee of the Court of the Bank of England, is responsible for protection the stability of the financial system in general, or macro-prudential regulation [34]. The activities of the PRA, a subsidiary of the Bank of England, aim at reducing the risks of the financial system by ensuring safe and reliable functioning of the regulated companies, or micro-prudential regulation [35]. FCA, independent regulator, is responsible for the protection and improvement of confidence in the UK financial system through the control over the market infrastructure and regulation of the conduct of agents and companies on banking, investment and insurance markets, which are not subject to regulation under PRA, and following a new trend in regulation is going to apply more interventionist approach in comparison with the FSA, which used more preventive approach [36].

However, Hudson [37] reasonably criticizes the new tripartite system for great opportunity of overlapping functions of micro-prudential regulation and conduct of business. Moreover, during the last financial crisis all former three bodies claimed each others for not predicting and preventing of the crisis. Currently, the conception of the regulation has not changed [38]. Thus, the rationale of the new system is quite unclear. In addition, there is doubt about the profitability of such significant transformations. In contrast, the previous system was relatively developed, but the new one will have to be tested; and it is unknown how it will resist a stressful situation [39],[40]. Thus, it seems that new system solely increases the level of bureaucracy, but methods of regulation have not been changed.

### 2.1.3 The European Union model

On 22 September 2010, the European Parliament approved a plan of reforming of the EU financial regulation system. This reform is aimed at ensuring the sustainability and stability of the financial system through the improvement of the



institutional structure of regulation, elimination of problems of fragmentation of individual risk analyses at the national levels, development of the system for early detection and prevention of the emergence of systemic risks. However, in spite of being relatively simple, a European model is more practical in comparison with mentioned above systems. Also, like the previous models, it focuses on expanding of macro-prudential supervision on the entire financial system. For this reason, in December 2010 it was created a new independent body, European Systemic Risk Board (ESRB) [41], which is responsible for macro-prudential supervision of the whole EU financial system. Moreover, ESRB coordinates the activities of the three main European Supervisory Authorities (ESAs). That is European Securities and Markets Authority (ESMA) [42], European Banking Authority (EBA) [43], European Insurance and Pensions Authority (EIOPA) [44].

The main purpose of this institute is to prevent or mitigate systemic risks in order to ensure financial stability in the EU or at least to limit the distribution of the financial turmoil in the region. First practical results of the ESRB work are the development of methodological bases of the institute's work, providing monitoring and stress tests of the European markets with the aim of identifying, prohibiting and preventing potential systemic risks and the development on their bases programs of measures of risks elimination. Unlike the policies implemented in the USA and UK models of hard regulation, the EU applies a policy of soft law. In other words, in case of detection of risks in the financial system regulator uses tools such as warnings and recommendations. In comparison to the UK, the EU is more actively involved in the regulation of hedge funds, private equity funds, rating agencies and over-the-counter derivatives market [45]. This is explainable by the fact that it is impossible to overestimate the negative contribution of these institutions in the development of the last financial crisis, for example the impact of activities of such SIFI, as AIG [46]. In comparison with the Dodd-Frank Act, Baber underlines a more 'sincere and comprehensive approach to contain the consequences of the collapse and to establish an effective and fair supervisory regime in the future' [47].

However, the ECRB is only theoretically independent body. Practically, it is embedded into European Central Bank (ECB), which could neither prevent no predict the last financial crunch [48]. For this reason, it seems that close relationship of these bodies will not be productive in preventing future financial crises. Secondly, in spite of having advantages of implementing the soft law, in case of emergency it will be rather difficult to force national authority to comply with ECRB and will become less legal and more political process [49]. Moreover, a complex system of coordination and policy making in the EU framework is the reason for the lack of responsiveness to perceived threats [50]. This problem is not new and it was tried to cope since 1963, when Segre in his report underlined the importance of integration of the European financial markets.

#### 2.1.4 *Background of the EU financial regulation*

##### 2.1.4.1 *Segre report*

The main purpose of the Segre Committee's study was to identify the factors necessary for the development of the European financial market [51]. The report clearly drew emphasis on the importance of integration of the European financial market [52]. In order to implement the proposals of the Segre Committee on trade in securities and on the legal basis of the Rome Treaty, from 1972 to 1982, three directives were adopted: Directive 79/279/EEC [53], Directive 80/390/EEC [54] and Directive 82/121/EEC [55]. Later in 1985 the White Paper from the Commission to the European Council, it was noted that to achieve integration there is a need of liberalization of financial activity [56]. However, the Committee stated that regulation should be in the national jurisdictions; and, this legal separation would help to increase liquidity in financial market [57]. In other words, 'the European Commission committed itself to the concept of minimum harmonization.' [58] In 1988, due to the lack of regulation at the national level, Directive 88/627/EEC was adopted [59]. The main purpose of this Directive was to protect the investor through the provision of adequate information. Further, in 1989, Directive 89/298/EEC aimed to ensure availability of information on securities [60]. Then, to prevent insider dealing Directive 89/592/EEC was adopted [61]. Finally, to protect investor, Directive 93/22/EEC introduced the concept of 'prudential rules' [62]. These rules require the keeping of records of transactions and investors' notification. In 1999 in order to further integration of the European market the Commission in its Financial Services Action Plan (FSAP) [63] proposed to introduce the single European currency [64], as well as, to organize a securities committee [65].

##### 2.1.4.2 *Lamfalussy process*

On 9 November 2000, the Committee, led by Lamfalussy, published an initial report [66] which criticized the slowness of the legislative process [67]. In particular, it was pointed on the significant difference of the EU Members' rules [68]. On 15 February 2001, the Committee published a final report [69] which outlined the measures needed to expedite the



legislative process [70],[71]. These measures were called Lamfalussy process and consisted of four-level [72] system [73]. First, it is development of framework directives. Second, it is technical execution of these directives. For this reason, and to perform advisory functions a Committee of European Securities Regulators (CESR) [74] was organized. In addition, the CESR was responsible for improving the collaboration of the national supervisory bodies. Later, in order to meet modern principles of regulation, in 2003-2004, the Committee adopted four directives: the Market Abuse Directive (MAD, 2003), the Prospectus Directive (PD, 2003), the Markets in Financial Instruments Directive (MiFID, 2004) and the Transparency Directive (TD, 2004), which are currently the legal basis of European capital markets. Directive MAD 2003/6/EC [75] was adopted to prevent manipulation and insider dealing. Directive PD 2003/71/EC [76] regulates the requirements for the prospectus necessary for the issuance of securities. Directive 2004/39/EC [77] (MiFID) establishes framework for market organization and prudential rules for investment firms. Directive 2004/109/EC [78] (TD) is devoted to the issues of coordination of the transparency requirements of issuer information. Further, on 30 April 2004, to harmonize European takeover legislation, Directive 2004/25/EC [79] (TOD) was adopted. In 2005, the Commission proposed in its Green Paper [80] (May, 2005) and later confirmed in White Paper [81] (December, 2005) the economic profitability principle of legislative and enforcement processes.

### 2.1.5 Post-crisis development

#### 2.1.5.1 De Larosier report

The last financial crisis of 2008-2009 revealed the necessity of preventing systemic risks committed by failure of large financial institutions which used to be reputed 'too big to fail'. Thus, this crisis showed the lack of global regulation and international cooperation of national authorities to diminish systemic risk and to terminate 'too big to fail' problem. In response to this situation, on 29<sup>th</sup> February 2009, the Committee under Jacques de Larosier chairmanship published a report [82] in which measures necessary to maintain financial stability at the global and European levels were suggested. In Europe, it was proposed to create a pan-European body that would coordinate activity of national supervisors. In turn, national regulators would execute the main obligation of direct supervision in their states. However, the UK government expressed disagreement against establishing of banking supervision body at the EU level [83]. Nevertheless, following the de Larosiere recommendations, on 23 September 2009, the Commission issued legislative measures to identify and prevent the systemic crisis in whole Europe ('macro-prudential supervision') and measures to update the regulation of individual market participants ('micro-prudential supervision') [84]. Thus, in 2010 a European System of Financial Supervision was organized. Functions of this organization were allocated among three separate bodies: the European Securities and Market Authority [85], the European Banking Authority (EBA) [86], the European Insurance and Occupational Pensions Authority (EIOPA) [87].

Before the crisis, the Commission did not planning any measures for regulation of activities of credit rating agencies and financial analysts, the requirements to the offer documents to purchase and the required minimum capital of market participants [88]. However, the crisis brought its corrections in relation to these matters. In particular, the issue of regulation of rating agencies raised in April 2002. Nevertheless, in April 2006 the Commission decided that there was no need of changing regulations of these agencies. The International Organization of Securities Commissions (IOSCO) deemed that self-regulation is the most suitable for rating agencies. However, the crisis showed that uncontrolled rating agencies played their negative role in wrong assessment of credit risks. Due to significance of rating agencies in global securities and banking markets, information of which were used by financial institutions for calculating risks in their investment activity, the European community realized the need of changing of credit ratings principles on the basis of integrity, transparency, responsibility and good governance in order to insure that agencies operate independently, objectively and produce reliable information [89].

For these reasons, to introduce prudential rules for rating agencies and to submit them to supervision, on 16 September 2009 the European Parliament and the Council adopted Regulation (EC) No. 1060/2009 on credit rating agencies. In subsequent years, with the aim of preventing financial crises and promoting financial stability, the Commission constantly proposes measures to update this Regulation. Based on these proposals, the Regulation shifts to the direction of more centralization of supervision at the European level in the ESMA competence and ensuring more transparency of credit rating agencies activities [90], of introducing of civil liability for incorrect information provided and more tough measures for discloser of these agencies [91]. In the last amendment, Regulation (EU) No.462/2013 [92], taking into account bias position of rating agencies towards big financial institutions, the subject matter was changed by adding the concept the avoidance of conflicts of interest [93], in other words the conflicts between consumer and SIFI.

273 2.1.5.2 Modernization of framework directives

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The 2008-2009 financial crisis exposed weaknesses in four framework Directives: Market Abuse Directive (MAD), Prospectus Directive (PD), The Markets in Financial Instruments Directive (MiFID) and Transparency Directive (TD). These acts adopted in 2003-2004 in other financial and economical circumstances were not adjusted to new conditions. Particularly, these acts had insufficient regulatory ability, undeveloped investigative capability and sanctioning powers. Moreover, regulations on national level were not enough harmonized. In connection with the foregoing, the Commission, consulted with CESR and the European Securities Markets Expert Group (ESME), proposed measures to modernize framework Directives. Later, in 2010, the European Parliament adopted Directive 2010/73/EU [94] with strong intention to improve investors' protection. Further, as MAD amendment [95], the Commission proposed to introduce administrative and criminal responsibility for committing insider dealing and market manipulation [96]. Nevertheless, the existing MAD, in the case of adopting by Parliament and the Council, will be replaced not earlier than 2015.

The next proposal [97] is related to TD and aimed to reduce administrative barriers for small and medium-sized financial institutions, as well as harmonization of the notification mode of large financial groups. However, practically, this proposal can be implemented not earlier than 2014. Also, the Commission proposed to update MiFID 2004/39/EC [98]. The main emphasis is made on insufficient regulation of the derivatives circulation, which in turn contributed to the development of the recent financial crisis. The financial meltdown has also highlighted the danger to the stability of the financial system of short sales. In this regard, to reduce systemic risk by increasing transparency, the Commission adopted Regulation No.236/2012 [99]. Further, taking into account that derivatives, especially OTC derivatives, also contributed to the 'swelling' of the financial 'bubble', the Commission adopted Regulation 648/2012 [100]. This Regulation demands stricter accounting of derivatives and more transparent to derivatives turnover.

### 3. Conclusion

Conclusively, setting down strict requirements in respect of professional participants and in relation to the procedure of conducting their operations in the financial markets, the state tries to ensure stable development of the national market. This issue is again in agenda, because the global financial crisis that began in 2008 has demonstrated that it is uncontrollable and reckless actions of market participants that led to severe economic consequences of global level. For this reason, strengthening of state regulation became imperative. However, it means not only increasing its scope, the number of rules or prohibitions and restrictions; but, the transformation of the state regulation mechanism from micro-prudential to macro-prudential that would prevent mistakes and problems leading to the systemic crisis. It seems that established supervisory bodies will be able to contribute to identifying and mitigating systemic risk. However, the results will be known only after stress-testing of the new systems.

In addition, it is worth to remember that the financial world is developing and can present new challenges. That is why new supervisory bodies should be flexible and capable to predict changes in the financial world. Moreover, the effectiveness of regulation depends primarily not on the degree of centralization or self-regulation, but mostly on philosophy of macro-prudential analysis and adopted on this basis administrative decision, that is the construction of the so-called "smart regulation". Such regulation should take into account the new systemic characteristics of financial markets and the major players of this market SIFIs. However, SIFIs are not only conventional banks, but also institutions engaged in banking activities, 'shadow banks', contributing to the growth in the number and severity of systemic crises in the economy and lead the modern global financial system into chaos and uncertainty. Thus, foregoing factors influence on the choice of regulatory system by national regulators and development of modern principles of regulation.

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# New Requirements of the Basel Committee on Banking Supervision to Capital as a Measure to Ensure the Stability of the Banking Sector

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## Abstract

*In this paper is devoted to problems of the introduction of new capital and liquidity standards proposed by Basel III. In particular, the authors critically analyze the lack of rigidity of the new requirements especially with respect to systemically important financial institutions. They also emphasize the necessity of macroprudential regulation to build more resilient financial system.*

**Keywords:** *systemically important financial institute, systemic risk, financial crisis, micro-prudential regulation, macro-prudential regulation, bank capital, liquidity, liquidity coverage, net stable funding.*

## 1. Introduction

'In the absence of detailed, prescriptive global standards, national regulators enjoy considerable discretion with regard to their local approaches. In practice, such flexibility means any one country's efforts to deal with the problem can potentially be undercut by another country's inaction' [1]. For this reason, in 1974, the Basel Committee on Banking Supervision (BCBS) was established by the Group of 10 (G-10) with the aim of preventing financial crises of international scale [2][3]. In 1988, Basel I proposed international standards for capital requirements. However, only narrow spectrum credit risk standards were not enough to prevent a series of crises in the nineties, for instance, the Mexican and the Asian [4]. Later, in 2004, Basel II was adopted, which consisted of three pillars: capital, supervisory review process and market discipline. However, even during Basel II project development, Half criticized the insufficiency of attention given to the regulation of 'financial conglomerates' [5].

## 2. Shortcomings of Basel II

The last global financial crisis, exposed shortcomings of Basel II and forced BCBS [6] to soundly revise existing capital adequacy requirements, diversification of credit portfolio, standards of liquidity management, and other spheres of bank activities to mitigate systemic risk [7]. It was revealed that Basel II standards were inadequate to prevent or at least to reduce the effects of global financial turmoil [8]. For instance, Northern Rock's internal risk model for residential mortgages in 2007 was in compliance with Basel II standards [9]. As a result, BCBS has developed a new edition of the provisions, so-called Basel III. It aimed to eliminate shortcomings of the Basel II, strengthen stability of the global financial system and prevent the onset of a new global financial crisis. Primarily Basel III changed conception from micro-prudential regulation, which was used by Basel II [10], to macro-prudential. In other words, the main concern of the new Accord is to protect not single bank, but the whole banking system. Moreover, Brunnermeier et.al argued that Basel II standards provoked banks to become 'too big', because in that case banks could count on government support in stress situation [11]. However, Basel III does not cancel Basel II [12], but modernize it and have an aim to adequately address the following shortcomings [13][14][15][16]: incentives for 'too big to fail'; high level of systemic risk; lack of macro-prudential regulation; lack of international coordination; lack of transparency; treatment of pro-cyclicality. Trying to solve these issues, Basel III Accord [17] becomes one of the most important international regulatory responses to 'too big to fail' problem [18]. New Accord demands higher requirements to capital and liquidity, particularly to SIFIs.

### 3. Requirements to the Structure and Quality of Bank Capital

The requirements to the structure and quality of the bank capital base have been tightened by Basel III agreement [19]. The Basel Committee proposed 'to strengthen global capital and liquidity regulations with the goal of promoting a more resilient banking sector' [17]. New capital requirements are introduced for the tier 1 and tier 2 capitals. Hybrid and quasi debt instruments are gradually withdrawn [14]. A list of allowed deductions from the capital base is being defined. Requirements to the own bank capital and capital of the first generation are being increased. Thus, Basel III focuses on the function of the equity instruments to absorb losses, what can be explained by the nature of the recent crisis [20]. Related to SIFIs, BIS [21] proposed 'higher loss absorbency requirement' from 1% to 2.5% depending on the systemic importance of the organization. This extra loss absorbency will come from tier 1 capital. However, this requirement will be introduced not earlier than 2019. Therefore, Basel III defines two levels of capital: tier 1 capital as a capital which can absorb losses during the current bank activity, 'going concern', and tier 2 capital as a capital which is able to cover the losses in the course of the termination of bank activity, 'gone concern' [22][23]. The tier 1 capital consists of Common Equity Tier 1 capital, which is the most reliable part of the capital; and Additional Tier 1 capital [24]. Common Equity Tier 1 capital includes the ordinary shares and share premium on ordinary shares. For Additional Tier 1 capital the Basel Committee proposed to include non-cumulative perpetual privileged stocks. In contrast, innovative hybrid instruments, such as subordinated loans with additional conditions, will be gradually excluded from the composition of the capital base of banks [25]. Tier 2 capital includes preferred stock with non-perpetual and debt-like features and subordinated debt [26]. Tier 3 capital, according to Basel III, is being abolished by the new system [27]. In the Basel I and the Basel II, deductions were carried out of both tier 1 and tier 2 capitals. In contrast, in accordance with Basel III, the main burden falls on the basic capital of tier 1 capital. Although, the consultation document does not directly set the ratio of tier 1 and tier 2 capitals, it proposes, to establish the ratio through minimum capital adequacy requirements for coverage for expenses [24].

Furthermore, the consultative document provides creating of two buffers; capital conservation, to cover banking losses during economic downturn, and counter-cyclical, to limit excessive bank credit activity [28][29]. The main purpose of formation of these buffers is to maintain a capital reserves and ability to absorb additional losses. The sense of these innovations can be explained, that during the onset of the last financial crisis some banks used to distribute dividends and personnel bonuses [30]. Moreover, the recent financial and economic crisis has shown the dependence of credit risk assessment on the phase of the economic cycle. In other words, in periods of economic recovery the risk for the banks are low, as well as for capital requirements. This means that banks will be able to increase lending, which will serve as a source of new pro-cyclical momentum [31][32]. As a result of these approaches, banks sharply reduced creating volumes of lending in the period of economic decline, when the economy was in the greatest need for additional capital. Therefore, the introduction of counter-cyclical buffer, determined by the ratio of the total value of credits and GDP [33], aimed to solve this problem by curbing the credit activity of the banks in periods of economic recovery and promoting in periods of recession [34]. Exceeding the threshold values of the record identified by the national regulator is the signal for the establishment of bank counter-cyclical buffer. In turn, conservation buffer is introduced for stability, with respect to both individual and systemic risks. The aim of this action is to support the banks during periods of 'systemic' problems. Practically, it is a system of banking insurance of protection from 'contagion risk'. In other words, this is a risk arising in the case, when the adverse process in one country lead to the fall of the rating or credit crunch in other countries too. Particularly, this requirement is important to prevent risks imposed by 'too interconnected' financial institutions, one of the characteristics of the SIFIs. In the case of forming by banks both counter-cyclical and cyclical, requirements will increase in two times up to 9,5% assets risk-weighted, since added another 2,5% in the form of the counter-cyclical buffer [24]. In turn, to improve the quality of capital and prevent excessive leverage in the banking sector, the Basel Committee has worked out proposals for the introduction of a new regulatory indicator 'leverage ratio' [24]. That is the ratio of capital to total volume of its assets and off-balance claims, not weighted by risk level.

Supporting new requirements, Hilderband [35] states that higher leverage or lower leverage ratio, the lower opportunity to absorb losses. As a result, the resilience of this bank to stress is lower. Similarly, Lui [36] highlights the importance of leverage ratio and capital requirements to sustain stability especially of large banks, because they can be characterized as 'too big to be regulated'. For instance, Australian banks, having higher level of liquidity and leverage ratio in comparison with UK banks, better resisted to the last financial debacle [36]. Hence, in addition to the new requirements to capital structure, the Basel Committee regulates the overall structure of the banks' balance by way of determination of the percentage of the borrowed funds. However, Petersen et al. [37] criticize the way of calculation of the leverage ratio and went further to argue that the new methodology of leverage ratio estimation does not improve this standard in comparison with Basel II. Thus, this instrument alone will not be able predict and prevent systemic risk,



especially imposed by large financial institutions [37]. Moreover, Kashyap et al. [38] predict that introduction of this factor may significantly increase the cost of all bank credits, because this factor is not entered on the weighted risk, but on the gross value of assets, that would be more targeted on risk reduction.

Nevertheless, BCBS chose the option with the lowest incremental load to SIFIs. While many large banks, particularly in the USA, have already complied requirement of 10 percentage of capital. In contrast, European banks, as a result of the imposed changes, will be forced to significantly clean its capital base, excluding deferred tax and share of participation of subsidiaries with a one-time increase in the number of common shares and retained earnings, having the aim to restore the capital base. However, in spite of progressiveness of the idea of extra charge for SIFIs, Petitjean notes two issues to implement new requirements [16]. First of all, it does not exist elaborated mechanism of identifying systemic risk urgently to impose proper surcharge timely. Secondly, as Duffy [39] described, according to the US regulation banks have already had to issue new shares in stress situation. Thus, despite the presence of updated act, but in the absence of the coercion mechanism, reforms may be will not be implemented.

#### 4. Standards for Liquidity Management

The last financial crisis started as a liquidity crisis [18]. However, till date there are not much of internationally agreed standards. Taking into account these facts, the Basel III proposed standards for liquidity management [40]. Thus, the Basel Committee has introduced two minimum standards for liquidity: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) [25], which should be external indicators of sustainability of the banks in case of the crisis of liquidity [24]. Like the international capital standards liquidity standards will establish the minimum requirements and will maintain equal conditions on the international level.

##### 4.1 The liquidity coverage ratio (LCR)

LCR allows assessing the bank capacity to continue its activities within 30 days of the stress [25], and defined as the ratio of liquid assets to net cash outflow. Liquid assets are divided into two levels. The first one includes cash, bank reserves and debt obligations of public entities, in other words, assets with 100% guarantee, which should be liquid in times of stress. These assets cannot be cut under the stress. The second level assets include securities issued by non-financial institutions. Unlike Level 1 assets, the size does not exceed 40 percent of the total of liquid assets, and 15 percent discount is applied to them. Although, a purpose of BCBS in determining the level of liquidity is the estimation of this level at the actual moment and, theoretically, the wording of the Basel Accord means determining of this level ex-ante, following the recommendations of the Committee estimation is obtained ex-post [41]. Thus, practically, evaluation of the level of liquidity is based on the data of the previous period.

##### 4.2 Net stable funding ratio

NSFR enables the assessment of liquidity within a one year time period. This indicator is intended to increase elasticity on a long term by creating additional incentives for banks to finance their activity from more stable sources on an ongoing structural basis [42]. In other words, it is assumed, that it will be able to protect banks involved in long term lending business based on wholesale market. For instance, it was suggested, that the proper NSFR would be able to prevent failure of the UK's Northern Rock, which used to be one of the top banks in mortgage business [43]. NSFR is defined as the ratio of available stable funding sources to the required volume of stable funding; and should be above 100%. NSFR is aimed at limiting the excessive dependence on major sources of finance in the periods of excess liquidity in the market and contributes to a more accurate assessment of risk liquidity on all balance and off-balance items. This approach will help to minimize the possible sharp deterioration of liquidity and prevent banks from establishment of liquid assets with short-term funding sources, which become mature immediately after the established, by supervisory body, legal period. In turn, stable funding can be both own equity and borrowed funds, which are a reliable source of financing during the year of the stress. Lopez-Espinosa et.al [44] empirically proves the necessity of NSFR proposed by Basel Committee to reduce systemic risk. However, theoretically having positive goals, Pengelly [43] indicates practical difficulties that await banks to comply with new Basel III requirements relatively NSFR. Namely, European banks will have to release long-term liabilities on 2.7 trillion euro. This task is complicated by the bail-in regime, or imposition of losses on bondholders. Simplifying, banks will have to sell bonds at a high price to a small group of investors. Taking into account, the huge necessity of capitalization for the systemically important banks, it seems that this task, of finding buyers in undercapitalized market [45] till 2018, will be significantly complicated for SIFIs.

## 5. Problems Unresolved by Basel III

Thus, practically, the introduction of minimum capital adequacy and liquidity requirements is not without problems, particularly in the EU Member States. 'There is a potential for differences in how the rules are transposed in each of the EU countries' [46]. Predictably, that implementing of the Basel III is taking longer than anticipated due to complicated constitutional structure of the EU [46]. Nevertheless, the USA is not swift too due to debates on the capital definitions [46]. In contrast, Switzerland identified systemically important institutions and surcharged higher standards in the 'too big to fail' framework [46]. Although the common goal of members of the Basel Committee is to strengthen financial stability, there are different views on issue of establishing of higher capital requirements both quantitatively and qualitatively. For instance, Admati et al. suggest that introduction of higher requirements will strengthen the financial stability [47]. Similarly, King [48] states that leverage ratio and capital requirements are essential for banks viability and, although these requirements do not guarantee 100 percent surveillance, anyway, they will allow bank to fail without systemic consequences. In contrast, DeAngelo and Stulz [49] argue that high leverage is optimal for banks, explaining it by constant increasing of leverage over the last 150 years and that high leverage is the intrinsic characteristic of profitability of the banking business. Moreover, they underlines that this rule does not make exception for 'too big to fail' institutions. Likewise, Kashyap et al. contend that higher requirements are not economically justified, because it will increase the cost of funds [38]. Similarly, Hanson et al. [50] maintain that imposition of higher requirements on banking sector will shift the banking activity to unregulated shadow-banking sector. For instance, the last financial crisis, as Metric [51] notes, started from shadow banks. For this reason, they should be regulated similarly to banks. Otherwise, the systemic risk will only increase. As a result, following these types of critics in 2013 the Basel Committee [52][53][54] decreased its requirements to liquidity provisions by lowering the run-off rates of deposits, corporate liquidity facilities and interbank liquidity facilities. However, the UK, Sweden, Spain, with the European Central Bank, support the stricter requirements to the quantitative and qualitative characteristics of capital. In contrast, Germany and France, interested in maintaining of some of the components of the banking capital as highly liquid, and with European Commission support, have the opposite point of view [55].

Thus, on the one hand, Basel III proposals can constrain banks' capitalization, on the other hand, they build a more stable financial system. Nevertheless, minimal requirements to the capital size established by the Basel III are more appropriate than the previous ones. Moreover, they are not sufficiently stringent [56][57]. In other words, the capital requirements recorded in Basel III are insufficient to prevent from possible crises. For instance, according to Hanson et al. estimations, this figure should be at the level of 15% [58]. Moreover, Miles [59] calculated that the proper standard of bank capital should be about 20%. Admati and Hellwig argue, that 'increasing equity requirements from 3 percent to 25 percent of banks' total assets would involve only a reshuffling of financial claims in the economy to create a better and safer financial system [60].' Meanwhile, the possibility of easing of requirements to the quality of bank capital will not limit possible losses, which can become taxpayers' burden. In contrast, opponents of the establishment of higher standards claim that this will significantly increase fund costs, reduce the volume of lending and slow the rate of economic growth in general [38]. However, calculations provided by independent scholars prove the necessity of new standards at the international level and higher requirements for systemically important financial institutions.

## 6. Conclusion

Conclusively, despite positive changes in the process of reforming the supervision and regulation, a critical issue of capital requirement in respect of 'too big to fail' remains unresolved. The larger the size of the 'too big to fail' financial institution, the more acute the need for rigorous standards of control will be. Thus, countries which have 'too big to fail' financial institutions to avoid repeating of the last financial debacle events, when the cost of support and liquidation of financial 'leviathans' were transformed to taxpayers, have to elaborate and introduce more stringent rules and international standards of macro-prudential regulation. This policy will be more consistent with aims stated by the USA and European governments.

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## Structural Analysis of the Dynamics of Petrochemical Cluster of Republic Tatarstan

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### Abstract

The article analyzes the competitive position and the dynamics of indicators of a petrochemical complex of Republic of Tatarstan. The authors of the article place emphasis on competitive growth of regional commodity producers and the tools applied to evaluate economic efficiency of resources utilization. The article deals with the assessing the level of competition and study the dynamics of the volume turnover. It involves a structural decomposition of growth on sectoral and regional components. The special attention is given to the analysis of costs by kinds of the economic activities, corresponding to an industrial profile of Republic Tatarstan.

**Keywords:** industrial systems, petrochemical cluster, types of economic activities competitive positions, structural decomposition

### 1. Introduction

Petrochemical and gas cluster of the Tatarstan Republic is the basic sector of the Tatarstan industry forming about 51.9 % of the total output, 86 % profit, 28 % of the employed. The complex plays a crucial part in foreign trade providing up to 91 % of the total Tatarstan export. The complex combines enterprises the business line of which is resource output, its processing, manufacture of petrochemical and chemical production and final processing production. Four enterprises of the Republic - "Tatneft" JSC, "Nizhnekamskneftekhim" JSC, "Nizhnekamskshina" JSC and "Kazanorgsintez" JSC - provide 93.95 % of the total sales of the main petrochemical and gas complex companies and are local economic mainstays of Tatarstan.

The subjects of inquiry within the data base of 2008-2011 have included economic activities from the following sections of the Russian National Classifier of Economic Activities (OKVED): Section C. Mining operations (1 economic activity), Section D. Processing manufactures (5 economic activities).

The research has embraced 63 subjects of the Russian Federation in the following districts: the Central Federal District (18 regions), the Northwestern Federal District (10 regions), the Southern Federal District (4 regions), the North Caucasian Federal District (1 region), the Volga Federal District (14 regions), the Urals Federal District (4 regions), the Siberian Federal District (12 regions). Due to the socio-economic situation, the geographical peculiarities and the branch specialization the research has not covered the regions of the Far Eastern Federal District and the North Caucasian Federal District (except for Stavropol Krai).

### 2. Methodology

According to complex theoretical regulations and methodological instruments of competitive strength analysis applied in modern competitive strength analysis procedures, we have offered a conceptual approach to territory's competitive position study by types of economic activity (TEA) and their competitive edge diagnosis based on labour productivity [5], [6]'. Taking into account significant influence exerted by technological peculiarities and market industry-specific factors on competitive positions of types of activity, it seems impossible to express all elements of competitive strength through quantitative indicators within the framework of the present paper.

*It seems more reasonable to use OKVED classifier (All-Russian Classifier of Types of Economic Activity) including 14 sections, with subsequent specification, when choosing a competitive profile.*

Determination of critical indicator values is a rather complicated methodological task. As a rule, a certain scope of retrospective information reflecting the phenomenon development experience of the past [7] is required to complete this task. Taking into consideration instability of business environment and competitive strength factors, as well as specific features of technological processes existing in various branches of industry, it is more preferable to set interval threshold values for indicators, from our point of view. Structural decomposition of indicator dynamics permits to differentiate them by uncertainty levels and degree of controllability.

Essence of this method is structural representation of the studied index dynamics [9]. Its increment is resolved into a national component (reflecting trends in the national economy), industrial component (peculiar features of industrial sector development) and territorial component (influence of territorial peculiarities). Correlation between these components permits to distribute types of economic activity by external and internal sources of competitive edges.

If the national component share exceeds that of the industrial and territorial components, it means that the index increment within the analysed period is mainly ensured by a favourable macroeconomic dynamics. In these circumstances industry-specific and territorial trends are of retarded nature. Stability of such a positive increment pattern within a prolonged period of time testifies a rather low strategic potential of these types of economic activity.

In the situation when the industrial component outstrips the national and territorial components, that is, the industry-specific increment displays maximum dynamics; such types of economic activity can serve as possible industrial priorities. In this case competitive edges are formed to a greater extent by virtue of external factors (pricing environment, solvent demand, new technologies, stimulating initiatives at the federal level and others). If such a positive increment pattern persists for a long time, then, in the absence of limitations conditioned by territorial peculiarities, we recommend to consider the aforesaid types of economic activity as strategic guidelines for industrial policy at the mesolevel.

The most attractive is a situation when the territorial component dominates in the index increment pattern. Such a state of affairs allows us to assume presence of internal sources of competitive edges, which ensure that dynamics observed in types of economic activity representing the industrial complex of the territory, outstrips macroeconomic and industry-specific growth rates. A growing share of the territorial component in the positive increment pattern is a target indicator of efficiency of regulatory impacts, which stimulate competitive strength of such types of economic activity that act as a basis for a competitive profile of the territory.

The general formula for calculations is as follows:

$$\Delta T_j = NS + NIS + RIS \quad (1)$$

where NS – national growth component; NIS – industrial growth component; RIS – territorial growth component.

Calculation of each component by shipped products volume is made in the following way:

$$NS = v_j^{t-1} \left( \frac{V^t - V^{t-1}}{V^{t-1}} \right), \quad (2)$$

$$NIS = v_j^{t-1} \left( \frac{V_j^t - V_j^{t-1}}{V_j^{t-1}} - \frac{V^t - V^{t-1}}{V^{t-1}} \right), \quad (3)$$

$$RIS = \Delta T_j^t - NS - NIS = v_j^{t-1} \left( \frac{v_j^t - v_j^{t-1}}{v_j^{t-1}} - \frac{V^t - V^{t-1}}{V^{t-1}} \right), \quad (4)$$

where  $v_j^t$  and  $v_j^{t-1}$  – shipped products volume in the  $j$ -th type of economic activity of the territory within the periods  $t$  and  $t-1$ ;  $V^t$  and  $V^{t-1}$  – industrial products volume shipped in the whole country within the periods  $t$  and  $t-1$ ;  $V_j^t$  and  $V_j^{t-1}$  – industrial products volume shipped in the  $j$ -th type of economic activity within the periods  $t$  and  $t-1$ , correspondingly.

When the dynamics of industrial products volume shipped within the territory exceeds industry-specific growth rates, the territorial component RIS needs modification:

$$RS = v_j^{t-1} \left( \frac{v_j^t - v_j^{t-1}}{v_j^{t-1}} - \frac{v^t - v^{t-1}}{v^{t-1}} \right), \quad (5)$$

where  $v^t$  and  $v^{t-1}$  – industrial products volume shipped in the territory within the periods  $t$  and  $t-1$ .

Thus, if growth rates of the  $j$ -th type of economic activity exceed macroeconomic, industry-specific and regional dynamics of industrial production in a certain territory (especially if the current trend has a clearly defined long-term nature), one can make a conclusion that there are certain competitive edges, which permit us to consider such a type of economic activity as a potentially attractive (target) for further development of the territory under consideration. A complete set of target TEAs can serve as an object of industrial policy at the mesolevel.

While analyzing competitive positions, substantial role plays calculation of concentration and localization indexes



that allow defining structure of competition on branch markets to which the selected types of economic activity belong [1], [3].

According to the theoretical analysis, three following primary characteristics of branch markets are singled out in the economic literature: concentration, scale and product differentiation [2]. Apart from the fact that each of them has its own functional value, their diverse combinations influence the specificity of branch structure in a complex manner. For instance, product differentiation and concentration influence intra-branch manufacturers' competition in prices and profit margins [8]. Economy of scale, product differentiation and related to it adherence to conventional brands define new entry possibility, as well as opportunities to maintain higher prices not to attract external competition. Three elements provide monopolistic advantages establishing market entry-quit barriers. In this respect, the structure can define not only the highest price set without threat of quitting the market, but also the opportunity for existing manufacturers future collaboration in order to achieve this maximum price avoiding price competition between them. Besides, if product differentiation can serve as the only one barrier to enter the branch market, concentration and economy of scale have closer tie and act jointly. In this connection, while managing competitive edges on branch markets it is required to pay attention to self- analysis of not only these factors economic content, but also to interrelation between them.

Thus, production concentration reflects relative value and number of branch market manufacturers. The fewer the number of manufactures is the higher is concentration level. If the number of manufacturers the same, the situation is the following: the less they differ from each other in size, the smaller is concentration level. Result of manufacturer self-selection on production capacity and price is formed by feedback of market acting competitors. Concentration level impacts the manufacturers' disposition to competition and collaboration: the fewer manufactures on market are, the easier they understand mutual dependence and sooner accept cooperation.

Therefore one can suppose that the higher concentration level is, the more competitive and monopolistic will be the market.

Since 1982 the United States Department of Justice has used the Herfindahl-Hirschman index (HHI) as the main characteristics for branch markets structure. This index is defined as the sum of squares of shares of shipped goods volumes in each region (territory) on branch market:

$$HHI = \sum_{n=1}^N S_n^2 \quad (6)$$

where  $S_n$  – industry share in n-territory in total volume of shipped goods countrywide.

If the index value is between 0 and 1000, the market is considered to be weakly concentrated, between 1000 and 1800 – moderately concentrated and more than 1800 – highly concentrated.

While analyzing branch markets structure on meso-level the concentration index should be supplemented by the localization factor:

$$I_{Lj} = \frac{D_{jkn}}{D_{jk}} \quad (7)$$

where  $I_{Lj}$  – localization factor of industrial production of j-type of economic activity in n-territory;  $D_{jkn}$  – share of shipped products of j-type of economic activity in total volume of shipped goods under k-chapter of the Russian classification system of types of economic activities (k=1;6) or in industry in n-territory in whole;  $D_{jk}$  – share of shipped goods of j-type of economic activity in total volume of shipped goods under k-chapter of the Russian classification system of types of economic activities (k=1;6) or in industry countrywide.

If the estimated values of a factor are more than 1, then the given type of economic activity appears to be core for the territory with its competitive edges and potentially attractive for further development (if it is 1 – the type of economic activity satisfies only local demand and is focused on internal market). If localization factor acquires the value less than 1 – the territory specializes in this type of economic activity, the internal demand mostly replaced by import from other territories.

Estimation of localization factor dynamics is reasonable: its growth can testify strengthening of its competitive edges on branch markets and favorable prospects of development, its decrease evidences competition sharpening or market situation decline that require expansion of competitive edges, diversification of production factors to enter the adjacent markets or decrease of business activity in this type of economic activity [4].

Localization factor can be estimated either by indicators absolute values (gross value added, number of enterprises, main production foundations, amortization, salary budget, amount of employed, investments to fixed capital) or by growth rates. For instance, estimation of localization factor by the number of employed can be made in the following manner:



$$I_{Lj}^I = \frac{l_{jn} / l_n}{L_j / L} \quad (8)$$

where  $l_{jn}$  – number of employed in j-type of economic activity in n-territory;  $l_n$  – number of employed in industry in n-territory;  $L_j$  – number of employed in j-type of economic activity countrywide;  $L$  – number of employed in industry countrywide.

One can calculate the given indicators on the example of analysis of competitiveness types of Tatarstan economic activities in terms of the Russian Federation regions, by means of study of production efficiency indicators of petrochemical cluster.

### 3. Results

This sampling has allowed covering the main economic activities of the Tatarstan Republic having the greatest share in the total turnover of organizations (without VAT, excises and similar obligatory payments). The most appreciable share (over 2 %) in the total turnover of the Tatarstan Republic among the chosen economic activities was occupied by:

- extraction of crude oil and casinghead gas; extraction of fractions from casinghead gas (16.76 %);
- petroleum refinery (5.50 %);
- synthetic rubber production (5.35 %);
- plastic and initial form synthetic resins production (2.16 %).

In the period of 2007 – 2010 the following types of economic activity of Tatarstan petrochemical cluster increased their market share: production of synthetic rubber, production of rubber tires, tire casings and inner tubes, production of soap and detergents, extraction of crude oil and oil (associated) gas, production of plastics. Besides, market share of plastics and synthetic resin production as well as petroleum production was prominently decreased (Fig. 4).

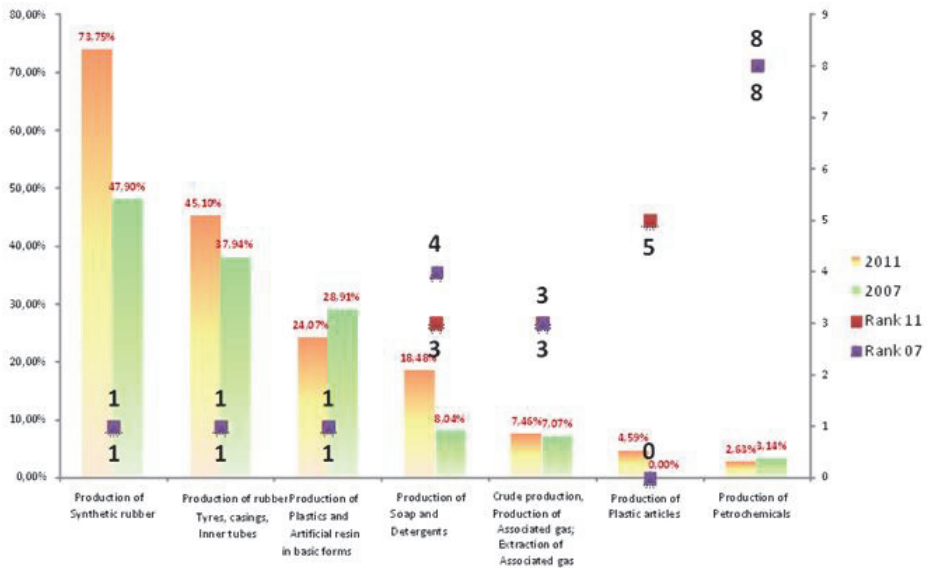


Fig 4. Dynamics of market shares of economic activity types in petrochemical cluster of the Republic of Tatarstan in 2007-2011

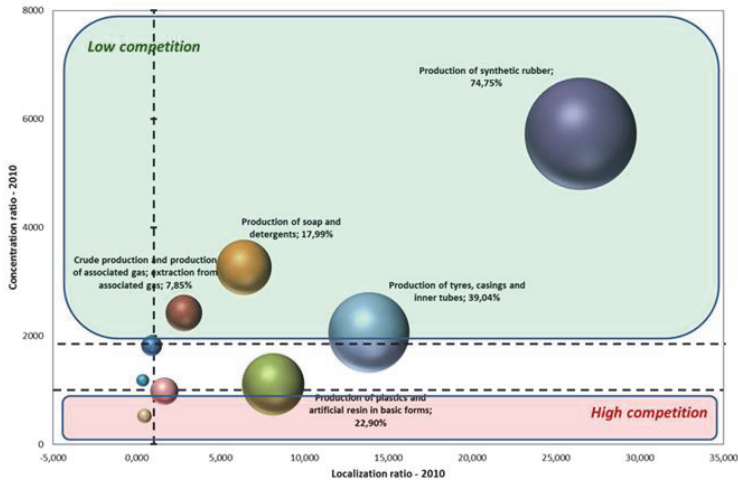


Fig. 5. Level of competition at markets of industrial profile of the Republic of Tatarstan at the beginning of 2011 (Petrochemical cluster)

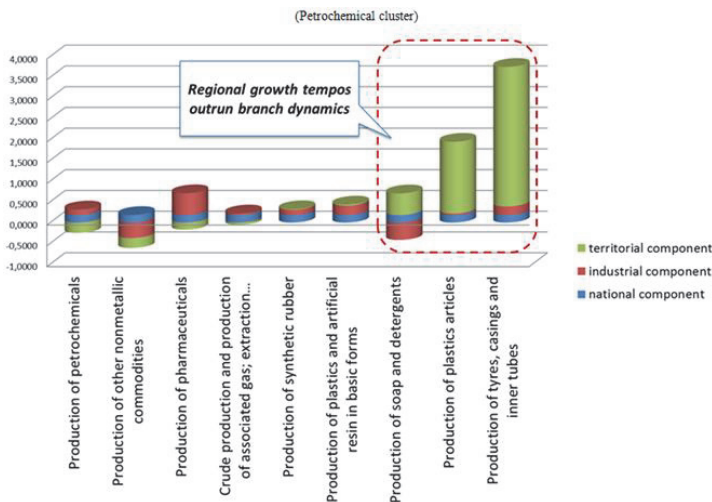


Fig. 6. Structural decomposition of capacity gain of turnover in the Republic of Tatarstan for 2007-2011 by types of economic activity

Dynamics of market shares of Tatarstan petrochemical cluster types of economic activity in 2005 – 2010 was not so active in the following types of economic activity: production of plastics and synthetic resin, production of artificial rubber, production of rubber tires, tire casings and inner tubes. Market shares of such types of economic activity, as extraction of crude oil and oil (associated gas), production of petroleum products were not substantially changed.

According to the results of comparing the competition level on Tatarstan petroleum market in the beginning of 2007 and 2011, one can observe that the competition level of the majority of types of economic activity of petrochemical cluster was changed in 2011 and they started to lose their positions: extraction of crude oil and oil (associated) gas, production of rubber tires, tire casings and inner tubes, production of soap and detergents, production of plastics and synthetic resin in primary forms, production of petroleum products (Fig. 5). Only production of artificial rubber has been occupying a more confident position in given years.

196 Analysis of turnover capacity dynamics in 2007 – 2011 by method of structural decomposition of growth rates  
197 brought the following results (Fig. 6).

198 Despite a crisis in 2008-2009 the positive macroeconomics dynamics of 2010-2011 ensured capacity gain of the  
199 reviewed types of economic activity equal to 18,06% (NS component). With consideration for industrial scale the  
200 maximum effect was achieved in crude production, production of associated gas; production of petrochemicals;  
201 production of synthetic rubber; production of plastics and artificial resin in basic forms.

202 The biggest branch rate of growth (IS component) for 2008-2010 years (running ahead of macroeconomic  
203 dynamics) was demonstrated by:

- 204 ▪ Production of pharmaceuticals (growth 52. 37%);
- 205 ▪ Production of plastics and artificial resin in basic forms (22.8%);
- 206 ▪ Production of rubber tyres, casings and inner tubes (20.83%).

207 Herewith more than a half of reviewed types of production had negative growth of turnover capacity. The significant  
208 decrease among profile types of economic activity was registered only in production of soap and detergents (-41.67%);

209 From the point of competitiveness evaluation those types of economic activity which regional tempo of growth run  
210 ahead of the branch (IS component) and macroeconomic (NS component) dynamics are of specific interest. Such  
211 productions are (fig. 6):

- 212 ▪ Production of rubber tyres, casings and inner tubes (the regional growth is 3,3589 while the branch growth is  
213 0,2083);
- 214 ▪ Production of plastics (1,7254 and 0,0384 correspondingly);
- 215 ▪ Production of soap and detergents (0,5199 and -0,4167 correspondingly).

217 **Table 1.** Share of economic activity types of the Republic of Tatarstan in gross industrial-based turnover, %,
   
218

Position of region until 2011	Regions	2011	2010	2009	2008	2007	Change in 2011 in comparison with 2007
1	Production of synthetic rubber	73,75%	74,75%	72,84%	74,07%	47,90%	25,85%
1	Production of rubber tyres, tyre casings and inner tubes	45,10%	39,04%	43,65%	11,42%	37,94%	7,16%
1	Production of plastics and artificial resin	24,07%	22,90%	18,12%	22,53%	28,91%	-4,84%
3	Production of crude and associated gas	7,46%	7,85%	8,78%	8,19%	7,07%	0,38%
5	Production of plastics articles	4,59%	4,56%	3,34%	1,89%	2,70%	1,89%
8	Production of petrochemicals	2,63%	2,42%	2,33%	2,99%	3,14%	-0,51%

219 It should be emphasized that almost all types of economic activity in the industrial profile of the Republic of Tatarstan  
220 have shown positive regional dynamics. Only crude production and production of associated gas are exception as their  
221 RS components were negative (-0,0507) at positive branch growth. Considering the industrial profile of the region in long  
222 term one may turn attention to the significant lag in recovery tempos of economic indicators of the following types of  
223 economic activity (negative value of regional RS components):

- 224 ▪ Production of petrochemicals (-0.2472);
- 225 ▪ Production of other nonmetallic mineral commodities (-0.2377);
- 226 ▪ Production of pharmaceuticals (-0.1682).

227 Despite negative regional dynamics two types of economic activity (production of petrochemicals and production of  
228 pharmaceuticals) demonstrate positive branch growth (IS components) (0.1333 and 0.5237 correspondingly).  
229

#### 230 4. Conclusion

231 In such a manner the conducted structural analysis of dynamics has revealed some negative factors which influenced on  
232 the competitive position of the industrial complex of the Republic of Tatarstan. First of all, branch tempos of turnover  
233 growth in almost all productions which compose the industrial profile of Tatarstan turned out to be negative or did not  
234 exceed industry average dynamics (NS component). It witnesses the high dependence of such types of economic activity  
235 on crisis events in Russian economy of 2008-2009. The exceptions are production of plastics and synthetic rubber in  
236 basic forms, production of rubber tyres, casings and inner tubes; dynamics of their turnover exceeded macroeconomic  
237 indicators. Secondly, regional components of only five profile types of economic activity (production of rubber tyres,  
238  
239

casings, inner tubes, production of plastics articles, production of soap and detergents) run ahead of branch and macroeconomic growth tempos. Notably, only production of rubber tyres has influence on Tatarstan economy. Respectively, profile types of activity have not so evident competitive edges or the region has limited opportunities of influence on the sources of their formation.

In the meantime the highest regional gain was demonstrated by productions with fair low localization in capacity. By keeping such tendencies in long term perspectives these productions may be considered as a target investment portfolio which can provide gradual substitution of the present industrial profile and forming potential of strategic growth of the Republic's economy.

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## Multisectoral Integrated Structures Key Competences. Regional Aspect

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### Abstract

The article considers the nature and content of multisectoral integrated structures. There are given examples of region multisectoral integrated structures and designated their contribution to the regional economies development and to the multisectoral industry clusters formation. There is a classification of the key competences by the most significant economic and administrative features: the implementation scope, relation to the process of intraorganizational integration, competencies scalability, character of competencies formation, features of the impact on the regional economy. Comparative effectiveness of multisectoral integrated structures index is grounded. Testing of the proposed index carried out on the materials of one of the largest Tatarstan Republics multisectoral integrated structures - JSC "Ak Bars Holding Company". Based on the results of testing are revealed points of reducing the effectiveness of the considered company, are made suggestions for their improving.

**Keywords:** multisectoral organizations, integration, effectiveness, key competences, the region's economy.

### 1. Introduction

Multisectoral integrated structures play an important role in the development of modern regional socio-economic systems. According to D. Crump multisectoral integrated structures can operate in three main forms: large diversified corporations, holding structures and vertically integrated companies, which uniting enterprises entering into a one production-technological chain [4]. In our view, to the enterprises of this kind should also include multi-directional government corporations and financial-industrial groups.

Multisectoral integrated structures ensure the implementation of large-scale cross-sectoral investment projects, thereby contributing to increase in employment in the region's economy and ensure the enhanced fullness of regional budget in part of income tax and the tax on personal income. Inside the integrated cross-sectoral formations are formed additional organizational and financial capacities for the implementation of innovative initiatives and the formation of infrastructure projects and programs.

It should be noted that in the regional economy of the Republic of Tatarstan functioning various multisectoral integrated structures. Thus, in particular, JSC "Ak Bars Holding Company" is a diversified multisectoral corporation in which are presented several vertical production process chains (production and processing of agricultural products - food industry - trade sector, the forest industry - woodworking - building materials industry - building complex). Strong corporate integration with the largest regional financial and credit institute - JSC "Ak Bars Bank" - gives financial and economic stability to the diversified company.

Another example: JSC "Tatgazinvest" provides services by the gasification and maintenance for the "Gazprom's" gas mains and other similar objects. This diversified integrated company includes a number of small and medium-sized enterprises producing equipment for gas pipelines, components, auxiliary materials and rendering services, thereby forming a regional distribution cluster of the Republic of Tatarstan.

Finally, there is the largest diversified integrated corporation in the regional economy of the Republic of Tatarstan – JSC "Tatneftkhiminvestholding", linked on the conditions of industrial cooperation enterprises which forming a vertically integrated production-processing chain in the field of oil refining, petrochemical and chemical industries. This corporation is not only one of the largest taxpayers in the budget of the region, but also ensures the implementation of a number of social programs and projects, particularly in the area of formation and development of industrial and social welfare infrastructure.

### 2. Theory

According to many researchers, multisectoral integrated structures play a fundamental role in the economy. J. Pescatore

57 pointed to their particular importance in the development of scientific and technical progress, generating and  
58 implementing innovations as early as 1974 [6]. Later R. Abrams [1] and P. Drucker [5] argued the role of multisectoral  
59 integrated structures in enhancing innovation processes, the formation and development of industrial clusters.

60 L. Brown notes the crucial role of diversified production structures to generate synergies in various areas, such as  
61 the acceleration of the process of creating new assortment positions of products, the formation of large-scale training  
62 programs for staff, implementation of infrastructure projects [3]. However, we have to agree with the Michael Porter's  
63 opinion that creation of long-term positive synergies in diversified corporations is possible only if each of their divisions  
64 has enough detailed, science-based development strategy, based on the synthesis of which is formed a common strategy  
65 of socio-economic development of the multisectoral integrated structure [7].

66 The positive effect of large diversified companies in the development of regional socio-economic systems,  
67 improving their competitiveness in general recognized by a number of researchers [8], [9]. D. Ulesov, G. Murtazina and L.  
68 Safullin allocate special role of large multisectoral structures in the formation of the modern knowledge economy [10]. In  
69 this regard, it should be noted that the multisectoral industrial formations are traditionally more significant organizational  
70 and financial opportunities for the creation and development of corporate training centers, including corporate  
71 universities, than in other types of companies. This kind of centers not only provide long-term sustainable improvement in  
72 productivity this very diversified structure, but also contribute to the improvement of the educational potential of the  
73 region's economy as a whole.

74 It should be noted, that in the Republic of Tatarstan not one of the multi-structures, including such significant  
75 financially and organizationally as JSC "Tatneftekhiminvestholding" or "Ak Bars Holding Company", are not created yet  
76 corporate universities. In our opinion, it is connected with a certain inertia of diversified structures management thinking,  
77 lack of understanding of the role of the system corporate entity in their development. In addition, the multisectoral  
78 integrated structures play a significant role in stimulating the progressive development of small, including innovation,  
79 entrepreneurship in the region's economy [2].

80 Thus, the main functions of the multisectoral integrated companies are:

- 81 - providing a positive synergistic effect due to the formation and use of sustainable cooperation and integration  
82 relations between enterprises of different industries;
- 83 - realization of large-scale cross-industry investment projects, which would not be available for implementation  
84 at the level of a specialized company because of financial and organizational-economic limits;
- 85 - the formation of additional features to activation the processes of financing of research and development  
86 activities, including cross-cutting;
- 87 - active participation in the formation and improvement of regional production and social-welfare infrastructure,  
88 the implementation of large-scale programs of corporate social responsibility;
- 89 - assistance in accelerated formation of a knowledge economy, the development and improvement of  
90 intellectual capital through additional financial and institutional capacities, including in terms of ensuring the  
91 active processes of educational-industrial cooperation with institutions of higher and middle specialized  
92 education in the region;
- 93 - growth of opportunities for lobbying activities, including legal character activities, provided by the regional  
94 Chamber of Commerce, business associations, etc.

95 However, in the special literature is not revealed enough the issue about the specifics of multicore integrated  
96 entities competencies, the classification of this kind of competencies, features of estimation of economic efficiency of  
97 functioning and development of multisectoral structures.

### 98 99 3. Results

100  
101 Key competences of diversified integrated structures are their most important functions, accumulated knowledge, develop  
102 skills activities to ensure the generation and implementation of competitive advantages. It is obvious that the system of  
103 multisectoral integrated structures competencies should have some differences from the competencies of large  
104 specialized corporations. In particular, for the multisectoral nature integrated companies are particularly important  
105 competences related to the organization and implementation interaction between separate units, with circulation of  
106 information between structures of diversified company, with ensuring effective integration processes in the field of  
107 generation and introduction of innovations, with formation and implementation of joint large-scale investment projects,  
108 social programs that are relevant to corporation as a whole, etc.

109 Formation of diversified integrated company's core competences system requires specialized knowledge and skills  
110 in the sphere of multisectoral production technology plan and characteristics of management systems for the



111 administrative personnel of the corporate structure of the species.

112 The author proposes classification of multisectoral integrated formations key competences by the most significant  
113 economic and managerial characteristics (Table 1).

114 The first of the highlighted in Table 1 multisectoral integrated structures key competences classification features is  
115 common to both types of structures under consideration, and for the companies of a different type; subsequent  
116 classification features are specific to organizations is primarily the multisectoral nature of the activities.

117

118 **Table 1.** Classification of multisectoral integrated structures key competences (Based on own researches)

119

Classification features	Types of key competences
1 Scope of implementation	- production competences; - financial competences; - scientific and innovative competences; - competences in the sphere of personnel management; - marketing competences, etc.
2 Relationship to intraorganizational integration process	- Specific competences of individual activities (sectors) of the structure; - Specific competences of integration processes between activities; - Specific competences to manage a diversified structure as a whole.
3 Competencies scalability	- non-scalable competences; - competences scalable within a multidisciplinary structure with minor modifications; - competences scalable with significant modifications; - competences scalable without modification (standard).
4 Character of competencies formation	- competences developed by outside organizations (for example, by consultants); - competences created by experts of this very diversified structure.
5 Features of the impact on the regional economy	- competences, forming secondary effects in the region real economy sectors; - competences, creating secondary effects in the service sector of the regional economy and infrastructure sector; - competences, without significantly affecting on the development of the region economy.

120

121 So, depending on the relationship to the integration process is proposed to differentiate the key competences to the  
122 characteristic for certain types of diversified organization economic activities and to related to processes of integration  
123 between different types of activities. The latter include some innovative ways of interaction between the activities within a  
124 multisectoral structure, methods of formation and realization of cross-sectoral industrial projects, interbranch R & D,  
125 organization of intra-settlement etc. In addition, it is advisable to identify the key competences that are typical for  
126 multisectoral organization management system as a whole, the content of which significantly differ from the specialized  
127 company management competences.

128

129 Diversified organization key competencies classification, depending on their degree of scalability, i.e. the ability to  
130 use in a wide range of departments and activities of the organization, has fundamental importance. So, those  
131 manufacturing, financial, human and other competences that are formed within one of the activities of a multisectoral  
132 organization and cannot be used in other activities are non-scalable. Ideally, most of the key competences of a  
133 multisectoral organization must be scalable, albeit with some modifications, within all or the vast majority of directions of  
134 activity across industries.

135 From formation character positions key competences that are created by specialists of this very diversified  
136 organization are particularly important. In our opinion, under the same conditions, this kind competencies in most cases  
137 are higher quality than competences generated by third-party consultants. It should be noted that using the third-party  
138 services for the formation of the key competences is increase the risk of leakage of confidential information that  
139 economically significant for the diversified production formation.

140 Finally, diversified integrated organization key competencies classification is importance for the regional economy.  
141 Ideally, this kind competencies should provide multidirectional secondary positive effect for all sorts of regional economy  
142 organizations (small enterprises involved by the subcontract, the scope of specialized logistics and service companies,  
143 higher education institutions under the conditions of industrial-educational cooperation, etc.).

144 Separate methodological problem is the evaluation of functioning and development of integrated multisectoral  
organization effectiveness, instruments of which obviously must be different from the effectiveness evaluating



145 instrumentation of a specialized company. This kind of evaluation is necessary, first of all, to identify the most significant  
146 reserves for increasing the effectiveness of multisectoral organization and consequently improving the system of key  
147 competences aimed at effective mobilization of these reserves.

148 To solve the problem of complex effectiveness evaluation of diversified companies we propose index of the  
149 comparative effectiveness of multisectoral integrated organization (1):

$$150 \quad I = (T \div \sigma) \times (Rm \div Rr) \times Ke \quad (1)$$

151 where I - proposed index of the comparative development effectiveness of the multisectoral integrated  
152 organization;

153 T – average weighted rate of physical volume growth of organization activities (a proportion of the organization  
154 activities in revenue structure by industry acts as the weights);

155  $\sigma$  - standard deviation of rates of growth of the physical volume of the multisectoral integrated organization  
156 activities;

157 Rm - average profitability of multisectoral integrated organization;

158 Rr - average profitability of similar activities on the regional economy as a whole;

159 Ke - elasticity coefficient of profitability changes according to growth rates dynamics of the average index of  
160 physical volume of multisectoral integrated organization production.

161 Thus, the proposed formula for the index of the comparative effectiveness of multisectoral integrated organization  
162 considers the intensity of its functioning (the growth rate of physical volume) and the balance of rates of activities  
163 development by industry (ideally standard deviation of growth rates should be minimal), and also one of the most  
164 common indicators of financial and of economic productivity of the organization - profitability, which correlating with the  
165 similar activities profitability on the region's economy as a whole.

166 Finally, the effectiveness index will be higher, the higher coefficient of elasticity of profitability changes in  
167 depending on the dynamics of the average index of physical volume. Ideally, this type elasticity coefficient must exceed  
168 one, that will indicate the presence of multiplier effect - the accelerated profitability growth as a result of the positive  
169 physical volume of production changing.

170 Carried out approbation of the proposed index of comparative effectiveness of multisectoral integrated organization  
171 on the materials of "Ak Bars Holding Company" (Republic of Tatarstan) - regionally important multisectoral holding. Initial  
172 data for calculation of the proposed index in the context of consolidated types of economic activity of the multisectoral  
173 organization are presented in Table 2. It should be noted that, despite the post-crisis recovery of the company in 2010 -  
174 2013 and a small stable exceeding the average profitability of over the same period of the RT regional economy as a  
175 whole, in 2007 - 2013 index of relative effectiveness of multisectoral organization has a tendency to reduce.

176 Overall, industrial production acts as basic aggregated economic activity by industry for JSC "Ak Bars Holding  
177 Company". In 2006 – 2013, except 2009 (the peak of the global financial and economic crisis), investigated multisectoral  
178 integrated company characterized by positive growth of real physical volume of industrial production, that indicating high  
179 competitiveness level of holding enterprises products. In the agricultural production sphere holding structures show less  
180 satisfactory rates of development what is connected with certain difficulties of financing this activity sphere and with a  
181 relatively high level of basic production assets depreciation in agriculture. Rates of development instability in trade and  
182 services enterprises belonging to the this multisectoral integrated company connected with a high level of competition in  
183 the relevant industry markets in the Republic of Tatarstan regional economy, especially in the post-crisis period of 2010 -  
184 2013.

186 **Table 2.** Initial data and evaluation of the proposed index of the comparative development effectiveness of JSC "Ak Bars  
187 Holding Company" multisectoral organization  
188

Indicators	2006	2007	2008	2009	2010	2011	2012	2013
Real growth rates of the physical output volume, times to previous year								
1. Industry	1,05	1,08	1,01	0,97	1,04	1,06	1,05	1,07
2. Agroindustrial complex	1,06	1,07	0,97	0,94	0,95	1,01	0,99	1,01
3. Service sphere	1,09	1,11	1,04	1,02	1,11	1,12	1,07	0,89
4 Trade	1,11	1,12	1,04	0,99	1,03	1,12	1,01	1,15
5 Others	1,06	1,07	1,11	1,01	0,94	0,93	1,02	0,98
The share of the revenue structure, %								
1. Industry	71,10	72,30	70,90	69,80	71,10	72,90	73,40	73,70
2. Agroindustrial complex	10,50	10,90	9,90	9,20	9,00	9,40	9,00	9,20

3. Service sphere	3,20	3,10	2,90	2,80	2,60	2,70	2,60	2,60
4 Trade	9,60	10,40	10,80	10,60	10,90	11,20	11,30	12,50
5 Others	5,60	3,30	5,50	7,60	6,40	3,80	3,70	2,00
Average weighted rate, times (T)	1,06	1,08	1,02	0,97	1,03	1,06	1,04	1,07
Standard deviation of rates of growth ( $\sigma$ )	0,02	0,01	0,03	0,02	0,04	0,04	0,02	0,05
The profitability of multisectoral integrated organization 's attitude to the average profitability by the Republic of Tatarstan, times (Rm / Rr)	1,02	1,05	1,07	1,04	1,03	1,10	1,04	1,03
Elasticity coefficient of profitability changes according to growth rates dynamics of the average index of physical volume (Ke)	x	1,01	1,09	1,11	1,04	1,08	1,04	1,00
Index of the comparative development effectiveness of the multisectoral integrated organization (I)	x	81,94	42,02	64,56	30,33	33,86	53,64	23,85

Sustained excess average level of profitability in the holding of the average profitability in the Republic of Tatarstan regional economy as a whole indicates the effectiveness of investigated multisectoral integrated company.

The main reasons for the decline of the comparative effectiveness of multisectoral integrated structures index of the JSC "Ak Bars Holding Company" in 2007 - 2013, as shown in Table 2, are:

- the standard deviation of the activities growth rates substantial increase in 2006 - 2013 indicates the lack of balance in the organization development by industry and the inadequacy of using the potential of production integration between enterprises belonging to the holding company;
- not high enough (though somewhat greater than unity) coefficient of elasticity of profitability depending on changes in the physical volume of production, that indicating substantial absence of a multiplier effect on income and profitability of the investigated organization.

Accordingly, to improve the efficiency investigated multisectoral organization should develop competencies related to the integration of activities within the organization, to develop the production-process chains (industry - trade, agriculture - light industry - trade), to orient holding service industries companies for complex maintenance, in the first place, needs of different economic activities enterprises. This will allow to reduce the level of the growth rates standard deviation and, consequently, to increase the level of effectiveness of multisectoral organization in the medium term.

At the same time, ideally, integration between departments multisectoral integrated company must be diverse, include both strong industrial and technological relations and joint investment and infrastructure projects, innovative initiatives, general educational and social programs. This kind of diverse integration, as a rule, is the most strategically stable.

To increase the elasticity of profitability depending on changes in the rates of change of production volume appropriate to develop and adopt new complex intraorganizational program of consistent cost reduction: through the development of budgeting, thrifty manufacturing, optimization of flow processes within the holding company, the introduction of a unified ERP-system of control over industrial, financial and commercial processes.

#### 4. Conclusions

In general, developed classification of multisectoral integrated organizations key competences by the most significant economic and management features allows more exactly differentiate multisectoral corporation's competences and to identify their specific depending on trends in enterprise integration.

The proposed index of comparative efficiency of multisectoral integrated organization allows comprehensively assess the multisectoral company development effectiveness in the dynamics, as well as to compare similar by industry activities structures diversified organizations with each other. In addition, on the basis of this index it is possible to identify the most significant reserves to enhance the functioning and development of multisectoral organization (problem areas that impede improve the efficiency) and to develop measures for improving organization's key competences aimed at effective mobilization mentioned reserves to improve efficiency.

It should be noted that during the formation of multisectoral integrated organization's key competences should also take into account the factors of the institutional order. From the extent to which the development of multisectoral organization meets the requirements of the existing formal and informal social and economic institutions, such as, in particular, the institute of corporate governance, public-private partnership institute, elites institute, requirements for quality and quantity of generated and realized multisectoral organization competences depend directly.

In addition, using for the analysis of the characteristics and problems of interaction structures within the multisectoral company of economic and mathematical instruments of neoinstitutional economy, in particular the theory of

232 games, is perspective direction of multisectoral integrated structures competencies research. On the basis of such  
233 instruments it is possible to analyze the efficiency of resource allocation between the multisectoral company structures  
234 and to analyze possible conflicts between different company departments by questions both a strategic development  
235 either operational cooperation, etc. This kind of neoinstitutional analysis could be complement the results of application of  
236 proposed multisectoral integrated organization comparative efficiency index.

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## Directions of the Region Transport Infrastructure Development in the Context of Its Competitiveness

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### Abstract

The influence of transport factors on the dynamics of regional competitiveness and the integrity of the country economic space is considered in the article. The assessment of transport factors influence allows identifying the priority directions of modernization of the Russia regional transport segments and developing a system of organizational and economic tools to increase its effectiveness and external regional competitiveness.

**Keywords:** transport infrastructure, passenger turnover, cargo turnover, competitiveness, the regional economy

### 1. Introduction

In the context of economic globalization the transport infrastructure has become one of the main instruments of economic development of the country and its regions. On the one hand it provides mobility of resources and products which were produced in it, on the other hand facilitates areas access allowing the free shipping of goods and passengers. Low technical level and the poor state of the transport infrastructure leads to a significant transport component appreciation in the cost of goods up to 15-20%, increase in the average fuel consumption of 1.5 times, growth of the vehicles maintenance cost in 2.5-3.4 times and finally average shipping speed reduces 3-5 times. Under these conditions, the poor state of the transport infrastructure leads to a significant restriction of territories social and economic development [1, 6]. In view of this important direction of region economic development is the need to create economic conditions and mechanisms to upgrade the transport infrastructure and the fullest realization of its potential. In other words, one needs such level of the transport infrastructure development that would provide job manufacturing industries with optimal cost and the greatest economic benefit to the region's economy increasing its competitiveness. One of the results of the transport infrastructure development will be effective transportation and logistics service which allows providing the most efficient and high-quality transport service of the region needs. [3, 4, 7]

Geographical and economic position of Russia and its partners in the Customs Union is responsible for their huge transit potential which is not completely used. One of the main reasons for under-utilization of the transit potential of the continent is a low competitiveness of the transport infrastructure, the inability to ensure the quality of transit traffic between the two macro-regions of the continent.

Such existing barriers as nonconformity of roads to the international quality standards, poor transportation infrastructure and network of logistics centers, causeless delay in control cargo weight at border crossings and so on lead to significant delays in transport. A waste of time it's not just lost money and the trust of customers, but also the loss of the main competitive advantage of land transit to maritime transport.

### 2. Regional Transport Infrastructure and the Directions of Its Modernization

An important direction of a competitive transport and logistics system development in the country and its regions is based on the integration of advanced logistics technology of all participants in the supply chain, serving the Russian regions, as well as international transport corridors passing through the territory of Russia. [2] In the medium term the formation of its own competitive regional transport and logistics infrastructure will be carried out through the creation of transport and

56 logistics cluster. One of such examples is the largest logistics center of federal significance Sviyazhsk interregional  
57 multimodal logistics center which is located at the intersection of international transport corridors "North-South" and  
58 "West-East" with access to federal highways of water, rail and road posts. This center is a pilot project which is  
59 implemented in one of the subjects of the Russian Federation, in the Republic of Tatarstan and it is intended for federal  
60 cargo flows processing as existing international transport corridors "Transsib" and "North-South" and now creating  
61 international transport route "Europe-Western China." Additional attraction of cargo flows will ensure further expansion  
62 and development of new terminals of warehouse distribution network, which will lead to a redistribution of transit traffic  
63 between Europe and Asia and the logistics center will give an international status. The project will ensure the  
64 implementation of modern transport logistics principles, development of transport services export, improving the  
65 competitiveness of Russian carriers, maximum use of market potential in the field of cargo traffic. Sviyazhsk center, in the  
66 long term, can become the transport and logistics system core of cargo traffic in the Volga region of Russia.

67 Tatarstan was not randomly chosen as an experimental platform. It has quite an extensive transport network and  
68 transport links with all its surrounding Russia regions. [10] This is due to the complexity of the territorial structure of the  
69 region and, above all, the hierarchy of the transport network, which is characterized by stacking of intercity, suburban and  
70 long-distance transport networks, the length of the region, which determines the long distance of intra-regional traffic. The  
71 key role in the implementation of these links is not operated by railways but highways and that is not typical for the region  
72 of central Russia. Significant fact is that the length of federal highways in the country (1,080 km) exceeds the length of  
73 railways (825 km). The reason is that the construction of railways was carried out on the territory of modern Tatarstan  
74 before the main contemporary economic centers appearing. As a result the railroads do not connect directly the major  
75 cities of the country.

76 The contribution of the transport sector into the gross regional product is possible to estimate considering the share  
77 of the transport component in the production of goods and services of all sectors of the Tatarstan Republic economy.  
78 Thus, the total contribution of road transport component into the gross regional product of the Tatarstan Republic in 2013  
79 was 12.3%.

80 According to the Statistical Service of the Tatarstan Republic in January-December of 2013, companies which  
81 were engaged in road transportation of passengers of regular communication transported 276.6 million. passengers.  
82 Passenger turnover was 2,098,400,000. passengers. The main part of public transport passenger turnover, as in the  
83 intracity as suburban and inter-city transport comes for bus transport (about 75% in the Tatarstan Republic), including  
84 long-distance transport - 67%, suburban - 84.3% , intracity - 61 9% (the end of the period). It speaks about rather dense  
85 network of highways [4].

86 In 2013 transport organizations of the Republic served 203,700,000. passengers, against 202.3 million.  
87 passengers for the same period in 2012 (growth of 0.6% compared to the previous year).

88 Also there is an increase in passenger traffic on the subway - from 3.6% in 2009. to 6.5% in 2011., attracting a  
89 portion of the passenger traffic from traditional urban public transport as trams and trolleybuses. The volume of urban  
90 electric transport passengers in 2013 was 110.4 million passengers, compared to the same period of last year more than  
91 5%.

92 Railway line to the international airport "Kazan" provides intermodal functionality of airport system connecting the  
93 center of Kazan with air terminal and providing the ability to quick transfer. Transport hub "Railway station" is a major  
94 interchange point where you can carry out any kind of change to the urban passenger transport. For the carriage of  
95 passengers at this area with the length of 26.5 km,

96 LLC. "Aeroexpress" involved modern electric trains Siemens Desiro Rus. However, it should be noted that there is  
97 a lack of transport accessibility of the Station Kazan-1, from this station aeroexpress goes to the airport "Kazan", "The Old  
98 station" is not convenient because it doesn't have connection with the Kazan subway and in the surrounding streets there  
99 is regularly traffic jam that makes worse its availability.

100 According to the Ministry of Transport and Roads of the Republic of Tatarstan in 2013, overhaul and roads repair  
101 of the road network of Kazan which is the capital of the Republic of Tatarstan, was as follows: - the total number of  
102 objects - 90, total length - 78.5 km, the total area - 1459, 766 square meters

103 The above data for Kazan city shows that despite the overall decline of the absolute indicator parameters of "Public  
104 transport" in the internal structure have been some shifts associated primarily with the development of the Kazan subway.  
105 Exactly here we see the growth of the rolling stock in 2013 compared to 2009, more than doubled. Also more than  
106 doubled increased the length of the route network, as for passenger traffic since 2009, in 2012 it increased by 170.3%. In  
107 addition, during this period by 171.7% increased the number of passengers. [5]

108 It should be noted that in recent years in the Tatarstan Republic, a great attention was paid to the new roads  
109 construction, in particular, the construction of approach roads to the villages. For the period of 2011 to 2013 including

110 Republic there were built, reconstructed and set to work 93 roads with total length of 235 km.

111 Thus, on the basis of the above, one can mark out the following features of the regional transport infrastructure.  
112 Firstly, the transport infrastructure sector operates on a national scale as a single system, while its activity is  
113 characterized by a regional aspect. Secondly, there is a dominant influence result of functioning of the regional transport  
114 infrastructure on the general settings of life in the region. Third, a close relationship and interdependence of transport  
115 infrastructure with other components of the regional system is carried out. [8]

### 117 3. Top-Priority Directions of the Regional Transport Infrastructure Development

118 The main strategic direction of transport system development is balanced and integrated development of all elements of  
119 the transport infrastructure. The implementation of this strategic direction is possible while ensuring the availability,  
120 volume and competitiveness of transport services on the quality criteria for cargo owners at the level of innovative  
121 development needs of the country economy. The development of this element involves the development and  
122 implementation of the transport services market model for the needs of all economy sectors. This is an innovative model  
123 for the national transport system. It must define the parameters of the transport services quality, a framework of quality  
124 standards for different categories of goods and sectors of the economy, the requirements for the development of the legal  
125 framework in the field of transport services and engineering models to ensure the quality of transport services.

126 Next element of the transport infrastructure in transport development strategy is to integrate into the global  
127 transport space and realization of transit potential of the country. The development of this element involves the  
128 development of international cooperation with other international transport organizations and other Russia trade partners,  
129 expansion of participation in the system of international agreements and conventions in the field of transport, as well as in  
130 major international transport projects. Increase of Russian transport organizations participation in the transport of  
131 domestic export and import of goods as well as goods between third countries requires the development of appropriate  
132 legislative and other regulatory practices to ensure the competitiveness of the Russian transport.

133 Implementation of the transport system development strategy is available only on the basis of a full statistical  
134 analysis and the use of mathematical methods of forecasting needs of the economy and public in the transport services,  
135 the dynamics of cargo base and the construction of the transport system models in order to create a single transport  
136 space in Russia. [9]

137 Achieving this goal will ensure the dynamic growth of the state economy, socio-economic development and the  
138 strengthening of ties between its regions by removing territorial and structural imbalances on transport. However, the  
139 creation of a single transport space will give an opportunity to engage into the economic turnover new territories by  
140 creating additional transport links, increasing the competitiveness and efficiency of other industries by allowing  
141 unhindered exit of economic entities to regional and international markets, growth of business activity which directly  
142 affects the quality of life and social activity of population.

### 145 4. Conclusions

146 The position of Russia in the XXI century and the establishment of it as one of the leading centers of the multipolar world  
147 must take stand on sustainable economic development based on further economic restructuring and improving the  
148 competitiveness of domestic goods and services in the domestic and global markets, as well as full and beneficial  
149 participation in the system of labor international division. Regional and industrial monitoring of transport complex,  
150 dynamics of its development makes it possible to identify the specific features and attributes of the current state and  
151 prospects of the transport subsystem development of the Tatarstan Republic - high importance of communication links  
152 between east and west, transitive specificity, kind differentiation allowed to offer as the directions of its modernization  
153 stimulation of transport agencies and organizations innovation activities, the implementation of quality management  
154 systems, improving the efficiency of traffic management, the formation of transport and logistics infrastructure.

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## Factor Analysis of the Interest in the Work of Socially Important Institution

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### Abstract

The article presents the research results in which identified interest determinants of employed health workers. Stable and peaceful relations with colleagues are an important factor of interest, whereas frequent disagreements - have negative influence on employee interests in work activity. Found a significant direct relationship between work activity interest and the wages amount. Lone workers have a low level of interest in work activity. A significant factor was satisfaction with work process, because it's an implementation result of the employment interests of employees. Availability awards and bonuses to wages, overtime pay and it's payment determines to a lesser extent the employee interests in work activity.

**Keywords:** job performance, job satisfaction, workforce, degree of interest

### 1. Introduction

Workforce interest is provided with the system of interrelated forms and tools of motivation increasing satisfaction by various characteristics of career development. Thus in the modern sense of the term, the development of Workforce motivation particularly means to establish conditions for job involvement and to heighten Workforce interest in efficiency and quality of work. It gives the possibility to achieve self-actualization and to support the professional development needs improving the productivity and profitability of the organization.

Generally it should be noted that raising the interest of Workforce by the motivation is explained by the theory of motivation. Modern theories of motivation are divided into 2 types: procedural and content. Procedural theories of motivation are based on the fact the person distributes its effort to achieve the desired results and why a person makes this or that type of behavior. [1,2,3] The motivation of employees to complete a task is affected by the reward they expect to receive. It explains direction in the behavioral process. It does not attempt to explain what motivates individuals, but rather how they make decisions to achieve the result they want.

On the contrary content theories of motivation primarily examine those needs of people that motivate them to act, especially when defining volume and contents of work. [4,5]

Without criticizing the theories of motivation it should be mentioned that the interest in work acts as a significant factor in both theories. A lot of research has been done to study it.

Modern version of the process theory of motivation is presented by Daniel Pink. [6] He suggests switching from external stimuli motivation (among which material reward is the main one) to internal - the most important of which is the full disclosure of human interest in job performance. According to Pink, in the information age monetary rewards, bonuses and other forms of material incentives are either useless or harmful to workers and the enterprise. Material compensation is effective when there are algorithmic tasks.

According to McKinsey & Co in the U.S. only 30% of new jobs are associated with algorithmic work, and 70% of people have jobs with elements of creativity and analysis. [6] He lists three elements of the motivation formula: autonomy, mastery, and purpose. In situations where people are paid fairly, this trio drives, engages, and stimulates them to do the best of their job. It makes sense that old-school organizational and personal frameworks of productivity just do not cut it in this age when knowledge work, creativity, and problem-solving are required to stand out and succeed. He considers employing only those workers who have strong intrinsic motivation - curiosity and independence.

Certainly Pink's theory is impossible in modern Russia, where decent wages is viewed more as a "hygienic", than a motivational factor: heuristic activities (high-tech industries, inventions, applied sciences, research and development, etc.)

57 are not developed. There is also low productivity, shortage of skilled workers and management in enterprises, etc.  
58 However we consider that the growth of Russian economy through building the Information society will make these  
59 postulates actual.

60 There is a similar approach towards question of theories of motivation in D. McGregor fundamental work "The  
61 Human Side of Enterprise" (1957), where he convincingly proved that "Effort in work is as natural as work and play" and  
62 that the capacity to use a high degree of imagination, ingenuity and creativity in solving organisational problems is widely,  
63 not narrowly, distributed in the population and that under particular conditions, "...people usually accept and often seek  
64 responsibility". [7]

65 In self-determination theory (SDT) of human motivation and personality of Edward L. Deci and Richard M. Ryan, a  
66 person's ability to experience interest is considered to be fundamental in his nature. [8] According to scientists this ability  
67 should be only developed and strengthened. Universality of human needs in the competence, autonomy and relationship  
68 satisfaction are of priority need. Only in this case we are motivated, most productive and happy.

69 Similar empirical results were obtained by researchers at Cornell University who studied 320 small businesses, half  
70 of which were based on the internal interest of the workers, provided them with greater autonomy, while the other half  
71 was based on the rigid vertical management. Indicators of growth-oriented enterprises interest of workers, were four  
72 times higher than the corresponding figures of firms focused on monitoring. Indicators of labor turnover were three times  
73 less. [9]

74 Interest and job satisfaction, in terms of temporary employees is researched by Ellingson J. E., Gruys M. L. and  
75 Sackett P. R. Analysing specifics of the factors influencing job satisfaction of temporary workers, they come to the  
76 conclusion that first of all it is caused, by the degree of voluntary or involuntary consent for temporary work. [10]

77 In 2011 global research of employee engagement conducted by the GfK get adverse results about the low degree  
78 of employee's interest among working-age population. 30,556 working adults from 29 European and American countries,  
79 including Russia and the United States, were surveyed by GfK. Demographic data of each country (industry, gender, age)  
80 were obtained. According to the results young workers all over the world are not interested in employment: it is not only  
81 engagement, they are stressed at work, what can lead to problems in the management and to slower development, both  
82 for companies and for economics in general. [11]

83 Survey results showed polarization of the labor market around the world. On the one hand, there; disappointed  
84 people of ages 18-29 and on the other, their senior co-workers. Although younger employees usually are not responsible  
85 at work, it is this group that has the highest percentage of employees "often" or "almost always" feeling anxious about  
86 work-life balance, overtime work and their health.

87 Confirmation of this research is the data of consulting firm McKinsey&Co. These results show that only 2-3 % of  
88 labor force actively involved and interested in work. [12]

89 Low employee satisfaction leads to the development of opportunism. [13]

90

91

## 92 2. Data and Methodology

93

94 Information base and research methods are presented. The basis of the data analysis was employee survey data of  
95 Almetievsk city hospital in the Republic of Tatarstan. Data were combined into one array and used as a basis for  
96 calculations of regressions. Total number of observations is 152.

97 In our research health care workforce interest in job performance is analyzed by the following question: "Are you  
98 interested what you do at work?" (five-point scale, where 1=yes, 2=more yes than not, 3=difficult to answer, 4=more no  
99 than yes, 5=no). We consider that this question allows assessing the adequacy of the content of job performance and  
100 professional interests. This means we assess workforce interest in the content and effectiveness of job performance.

101 Model. To estimate the parameters of interest in professional performance the following equation was used:

$$102 YJS = \alpha + \beta \cdot (x_i) + u^* \quad (1)$$

103 where YJS — the interest in professional performance;

104  $\alpha$  — constant

105  $\beta \cdot (x_i)$  — matrix of characteristics

106  $u^*$  — components, reflecting the influence of factors not accounted for in the model.

107 Matrix of characteristics of the interest in professional performance  $\beta \cdot (x_i)$  includes information: Do you have a  
108 good relationship with the members of workforce (colleagues)?; Are you satisfied with the value of your salary  
109 (remuneration of labour)?; Do you get uplifts apart from your salary (premiums, bonuses)?; Does professional activity  
give you pleasure? Do you often have disagreements with colleagues about work process?; Are you satisfied with job

performance in workplace?; How do you assess the relation of your organization employees to their work conditions? Etc.

### 3. Discussion

We studied the assessment of health care workforce interest in job performance according the gender. Among 152 interviewed of Almetievsk clinical hospital workforce 69, 7% (106 people) were women and 30,3% (46 people) were men.

Factors of interest in job performance.

We examine how different factors affect the interest of health care workforce interest degree in job performance

Table 1 provides an assessment of the importance of factors affecting interest.

**Table 1.** OLS model of employee job satisfaction. We used 152 observations

Variables	Coefficient	Standard Error	t-statistics	P-value	
const	0,620925	0,321703	1,9301	0,05557	*
Do you have a good relationship with the members of workforce (colleagues)? (v12)	0,398013	0,0700059	5,6854	<0,00001	***
Are you satisfied with the value of your salary (remuneration of labour)? (v14)	0,211384	0,0584685	3,6153	0,00041	***
Do you get uplifts apart from your salary (premiums, bonuses)? (v15)	0,284193	0,0589848	4,8181	<0,00001	***
Does professional activity give you pleasure? (v16)	0,364985	0,0692929	5,2673	<0,00001	***
Do you often have disagreements with colleagues about work process? (v24)	-0,254001	0,0612698	-4,1456	0,00006	***
Are you satisfied with job performance in workplace? (v26)	-0,264937	0,067084	-3,9493	0,00012	***
Did the need of extra work hours appear in your organization last half a year? (v29)	0,172935	0,0550002	3,1443	0,00203	***
Are these extra work hours paid? (v30)	-0,221865	0,0580263	-3,8235	0,00020	***

**Table 2.** Analysis of the model parameters

Indicators	Value
Mean of Dependent Variable	2,032895
Residual Sum of Squares	85,68193
R-squared	0,531372
F(8, 143)	20,26822
log likelihood	-172,1125
Schwarz criterion	389,4400
St. Deviate of Dep. Variable	1,100378
Model bug	0,774064
Corrected R-squared	0,505155
P-value (F)	3,00e-20
Akaike Information Criteria	362,2251
Hannan-Quinn Criterion	373,2807

We conducted a White's test for heteroskedasticity. Null hypothesis: heteroskedasticity is missing.

Test statistic: LM = 66,4961.

P-value = P (Chi-square (44) > 66.4961) = 0,0158387.

Model analysis for multicollinearity showed its absence.

Table 2 data shows the importance of good interrelations of workforce. Data prove that stable, conflict-free and smooth relationship with co-workers is very important. This most important factor defines interest degree of employee in job performance (question 12). The analyses of the frequency of disagreements with co-workers shows complete picture of influence of intercollegiate relation on interest (v24). We found that frequent conflicts with co-workers affect negatively the employees interest in the workplace. That means the relationship between employees of health care institutions is a significant factor to form their interest in job performance. This is confirmed by the correlation coefficients (Table 3).

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**Table 3.** Correlation matrix, observations 1 – 152 5% critical value (two-sided) = 0.1593 for n = 152

v9	v12	v14	v15	v16	v24	v26	v29	v30	
1,0000	0,4250	0,3308	0,2268	0,4881	-0,1869	0,2061	0,1629	0,0304	v9
	1,0000	0,1662	-0,1713	0,4241	-0,0642	0,4265	0,0976	0,0904	v12
		1,0000	0,4369	0,4362	0,1380	0,5427	-0,0102	0,4916	v14
			1,0000	0,1772	0,2792	0,1978	-0,0455	0,3528	v15
				1,0000	0,0458	0,5513	0,0928	0,3157	v16
					1,0000	0,0368	0,0115	0,2013	v24
						1,0000	0,0765	0,3412	v26
							1,0000	0,1998	v29
								1,0000	v30

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Now we discuss the factor of the job management (v26). According to results obtained, this factor contributes positively to workforce interest in job performance. In other words, the better is the teamwork management (schedule, task overload, workplace equipment, etc.) the higher is the workforce interest rate in the content and the results of their work.

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Salary is a significant factor when forming the workforce interest in job performance. There is a direct connection between the salary and its size.

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According to the data obtained, job satisfaction in a greater degree defines workforce interest in job performance than any other factors. We consider this is a result of the efficient management in Health Care workforce interest development and the factor of self-appraisal of their work. In this regard it is attractive in the practical application.

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Extra bonuses (v15 – 0,2268), overwork (v29 – 0,1629) and its payment define the workforce interest in job performance in a less degree.

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**4. Conclusion**

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We described the Health Care workforce interest in job performance in terms of their sex, age, marital status, education and defined factors that affect the interest. Major tasks that were initially staged were solved during the model building. Our research reflects the most important aspect of Health Care workforce life, their interest in job performance.

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## Government Regulation of the Financial Market in Russia

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### Abstract

The article analyzed the peculiarities of state regulation of the financial market in Russia over the last decade, which helped to identify deficiencies in the legislative and administrative regulation of the financial system, and however showed a lack of a developed financial market infrastructure, the presence of large systemic risks and ineffective measures in the framework of the strategy of development of the financial market in Russia up to 2020. The proposed measures to address identified problems based on the integrated development of segments of the financial market, on the involvement of people's savings, on the activation of mechanisms of state-private partnership, improvement of legislative regulation.

**Keywords:** regulation; financial market; securities market; commercial banks; state-private partnership.

### 1. Introduction

Globalization processes in the world economy as a whole, our country's accession to the WTO has generated some positive preconditions for economic development of Russia and at the same time clearly showed the negative aspects related to the underdevelopment of the domestic financial market with the legal, economic, infrastructure and other points of view. In this regard, important is the assessment of the regulation of the financial market of Russia and to develop recommendations for improving the situation.

### 2. Materials and Methods

September 1, 2013 in Russia abolished the Federal service for financial markets, previously responsible for the development of the national securities market, and its powers transferred to the Bank of Russia. Thus, on the basis of the subject of regulation created extensive financial market. However, regulation of the financial market in Russia still lags behind the needs of its participants and in most cases has a rough defects. In particular, a number of normative documents of the Russian Government made a methodological error, which consists in the separation of integral segments of the financial market:

- the name of one of the subsections of the fourth section the concept of long-term socio-economic development of the Russian Federation for the period up to 2020, approved by decree of the RF Government dated 17 November 2008 #1662-R sounds like a "Long-term development priorities of the financial markets and the banking sector";
- decree of the RF Government dated 22 February 2013 #226-R approved the state program of the Russian Federation "Development of financial and insurance markets, the creation of an international financial centre".

Also noteworthy is the fact that in the introduction to the Strategy of development of the financial market of the Russian Federation for the period up to 2020, approved by decree of the government of the Russian Federation of December 29, 2008 #2043-p written in this Strategy does not address the development of the banking and insurance sectors, as well as their regulation, control and supervision".

It is advisable to note that in the current legal framework there is no interpretation of key definitions of "financial market".

Another methodological error is that the independence of the Central Bank of Russia, guaranteed by the Constitution of Russia and the Federal law "On the Central Bank of the Russian Federation (Bank of Russia)", is

57 disturbed by the fact that the government currently attend meetings of the Central Bank with the right of deliberative vote  
58 and, in the Board of Directors of the Central Bank of Russia, involving members of the government.

59 Thus, the concentration within a single body of authority for regulation of the entire national financial market on the  
60 background of pronounced trends on strengthening the vertical of power in the country, in our opinion, will lead to  
61 increased risk of loss of independence on the part of the Bank of Russia.

62 Analysis of a substantial part of the relevant regulatory documents adopted by the Government of the Russian  
63 Federation, showed their fragmentation and lack of coordination among themselves, the absence of real measures to  
64 promote the development of Russia's financial market, focus on attracting foreign investment.

65 The development of the domestic financial system is difficult because of various negative factors, such as the crisis  
66 phenomena in the economy, the predominance of speculative transactions orientation, lack of proper regulation by the  
67 state.

68 State regulation of investment activity participants in the financial system should focus not only on regulatory  
69 activities, but also to promote the development of appropriate infrastructure and tools that constitute the basis for an  
70 effective mechanism for the reallocation of investment resources.

71 Today in Russia the infrastructure of the securities market is actually only the Moscow exchange (MICEX-RTS).  
72 Other auction organizers licensed stock exchange, focused on the organization of trading in commodity assets.  
73 The rapid economic development of the Russian economy is largely dependent on the investment activity of its subjects,  
74 regulation which may lead to the restriction, and an expansion of this activity. Recent years are characterized by the  
75 expansion of commercial banks in the securities market, and unnecessary government regulation can reduce the positive  
76 effects of these operations. A study conducted by a group of foreign authors showed that the effect of government  
77 support of the banking sector may be different [7].

78 According to the Strategy of development of the financial market of Russia up to 2020, the securities market will be  
79 a priority segment of state influence.

80 Unsustainable development of the Russian economy raises controversial issues about the effectiveness of  
81 monetary policy implementation by the bodies of state regulation and supervision. In this regard, it is important to assess  
82 the role of the Bank of Russia as of the mega-regulator of the financial system and the search directions by increasing the  
83 role of Bank of Russia in the sustainable development of the financial and credit system. At the same time it should be  
84 noted that a number of foreign authors, for example, Saktinil Roy, David M. Kemme believe that the occurrence of  
85 banking crises is only weakly dependent on the deregulation of the financial system [8].

86 Analysis of the implementation of monetary policy by the Bank of Russia for the period from 2011 to 2013 showed  
87 a preferential orientation of the main Bank on inflation targeting and risk management in the banking sector. From the  
88 point of view of the Bank of Russia this policy will promote sustainable economic growth, improving people's welfare and  
89 financial stability of commercial banks.

90 To evaluate the effectiveness of the monetary policy of the Bank of Russia is comparable main macroeconomic  
91 indicators on the basis of information of the Central Bank of the Russian Federation and the Federal service of state  
92 statistics, documents of the Government of the Russian Federation. The obtained data will display in tabular form (table  
93 1).

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**Table 1.** Dynamics of macroeconomic indicators for the evaluation of monetary policy the Bank of Russia

Indicator name	2011	2012	Growth rate (2012/2011)	2013	Growth rate (2013/2012)
Inflation, %	6,1	6,6	108,19	5,5	83,33
The discount rate of the Bank of Russia (average), %	8,25	8,25	100,00	8,25	100,00
Gross domestic product, %	4,3	3,4	79,07	2	58,82
The subsistence minimum in the Russian Federation in the 1st quarter of the year, rubles	6473	6307	97,43	7095	112,49
The average salary in Russia, rubles	23091	26690	115,58	27339,4 (на 1 кв. 2013 г.)	-
The average exchange rate of 1 US dollar (01 January), rubles	30,35	32,19	106,06	30,37	94,35
The number of credit institutions licensed to conduct banking operations - total (beginning of year)	1012	978	96,64	956	97,75
The number of credit institutions with foreign participation in the share capital, carrying out banking operations (beginning of year)	220	230	104,54	244	106,08

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In table 1 according to indicators such as inflation and GDP data for 2013 shows the average predicted values. Presented in the table 1 data among the negative factors in the development of the domestic economy, we note the following:

- in 2012, compared with 2011 increased inflation 8,19%, decreased standard of living for citizens by 2.57%, increased the dollar on 6,06%;
- in the first quarter of 2013 compared with the first quarter of 2012 there was a significant increase in the cost of living for the citizens; for the period from 2011 to 2013 is the refinancing rate unchanged;
- sequential decline in GDP in the dynamics.

The analysis also helped to identify and positive factors:

is expected in 2013, the reduction of inflation on 16,67%;

- the increase in average wages (in dynamics from 2011 to 2013);
- reduction on 01.01.2013 the dollar on the 5.65%;
- reduce the number of credit institutions licensed to conduct banking operations (in dynamics from 2011 to 2013);
- increase in the number of credit institutions with foreign participation in the share capital having the right to conduct banking operations (at the beginning of each accounting year).

It is obvious that the Central Bank of the Russian Federation may not affect the average wage in the Russian Federation and on the subsistence minimum, while 2012 is characterized by a significant increase in the level of inflation and the exchange rate of the ruble against the dollar.

Saving in the dynamics between 2011 and 2013, the refinancing rate, the reduction in the number of credit institutions licensed to conduct banking operations and the increase in the number of credit institutions with foreign participation in the share capital having the right to conduct banking operations, confirms the stability of the Bank of Russia's policy aimed at maintaining financial stability of commercial banks. The increase in the share of credit institutions with foreign capital we associate with the entry of Russia in 2012, the WTO, and the decrease in the number of credit institutions licensed to conduct banking operations - with the increase of own capital requirements of banks in connection with the tightening of rules of Basel and the corresponding amendments to the banking legislation of Russia.

In fact, we observed a shift of focus the Bank of Russia's policy towards the supervision of financial sustainability of the banking sector. Thus the actions of the Central Bank of the Russian Federation for ensuring sustainable economic growth, improving people's welfare are extremely inefficient. We believe it is necessary to develop recommendations for enhancing the role of the Bank of Russia in the sustainable development of the domestic economy.

### 3. Results and Discussion

In our opinion, to develop a composite segments of the financial market, consisting of insurance, foreign exchange, stock, banking markets, it is necessary in the relationship and comprehensively. In the last decade in the global financial market is the symbiosis of its separate parts, which generates the appropriate financial tools.

Accordingly, the efficiency of financial market development will depend on the uniform development of all its segments. Display this dependence by the formula:

$$E_{fm} = E_{im} + E_{sm} + E_{bm} + \text{etc.} \quad (1),$$

$E_{fm}$  – efficiency of financial market development;

$E_{im}$  – efficiency of development of insurance market;

$E_{sm}$  – efficiency of stock market development;

$E_{bm}$  – efficiency of development of the banking market;

etc. – effectiveness of other segments of the financial market.

We believe it is necessary to create a regional stock exchanges, for example, under the Federal districts, which should encourage and accelerate the economic growth of the country as a whole. On the regional stock exchanges to appeal should only be allowed securities regional issuers, while important is involvement in the stock market funds households.

A similar position on the need for the development of regions contained in the research of scholars such as Bagautdinova N.G., Gafurov I.R., Kalenskaya N.V., Novenkova A.Z. [3] and Pesaran M.H., Schuermann T., Weiner S.M. [4], and Gadelshina L., Vakhitova T., etc. [5].

As world experience has shown that the securities market allows for more efficient allocation of financial resources between actors in the economy, the development of regional stock exchanges, in our opinion, will accelerate the process of economic development of our country. In this case, the formula 1 can be transformed as follows:

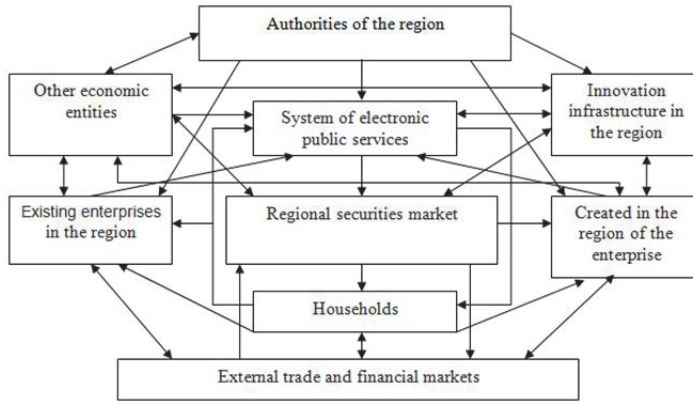
$$E_{fm} = E_{im} + E_{rsm} + E_{bm} + \text{etc.} \quad (2),$$



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ErsM – efficiency of the development of the regional stock exchanges.

Kundukchyan R.M., Gaizatullin R.R., Zappartova Z.N. believe that development of the Russian financial system depends on the integration processes [6]. The mechanism of formation and functioning of regional stock market with regard to the integration processes display in figure 1.



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**Figure 1.** The mechanism of formation and functioning of regional stock market on the example of the region of Russian Federation

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The basis for electronic marketplaces will serve as the system of electronic public services (e-government). Businesses, financial authorities in the region who wish to raise capital through the issuance of securities, place a notice with detailed information about it on the appropriate section of the portal of public services. Households acquire the opportunity to familiarize themselves with relevant securities and, if desired, to buy them through this information system. Funds received from the placement of securities, in a subsequent act issuers.

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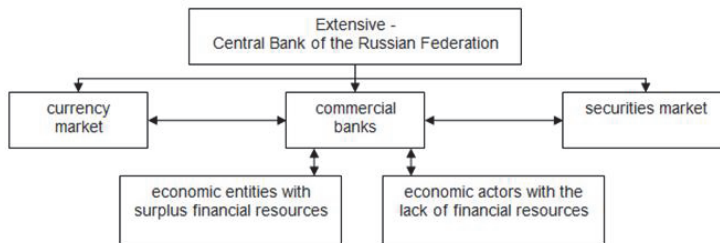
The positive effect of ownership of securities has been implemented through the infrastructure established securities market, for example, information on shareholders' meetings, dividend payments or percent of households and other investors receive from the professional participants of the securities market. Also provides the possibility of direct cooperation between investors and issuers to implement the rights provided valuable paper.

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Measure the confidence of private investors in the financial market may be the creation of a system of insurance of investment similar to the state Corporation "Agency for deposits insurance", created in accordance with the Federal law dated 23.12.2003, #177-FZ "On insurance of deposits of individuals in banks of the Russian Federation within the limits of formation of the Deposit insurance system. This is analogous to the system of Deposit insurance premiums for the insurance of investment must come from professional participants of the financial market, retail investors. The creation of a system of insurance of investments as possible at the state level, and on the basis of self-regulating organizations in their respective segments of the financial market.

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The stability and development of the national payment system should include the protection and sustainability of the ruble, as the ruble is an integral the main element, the unit of account within the payment system.



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**Figure 2.** The proposed model is effective monetary policy

184 The Bank Of Russia

185 Based on our analysis of table 1 data, will form a model of effective monetary policy of the Bank of Russia (see  
186 figure 2), focusing on meaningful, in our opinion, the operations of the Bank of Russia.

187 As we noted above, in recent years, the Central Bank of Russia monetary policy had a positive impact on the  
188 stability of the banking system of the country and strengthen the financial condition of commercial banks. At the same  
189 time, a large share of the credit products commercial banks implemented at higher interest rates exceeding the average  
190 rate of return across sectors of the economy, despite the low levels of inflation (about 6%) and a discount rate (8,25%).  
191 "Dear" loans do not promote economic growth, reduce welfare and profitability of business entities, while they improve the  
192 financial condition of commercial banks. Sami Ben Naceur, Mohammed M. Omran indicate the Effects of Bank  
193 regulations, competition and financial reforms on banks' performance [7].  
194

195 **4. Conclusion**

196 In the model of effective monetary policy of the Bank of Russia (figure 2) activities of the Bank of Russia in respect of  
197 commercial banks should be directed on:

198 the regulation, control and supervision of interest rate loan products of banks, for example, by setting limits on the  
199 level of margins of banks on credit operations, which is especially important in connection with an active parish in the  
200 domestic banking market to foreign banks (after Russia joins the WTO), credit products which are characterized by  
201 significantly lower interest rates compared with the national average. In this regard, significant is the point of view Horst  
202 Feldmann , according to which the liberalization of banking activities can qualitatively affect the social sphere, in  
203 particular, to reduce unemployment in the country [8];

- 204 - the adoption of measures under the terms and amounts of the operations of raising and allocation of financial  
205 resources by commercial banks, for example, when bringing the Bank Deposit in the amount of 1 million rubles  
206 for a period of 3 years, these funds may be posted only for a period not exceeding three years, which will  
207 reduce the financial risks for banks. These measures will help to meet the growing demands of Basel III;
- 208 - encourage lending to the real sector of the economy that is not associated with the directions of modernization  
209 of economy of Russia announced during the presidency D.A. Medvedev, for example, by reducing the  
210 requirements of compulsory redundancy according to credit transactions;
- 211 - promotion brokerage and trust operations of commercial banks on the stock market by differentiating the  
212 requirements of financial stability of banks engaged in traditional banking lending and brokerage operations on  
213 the stock market. When this dealer and investment operations of commercial banks should be reflected in the  
214 "standard" statements of banks;
- 215 - development of the market of derivative financial instruments in hedging transactions of commercial banks in  
216 the foreign exchange and stock markets [9, 10].

217 We believe that our proposed measures will improve the effectiveness of monetary policy by the Bank of Russia,  
218 namely to stimulate economic growth through accelerated cost-effective development of enterprises of the real sector of  
219 the economy [11], improve living standards, reduce inflation, improve the financial sustainability of the banking sector, will  
220 reduce the orientation of commercial banks for speculative purposes.  
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## Methodology of Innovative Economics

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### Abstract

The article explains the methodology of exploring innovation economy. New economic theory and the transition to the priority of innovative economic laws generate new theoretical problems and lead to the emergence of new areas of economic research methodology.

**Keywords:** Innovative economy, economic theory, methodology, method, hypothesis, modernization, transformation

### 1. Introduction

In the economic system, there is a radical change in the dependencies and regularities. Within the industrial system the economic processes lose their pattern of development inherent to them for centuries. Previously, the growing points of the economic system were formed on its local elements within the individual entities, and then extended spatially, forcing out the preceding economic organizations in the competitive struggle. The latter either ceased to exist or turned into marginalized forms of activity on the background of qualitatively and quantitatively dominant new economic models.

Similar processes can be observed today, but only in the context of transformation. In terms of the economic system transformation the focus is on the fact what is primary: either essential patterns and regularities of occurrence and operating of the innovative economic system, which are formed in a qualitatively different form, or the transformation of regularities in the industrial economic system.

Increase in the integrity of the new economic system and the transition to the priority of innovative economic laws generate new theoretical problems and lead to the emergence of new areas of economic research methodology.

The methodology of innovative economics as a new branch of scientific knowledge is based on the methods and models of the innovative economic processes research to identify regularities, trends, and implications. It is possible to suggest a new stage in the formation and development of the methodology of innovative economics, the reasons, the content, and the effects of innovation processes in the dynamics of the modern economic system. In our opinion, the novelty of the provisions put forward consists in understanding the methodology of innovative economics as a product of the whole previous progressive development of economics, which embodies the most important and time-proven achievements of all the scientific schools and trends. Secondly, the novelty consists in essential specification of the innovative economics subject, which includes, on the one hand, the problems of innovation and inherent modernization, and on the other hand, the theoretical and practical aspects of the property relations transformation. The third aspect is the development of the research methodology for the theory of the triple helix and determination of the innovation degree at the enterprises [6], [14].

The specifics of economic relations of the innovation economy consist in their complex nature. Hence the need to have a methodology that implements the heuristic function of the research subject is obvious. Any theoretical system of knowledge makes sense only if it not just describes and explains the required subject area, but is also a tool for finding new knowledge. The structural theory of innovation economy includes functions, principles and laws that reflect the essence of innovation, the original reasons, the value factors, and the logic of the innovative economics which fundamentally distinguish it from the industrial stage of development and, above all, a willingness to change and operate in a situation of constant update in production, structures, and institutions [5], [2].

From a functional point of view innovative economics is a set of interrelated provisions describing, explaining and predicting a variety of events of formation and development of the national innovation system. Therefore, the innovative economics performs synthetic, explanatory and predictive function. In addition, it performs a methodological function, as it serves as a basis for diverse methods, techniques and tools of research. "An Essay on the nature and significance of

56 economic science" by Robbins [13] is often cited as an example of the approach, claiming the irrelevance of empirical  
57 tests to determine the truth or falsity of economic theory. As a supporter of radical apriorism Robbins considered the  
58 economic theory as a system of logical conclusions from a set of postulates, which, in turn, are generated by  
59 introspection and are not subject to empirical testing. [3]

60 The direct opposite of radical apriorism is an ultra empiricism, which adherents refuse to accept any postulate or  
61 premise that can not be directly verified. In other words, an ultraempirist offers to start with the facts, not the prerequisites  
62 [11], [12].

63 The leader of the British historical school W. Cunningham contrasted two ways of research: from events to their  
64 causes ("to identify economic phenomena and to seek conditions that caused them to life") and from cause to effect ("to  
65 highlight economic reasons and try to deduce necessary consequences from them "). [4] According to O. Ananyin, the  
66 historical school considered abstract theoretical analysis as secondary in relation to the empirical study of the historical  
67 experience of economic activity which was viewed as the main task of an economist [1].

68 Building models of innovative economics suggests that theoretical knowledge of innovation appears as a moment  
69 of discursive innovation practice, and basic assumptions and models, as certain components of dispositions and acts of  
70 thinking (observation, measurement, and search for rules of correspondence between empirical and theoretical  
71 languages, modeling, conceptualization, and construction of theoretical, ideal objects).

72 One can come to the empirical law of innovative economy development through industrial generalization of  
73 innovation process. The challenge is to turn the assembled system of innovative facts into the conceptual system to give  
74 them meaning and significance. Hypothesis and innovative economics, revealing empirical constructivism, are intended  
75 to explain the reality and must be confirmed: innovative facts - empirical laws of innovation economy - hypothesis -  
76 confirmation.

77 Thus, the way to the innovative economics has its own characteristics. The center of gravity is shifted toward  
78 empiricism and realism. The following sequence in the development of the methodology for forming hypotheses and the  
79 innovative economics is formed: empirical realism - active realism - streamlined realism. This is the basic outline of the  
80 innovative economics methodology, but there are various modifications of modeling the future of modern economy. For  
81 example, cognitive human activity consists in the construction of an innovative economic model, which should be  
82 adequate to the world innovative laws. It is appropriate to use here the concept of "innovative empirical adequacy", which  
83 is understood as the coincidence of empirical manifestations of the theoretical model of the innovation economy and the  
84 most innovative economy.

85 Thus, the explanatory hypotheses of constructive empiricism are recognized as true when matching the innovation  
86 economy. They are locally true if they are adequate to the innovation economy. Means of achieving objectivity is the unity  
87 of subject and method of innovative economics. As emphasized by Kuhn, "paradigm formation and the appearance on its  
88 basis a more esoteric type of research is a sign of maturity of any scientific discipline" [10].

89 Today the state of innovative economics is characterized by a variety of theoretical approaches and conceptual  
90 provisions, the emergence and development of new areas, the search for new premises, and principles of universal  
91 constants, which would contribute to the establishment of a clear recognized paradigm of the innovation economy. There  
92 is a distinction between the "realism of the outside world" («World Realism»), which implies that the object of the  
93 innovative economics is an innovative system, as it is (and not as we would like to see it) and «Truth Realism», which  
94 implies that we judge the theory of innovation system comparing its results with real activity, and not only using the  
95 criteria of its internal consistency and satisfaction of initial axioms as a basis. But this naturally raises the question of what  
96 constitutes an "objective innovation system." It is obvious that this approach is closely related to positivism [11], [12]. If  
97 one includes in the concept of "real world" not only existing institutions and the state of science and technology in  
98 innovation system, but primarily the sum of notions of the subjects of innovative relations about their own innovation and  
99 innovations of others, about their own position on the modernization of their potential on a new basis, the concept of  
100 «World» becomes similar to the one that you can find in the strategic management - innovative system operates in both  
101 domestic and foreign environment.

102 "Truth Realism" as a criterion in relation to the innovation system allows to narrow the scope of analysis. Inside the  
103 criterion of "Truth Realism" one can distinguish between procedures which involve checking on the basis of a specific  
104 innovation process and procedures, which check the logic of the innovation process in the innovation system.

## 106 2. Methodology

108 Each national innovation system is specific. No basic theoretical model, even a "good" one and generally accepted in the  
109 scientific community can not be directly applied to economic analysis and forecasting. It requires the development of

110 more detailed models that take into account a multitude of specific variables in a particular innovation system where this  
111 theoretical model will serve as a basis.

112 Neoclassical innovative economics does not adequately describe the features of a technologically advancing  
113 market economy and, at best, merely states that advancement, for example, by means of production functions.

114 Orthodoxy turns away from the real problems of technological progress, which often leads to a negative  
115 consequences and deep decline in production.

116 Evolutionary innovative economics sees economic development as an irreversible process of growing complexity,  
117 diversity and productivity of production due to recurrent change of technologies, products, organizations, and institutions.

118 To develop the innovative economics from the odds-formal logic it is necessary to point out a number of  
119 fundamental principles which one should adhere to.

120 The first principle is the recognition of the objective nature of the innovation process, which forms the subject of the  
121 economics. This means that all the innovative relations really exist outside of our consciousness.

122 The second principle is the analysis of innovative forms of relationships based on their classification and  
123 comparison of certain features in order to reveal their essence, or sustainable qualitative determination, which is  
124 characterized by a special, distinctive location and movement of the innovation economy in the economic system. Such  
125 analysis from the individual forms to their common core content is called the empirical method or the movement of  
126 knowledge from a single form to the abstract that is to substantiality of its content [16].

127 The third principle of formal-logical method of innovation economy cognition is the reverse ascent from the abstract  
128 (economic system) back to the specific (innovation system), but as a manifestation in it the cognized essence that is to  
129 essentially-specific. This method of cognition from the general to the specific is referred to as theoretical method. A  
130 characteristic feature of the modern science is intrascientific reflection which is a study of the innovation economy  
131 properties, supplemented by a new approach that is the use of forms and methods of scientific knowledge of innovation  
132 processes, new ways of raising questions relating to the methodology of the study of the innovation economy. It is  
133 proposed to understand under such a methodology the general view of the innovation economy, the object and the  
134 method of analysis, the purposes and methods of developing the innovative economics, the balance between theory and  
135 reality. The formulation "general view" captures the essence of the methodology pretty well, in which scientists and  
136 economists have repeatedly drawn attention to the significance of the individual energy in the economic development of  
137 innovative processes. Among them are K.Marx, V.Sombart, M.Weber, A. Bogdanov, J.Schumpeter. According to J.  
138 Maynard Keynes in particular "an appreciable part of our actions, because they are aimed at something positive, depend  
139 on spontaneous optimism rather than on rigorous calculations based on moral, hedonistic or economic motives. It is our  
140 innate desire for activity that drives the world" [7]. It is worth mentioning Weber's "spirit of capitalism", the "entrepreneurial  
141 natures" of Sombart and the role of the entrepreneur in the "creative destruction" of the economic equilibrium of  
142 Schumpeter. An innovative person and his tendency for the "creative destruction" have the world-historical significance  
143 and are found in any economic system [16]. A variety of manifestation forms for human innovation can include two  
144 aspects: information and energy. As information it means the data about innovation and innovative experience. As energy  
145 it suggests a mobilization force that transforms the information into a system of innovation priorities and values, ensuring  
146 a high level of productive innovative motivation or degree of innovation commitment of an innovative person.

147 The choice of methodology, as well as the choice of the investigated problem of the innovation economy, is, in  
148 some way, the art of competent identification of the innovation economy problem. But this is only the first part of the  
149 research problem. The second important issue is the right choice of the research methodology for the problems of  
150 innovation economy.

151 The criteria for selection of research methodology are as follows: the factor of scientific character; the role of  
152 human innovation; the factor of dynamics; the factor of target; the factor of creative destruction.

153 Methods of research:

- 154 - Empirical, including organizational, functional-structural and functional-cost innovation.
- 155 - Scientific - conceptual (socio-economic, diachronic, program-target).
- 156 - Pragmatic (technocratic, informational).

157 Methodology as a way of exploring the innovation economy is diverse. It can be classified as follows:

- 158 - scientific methodology and methodology of different types of knowledge depending on the area of knowledge  
159 of innovation economy, where the methodology is used;
- 160 - quantitative methodology and qualitative methodology depending on the type of innovative relations;
- 161 - inductive methodology, interpretive methodology, experimental methodology, modeling methodology,  
162 evolutionary methodology, depending on the type of method used;
- 163 - universal methodology, general scientific methodology and science specific methodology according to the

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levels.

According to E. Korotkov the content of the research methodology includes: the purpose and the object of research (current and future); approaches (systemic, aspective, conceptual, empirical, pragmatic, scientific); guidelines and limitations (rigid, predictable, soft, unpredictable); ways and means of research; research methods (specific, formally logical and valid) [9].

### 3. Conclusion

Hypothesis and innovative economics disclose the streamlined realism and are aimed at solving the problems of economy modernization. Hypothesis and innovative economics containing constructive rationalism have the most sophisticated methodological framework. This leads to the discovery of new ideas, new activities of enterprises and organizations that will reshape the economy and generate a whole new industry. The main criterion for their evaluation is the novelty and usefulness of economic modernization. Reliance on a given model designs the future that is based on the refinement of the existing reality.

Methodology and the style of innovation economy cognition are closely inter-related and represent the general principles of research for the study of innovation economy, ensure interdisciplinary synthesis, develop the outlines of the innovation economy problem and its method of verification, analyze the ideological standards of knowledge.

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## Socioeconomic Processes in the Cis Countries

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### Abstract

Proposed instruments used to measure inequality in living standards in five CIS countries: Azerbaijan, Belarus, Kazakhstan, Russia and Ukraine. Compared countries in the aggregate represent most of the economic and human potential of community; In addition, a number of them are consolidated with each other with deeper forms of integration. Currently differentiation of incomes of the population estimated by the traditional factors (index- numbers): funds and Gini, which is determined by socioeconomic inequality.

**Keywords:** Poverty rate, living standarts, distribution of incomes

### 1. Introduction

During the period after the collapse of the USSR, the methodological instruments of estimation of poverty in the countries that joined in the CIS, was different, and standards for the identification of socioeconomic population groups, which differ depending on the income level of the quality of life, has not been worked out. Differentiation of income of population is estimated by traditional statistical coefficients (index- numbers): funds and Gini, which is determined by socioeconomic inequality and other population groups:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|}{2n^2 \bar{y}} \quad (1),$$

where  $G$  — Gini index,  $X_k$  — cumulated share of population (population previously prioritized by rising of income),  $Y_k$  — part of income, which in the aggregate get  $X_k$ ,  $n$  — number of households,  $y_k$  — part of income of households in combined income,  $\bar{y}$  — arithmetical average of parts of income of households.

### 2. National Methodological Approaches to the Definition of Poverty

As a criterion in the assessment of quality of life and poverty of Republic of Azerbaijan use data on per capita consumer expenditures. They are calculated on the basis of household cash expenditures, and the cost of product consumption from private farming. Using consumer expenditures as a criterion has both advantages (these data are less underreported than income data) and disadvantages (not taken into account savings that can be used by households for consumption).

It should have in view that using consumer expenditures as a consideration a large part of the rural population could fall into the category of the poor, though often their consumption is above the standard as food mostly comes from private farms. For this reason, the practice of recalculation of size of non-cash income is applied. For internally displaced persons cost of the governmental grant and benefits is also taken into account. Poverty is expressed by a single figure in the republic, and is measured on the basis of the subsistence minimum. To provide social assistance to the most people in need in Azerbaijan adopted the "Law of level of need criterion."

Criterion of poverty (poverty) in the Republic of Belarus is the per capita budget of the subsistence minimum, calculated as attributable to one member of a family of four the average value of the subsistence minimum - a minimum set of goods and services necessary to ensure the viability of the family and the preservation of the health of its members, as well as compulsory payments and contributions. The budget of the subsistence minimum is calculated on a quarterly basis by the Ministry of Labor and Social Protection of the Republic of Belarus in the prices of the last month of the quarter. The poverty rate is calculated for the whole country; on areas of the Republic of Belarus and Minsk; in rural and urban; in towns and cities; for households with children (of which one, two, three or more children) and households, as part of that do not have children (one of them separately by the families of pensioners); for household consisting of

56 one, two, three, five or more persons [2, 3].

57 In the assessment of quality of life and poverty of Republic of Kazakhstan apply data of population income used for  
58 consumption. Income used for consumption is the amount of money spent on consumption (excluding investment by the  
59 public and savings), the cost of own production consumed with personal subsidiary plot, as well as the amount of social  
60 transfers in kind. In the system of national statistics, level of the subsistence minimum, used to assess the proportion of  
61 the population with incomes lower than the level of consumer basket (CB) varies in regions. For measuring poverty at the  
62 household level accepted equivalence scale of household incomes: 1.0; 0,8; 0,8, ..., rather take into account saving of  
63 expense due to the effect of cohabitation and all household members, except the first, are assigned a coefficient of 0.8 [4,  
64 5].

65 Since 1992 Russian Federation has used the results (quarterly) of Household Budget Survey (HBS) as an  
66 information base for the formation of inequality and poverty. The screening program is oriented to obtain the information  
67 of household expenditure, and (since 1997) does not contain a direct measure of the total amount of income. Assessment  
68 of the level of income of each household in the survey carried out by simple calculation. The indicators characterizing the  
69 level of income at the disposal of households during the survey are available resources and cash income. In accordance  
70 with the current methodology the calculations of readings of population distribution by income level are made using the  
71 method of simulation modeling by converting an empirical distribution obtained on the basis of HBS data in a number of  
72 distribution that corresponds to a grouping index in the total population (per capita cash income derived according to the  
73 balance of cash income and expenditure).

74 The main contribution of this methods is based on the hypothesis for correlation of cash income logarithmically  
75 normal (two-parameter model) distribution pattern of population. Based on the obtained number of population distribution  
76 in terms of per capita income formed attribute data on the distribution of total cash income for quantile groups, the main  
77 coefficients (index numbers) income differentials and poverty rates in the general population (in Russia and the subjects  
78 of the Russian Federation) and demographic (age-sexually) groups (in Russia). Poverty indicators for socioeconomic  
79 groups of the population and households are formed on the basis of the results of the HBS without adjustment for the  
80 relevant macroeconomic indicator of cash income. Given the size of the deviation between the results of the HBS and  
81 macroeconomic indicator, indicator of poor participation rates, differentiated by socioeconomic groups (on the basis of  
82 HBS) and the population as a whole (on the model), have a relatively high divergence on the level. In forming the  
83 indicators characterizing the level of poverty, are used the category of indigent (households) having per capita incomes  
84 lower than the level of the subsistence minimum (absolute poverty line). In the general population and the age-sex groups  
85 the comparison is made on macroeconomic indicators of per capita income and the corresponding level of the  
86 subsistence minimum. By socioeconomic groups of population (households) per capita income (disposable resources  
87 and cash income) proportions with the calculated level of the subsistence minimum for a particular household, on the  
88 basis of his place of residence and demography[1].

89 Until 2010 in Ukraine, the poverty line was determined by the relative criterion and was set at 75% of the median  
90 total equivalent expenditures. Total expenditures include cash expenditures; benefits, subsidies and compensations that  
91 the household get in cash and in kind; incomes in kind from private farming. For measuring poverty at the household level  
92 adopted equivalent scale: 1.0; 0.7; 0.7, rather all members of the household (irrespective of age and status), except the  
93 first, are assigned a coefficient of 0.7. Along with the relative low-income poverty threshold for a comprehensive  
94 assessment of the situation the subsistence minimum confirmed by the state level which serves the basis for the  
95 establishment of social guarantees is applied.

96 In Russia and the CIS countries in the official social policy generally apply only subsistence minimums. Currently in  
97 the compared countries national statistical authorities apply different approaches to determine the national levels of the  
98 subsistence minimum and determine the levels of poverty. This required a decision on the choice of comparable  
99 databases and, though to varying degrees, the transformation of national databases on Azerbaijan, Belarus, Kazakhstan,  
100 Russia and Ukraine [7].

### 101 102 **3. Classifications of the Population in Terms of Standard of Living** 103

104 Several model distributions of the population of the countries compared to economic groups with different levels of living  
105 were built. The basis of the formation of these groups was based on the income used for consumption, and regulatory  
106 consumer basket of consumer budgets of different levels of material prosperity. Distribution of the population by income  
107 group in percentage is presented in table 1.  
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**Table 1.** Distribution of the population by income group (model 1 in the national social standards)

Income groups	Russia	Ukraine	Kazakhstan	Belarus	Azerbaijan
Before CB	20,5	25,6	26,7	12,1	13,2
CB-3CB	52,9	67,0	66,8	55,2	85,4
3CB-7CB	22,5	7,3	6,4	28,2	1,3
7CB-11CB	3,1	0,1	0,1	3,6	0,1
>11CB	1,0	0,0	0,0	0,9	0,0

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The results of the analysis of groups of the population of households according to the I model present the following:

1. In Russia, Ukraine, Kazakhstan, Belarus and Azerbaijan was dominated by those most in need with low incomes and socioeconomic population. In Belarus - 67.3, in Russia - 73.4, in Ukraine - 92.6, in Kazakhstan - 93.5, while in Azerbaijan - 98.6 of the population in 2008 lived in households with incomes less than the socially acceptable consumer budgets;
2. Middle and upper class socioeconomic groups in Russia, Ukraine, Kazakhstan, Belarus and Azerbaijan were presented slightly.

**Table 2.** Distribution of the population by income group (model 2, in Russian social standards)

Income groups	Russia	Ukraine	Kazakhstan	Belarus	Azerbaijan
Before CB	20,5	37,2	69,6	20,0	41,6
CB-3CB	52,9	58,6	30,0	58,1	57,9
3CB-7CB	22,5	4,2	0,4	19,8	0,5
7CB-11CB	3,1	0,0	0,0	1,8	0,0
>11CB	1,0	0,0	0,0	0,4	0,0

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The results of the analysis of groupings of the population of households in the 2 model in Table 2 present that if we take the distribution of living standards, national standards for Russia, Belarus to the two lower income socioeconomic groups of the population was 78.1 of the population, in Ukraine - 95.8, in Azerbaijan - 99.5, in Kazakhstan - 99.6 of the population. In the distribution of living standards of the population of Ukraine, Kazakhstan, Belarus and Azerbaijan low-income people dominated more than in Russia.

Results of the analysis of the population groupings of households according to the third model in table 3 presented; that Russia and Belarus have been observed close distribution of the population by income group. If we take the distribution of living standards, national standards in Belarus, the Russian to the two lower socioeconomic groups would apply 63 of the population, in Belarus - 67.3. And 29.7 of the population in Russia and 28.2 in Belarus would belong to the transitional social strata. Middle and upper class socioeconomic groups were, respectively, 7.4 and 4.5 of the population of compared countries [6, 8].

**Table 3.** Distribution of the population by income group (model 3, in national social standards of the Republic of Belarus)

Income groups	Belarus	Russia
Before CB	12,1	13,2
CB-3CB	55,2	49,8
3CB-7CB	28,2	29,7
7CB-11CB	3,6	5,3
>11CB	0,9	2,1

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**Table 4.** Distribution of the population by income group (model 3, in national social standards of Ukraine)

Income groups	Ukraine	Russia
Before CB	25,6	14,1
CB-3CB	67,0	50,4
3CB-7CB	7,3	28,6
7CB-11CB	0,1	5,1
>11CB	0,0	1,8

141 The results of the analysis of groupings of the population of households according to the third model in table 4 present  
142 that if we take the distribution of the population by income group, national standards of Ukraine, in Russia to the two  
143 lower socioeconomic groups would apply 64.5 of the population, and in Ukraine - 92.6. And 28.6 of the population in  
144 Russia and 7.3 - in Ukraine would belong to the transitional layers. For the middle and upper class socioeconomic groups  
145 would apply respectively 6.9 and 0.1 of the population of compared countries [10].

146 The results of the analysis of groupings of the population of households according to the third model in table 5  
147 present that if we take the distribution of the population in terms of living standards, national standards in Azerbaijan, in  
148 Russia to two lower socioeconomic groups of the population would apply 57.9 of the population, and in Azerbaijan - 98.6.  
149 And 32.7 in Russia and 1,3 in Azerbaijan would belong to the transitional segments of the population. For the middle and  
150 the upper class socioeconomic groups belonged respectively 9.4 and 0.1 of the population of compared countries.

151 **Table 5.** Distribution of the population by income group (model 3, in national social standards of Azerbaijan)

Income groups	Azerbaijan	Russia
Before CB	13,2	10,6
CB-3CB	85,4	47,3
3CB-7CB	1,3	32,7
7CB-11CB	0,1	6,6
>11CB	0,0	2,8

154 Distribution of the population by income group (model 3, in national social standards in Kazakhstan are presented in table  
155 6.

156 If we take the distribution of the population by income group in Kazakhstan, in Russia to the two lower layers of the  
157 population belonged to 45.7, and in Kazakhstan - 93.5. And 38.7 of the population in Russia and 6.4 - in Kazakhstan  
158 belong to the transitional layers. For the middle and upper class socioeconomic groups would apply respectively 15.6 and  
159 0.1 of the population of compared countries [9].

160 **Table 6.** Distribution of the population by income group (model 3, in national social standards of Kazakhstan)

Income groups	Kazakhstan	Russia
Before CB	26,7	6,0
CB-3CB	66,8	39,7
3CB-7CB	6,4	38,7
7CB-11CB	0,1	10,2
>11CB	0,0	5,4

164 **4. Conclusions**

165 The overall conclusion is that, despite the differences in living standards, all five compared countries are still far from  
166 optimal market model of the distribution of population in standard of living. All this is necessary to observe, having in view  
167 that in this publication normative standards of income are lower than in the developed capitalist countries. They reflect the  
168 state of their national transitional economies, in order to consider all previously reservations relating to individual  
169 compared countries.

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# Tendencies of Small Business Development in the Russian Information Economy

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## Abstract

The problem of small businesses products and services promotion with the using of new information technologies is considered in the article. The particular attention is paid to small businesses products and services promotion through social networks, especially on the Russian level. There is observation of the small businesses economic activities and social networks, which are preferable for a small business development. The basic ways of products and services promotion on social networks have been found out and there are given some recommendations on the most successful and rapid onset of the consumer audience attracting campaign. The proposed method of indicator calculation which shows the number of potential buyers will allow to calculate the approximate number of potential buyers for any business account in Instagram.

**Keywords:** small business, enterprise, the information economy, the information technology, social network, Instagram.

## 1. Introduction

The growing interest to the problem of small businesses products and services promotion using the new information technologies in the recent years is related to the society awareness of the information economy global development, the modernization of the economic potential through the development and implementation of the information technology.

In the available domestic and foreign literature the study of small businesses products and services promotion problems through the social networks, especially on the Russian level has an episodic nature. In these circumstances, it is necessary to light the issue since exactly Russian small business, today, is more than just interested in the following: sales increasing, attracting new customers, promoting their products and services in the information economy through the new information technologies application.

In connection with the foregoing there have been made an attempt to observe some small businesses economic activities and social networks, which are preferable for a small business development; to identify the main ways of products and services promoting in these networks, to give some recommendations on the most successful and rapid onset of the consumer audience attracting campaign

## 2. Literature Review

In this article we are going to consider enterprises of small businesses. According to statistics the number of small businesses is increasing annually: in 2001 there were 1 million 836 thousand enterprises of small businesses the number of small businesses enterprises in Russia in 2013 has exceeded 2 million. Such indicators as population growth and the number of Internet users in Russia also increased. (Figure 1).

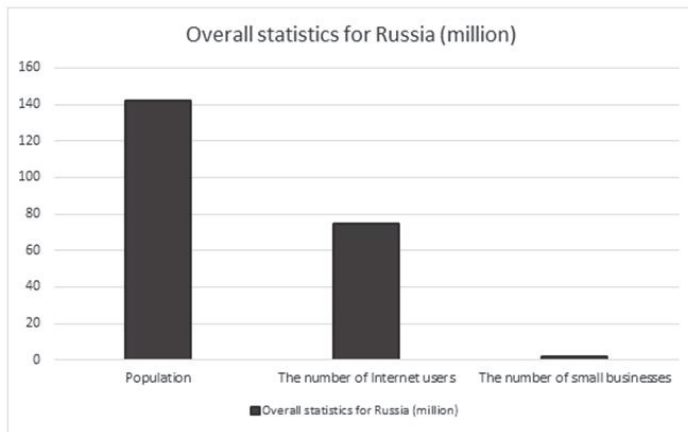


Figure 1: Overall statistics for Russia [1].

The proper promotion of business in the information economy –the promotion of business in cyberspace may be the key of a great success. It is important to note that Internet trading became a serious competitor to the common shops, and the Internet has won the trust of customers. Under conditions of economic uncertainty, consumers are spending more and more time looking for profitable offers. The time spending to the decision making process of purchases increases. Nowadays the Internet has become the very universal tool for market research. The consumers could hardly make a purchase without first examining the product and manufacturer reviews in the internet. More and more people before decision making need to read reviews and ratings of other users about products and stores. For this purpose one can increasingly use the search engines, services of comparative technical and price analysis and social networks. Products as varied as software, credit cards, and even coffee makers are influenced by network effects whereby the product's value is contingent upon the number of people using it [2]. With the help of blogs, newsletters, social networks, video and other marketing businesses can build relationships and get credibility and trust with its audience and ultimately increase sales [3].

When deciding which platforms to invest in, it's important to determine where your target market is active, and also which ones your competitors are using successfully [4].

Promoting small businesses enterprises in the social networks makes it possible to influence on the target audience, select the site place where the brand audience is represented to a greater extent, and the most appropriate ways to contact with it not affecting those who are not interested in the advertisement. The predictions of growing consumer power in the digital age that predated the turn of the century were fueled by the rise of the Internet and then reignited by social media [5].

It is necessary to mention the Social media marketing – it is a set of actions on the use of social media as channels for business promoting and attention and traffic attracting to the brand or to the product as well as the various tasks which are set by the company. Social media is an ideal environment for building brand communities [6].

Today there are more and more social networks in Russia and they are open to all Internet users. Their information is accurate, they also provide great opportunities for the target audience searching. The goal of any social network is a community of people that bring something in common (school, relax, work, interests). In the context of advertising technology it is very profitable - it is possible to attract a certain group of people for a particular advertisement. Leveraging the power of content and social media marketing can help elevate ones audience and customer base [7].

### 3. Research

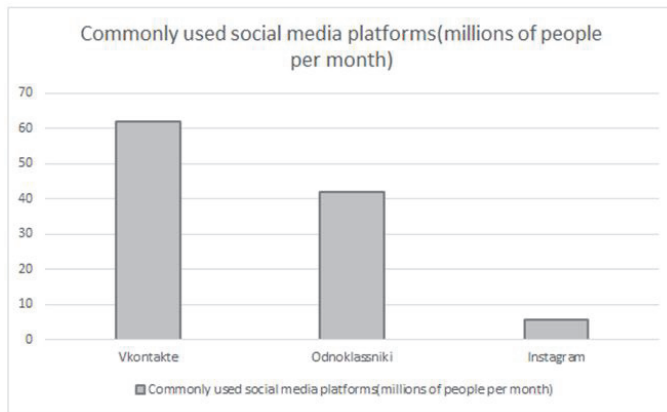
Active development of social networks and services in recent years has had a strong influence on the information economy development, on the way how millions of consumers make purchases, take sellers. Such services as social networks, blogs and microblogs manage to attract an audience of millions. Also the world's largest companies, including market leaders in the retail trading and food production use the Internet in their strategy, as their target audience, their customers are exactly in the Internet.

As an object of the study the author in this paper selected 3 main Russian social networks: 1 - Vkontakte, 2 -



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Odnoklassniki, 3- Instagram. Processed statistics showed that in fact a huge part of the population visits social networks and a leader among them is a Vkontakte site - 62mln monthly visits. (Figure 2).



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**Figure 2:** Commonly used social media platforms (millions of people per month)[1;8]

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Nonlinear dynamic model has been suggested for assessing and predicting the number of social network users.[9] However, the growing popularity of network Instagram with more than 5mln people visits per day, will soon catch up with its main competitors. Instagram is the hottest social media site today: Two years after its launch, the number of its daily mobile users surpassed that of Twitter. Then Facebook purchased it for a billion dollars-and it took the world by storm [10].

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People began to devote more time to examine proposals of the mass market, which is another qualitative shift in the consumer behavior. Statistics shows that the number of queries in search engines for high-value goods, such as cars and large household appliances are comparable to the number of user queries for animal feed and hair care.

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Taking into account the impact of the economic downturn in the nearest future, consumers will spend more time looking for discounts and special promotions and examining sites with price comparisons and user reviews. Internet space becomes one social community and consumers listen to the opinion of other members even if they are complete strangers. Generally as in a real life consumers more trust the opinion of each other than different advertisements.

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According to a survey of the Russian consumers, in addition to the personal recommendations of their friends, the Internet has become a major information resource and a place for a purchasing decision making. The active development of social networks and services in recent years has had a strong impact on the way how millions of users around the world communicate, shop and take brands.

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#### 4. Results

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Creating a website is difficult and rather expensive, so we recommend for small businesses to create a community in blogs, groups, social networks and promote in these spaces, in a social sphere, getting a very significant effect with better returns than in the case of the site development and with more active users.

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The following table lists as described above, some of small businesses economic activities and social networks which are preferable to develop their business, as well as the main ways of products and services promoting in these networks.

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**Table 1.** Small businesses promotion of goods and services in different social networks.

Small businesses in Russia	Social network Vkontakte	Social network Odnoklassniki	Social network Instagram	The main ways to promote ones products and services using social network
Wholesale and retail	+		+	Placing texts, links, photos, video and hashtags. Variety of content increases coverage and user involvement. A selection of different photos from a storefront, dialogues with subscribers in the form of questions, corporate news, photos of a new products range. A variety of events: flash mobs, discounts and coupons, themed photo contests.
Hotels and restaurants	+	+	+	Text, links, photos, and videos: workflows: photos of dishes, menu, hotel rooms photos, photos of satisfied customers; celebrities holding various competitions; special offers; active dialogue in the comments and hashtags.
Operations with real estate, renting and services	+	+	+	Text, links, photos, and videos: workflows: photos of real estate, renting photos, etc.
Education, health		+	+	Text, links, photos, and videos: Master classes, A variety of events: flash mobs, discounts and coupons, themed photo contests.
Textile and clothing manufacture	+		+	Text, links, photos, and video, photos of new products, sketches, public opinion survey, dialogue with subscribers. New products range, manufacture photo and video. A variety of events: flash mobs, discounts and coupons, themed photo contests.
Production of leather, leather products and shoe production	+		+	Text, links, photos, and video, photos of new products, sketches, public opinion survey, dialogues with subscribers. New products range, manufacture photo and video. A variety of events: flash mobs, discounts and coupons, themed photo contests and hashtags.
Publishing, printing, advertising	+	+	+	Text, links, photos, video and hashtags. Photos and video from the shooting, layouts photo, public opinion survey, dialogue with subscribers. A variety of events: flash mobs, discounts and coupons, themed photo contests.

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According to the information above, it can be concluded that the social network Instagram is ideal for small businesses if it is connected with: family; fashion; gadgets and electronics; architecture; sports; food; travel. In fact, this list is not a strict restriction but only a recommendation for the most successful and rapid onset of the campaign in this social network on the basis of its preferences. Making products real can be a tough challenge for online businesses, because customers can't see, touch and smell products first-hand. But visuals can deliver those sensual experiences, too [11].

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As a result of the study, we would like to propose a calculating formula of the indicator which shows the number of potential buyers for a separate account in Instagram.

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$$Q_i = S / L \quad (1)$$

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Q<sub>i</sub> - index number (quantity) of potential buyers in Instagram (i);

S - total number of subscribers (users) of the user (account);

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L - total number of likes (one photo / one item).

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The indicator of potential buyers number in Instagram (Q<sub>i</sub>) depends on the following factors:

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- gender of the potential (prospective) buyer;
- Age of the potential buyer;
- Solvency of the potential buyer;
- Taste (preferences) of the potential buyer, and so on.

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Thus you can calculate the approximate number of potential buyers for any business account in Instagram.

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Such services as social networks, blogs and microblogs succeeded in attracting an audience of millions. And the world's largest companies, including market leaders in the retail trading and food production use the Internet in their marketing strategy, as their target audience, their customers are there. Social media has become an effective tool for the study of opinions about the brand, allowing you to work directly with customers to get feedback on existing products and suggestions for improvement.

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## 5. Conclusions

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The information economy opens new opportunities for small businesses in Russia. An increasing number of small businesses are striving to integrate the Internet - communities, as now all companies and individual entrepreneurs have realized the importance of business promotion in several areas. It is especially important to contact and "get closer" to the

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156 potential customers. Communicating with customers through social networks, it is possible not only to attract new ones,  
157 but also increase the loyalty of regular customers. Meanwhile, one can create a community in blogs, groups, social  
158 networks and promote in these spaces, in a social sphere, getting a very significant effect with better returns than in the  
159 case of developing the site and with more active users. The main trend will be increasing of the number of different  
160 communities, groups and business accounts in social networks, by gaining the number of Internet users and the growth  
161 of their interaction with small businesses.

162 For the modern Russian economy is characterized limited capacity to overcome the crisis in the economy owing to  
163 the underdevelopment of market instruments, the lack of a system of economic policy orientation[12], for that reason  
164 small businesses need to develop any possible ways the information economy provides.  
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## Theoretical Aspects of Public Goods Guardianship

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### Abstract

Following text describes theoretical aspects of public goods reproduction in terms of modern challenges from the prospect of government and private cooperation. Based on the analysis of the relationship of the public sector with public goods, text presents the discussion about creating evidence-based basis for constructing a system of public policy priorities. The concept of fiscal policy reviewed a set of basic goals, objectives, priorities and methods of financial management, constituent methodology of financial security concept of economic policy of the state (municipalities). The main priorities of fiscal policy development analyzed based on the goals, objectives and priorities for economic and social policy of the public authorities. Text is of general interest to those involved in the study of a mixed economy and social policy in the field of welfare states.

**Keywords:** public goods; public guardianship; economic theory; macroeconomics; public finance.

### 1. Public Goods Reproduction in the Prospect of Government and Private Cooperation

In recent years, public goods production and provision become a matter of particular relevance. The main objective of government public finance policy was the organization of the adequate revenue sources for such reproduction. Only under these conditions, it is possible to talk about the Pareto-efficient allocation of public benefits. From this position, we should talk about the process of production and distribution of public goods and the emergence in connection with this public commitment. Accordingly, the public goods are the specific group of goods and services, uniform production and distribution of which is associated with the emergence of public lawful obligations.

A specific feature of these goods and services group is contrary to the fundamental theorems of welfare, when trying to market their distribution [1]. When you select the competition and excludability parameters, inevitably arises a situation in which the benefit becomes non-competitive and non-excludable. That is – on the one hand – inability to give up its consumption, and – on the other – impracticality of production in terms of a market economy. So the question of the public guardianship organization over these goods raises. From the point of view of contemporary reality, in our view, it would be more correct to use the term "public guardianship", as it relates to public lawful obligations and public law entities.

With regard to Russia, the public law organization defined as an integral part of public law entities, which is involved in the production and provision of public goods, based on accepted public lawful obligations. As the practice shows, the adoption of specific decisions in the diversity of the public goods production and distribution management instruments reduced to a uniform set of some techniques, forming a definite financial policy.

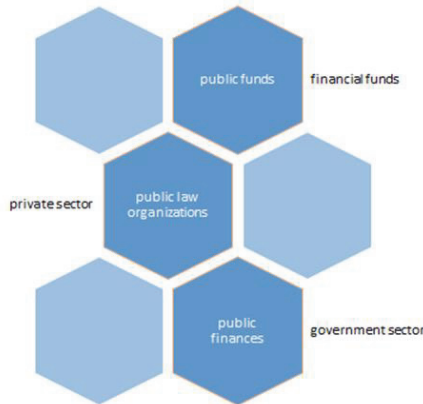
Should note, that the public finances, expressed through the institution of public law entities play an important role in the financial system as a whole. Thus, we proceed to consider the role of public finance in the process of forming the financial sources of social reproduction. In other words, we express the importance of public finance in terms of two components: the part of public finances in the process of production and distribution of public goods and the provision of access to data benefits for everyone. The role of public finance, as part of the financial system, participating in the distribution of financial resources to the production and distribution of public goods, to a large extent determined by the legal component.

Institutional framework, through which fiscal policy implements, is a system of public law organizations. Public law organizations considered as a set of public authorities and all levels of government, non-market non-profit organizations, financed and controlled by the state (schools, hospitals, cultural institutions, etc.) and state funds – the primary function of which is the implementation of welfare state programs.

General government unites units carrying out the functions of government as the main activity. Functions of

57 government are as follows: firstly – taking responsibility for ensuring that the company products and services on a non-  
58 market basis for their collective or individual consumption; secondly – the redistribution of the income and wealth by  
59 means of transfers and subsidies [2,3].

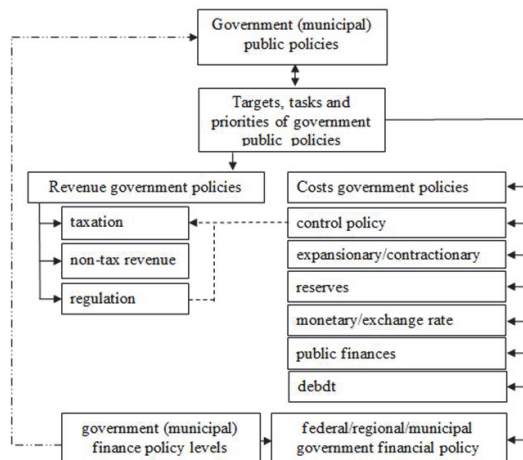
60 Government units operate within funding from the budget, extra-budgetary funds, borrowing, as well as from the  
61 proceeds of property sales and market services. The totality of public law organizations represented in the following  
62 organizational chart (Figure 1).



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64 **Fig. 1.** Place of public law organizations in the Public Sector  
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66 Touching upon the issue of financial policies should immediately note features of public finances. Objectives of  
67 government (municipal) policies are the basis for the development of its priorities. Conventionally, the objectives divided  
68 into various segments in which these objectives will form. Thus, in the area of revenue targets due to the functions of the  
69 system of public revenues: fiscal and regulatory [4]. The main objective of fiscal policy expressed in full providing income  
70 sources of the production process of public goods.

71 This means that should be achieved parity in providing income sources planned expenditures, on the other hand - all  
72 collected revenues should direct to the performance of public obligations of the public authorities, as it is in the process of  
73 spending made the provision of public goods. Thus, the concept of the proposed financial policies included the concept is  
74 not public, and public finance [5,6]. At the same time, it does not reveal the features of the management of public  
75 finances. To expand the understanding of the financial management policies of public finances, consider the goals of the  
76 state (municipal) financial policies  
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80 **Fig. 2.** The structure of the state (municipal) financial policy

## 2. Introduction of Public Guardianship

The overall objective of the public guardianship is to create conditions for uniform production, distribution and consumption of goods. The main purpose of financial regulation is to minimize the social costs of guardianship to achieve its objectives. Hence, we allocate the total costs of social care, which are in the cost of maintaining a uniform demand, supply and consumption of goods. Then it becomes obvious source of counter-cyclical policy.

Relatively modern features of most types of wards benefits observed their approach through market instruments and government. As an example, partial solution to the "free rider" problem public goods [7]. These decisions include:

- a) securing by contracts;
- b) introduction of privileged groups;
- c) "free riders" merge;
- d) introduction of an exclusion mechanism;
- e) introduction of social standards.

In addition, to illustrate the relationship of public goods to the distribution process of financial resources we have proposed an approach based on the findings of the study, grouped in the form of a generalized approach to public care [2]. This approach formulated in the form of Table 1.

**Table 1.** Classification of public (social) benefits

Public goods	Problems	Solutions
With standard market errors	price uncertainty, the standard errors of the market	hedging reserve in case of value deviation
Baumol goods	"price disease"	price equalization
Public property	non-excludable property	guarantee of production and uniform distribution
Meritorical goods	decline in demand, based on the lack of information, the will and resources within universal needs	stimulate the production / distribution

Based on the analysis of the relationship of the public sector with public goods, we can talk about evidence-based basis for constructing a system of public policy priorities. As we know, the concept of fiscal policy is a set of basic goals, objectives, priorities and methods of financial management, constituent methodology of financial security concept of economic policy of the state (municipalities) [7,8,9]. The main priorities of fiscal policy develop based on the goals, objectives and priorities for economic and social policy of the public authorities.

As the most important goals of modern government financial policies, the majority of domestic economists allocate development and implementation of an effective system of full financial support and financial incentives accelerate sustained economic growth in the country, allowing a relatively short time to become leaders in the global economic environment and the well-being of citizens. As evidence of the realization of this goal, lead GDP growth.

In our view, this approach, at least, is debatable. Due to the fact, that the regulatory definition of efficiency is not fixed and is not offered, usefulness of indicators of financial security doubtful and it is impossible to talk about the implementation of these financial policy objective parts. At the same time, the size of GDP cannot characterize stability and economic growth, because economy cyclical nature causes periodic changes in its volume.

Talking about the release dates in the leading countries, we should specify the planning horizon, as the phrase "in a relatively short period of time" does not provide a basis for predicting positive change [10]. In accordance with the theory of well-being, of course, can be regarded as the purpose of improving the welfare of citizens' financial policy, but in the part of the public sector and the public goods provided by the state, as we have previously shown, there is a contradiction of their distribution process with the theory of well-being. In connection with this, in our opinion, one should not talk about improving the welfare of citizens, as the purpose of government financial policy. In terms of fiscal policy, we should rely on two fundamental factors: the reality and attainable – and operate within the framework of these definitions, performance criteria, and the uniqueness of the specific.

Under the attainable hereafter, we mean a fundamental criterion of completeness fulfill the objective, in other words, the goal should be achievable within the planning horizon. Reality goal implies that it has a scientific and legal basis that would allow us to speak of its concreteness. Defining the purpose of financial policy indicates its viability and relevance: that is, the unbiased forecast estimates and results.

Addressing to the main objective of financial policy, we should ensure that full spectrum of the public goods

127 production and distribution revenue sources present. From this point of view, Richard Abel Musgrave notes that the main  
128 functions of government financial policy should include [5, 6]:

- 129 1. Ensuring provision of public goods, or process in which the total resources divide between the production of  
130 private and public goods, and defines a set of alleged public goods. Providing public goods expresses the  
131 distribution function of fiscal policy.
- 132 2. Adjustment of the existing distribution of income and wealth in order to ensure compliance with public notions  
133 of equitable distribution - redistributive function.
- 134 3. Use of fiscal policy as a means of ensuring high employment, a reasonable level of prices and the  
135 corresponding level of economic growth, taking into account effects on trade and payments balances –  
136 stabilization function.
- 137 4. The basis for goal setting government financial policy are listed functions in the annex to the emerging  
138 economic problems.

139 Linking medium-term priorities of government financial policy with the basic functions of the public sector, and  
140 knowing the characteristics of the relationships between various financial flows, it is possible to build a state financial  
141 policy based on the principles of the system, the efficiency and rationality. Based on the production function, we can talk  
142 about arrayed state policy in the field of public goods. As part of the construction of the policy should be aware that when  
143 we are talking about ensuring the production of a public good, the state, we mean that the budget finance them. It does  
144 not matter who produced public goods: a private organization or a government.

145 Applying this scheme to our case, we can say: firstly – the volume of direct public procurement plays a more  
146 important role in the creation of public goods; secondly – the volume of public procurement and private equity-related  
147 values can be represented in the form of indifference curves [11,12].

148 Thus, in each case, the choice between investing in the creation of wealth and the organization of the state order,  
149 to be considered a scenario as a set of equivalent goods and the start of the budget constraint [13].

150 Applied to our model, we should note the identified trends:

- 151 a) the higher level of well-being leads to the higher share of the private sector in the production and distribution of  
152 public goods;
- 153 b) the greater unevenness of public law entities leads to the lower efficiency of the private sector in the  
154 distribution of public goods;
- 155 c) the amount of the returned funds through taxation leads to the value of maximum decreases, which leads to its  
156 low impact on the amount of running public obligations;
- 157 d) direct transfers (monetized benefits) leads to less benefits.

158 Thus, based on the identified dependencies, there is the possibility of the flexible process control of the distribution.  
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### 160 3. Summary

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162 In summary, we can put forward specific proposals for the formulation of priorities for government financial policy:

- 163 1. Should be to discourage the demand. This is due to the fact that, because of the preferences of direct  
164 investment, there was no increase of production of goods; the assumption that a high enough effective  
165 demand will automatically trigger the growth of production is unfounded, because of the propensity to import  
166 substitution;
- 167 2. We need to create an effective mechanism for the organization of public procurement: give control functions in  
168 the field of quality of public works contracts, increase the volume of orders, stimulate the production of public  
169 goods with the help of government contracts;
- 170 3. On a par with that, the choice between public order and investments should be considered from the  
171 perspective of the process of hidden costs;
- 172 4. It is necessary to concentrate on the more backward regions, due to the fact that under the condition of growth  
173 of wealth due to the unevenness of access to public goods distribution efficiency will fall;
- 174 5. The need to reduce the costs associated with governance.

175 Thus, we believe that the priorities of state policy formulate in the form of three main areas: increased productivity,  
176 lower costs for state governance and alignment of the level of economic development of the regions. As part of each  
177 direction are the following solutions: a high salary to replace officials social package, align wages, replacing surplus  
178 wages a large range of benefits (including for utilities and taxation). Therefore, the change in inequality between the  
179 private and public sector. Based on estimates of the solution of direct investment or PPL will be possible to support a  
180 proposal to temporarily unclaimed goods, providing demand for the products of mono-towns. Finally, tax-efficient (up to



181 negative tax rates) for organizations operating (placing manufacture) in backward regions.

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# Inequality and Economic Growth in the Russian Economy

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## Abstract

*During the transformation of the market economy in the last decade, its advantages, competition, price mechanism and efficiency in the allocation of society's resources could be combined with social policies. In a modern economy market mechanisms don't warrant themselves in a number of spheres. For increase of efficiency of functioning of the economy in general these spheres, as well as addressing the global challenges of poverty reduction and inequality are subject to the government regulation. Problems of inequality and poverty in the Russian economy are directly concerned with the problems of achieving positive economic growth. Economic growth forms the environment that provides reduction of excessive inequality.*

**Keywords:** economy, economic growth, efficiency, competition, inequality, capitalism, poverty, social policy, industrial policy, society

## 1. Introduction

The modern model of market economy of the Western countries was formed in the framework of significant changes in the social policy over the last century. It is during these transformations the efficiency of the market economy and competition could be combined with a well thought out social policies, the realization of the necessity of expansion of effective demand. According to I.Schumpeter capitalist system as a mechanism for mass production is focused on production for the population. Thus progress in the development of capitalist society should raise the living standards of the population. S.Kuznets suggested that inequality has to increase by economic growth, striving for a certain level of saturation. However, statistical data confirm this thesis only for a number of countries. Moreover since the 60-ies of the XX century and by the beginning of 2000 in the world economy has seen a stable stratification of the countries themselves on countries with higher and lower levels of life (and these groups are sustainable today), in the context of social policy you can't talk about stable and optimal level of saturation that all must seek. You can actually say only the presence of various trends specific to certain groups of countries approaching each other on a number of parameters (including life terms). Thus inequality cant represent a homogeneous characteristics of the economic system. In different countries and even in different regions different dimensions of inequality are defined by the various mechanisms in accordance with the evolutionary way of development of a given economy.

## 2. Theory

The nature of modern capitalism is the recognition that there are areas where market mechanisms don't warrant itself sufficiently (the system of healthcare, science and education, social services). And these areas to increase the efficiency of the economy in general are subject to state regulation. Regulation can be held on the one hand in the fight against poverty. On the other hand - to encourage the development of "human capital". The importance of the second direction was especially increased in recent years with the transition to the information society. In this case we can talk about increasing returns to scale of production, when the main factors of production allow to the sum of the elasticity of production for factors of production to be greater than one what in the framework of formation of information society in many respects is provided by the intensive development of «human capital». By-turn, increase returns from production allows to solve many social problems (securing higher rates of economic growth), what is a proof that the long-term planning of economic development, on the one hand, and the processes of socialization and increasing the level of life of the poorest groups of the population, on the other hand, can develop only reciprocally.

Poverty and inequality in the economy are interconnected. Inequality can be seen as the uneven distribution of society resources among different population groups. In this case, the main indicator of inequality is amount of liquid

assets at specific individuals (that determine the social role of the individual). At the same time, poverty also means decrease (as a consequence of the reduction of liquid values) of a level of intellectual and moral development of a person. Therefore, poverty can be understood as the economic status of individuals, which requires a minimum amount of liquid values and limit access to social benefits. The concept of poverty is determined by the level of economic development in the country and wealth of society. More developed economic system allows to diversify the range of needs and increase the degree of satisfaction. However, the richer a country is, the wider the range of needs marked as required for the normal life of needs (satisfaction the requirements recognized optimal and formed of evolutionary development of this economic system). Accordingly, the criteria of poverty will vary depending on the development level of the economy within the country depending on the development of a particular region. And this question is not a theoretical but has practical importance, identifying the scope of social assistance from the government (and the scale of spending funds from the state budget for social programs).

Changes in patterns of poverty and normal inequality are rather stable and linked to the existing criteria for the assessment of the level of populations life (what involve the use of macroeconomic indicators). Almost every macroeconomic parameter that affects the standard of living has a strong dependence of inequality and poverty. Improving the quality of life may not reduce the overall inequality, but initiate substitution of normal inequality excessive inequality generated by poverty. In particular, concerning Russia can be argued that at present normal inequality has not yet reached its limit when the growth of the quality of life leads to a reduction in overall inequality (as a consequence of poverty reduction). When analyzing specifically macroeconomic parameters should be noted that foreign investments (in this case, both direct and portfolio), the level of production, the total value of domestic investment and savings, development of the financial system, the share of commodity export in the total volume of export are factors directly affecting quality of life and poverty. Analysis of the influence of these parameters on the economic growth we can trace in the example of instrumentation of general state industrial policy in the framework of all its components (structural, investment and innovation) [2].

### 3. Results

When considering the basic parameters of development of the national economic (table 1), we focus primarily on the rate of change in GDP (relating to economic growth) and the rate of change of unemployment rate (describing change of social tension in the society), that in moments of significant changes on the market have a reverse dependence (Figure 1), as well as on the parameters characterizing the change of the situation in the social sphere, provided by the official statistics (Table2).

**Table 1.** [12] Changes in GDP (prices of 2008) and unemployment of the population in an average one year in the Russian economy

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GDP (prices of 2008) bln rubles	26062,5	27312,3	29304,9	31407,8	33410,5	36134,6	39218,7	41276,8	38048,6	39762,2	41458,0	42878,5
The rate of change in GDP in %	5	4,8	7,3	7,2	6,4	8,2	8,5	5,2	-7,8	4,5	4,3	3,4
Unemployment rate in %	9	7,9	8,2	7,8	7,1	7,1	6	6,2	8,3	7,3	6,5	5,5
The rate of change of the level of unemployment in %	-15	-12	3,8	-4,9	-9	0	-16	3,3	33,9	-12	-11	-15

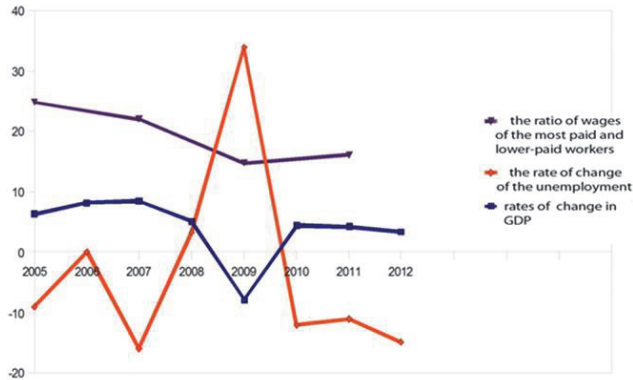
**Table 2.** [11] Indicators of inequality in the Russian economy

	2005	2007	2009	2011
Gini coefficient	0,456	0,447	0,418	0,425
The ratio of the average wage of 10% of the employees with higher and 10% of the employees with the lowest wages (the ratio of funds), times	24,9	22,1	14,7	16,1

As can we see from figure 1, the ratio of average wage of 10% of the employees with higher and 10% of the employees

98 with the lowest wages varies in accordance with the rate of change of GDP, what may indicate a decrease in this ratio  
 99 during the crisis. In other words, the wages of workers with the lowest wages actually meets only the minimum  
 100 requirements and cannot be reduced, and the salary of the more affluent workers really depends on the economic  
 101 situation. Thus, since the change of the economic situation does not affect directly the position of the poorest population,  
 102 the social policy becomes the most important tool of regulation of social tension in society.  
 103

104 **Figure 1.** Dynamics of parameters of development in the Russian economy  
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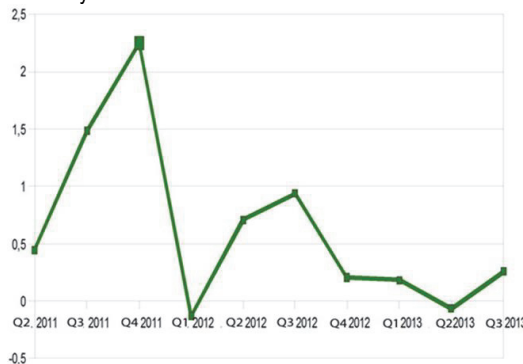


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 107  
 108 When considering the current situation with the rate of change in GDP in the Russian economy for the period 2011-2013  
 109 (table 3), we can assume that Russia's accession to the ITO negative impact on economic growth from the mid-2012  
 110 (figure2).  
 111

112 **Table 3.** [12] Dynamics of the ITO growth on a quarterly basis according to prices of 2008 (billion rubles) with the  
 113 exception of the seasonal factor in the Russian economy  
 114

	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013	Q3 2013
ITO in prices of 2008, billion rubles, with the exception of the seasonal factor.	10215,3	10366,9	10600,6	10587,3	10662,5	10762,7	10784,2	10804	10796,8	10823,4
The rate of change in ITO in % to the previous quarter	0,45	1,48	2,25	-0,13	0,71	0,94	0,2	0,18	-0,07	0,25

115  
 116 **Figure 2.** Dynamics of growth of ITO on a quarterly basis in prices of 2008, billion rubles, with the exception of the  
 117 seasonal factor in the Russian economy



119 The idea of social equality implies the use of a dependence criterion of the social benefits obtained by individual from its  
120 contribution to society. The society provides the equality of its citizens in a number of spheres. However, the economic  
121 freedom of the individual must assume the possibility of increasing their personal wealth. At the same time, the market  
122 mechanism for allocating resources, income, and the resulting product not include any demands and peculiarities of the  
123 economic agent, in addition to its solvency.

124 However, it can be argued that in terms of the evolutionary development of the capitalist system the market  
125 economy implies a social levelling. This is because, first, the market can be considered as some form of compromise  
126 between its participants, who are forced to increase their own efficiency to be able to coordinate their economic interests.

127 Secondly, at saturation of the market and increased competition, producers are interested in the growth of  
128 consumers' incomes (ensuring the growth of solvency).

129 Thus we can agree that the market creates conditions for social cohesion, but only within certain limits. In the  
130 conditions of fast economic growth employers and society can without significant losses in the achievement of their  
131 economic and social interests to solve the problems of distribution of income.

132 Considering the current situation in Russian economy and an indicator of the allocation total wage by five twenty-  
133 percent groups of workers in Russia, we see that if the first (least-paid group) 2005 received only 4.1 percent of the total  
134 wage, 2013 its share amounted to 5.4 percent. Accordingly, the fifth group (most paid workers) reduced its stake from  
135 51.1% to 48.7% at the same time [11]. Thus there are minimum positive changes on the market, but they are unable to  
136 change the structure of solvent demand. Demand of the most and the lowest paid groups of the population differs quite  
137 considerably in its structure, what leads to serious changes in the structure of production aimed at gaining profit and  
138 accordingly adapt to the requests of the top segments of the population.

139 When considering the indicator of the average hourly wages of employees of organizations by types of economic  
140 activity we see that 2012 employees of agriculture and forestry receive only 99.8 rubles per hour, workers employed in  
141 branches of mining-related on average receive 359, 5 rubles per hour, and workers engaged in the production of fuel and  
142 energy minerals receive 409.9 rubles per hour[11]. But the stratification of workers on wages even on the types of  
143 activities can demonstrate geographical stratification of territories providing the population of the higher and lower level of  
144 consumption (depending on the dominance in the region enterprises in a particular industry). Thus, if the branch structure  
145 of production (through the average accrued wages) can affect the prosperity or poverty of regions and actions of  
146 government planning sectorial structure should take into account not only economic but also social efficiency [9, 10].

147

#### 148 4. Conclusions

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150 Considering the economic growth as a basic tool for creating the potential possibilities for reducing poverty and inequality  
151 will focus on the systematization of the industrial policy instruments. The instruments of industrial policy and its  
152 constituent parts (structural, investment and innovation), we analyze instruments of structural policy as one of the  
153 elements of a common social policy.

154 We identify the following blocks of industrial policy with the appropriate tools:

- 155 1. Fiscal unit of industrial policy, federal and regional target programs (including investments) and regulations  
156 affecting; budget investments (at the level of Federal and regional budgets); regulation of the contents of  
157 collected taxes and the main parameters (base and tax rates).
- 158 2. Social block of industrial policy, legal regulation of labour relations in the industry; the policy of the state  
159 authorities (both Federal and regional) in relation to trade unions; the regulation of the sphere of education and  
160 retraining of the staff, the formation of educational programs (this toolkit implemented at the Federal and at the  
161 regional level); activities of the state employment service.
- 162 3. Foreign economic block of industrial policy, the regulation of foreign investments; tariff and non-tariff incentives  
163 (or constraints) of exports and imports, customs policy; regulation of the functioning of foreign financial  
164 institutions on the territory of the state; the conclusion of bilateral and multilateral trade and economic  
165 agreements; immigration; membership in international organizations; special tax regimes.
- 166 4. Macroeconomics block of industrial policy, the regulation of financial markets; the regulation of the processes  
167 of restructuring industry through changes in interest rates, by changes in the quantity of money supply;  
168 implementation of public procurement and application of public order, regulation of intellectual property rights.
- 169 5. Regional unit of industrial policy formation and regulation of the functioning of organized commodity markets;  
170 licensing and certification of production of a number of goods and services (selected in accordance with the  
171 existing priorities of regional development); accommodation of productive forces, zoning; regulation of the real  
172 estate market; support of facilities and institutions of the information infrastructure; supporting development of

173 small and medium businesses within the targeted industrial clusters.

174 As you can see from our patterns of industrial policy tools, its second block, namely the social block of industrial  
175 policy is directly connected with the economic and social development of territories. At the same time choosing some  
176 social block, we don't believe that the remaining blocks don't affect social problems (their influence can rather be  
177 considered as indirect and forming the general conditions for economic growth).

178 As a whole in Russia decreased the share of population with income below the subsistence minimum. 2009 it  
179 amounted to 13%, 2012 it had decreased to 11 percent. The share of the population with per capita incomes is below \$  
180 10 a day decreased from 8.9 percent in 2009 to 8 percent in 2012 [6]. Considering poverty and inequality in the Russian  
181 economy, we consider the fact that according to the experts the poverty in Russia is deep, and most of the poor people  
182 are at the level slightly below the official poverty line. Thus we can conclude that the acceleration of economic growth  
183 should be seen as the most effective factor of reducing poverty and excess inequality.

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# Integrated Eco-Economic Evaluation of Factors in the Regional Model "Environment-Human Health-Quality of Life"

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## Abstract

The article discusses the role of eco-economic factors in the formation of the model "environment - human health - quality of life"; reveals a significant effect of risk factors caused by unfavorable habitat on public health in the case of the Tatarstan Republic (RT); presents the calculation of the integral index for risk factors; ranks the quality of environment in the municipalities of RT by an integral index.

**Keywords:** Quality of life, eco-economic evaluation of life quality, well-being of the population, risk of environmental hazards, public health.

## 1. Introduction

At the moment the most important tasks in the concept of life quality are the following: to ensure the physical and moral health of society, to provide high quality and environmentally friendly products, to protect the environment, to maintain the resource potential of the region. The main criteria for the quality of life are the indicators of well-being, health, education, housing, quality of products and services, the institutional environment, ecological state of the region, respect for human rights. In fact, in this case we can see that it is a model of interaction among "environment – human health - quality of life." Therefore, this model requires more detailed analysis.

The problem of life quality can not be separated from the common environmental problems in the world and in Russia, because they are closely related not only to economic, but also to social and political decisions. Therefore, no matter what formal or deductive model could have been built based on the relationship among the "environment - quality of life – human health," it will be seriously distorted by the global, state, public, environmental and political instability, as well as by contradictions of exhaustible energy resources and limited economic resources.

The study of environmental problems and their impact on quality of life is reflected in the works of Streimikiene, D., Grasso, M., Canova, L. who investigated the trends in the development of this issue [6]. At the same time the problem of the integrated evaluation of environmental and economic factors has not been resolved yet. In order to solve this problem, we studied the publication of Matarrita-Cascante, D., Haq, R., Zia, U., M., Aganbegian A. Chebykin S. who investigated the evaluation questions and the influence of environmental and economic factors on the environment and quality of life. [1,4,8,9].

## 2. The Main Part

Economic and environmental as well as social interpretation of the problem "environment – human health - quality of Life" seems rather complicated because there are economic, social, institutional and even political aspects of the problem.

The number of research papers devoted to the impact of environmental factors on the health status of population is significant. As a rule, many of the authors are focused on the study of individual components of the ecological system for evaluation of public health or the impact of specific pollutants on human health. Thus, we have identified several factors and conditions that affect both the health of the population and its well-being as a whole. These include, first of all, state and local air quality, drinking water quality, soil contamination factors.

To date, it is proved that there was a direct relationship between the content of specific air pollutants and public health. Air pollutants have negative impact on the health of population, especially children. Inconsistency of children physical development can manifest itself as slower growth, increase or decrease in body weight due to the presence of



56 air pollutants such as sulfur dioxide, nitrogen oxides, and carbon monoxide. Increase in air pollution causes the growth in  
57 the frequency of respiratory diseases (bronchitis, bronchial asthma, allergic diseases). It is proved that the pollutants in  
58 the atmosphere have an adverse effect on pregnancy and fetal development, leading to spontaneous abortions,  
59 stillbirths, and congenital malformations.

60 To study the influence of chemical and bacteriological composition of drinking water on health is of particular  
61 interest and importance at the present stage. Variations from the health criteria for water supply can cause such diseases  
62 as renal failure, malfunction of cardiac, musculoskeletal and digestive systems.

63 Soil is the medium which can accumulate significant amounts of pollutants, especially in areas with industrial plants  
64 and other sources of pollution. It is known that oil and gas sites can bring macro and micro elements into the soil  
65 (chlorides, sulfates, bromine, boron, zinc, copper), and metals (cadmium, arsenic, mercury, lead) which are potentially  
66 harmful for the environment and human body. In addition, the property of metals to be absorbed and accumulated in  
67 plants is well-known. Pesticides used in agriculture also play a significant part in the pollution of soil. They contain  
68 arsenic, mercury, cadmium and other toxic substances. All these greatly affect the health of the population and may  
69 cause an increase in infectious diseases, diseases of the gastrointestinal tract, thyroid, and other diseases.

70 Most scientific papers on this issue concerns the study of the influence of individual factors in eco-economic  
71 system. Only in recent years, one can observe a number of research papers devoted to the integrated evaluation of  
72 impacts associated with the environment and the characteristics of the response of various population groups. But most  
73 of these studies relate to medical and biological problems when studying the quality of life.

74 Since the systematizing factor of the population well-being is its health, which largely depends on the state of the  
75 environment, it becomes necessary to solve the problem of identifying the availability of significant dependency of  
76 individual and public health indicators from the risks arising from changes in quality of the ecological system components.

77 Development of indicators characterizing public health, largely depends on the quality of air, water and soil, which  
78 in turn is directly influenced by the effectiveness of measures for the protection of these natural resources. In this regard,  
79 we have identified components of the ecological system, forming the ecological environment inhabited by the population,  
80 and this became the basis for the calculation of the integral index of risk factors caused by the habitat.

81 An integral index of risk factors caused by the habitat, as our method suggests, is a complex theoretical rate  
82 measured in points. Its calculation is based on the scoring method, according to which the indicators of quality of air,  
83 water, soil, having different dimensions, are transferred into points, which allowed us to obtain generalized parameters for  
84 24 indicators characterizing the degree of air, water and soil pollution.

85 Components of the ecological system in the three conventionally separated areas of oil production are obtained by  
86 averaging the data on risk factors of habitat for the period 2007-2013. Among the parameters of risk factors, not all  
87 indicators have a negative impact on public health. In particular, the parameter "level of implementation of measures for  
88 the air protection, %" reduces environmental risk due to air quality, and generally has a positive impact on the health of  
89 people living in a particular area. In the suggested method such parameters are designated as "indicators, reducing risk  
90 factors". They are subtracted from the total scoring of risk factors for the territory (municipality) when calculating the total  
91 scoring for a certain group of risk factors (air, water, soil)

92 Thus, "an integral component of risk factors caused by the habitat" is a complex index, which takes into account  
93 the environmental burden on the people living in this area, and include a total scoring of impact of air, water and soil  
94 components.

95 The criterion (index) of risk factors caused by the habitat, is introduced as the sum of all the parameters of the  
96 relative degree of influence of each of the indicators on the quality of air, water, soil, measured in points:

97 
$$I_{kj} = \sum_{i=1, j=1}^{n, m} \frac{r_i}{R_i}$$

98 where  $I_{kj}$  – integrated assessment value of k-th parameter (air, water, soil - in points) for the j-th site ( $i=1..n$ ;  
99  $j=1..m$ );  $r_i$  – the absolute value of the i-th parameter affecting the quality of air, water and soil respectively;  $R_i$  –  
100 the average value of this parameter for all units (regions, districts, municipalities, etc.).

101 Thus, it is the sum of relative quantitative scoring according to the indicator of air, water and soil, that makes an  
102 integrated index of risk factors caused by the habitat due to which municipalities are ranked in terms of the values of the  
103 integrated index.

104 It seems interesting to analyze the interaction of the derived index of population well-being, the integrated index of  
105 risk factors caused by the habitat, with health indicators of these municipalities in the Republic of Tatarstan, as well as  
106 with expenditures on healthcare and the environment per capita. To illustrate the characteristics of these phenomena we  
107 have constructed scorecards, reflecting the actual values and the rank of municipalities according to the above values.

108 Analysis of indicators for averaged scores and the rank of risk factors that threaten the health of the population

living on the territory of municipalities shows that the quality of soil in a conventionally separated areas and, consequently, in the municipal districts is approximately the same (Table 1).

**Table 1.** The scores on risk factors threatening the health of the population for 22 municipalities of the Republic of Tatarstan, divided into 3 areas for 2007-2013, in scores

Components of the environment	Scores, in average for 22 municipalities of the conventionally separated areas ( $\pm$ standard deviation)			
	For all municipalities of the indicated areas	Specific for municipalities		
		1 area	2 area	3 area
Air	12 $\pm$ 3,9	15,2 $\pm$ 4,2	11,9 $\pm$ 3,2	9,2 $\pm$ 1,4
Water	9 $\pm$ 11,6	17,6 $\pm$ 17,1	5,83 $\pm$ 6,6	4,23 $\pm$ 2,6
Soil	10 $\pm$ 1,9	9,6 $\pm$ 1,1	10,5 $\pm$ 2,0	9,9 $\pm$ 2,5

With regard to the quality of air and water by the areas, they as one can see from the table, have significant differences (Table 1). The greatest impact of air pollutant on the quality of the environment is experienced in Almetyevsky, Bugulminsky, and Bavlinsky districts (conventional area 1), Elabuzhsky, Zainsky districts (conventional area 2). The level of air pollution above average is observed in Aznakaevsky, Cheremshansky, Leninogorsky, Yutazinsky districts (area 1), Sarmanovsky, Novosheshminsky, Elabuzhsky (area 2), Mendeleevsky districts (area 3). Low level of air pollution is observed in Muslyumovsky, Nurlatsky, Agryzsky, Mamadyshsky and Alkeevsky districts that belong to the second and third conventionally separated areas for oil production. Thus, as expected, and according to studies conducted by different scientists and specialists, high air pollution occurs mainly in the municipalities of the 1st conventional area.

The degree of air pollution is in many ways dependent on the air protection measures and their financing.

It should be noted that the maximum amount of funding is in the territory of South-Eastern municipalities (Table 2).

**Table 2.** Funding of the environment protection measures in 2007-2013. 3 conventional areas of the Republic of Tatarstan, on average per year, ths. rub.

Area of the municipality	Expenditures on environment protection, per capita	Expenditures on health care, per capita
First	3,59	2,3
Second	3,228	2,24
Third	0,38	2,35

As one can see from Table 2, the average cost of measures to protect the environment in the regions has significant differences. Expenditures on the environment protection in the third area are minimum, which is probably due to the small number of emissions into the atmosphere and there was no need to allocate substantial funds to reduce the impact of air pollution on public health. At the same time, the cost of health care per capita living in different areas, as shown by the same table, is nearly the same.

### 3. Conclusion

According to the results of our study concerning the relationship of morbidity and health risk factors in these areas we concluded that there is a significant correlation between public health and risk factors that is reflected by the correlation coefficients. The data show that the risk factors for air and water have a significant correlation with the indicators of primary disease incidence and prevalence of diseases (correlation coefficient  $R = 0,4-0,5$ , the accuracy was confirmed at the level of  $p < 0,05$ ). At the same time the risk factor due to soil pollution, as expected, has a low correlation with the above mentioned indicators (correlation coefficient  $R = 0,1$ , with the same reliability).

Besides, it is worth noting that the indicators of public health in the studied areas have significant statistical difference. Consequently, the quality of components constituting the ecological system for the formation of health indicators is essential. All this is confirmed by parametric values of incidence and prevalence of disease among the population of different regions (Table 3).

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**Table 3.** The incidence and prevalence of disease among the population in the three areas of municipalities for 2007-2013, per 1000 of residents (average for the area, with a standard deviation)

Conventional areas	Incidence	Prevalence
Area 1	741,7±81,6	1479,0±191,6
Area 2	675,8±154,2	1377,7±416,6
Area 3	602,6±101,6	1196,9±237,9

155

Morbidity of the population in the third area differs from that of the first and second areas (in the third area, they are lower than in the first and the second) that should be regarded as the impact of intensive pollution of the environment during the intensive production of oil. In addition, the expenditures on healthy environment in the territory of the first area are predominantly (75%) directed at the protection and use of regional water resources and much less at the protection of soil and air. In this regard, the effect of the human body positive response to the introduction of environment protection measures has to be waited for quite a long time, whereas with the measures to protect the air a positive effect could be achieved much faster.

156

Heavy pollution of water resources and, consequently, poor water quality (characterized by high scores for this risk factor) is observed mainly in the areas of the first area, except for Elabuzhsky (area 2) Almetyevsky, Yutazinsky, Bugulminsky, Bavly districts. The least dangerous qualitative characteristics of water are in the third area - Alkeevsky districts, and in the second area - in Novosheshminsky, Sarmanovsky, Aksubaevsky districts.

157

Overall, the analysis of data on the relative total score for all components of the ecosystem (air, water, soil), more specifically the integral index of risk factors caused by the habitat for 22 municipalities, made us conclude that the most harmful from the environmental point of view are Almetyevsky, Yutazinsky, Bugulminsky (area 1), Elabuzhskij, Zainsky (area 2) districts where the scores range from 22.2 to 66.4 points. The most favorable in terms of quality of the ecological environment are Alkeyevsky, Agryzsky, Aktanysh districts (third conventional area) and Nurlatsky, Novosheshminsky (second area of oil production).

158

Thus, the analysis has revealed a significant adverse effect of environmental factors such as air and water on the quality of people's life in the region, they play a significant role in reducing the level of population well-being living in these territories. The indicators presented and dependencies identified should be considered when developing regional programs for socio-economic development at all levels and evaluating governing bodies in administrative units.

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# Sustainable Urban Development: Urban Green Spaces and Water Bodies in the City of Kazan, Russia

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## Abstract

In recent years social, economic and environmental considerations have led to a reevaluation of the factors that contribute to sustainable urban environments. Increasingly, urban green space is seen as an integral part of cities providing a range of services to both the people and the wildlife living in urban areas. The use of urban green space, and especially increasing the use, has become a hot topic for many green space managers during the past few years as the assumed link between use of urban green space and sustainable urban development is becoming more visible. Up to this time, there is little systematic information about urban green space including natural water bodies in the City of Kazan, Russia, its use and the main factors that influence this use. As green spaces play a crucial role in supporting urban ecological and social systems, it is important to make investigations in the amount of provision, the distribution and characteristics of urban green space in the city. The main concern of this paper is to address the importance of urban nature for citizens' well being and for the sustainability of the city they inhabit.

**Keywords:** sustainable urban development, smart city, urban green spaces, water bodies, system of lake classification

## 1. Introduction

In recent years social, economic and environmental considerations have led to a reevaluation of the factors that contribute to sustainable urban environments. Increasingly, urban green space is seen as an integral part of cities providing a range of services to both the people and the wildlife living in urban areas [1, 10, 11]. It is widely recognized that urban green space is an important part of complex urban ecosystems and provides significant ecosystem services contributing to sustainable development. It benefits urban communities environmentally, esthetically, recreationally and economically [3,4]. Therefore, protection and development of urban green-space has become recognized by international agencies and donors as important tool in improving the quality of urban livelihoods and urban environment [5].

The use of urban green space, and especially increasing the use, has become a hot topic for many green space managers during the past few years as the assumed link between use of urban green space and sustainable urban development is becoming more visible. Many recent national and local health policies, as well as city planning policies, are mentioning the positive effects of the use of green space [6].

Up to this time, there is little systematic information about urban green space including natural water bodies in the City of Kazan, Russia, its use and the main factors that influence this use. As green spaces play a crucial role in supporting urban ecological and social systems [7], it is important to make investigations in the amount of provision and the distribution of urban green space in the city. Additionally with information about the public's use and perception of natural settings in the city could contribute to the improvement of Kazan green structure as a step towards securing more sustainable city development. Through this, the possibilities of implementation of concepts and strategies for sustainable urban development, based on urban green spaces and water bodies could arise in the City of Kazan, Russia. This research proposes to analyze the current situation with urban green space in the City of Kazan (distribution, quantity,

57 characteristics and supply)

58 This paper addresses the importance of urban nature for the well being of the citizens and for the sustainability of  
59 the city they live in.

60 At this point, a brief explanation of what a urban green space is supposed to be seems necessary.

### 61 1.1 Urban green spaces

62 *Urban green spaces* (UGS) are defined as the sum of all green spaces within urban land uses including formal and  
63 informal green areas. [2].

64 *Public open spaces* are defined as urban areas which are predominantly characterized by vegetation and which  
65 combine to makeup the urban green fabric which are directly used for active or passive recreation or indirectly used by  
66 virtue of its positive influence on the urban environment, serving the diverse needs of citizens and thus offering a good  
67 quality of life in cities [2].

68 *Formal urban green space* (formal UGS) is formally designated open spaces including paved city spaces with  
69 plants, parks, gardens, sport grounds, burial places etc.

70 *Informal urban green space* (informal UGS) is other actual greenspaces from formal UGS as domestic gardens,  
71 private open spaces, transport corridor verges, farmland, horticulture, derelict land, water, water margins.

72 *Use of urban green space* (use of UGS) is defined broadly as any sort of visit to an urban green space without  
73 looking at the duration of the stay, the reason for visiting or the activity done while visiting, e.g. passing through on the  
74 way to a destination is also counted as use [6].

75 Each city has its own, distinctive green structure. The specific green structure of a city is a result from the  
76 interaction of natural and human processes over time. As a result, a great variety of different green spaces can exist in a  
77 city and according to their origin three different green structure layers can be distinguished [9]:

80 1. The pre-urban layer of the natural and cultural landscapes that were already there before the city. This layer  
81 includes, for instance, rivers, forests, arable land, wetlands, hay meadows and pastures. It is particularly this  
82 pre-urban layer which distinguishes the greenstructure from one city to the other. For instance, in the two  
83 Nordic cities – Oslo and Helsinki – woodlands, wetlands and the sea shore are prominent and they have  
84 influenced the pattern of urban development, as results from case studies undertaken in EU COST Action C11  
85 showed. In central European cities such as Munich and Vienna, on the other hand, open farmland is much  
86 more important around the cities.

87 2. Urban layer: This layer includes public parks, playing fields, cemeteries but also the green spaces within the  
88 different land uses such as gardens in residential areas, green space on institutional grounds, in commercial  
89 developments, as well as land where the former use was abandoned (derelict land). The distribution of these  
90 green spaces follows the urban development patterns. In many cities, the green space cover is very low in the  
91 densely built areas of the inner city and the 19th century extensions but much higher in low density housing  
92 areas.

93 3. Infrastructures such as major roads, railway lines and canals can include important green spaces. The railway  
94 lines may not be accessible but they kept land from being built over within the city. They can offer an  
95 opportunity for creating green space corridors when the railways and adjacent land are not needed anymore.

96 Large green spaces can also be found along motorways, big roads and other linear infrastructures.

97 The composition of city's greenspace includes formally designated open spaces (woods, paved city spaces with  
98 plants, parks, gardens, sport grounds and burial places) and other actual greenspaces (water, water margins, transport  
99 corridor verges, farmland, horticulture, derelict land, domestic gardens and private open spaces). This spatial composition  
100 of the green spaces in the city has an influence on green space use and ecological services. [8]

## 101 2. Material and Methods

102 Both secondary (literature review and desk research) and primary data have been gathered. The information available in  
103 the Report of Green spaces and water bodies Inventory of the City of Kazan (2007) and Google Earth were used as basic  
104 UGS information. The information on all publicly owned and managed UGS as their exact location, size and different  
105 elements in the area were verified during field visits. All collected data were analyzed and processed by means of the  
106 ArcGIS program (the current version of the ArcGIS software 9.3.1).

107 Analyzed data of investigated UGS was processed by the means of ArcGIS and maps of UGS distribution in the  
108 City of Kazan were created including the general map of all investigated UGS in the city and the map for each of the  
109 seven districts of the city (Aviastroitely, Kirovsky, Moskovsky, Novo-Savinovsky, Privojsky, Sovetsky, Vahitovsky).

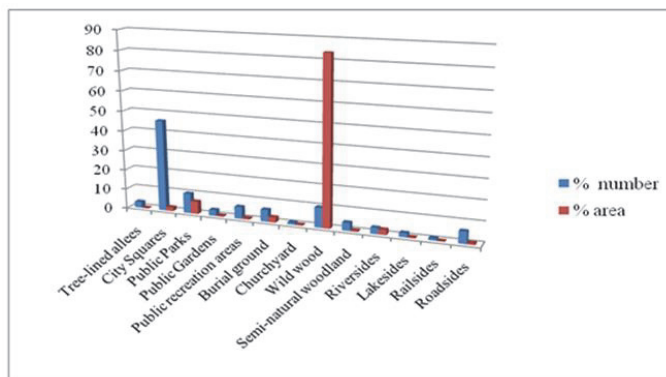
112 **3. Results**

113  
114 During the present research it has been investigated that surface area of all UGS (included in the research) is around  
115 39,5 km<sup>2</sup> (3 952 ha) that composes 6.45% from the overall area of the city (613 km<sup>2</sup>) . On territory of the city there is a  
116 total number of 156 UGS including formally designated open spaces (number of 115, surface area of 4,7 km<sup>2</sup>) and other  
117 actual green spaces (number of 41, surface area of 34,7 km<sup>2</sup>) . It has been conducted that there is on average 34,7 m<sup>2</sup> of  
118 UGS area per resident in the city (the population of the city has been estimated 1, 136, 566 people in 2009).

119 The data about total number and total surface area of 13 investigated categories of UGS in the City of Kazan is  
120 shown in table 1. From this table and the diagram (Figure 1) showing the percentage of each UGS category from the total  
121 number of UGS, it could be seen that the city squares are the UGS category the most presented in the city (n=71). There  
122 are 16 public parks and 16 wild woods in the city, the less presented churchyards (n=2) and railsides (n=2) and all other  
123 categories are in between as public recreation areas (n=9), burial ground (n=9), roadsides (n=9), semi-natural woodlands  
124 (n=6), riversides (n=5), tree-lined alleys (n=4) and lakesides (n=3). From the diagram showing the percentage of each  
125 UGS category from the total surface area of UGS it could be gathered that the biggest area within all investigated  
126 categories of UGS has wild wood with the surface area of 33,1 km<sup>2</sup>, which composes more than 80% of total surface area  
127 of all UGS in the city, public parks are presented with the area of 2,5 km<sup>2</sup> , burial ground with the area of 1 km<sup>2</sup> , all other  
128 categories have surface area less than 1 km<sup>2</sup> and the smallest surface area have roadsides and tree-lined alleys (less  
129 than 0,03 km<sup>2</sup>).

130  
131 **Table 1.** Total surface areas and total number of different types of UGS in the City of Kazan.  
132

UGS	UGS	Type of UGS	Total number	% of all green spaces	Total surface area (m <sup>2</sup> )	% of all green spaces
Formally Designated Open Spaces	Paved City Spaces with plants	Tree-lined alleys	4	3	22 077	0,1
		City Squares	71	46	747 787	1,9
	Parks, gardens and sport grounds	Public Parks	16	10	2 484 676	6,3
		Public Gardens	4	3	161 125	0,4
		Public recreation areas	9	6	219 615	0,6
	Burial places	Burial ground	9	6	1 045 955	2,6
Churchyard		2	1	111 594	0,3	
Other actual green spaces	Woods	Wild wood	16	10	33 103 649	83,8
		Semi-natural woodland	6	4	192 000	0,5
	Water margines	Riversides	5	3	982 219	2,5
		Lakesides	3	2	103 985	0,3
	Transport corridor verges	Railsides	2	1	45 338	0,1
		Roadsides	9	6	295 141	0,7
<b>Total</b>			<b>156</b>	<b>100</b>	<b>39 515 161</b>	<b>100</b>



133  
134 **Figure 1.** Percentage of different UGS categories from the total number and total surface areas of UGS in the City of Kazan.  
135



136 The general map of all investigated UGS in the City of Kazan is shown in the Figure 2. From the map it could be seen  
137 that the biggest area covered by UGS is located in the western part of the city closer to the border, the major part of  
138 which composes of Forest "Lebyajie". Another large location of UGS is situated along the river Kazanka (on the right bank  
139 of the river – Gorkii Park in Vahitovskii district, Skotskie ranges in Sovetskii district and on the left bank – Green zone  
140 along Gavrilova street in Novo-Savinovskii district). Few other large location of UGS are located closer to the border of  
141 the city on the north (Park "Krilie Sovetov" in Aviastroitel'nii district), on the north-east (Park in Derbishki in Sovetskii  
142 district), east (Forest "Lebyajie 2" in Privoljskii district) and south (Forest on Orenburgskii district in Privoljskii district). A  
143 lot of small UGS primarily consisting of city squares and small recreation areas are located all around the city, mostly in  
144 Privoljskii and Sovetskii districts.



145 **Figure 2.** Map of UGS in the City of Kazan.

146 Few large UGS included in this research are cemeteries of the city : Cemetery "Suhaya reka" in Aviastroitel'nii district,  
147 cemetery "Okolnoe" in Kirovskii district, cemetery "Novo-tatrskoe", "Archangelskoe" and "Archeiskoe" in Privoljskii district  
148 and cemetery Nagornoe in Sovetskii district.

#### 149 **4. Discussion**

150 It has been investigated that the distribution of UGS within the city is frequently uneven and surface area of all UGS  
151 included in the present research composes 6.45% (3 952 ha) from the overall area of the city. There are number of green  
152 spaces of different quantity and quality around the city with total number of 156 including formally designated open  
153 spaces and other actual green spaces (informal). The percentage of UGS in the city is relatively low, but it should be  
154 taken in the account that the research didn't include all possible urban green spaces as farmland, horticulture, derelict  
155 land, domestic gardens and private open spaces. It has been conducted that there is on average 34,7 m<sup>2</sup> of UGS area  
156 per resident in the city which is a relatively low parameter as well.

157 Our results show that the highest areas of UGS are located in the areas with lowest density of housing and  
158 buildings closer to the borders of the city and few large locations of UGS are located along the river Kazanka in the  
159 center of the city.

160 It has been investigated that the following types of UGS are presented in the city of Kazan : city squares, public  
161 parks, public recreation areas, churchyards, tree-lined allees, railsides, roadsides, burial ground, wild woods, semi-natural  
162 woodlands, riversides and lakesides. The most presented UGS category in the city according to the total number is the  
163 city square (n=71). However the biggest area within all investigated categories of UGS has wild wood (80% of total  
164 surface area of all UGS in the city). This category mostly composes of the forest "Lebyajie", which is located in the  
165 western part of the city closer to the boarder in Kirovsky district. A lot of small UGS primarily consisting of city squares  
166 and small recreation areas are located all around the city, mostly in Privoljsky and Sovetsky districts.

167 The district with the biggest surface area of UGS is in Kirovsky district with UGS area more than 29,5 km<sup>2</sup> because  
168 of the forest "Lebyajie" which is the biggest UGS of the city. The rest districts have surface area of UGS less than 3 km<sup>2</sup>.

173 So small number could be explained through the limitations of the research that not all possible UGS have been included  
174 in the research. Vahitovsky district has the smallest area of UGS (less than 1 km<sup>2</sup>) that could be explained through the  
175 fact that it is the city center and there are highest density of buildings in the city.  
176

## 177 5. Conclusions

179 The study about provision and distribution of urban green spaces in the city of Kazan has shown that despite of the fact  
180 that the number of UGS in the city is high, the surface area of UGS is very low, its distribution is very uneven, available  
181 quantity of green space in the city is lower than required, there are not enough good equipped public areas for citizens  
182 where they can spent leisure time, do sport, special places for children. And taking in account that the city of Kazan  
183 covers 613 km<sup>2</sup> and inhabited by more than one million people, it is extremely important to start making contributions to  
184 the improvement of Kazan green space system for supporting urban ecological and social systems as steps towards  
185 securing more sustainable city development.  
186

### 187 5.1 Suggestions for city planners and green space managers

- 189 1. The present research showed that the number of existing UGS in the city of Kazan is very low. The quantity of  
190 UGS in the city should be increased. The detailed research should be done before placing new UGS.
- 191 2. A new UGS structure plan with a comprehensive perspective needs to be elaborated. The new structure  
192 should aim to create new green spaces for the city of Kazan and should adopt a scientific approach for the  
193 interpretation of recreational behaviour of citizens when providing UGS for their use.
- 194 3. Investigations about potential users should be done before placing new green spaces or improving the existing  
195 ones..
- 196 4. Investigations about available UGS should be done to find out which experiences and possibilities each UGS  
197 offers to the users. The data on UGS is usually consist of how many square elements of each element there  
198 are while typical user as the present research proved care more about certain experiences and possibilities for  
199 activities. That's why UGS data should be gathered in more user perspective terms than to be only  
200 maintenance focused.
- 201 5. The available UGS should be matched with potential users and the green spaces in the different  
202 neighbourhoods should be adjusted according the inhabitants wishes.  
203

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## Assessing Economic Losses of Lake Kaban (Kazan, Russia) Ecosystem and Developing of Compensation Measures within the Framework of Sports Facilities Construction

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### Abstract

We have calculated the environmental losses arising in the course of preparation and construction activities on the lake Kaban. The size of environmental damage caused under construction was evaluated in a total of \$ 273,863 USA. Developed compensatory measures that reduce the effects of damage caused by the construction work. We have developed a concept of biological rehabilitation of the lake and we have made prediction of change in the state of the lake ecosystem as a result of rehabilitation measures.

**Keywords:** economic losses, assessment, lake, ecosystem, rehabilitation

### 1. Introduction

Construction of various facilities is a form of impact on the environment and usually leads to negative consequences causes' economic damage. Legislation of the Russian Federation is assumed assessment of environmental harm caused to the environment, natural resources, public health and reparation of damage [8, 9, 10].

Kazan is the city of the Universiade - 2013. The projects of construction of sports facilities are developed and implemented during the preparation for this important international sports events, including the rowing canal [3]. Lake Middle Kaban on their morphometric parameters and conditions of the location of the lake is suitable to host the rowing course.

Kaban lake has oxbow-karst origin. The water surface area is 129.7 ha, volume - 11,156.2 m<sup>3</sup>, maximum depth - 22.8 m. Lake fed by groundwater, precipitation is receivers untreated waste water outlets stormwater and wastewater enterprises, first of all, the receiver-cooler heat-power stations of Kazan. Due to the pollution of the lake water, an essential part of the work on the design of a rowing race should make the development of environmental measures aimed at restoring the water quality of lake.

Construction and exploitation any sports facility must meet the requirements of the International Committee of Sports. They must also integrate harmoniously with the landscape and the city's infrastructure, as well as comply with environmental protection standards and requirements. The aim of this work was to assess the environmental damage caused by the implementation of the project and to develop compensation measures.

## 56 2. Method

57  
58 Construction work was carried out in the period of 2009-2013. The damage caused by the components of the  
59 environment consists of the following: damage from fish kills and loss of food organisms, loss of feeding areas; damage  
60 caused by felling of green trees; damage from soil contamination; damage from backfill and removal of wetland  
61 vegetation. The following are the formulas for the calculation of various types of damage.

62 Damage to fish resources consisting of: 1) the loss of the feeding areas of the reservoir and the complete loss of  
63 their fish production after filling part of the area as a result of straightening the shoreline and bank stabilization; 2) loss of  
64 food organisms from the effects of construction machinery alignment beaches, shore protection and temporary filling; 3)  
65 calculating the damage from the loss of habitat and reduce the reproduction of aquatic organisms by reducing the  
66 reproduction of forage fish as a result of filling part of the area [7].

67 Damage to fish resources from the loss of feeding areas calculated by the formula:  $N = P_o * S * 10^{-3}$ ,

68 (1)  
69 where N - the damage in tons,  $P_o$  - pond fish productivity (kg / ha), S - area of the water or its part, has lost its  
70 fishery value (n),  $10^{-3}$  - a multiplier to convert kilograms to tons.

71 Calculate the volume compensation investments (K) was calculated by the formula:  $K = M * K_0 * E_n * t * k_i$ , (2)

72 where M - natural damage;  $E_n$  - regulatory cost-effectiveness ratio of capital investments;  $K_0$  - specific capital  
73 investment; t - time of the negative impact on fish stocks;  $k_i$  - the coefficient of the deflator to convert prices to 1991 prices  
74 this year.

75 Assessment of damage to fisheries from destruction of food organisms was conducted by the formula:

76  $N_1 = B * P/B * 1/K_2 * K_3/100 * S(V) * k * t_0/t_1 * n$ , (3)

77 where  $N_1$  - the damage in tons of fish products; B - average biomass of food organisms (phytoplankton,  
78 zooplankton, zoobenthos) in  $mg/m^3$  ( $g/m^2$ ); P / B - coefficient to convert the biomass of food organisms in the product,  $K_2$   
79 - feed conversion ratio to convert food organisms in fish products;  $K_3$  - an indicator of the maximum possible use of  
80 forage fish (%); S (V) - area of the zone output, the dump, siltation (zone volume turbidity) in  $m^2$  ( $m^3$ ), k - the mortality rate  
81 of food organisms in the areas of impact dredgers,  $t_0/t_1$  - time / open water period (206 days); n - factor to convert grams  
82 per tonne (1/1000000).

83 To calculate the damage from the loss of aquatic habitat as a result of rectification of coastline used the same  
84 formula, but with different coefficients (2, 3).

85 Payment of compensation for damage caused during the degradation of soil and land, determined by the formula:

86  $Y = H * K_p * S * K_4 * K_5 * K_6$ , (4)

87 where: Y - the size of penalties for harm (\$ USA); H - standard cost of land (\$ USA/ha);  $K_p$  - regional coefficient set  
88 for suburban areas of cities of republican subordination and the oil zone; S - area of degraded land (ha);  $K_4$  - the  
89 coefficient of the environmental situation = 1.9;  $K_5$  - the coefficient of protection of land, taking into account the category  
90 of land and the type of vegetation cover;  $K_6$  - coefficient taking into account the degree of soil degradation [5].

91 Assessment of damage to woody vegetation was carried out according to the formula:  $C_1 = B_1 * j_1 * K_7 * K_8 * I_1$ , (5)

92 where:  $C_1$  - the cost of the demolished tree (\$ USA);  $B_1$  - the base cost of the tree as defined by the rock and tree  
93 diameter (at 1.3 m) (\$ USA);  $j_1$  - a group of trees on their property;  $K_7$  - correction factor vital condition of green spaces;  $K_8$   
94 - correction factor for the functional use of green spaces;  $I_1$  - the index change of the estimated cost [4, 5, 6].

95 The cost of the demolished bush was determined by the formula:

96  $C_2 = B_2 * j_2 * K_7 * K_8 * I_1$ , (6)

97  $C_2$  - the cost of the demolished bush (\$ USA)  $B_2$  - base cost bush, taking into account the specific breed and age  
98 (\$ USA);  $j_2$  - a group of trees by their value [4, 5, 6].

99 Damage from the backfill and removal of wetland vegetation was calculated by the formula:  $C_3 = B_3 * K_9 * K_{10} * I_1 * S$ ; (7)

100  
101 where  $C_3$  - the cost of the demolished lawn (\$ USA);  $B_3$  - the base cost of the lawn (\$ USA);  $K_9$  - correction factor  
102 vital condition of wetland vegetation;  $K_{10}$  - correction factor for the functional use of green spaces; S - area of the  
103 demolished pitch (wetland vegetation) [4, 5, 6].

## 104 3. Results

### 105 3.1 Assess the damage

106  
107 The construction project of the Center for rowing sports on Lake Kaban in Kazan was unique of its kind, unique in the  
108  
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country and world. However, the construction work will inevitably lead to increasing the impact on the ecosystem of the pond, environmental and economic damage. Not all types of damage can be assessed in monetary terms. So far, there are no approved methods for calculating damages from the loss of biodiversity, changes in habitat, reduce the potential of self-cleaning, etc. Consequently, predictive calculations of damage according to accepted and approved methods known to always lower than the actual damage to ecosystems.

The table 1 presents data on the assessment of the environmental damage caused during the construction of the Center rowing sports lake and surrounding area.

**Table 1.** Types of environmental damage and the estimate for the project of the Center rowing sports.

Type of damage	Amount, \$ USA
Fisheries damage	21274
Damage to soils	42616
Damage to trees and shrubs	205745
- actual damage	27884
- expected cost of disaster	177861
Damage from the backfill and removal of wetland vegetation	4227
Total	273863

Thus, the total expected cost of disaster of the construction of the Center for rowing sports and its infrastructure is estimated at 273,863 \$ USA. The greatest damage was trees and shrubs, from which actual damages amounted to 27,884 \$ and projected 177861 \$.

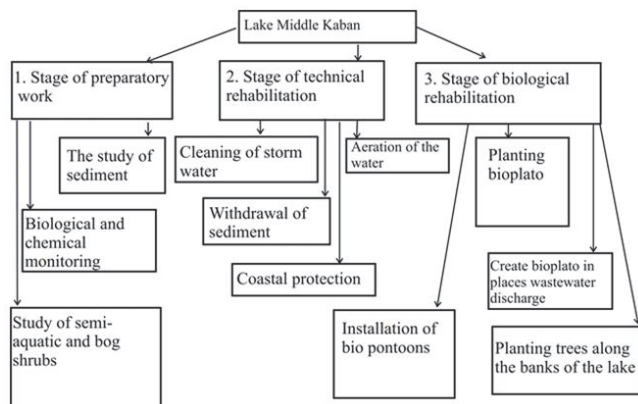
The safe water quality - one of the conditions for the creation of channels and international rowing distances. The project is currently hindered by the high degree of contamination of water and sediment of Lake Kaban. Therefore, we have developed a concept of biological rehabilitation of the lake.

### 3.2 The concept of biological rehabilitation

The main sources of pollution of Lake M. Kaban are: mass flow of stormwater runoff, leading to pollution and siltation of the lake; thermal and chemical pollution of the lake by sewage Kazan combined heat and power; pollution due to accidental discharges of enterprises and economic issues, fecal sewage; secondary contamination of sediments [1, 2].

The concept of biological rehabilitation offers a comprehensive approach to addressing the major challenges to improve water quality in the lake, consisting of three phases (Fig. 1).

The first stage includes the scientific, technical and hydrobiological studies of the lake ecosystem: the definition of the thickness of sediments and the degree of contamination; analysis of the quality of water flowing into the lake and sewage; assessment of the state of biological communities (phytoplankton, zooplankton, zoobenthos, fishes); assessment of higher aquatic vegetation of the lake and trees and shrubs in the area adjacent to the lake.



**Fig. 1.** The concept of biological rehabilitation of Lake M. Kaban.

At the second stage the technical measures: withdrawal layer of polluted sediments, aeration bottom water layers, bank stabilization, installation of treatment facilities for stormwater issues.

For dredging sediment from the lake M. Kaban most suitable dredging method. Recommended the removal of sediment on an area of 70 hectares, a thickness of 2 m, the total volume of 140,000 m<sup>3</sup>. In those areas where the removal of contaminated soil is not possible (or after the implementation of the work) recommended screening bottom - powder sediment layer of clean sand, clay or sorbent material thickness of 15-30 cm. Event is held to prevent the release of nutrients and pollutants from bottom sediments.

Aeration speeds up the oxidation processes, thereby helping to cleanse the body of water. For Lake M. Kaban minimum aeration is required in 4 places at once. For water aeration encouraged to use traditional aerators and oksidators (for winter).

For Lake M. Kaban major issues are: delivery of significant volumes of storm water, the use of the lake in the technological cycle heat and power plant of Kazan as a cooling pond plants, water pollution from industrial enterprises of the South industrial zone, delivery of emergency discharges of domestic and fecal sewage and municipal pollution from individual development of the private sector. At major releases stormwater treatment facilities offered to place stormwater. Engineering solution can be implemented by means of mechanical cleaning, using a drum-type installation microfiltration. These settings will operate in two modes - clean the incoming waste water during intense they become available, the rest of the water to clean the lake.

The third stage - the stage of biological rehabilitation. Along the coastal zone of Lake M. Kaban provides continuous system of landscaping to include sections of the existing vegetation.

For biological treatment of the lake, removal of nutrients, heavy metals and petroleum products are encouraged to use higher water vegetation (for a landing on pontoons and moving in the littoral part of the lake). Macrophytes can also be used for pre-treatment of water in the channel from the combined heat and power, which flows into the lake. Here alternate small plots (planted with vegetation that absorbs nutrients) and deep-sea areas (where the activity takes place aeration of water and deposition of pollutants).

#### 4. Conclusions

Thus, the use of modern technology improvement and rehabilitation of the lake, storm water treatment will preserve the natural systems and enhance the status of the recreational lake. According to our forecasts, based on literature data, the implementation of measures will allow for 2 years to significantly improve the water quality up to the standards that are acceptable to the competition world-class. It will also increase the aesthetic, natural and recreational value of the lake, return the historical significance of the lake as a favorite place rest of the townspeople. Designed rehabilitation project can be used in similar reservoirs, requiring the use of recreational activities.

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## Labor Productivity as a Factor for Increasing Public Production Efficiency

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### Abstract

The article focuses on an integral estimation of the public production effectiveness and shows the role of human labor productivity in the formation of the summarizing performance indicator. It focuses on measuring the public production effectiveness. The role of labor productivity as a major criterion of the efficiency of the national economy is shown. The problem of measuring the public production effectiveness is inseparable from the problem of measuring productivity. The aim of this study is to identify minimum indicators that characterize the public production efficiency and which make up a balanced system. To search for a balanced system the study uses: the traditional scheme of resource expressions for integral indicator of the public production effectiveness, including labor resources, production capital and working capital; integral estimation of the public production effectiveness, including labor productivity, return on fixed capital stock; return on stocks; after receiving a list of factors for integral estimation of the efficiency of production, procedure for calculating the multivariate average value of production resources is used in order to identify the role of human labor productivity and other factor variables in the summarizing performance indicator. Quantitative analysis of factors for integral expression of regional effectiveness of public production under the conditions of each individual unit of the territorial system can be accomplished by methods of the index factor analysis. As for the application to the whole territorial system, taking into account the statistical nature of the dependencies studied it is appropriate to use correlation - regression and multivariate analyzes, which make it possible to pose the problem in matrix form, and therefore they are adequately relevant to the content of system approach. The results of the analysis are mostly characteristic of engineering. In other industries, there is specificity in the distribution of the weighted coefficients of the performance indicators used in the manufacturing process of certain types of resources.

**Keywords:** Labor productivity, efficiency, correlation and regression analysis, efficiency factors, multivariate analysis.

### 1. Introduction

Labor productivity as a phenomenon in economic life is interrelated to other economic relations, events and processes [Abalkin, 1987; Polovkina, 2012]. On the one hand, the productivity is influenced by many factors of the economy, and on the other hand, it has a direct or indirect impact on many socio-economic phenomena and processes [Sokolova, 2000]. This relationship may be both direct and inverse [Khromov, 1979].

It should be noted that the labor productivity increase is the most important factor in the growth of public production and economic dynamics rate under the current socio-economic conditions [Leontiev, 1990; Shigabutdinova, 2013]. For centuries international practice has been showing a direct relationship between labor productivity in any national economy and its level of socio - economic development [Spiegel, 2014; Suhartono, 2011].

In the literature about the measurement of the production efficiency, a number of authors consider the total public labor as one of the performance criteria at the national level [Celin, 2002; Kendrick, 1984]. From this it is clear that one of the decisive factors in the efficiency of public production is the labor productivity, as the latter is a part of the total labor costs [Smirnov, 2003; Smirnov, 2010].

In economics it is known that a wide range of indicators characterize the efficiency of using those resources in the production which are, by their nature, a conglomeration of materialized labor, but it is difficult to select a certain minimum from their number, as they constitute a balanced system with the labor productivity, rather than a mechanical set of attributes [Sink, 1989].

The problem of connecting labor and material resources into a single result, can be solved by converting material resources in labor, rather than converting the labor force in the material one [Odegov, 2011]. To search for a balanced

58 system the study uses:

- 59 1. traditional scheme for resource expression of integral indicator of the public production effectiveness, including
- 60 the human labor resources, production capital and working capital;
- 61 2. integral estimation of the of public production effectiveness, including labor productivity, return on fixed capital
- 62 stock; return on stocks.
- 63 3. After receiving a list of factors for integral estimation of the production efficiency, procedure for calculating the
- 64 multivariate average value of production resources is used, in order to identify the role of human labor
- 65 productivity and other factor variables in the summarizing performance indicator.

## 66 2. Research Methods

67 The traditional scheme for resource expressions of integral indicator of the public production effectiveness is as follows:

$$68 B_e = \frac{E}{L + A + S} \quad (1)$$

69 where  $B_e$ - beneficial effect of production (gross output);

70 L – human labor resources used;

71 A - capital assets;

72 S - stocks.

73 Connecting labor and material resources in a single result can be achieved by converting material resources into

74 labor. To do this, the cost of capital assets and stocks is divided by labor productivity and thus we get the number of

75 workers needed for the reproduction of value which is equivalent to the cost of industry production facilities in the

76 economy of the region, during the calendar year, depending on the progress in labor performance rate in the region:

$$77 B_e = \frac{E}{E + (\frac{A}{E}) \cdot L + (\frac{S}{E}) \cdot L} \quad (2)$$

78 Let's make some transformations of formula (2) in order to differentiate its constituent components:

$$79 B_e = \frac{E}{L + \frac{A \cdot L}{E} + \frac{S \cdot L}{E}} = \frac{E}{L \cdot E + A \cdot L + S \cdot L} = \frac{E \cdot E}{L(E + A + S)} = \frac{E}{L} \cdot \frac{E}{E + A + S}$$

80 Thus, we obtain another proof of the fact that the human labor productivity ( $E / L$ ) is an algebraic sum of integral

81 estimation of the public production effectiveness.

82 In order to obtain the other variables which make up integral estimation, we make a further transformation of the

83 right factor of formula (3), and divide its numerator and denominator by the number of useful effect:

$$84 B_e = \text{Labor productivity} \cdot \frac{1 + \frac{A}{E} + \frac{S}{E}}{1 + \frac{1}{E \cdot A} + \frac{1}{E \cdot S}} \quad (3)$$

85 Consequently, the integral estimation of the public production effectiveness can be expressed as a result of the

86 interaction of three variables;

$$87 B_e = \frac{x_1}{1 + \frac{1}{x_2} + \frac{1}{x_3}} \quad (4)$$

88 or in a more general type:

$$89 B_e = f(x_1, x_2, x_3), \quad (5)$$

90 where  $x_1$  - labor productivity

91  $x_2$  - return on capital assets;

92  $x_3$  – return on stocks.

93 The denominator of the integral estimation can also be represented as capital intensity indicators of production and

94 velocity of working capital, but the essence remains the same.

95 The economic meaning of the denominator of formula (4) is that it is a coefficient that characterizes the number of

96 times the total labor costs exceeds the costs of living labor, hence it can be used in economic analysis and is directly

97 related to the integral estimation of the effectiveness.

98 After receiving the list of factors integral evaluation of the production efficiency, it is necessary to establish the role

99 of human labor productivity and other factor variables in the formation of the summarizing efficiency indicator, as well as

100 how individual factor attributes interact with each other.

101 Quantitative factor analysis of integral expression of regional public production effectiveness under the conditions

of each individual unit of the territorial system can be accomplished by methods of the index factor analysis. As for the application to the whole territorial system, taking into account the statistical nature of the investigated dependencies it is appropriate to apply correlation - regression and multivariate analyzes which make it possible to pose the problem in matrix form, and therefore they are adequately relevant to the content of system approach. Integral estimation of the public production effectiveness is calculated based on formula (1), presenting its denominator as a multivariate average of individual types of productive resources.

The mechanism of multivariate averages uses standardized assessment of averaged variables of multivariate analysis.

$$P_{ij} = \frac{x_{ij}}{x_i}, \quad (6)$$

where  $i=1, 2, 3$  – the type of production resources;

$j=1, 2, 3, \dots, N$  – economic regions.

The advantage of multivariate averages in comparison with the methods of component and factor analysis is a more active nature of search of multidimensional quantity, and to a much greater extent, the role of content analysis which is conducted at the first stage of the study is increasing. In this problem, a multivariate assessment will show how much production resources are available for an average industry of economic regions.

However, different types of resources do not play the same role in the formation of beneficial effect. Consequently, the multivariate average should be weighted quantity. As weights we have taken partial coefficients of determination that characterize a measure of the variations effect of each type of resource on the formation of the gross output of the industry when abstracting from the effects of variations of other types of resources:

$$d_i = r_{yxi} \beta_i, \quad (7)$$

where  $r_{yxi}$  – correlation coefficient between the value of gross output and production resources;

$\beta_i$  - equation coefficients of multiregression in the standardized scale.

### 3. Discussion

Russian and foreign scholars are continuing research in the productivity methodology in current economic situation [Andreyeva, 2013; Belyaeva., 2012; Solow, 1957].

Professor A. Zolotov, Doctor of Economics, for example, rightly believes that "the problem of increasing labor productivity has not objectively lost its paramount importance though it was pushed into the background in the first years of reforms » [Zolotov, 2002]. The author argues that the postulates of economics, which have become widespread recently, do not separate productive labor from other types of useful activities. This is not surprising, if labor is defined as any mental and physical effort undertaken partially or entirely in order to achieve any result, aside from satisfaction, obtained directly from the work done.

When analyzing existing approaches of statistical investigation to labor productivity we found that Russian economists have no single methodology to study this category [Basovskaya, 2013; Gagarinsky, 2013]. It is objective in nature, as productivity is a complex, multidimensional concept of economic science. In order to reveal the essence of the economic analysis of labor productivity, it is necessary to highlight the main aspects of the study. Thus, S. Fabrikant, an American economist, writes that "... labor productivity, anyway, is an integral part of any broad economic problem, whether industrialization or research and development, automation or tax reform, the disparity between prices and cost, inflation or currency shortage "[Barysheva, 1999].

In addition, some economists propose to distinguish between the concept of "productivity" and "labor productivity" because these categories have different meanings. L. Sokolova, in our view, rightly believes that "productivity" as an economic category in its content is much broader than "labor productivity" because productivity can be considered in relation to all factors of production and to each of them separately [Sokolova, 2000, Sokolova, 2002]. Labour productivity is characterized by the use of human labor (labor forces) and is determined by the productive power of labor and the labor intensity [Farzianpour, 2011].

An interesting approach was proposed by M. Porter, Harvard Business School professor, who comes from the fact that the main goal of each state is to achieve a high and constantly rising standard of living for its citizens, and the possibility of its implementation depends on the productivity which is achieved by the use of labor and capital. "The only sensible concept of competitiveness at the national level is productivity, that is, the volume of output produced by a unit of labor input and capital» [Porter, 2000]. According to M. Porter's theory, labor and capital productivity, along with the living standard of a nation define the basic parameters of its competitiveness.

Summarizing the above-said, we should note that labor productivity as a category of economic science is determined by the development level of the productive forces in society and is characterized by the appropriate production relations [Sumenth, 1986]. In this context, the problem of increasing labor productivity should be considered as cumulative saving of living and materialized labor.

#### 4. The Results of the Study

Calculations showed that in the conditions analyzed, variation of gross output by 60.1% is determined by the variation of the number of industrial and production staff ( $x_1$ ), by 20% - the variation of fixed assets ( $x_2$ ) and by 10% - the variation of the value of stocks ( $x_3$ ).

Thus, the procedure of calculating multivariate average of industrial resources may be described by the formula:

$$P_j = \frac{\sum P_{ij} d_i}{\sum d_i}$$

The calculation result of the integral estimation of production resources is characterized by data in column 8 of Table 1. They mean that the first of the considered economic regions has manufacturing resources that make up 341.9% compared to the average inter-district, second region - 102, third, 63.9, etc.

Integral estimation of the production efficiency is the ratio of the standardized value of the beneficial effect -  $y_i / y$  to an integral estimation of productive resources. Its values (see column 10) should also be interpreted as a relative value that characterizes the measure of use efficiency of all resources in the manufacturing process that is expressed as a percentage of inter-district level [Rangelova, 2013].

The integral estimation of the production efficiency and of its components makes it possible to calculate the parameters of formula (5) based on the correlation and regression framework. However, interesting are not only the equation coefficients of multiregression in natural scale, but also characteristics derived from them that set the priority of factor variables and, therefore, give the key to the solution of this problem [Ayinde, 2007; . Azadeh, 2005].

In general, the nature of the relationships in the integral estimation of the production effectiveness and its determinants is clearly expressed by paired correlation matrix (Table 2).

**Table 1.** Calculation of integral estimations of productive resources and production effectiveness by industries output of economic regions (numbers are relative)

Economic regions	$P_{1j} = \frac{x_{1j}}{x_1}$	$P_{2j} = \frac{x_{2j}}{x_2}$	$P_{3j} = \frac{x_{3j}}{x_3}$	$P_{1j}$ 0,6107	$P_{2j}$ 0,2002	$P_{3j}$ 0,1002	$\sum P_{ij} * d_i$	$\frac{\sum P_{ij} * d_i}{\sum d_i}$	$\frac{y_j}{y}$	Integral estimation of production effectiveness
	1	2	3	4	5	6	7=4+5+6	8	9	10=9:8
1	3,779	2,919	2,226	2,308	0,584	0,223	3,115	3,419	2,485	0,727
2	1,143	0,810	0,991	0,698	0,162	0,069	0,929	1,020	1,248	1,224
3	0,700	0,429	0,684	0,427	0,086	0,069	0,582	0,639	0,976	1,527
4	0,341	0,403	0,579	0,227	0,081	0,058	0,366	0,402	0,593	1,475
5	1,057	1,226	1,677	0,646	0,245	0,168	1,059	1,162	0,979	0,843
6	0,336	0,483	0,512	0,205	0,097	0,051	0,353	0,387	0,311	0,804
7	1,565	1,925	1,422	0,956	0,385	0,142	1,483	1,628	1,526	0,937
8	1,113	1,799	1,779	0,680	0,360	0,178	1,218	1,336	1,300	0,973
9	0,447	0,529	0,532	0,273	0,106	0,053	0,432	0,474	0,755	1,593
10	0,331	0,261	0,419	0,202	0,052	0,042	0,296	0,325	0,336	1,034
11	0,434	0,369	0,368	0,265	0,074	0,037	0,376	0,413	0,416	1,007
12	0,724	0,848	1,112	0,442	0,170	0,111	0,723	0,794	1,077	1,356

Paired  $r_{yxi}$  coefficients show that the level of production efficiency is associated most closely with the human labor productivity. The interaction mechanism of factor variables is characterized by  $r_{xi}$  coefficients.

Partial elasticity coefficients, calculated to assess the priority of factor attributes, showed that with the increase in labor productivity by 1% integral indicator of regional production efficiency will increase by 0.935%, a similar measure of growth in capital productivity and return on stocks causes an increase in the dependent variable by 0.230 and 0.150% respectively.

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**Table 2.** Matrix of paired correlation coefficients of statistical model for integral indicator of public production effectiveness in industries output of economic regions

Indicator	$r_{yx_1}^*$	$r_{x_1}^*$	$r_{x_2}^*$	$r_{x_3}^*$
Integral indicator of regional production effectiveness (y)	1			
Labor productivity ( $x_1$ )	0,9369	1		
Capital productivity ( $x_2$ )	0,6843	0,4860	1	
Return on stocks	0,4112	0,1568	0,5876	1

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However, partial elasticity coefficients still have more limited cognitive value in comparison with partial coefficients of determination, since they take into account only the intensity of the effect of changes in factor variables on the dependent variable, but do not take into account the limits of the influence [Krasnopevtseva, 2013]. Partial coefficients of determination, free from this defect, showed that regional production efficiency by 76% is determined by the variation in labor productivity, by 13.7% - a variation of capital production, and by 7.5% - a variation of return on stocks. Consequently, in a regional economy increase in labour productivity is ultimately a decisive factor in growth of production efficiency.

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### 5. Conclusion

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The weighted coefficients thus obtained explain how increase in the production efficiency can be achieved while reducing the return on assets.

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In order to verify the effectiveness of particular organizational - technical activities, it is necessary to fulfill a stipulation: to some extent, product of human labor productivity indicator and its calculated weighted coefficient should exceed the product of capital productivity decrease and respective weight.

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The results of the analysis are most characteristic of engineering [Garshina, 2013]. In other industries, there is specificity in the distribution of the weighted coefficients with the performance indicators of the use of certain types of resources in the manufacturing process. In the oil-refining industry the nature of fixed assets plays an increased role in shaping the production efficiency, due to the high capital intensity of production, and in the tire industry - the use of stocks.

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The problem of measuring public production effectiveness is inseparable from the problem of measuring labor productivity. On its basis, the best ways to increase the development efficiency of regional economy and its individual sectors are determined, in particular with a different dynamics of labor productivity and return on capital stock and working capital, the intensity of plans is measured, and some other economic and planning and economic-statistical problems are solved.

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## Ensuring Environmental Safety Based on the Modeling of Biological Process of Oily Sewage

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### Abstract

The article discloses the main areas of institutional support for sustainable ecological and economic development of economic entities on the basis of conceptual approaches to the systematization of methods and mechanisms for the protection of their economic interests. There described the mathematical basis of Petri nets used in the modeling and design of the module bioremediation of hydrocarbon wastewater. There described the technique of two-tier system of the modeling process of biochemical treatment of oily wastewater, as well as a model developed by the authors in the form of a modified Petri nets and software package management system of biochemical treatment of wastewater.

**Keywords:** ecological and economic safety, modified Petri nets, wastewater bioremediation, biochemist technology system, hierarchical structural model, system modeling.

### 1. Introduction

The effectiveness of the environmental mechanism largely depends on the structure of environmental costs. In Russia, the direct costs to combat pollution of more than 50% are costs associated with the biological treatment of sewage. Modern production lines and biotechnology industries are characterized by a complex multi-level structure, they can therefore be regarded as a complex cybernetic systems. Due to the complexity of the modeling and analysis of such systems, there is a need to attract modern methods of mathematical and computer modeling.

### 2. Materials and Methods

Researching the problems in the study, there are used the methods of systems analysis, computer simulation of Petri nets theory, graph theory, numerical methods for solving equations.

### 3. Results of the Study

According to the degree of concentration of industrial production of the Republic of Tatarstan is heterogeneous. Therefore, the level of environmental risk is not evenly distributed across its territory. The greatest danger of ecological impacts on the environment are discharges of water containing dirt of petrochemical industries. Purification of effluents is a prerequisite for the ecological balance of the environment. However, the existing wastewater treatment technology is not good enough and does not provide its efficient level. Modern wastewater treatment plants of large petrochemical enterprises are structurally complex systems. Therefore, their lance operation conditions in which the wastewater has dynamically varying parameters such as the composition and flow rate until the indicators salvo reset are the substantial interest [1]. The effective functioning of these systems can be achieved with the help of modern methods of information processing, using the methods of system analysis of complex objects based on a mathematical description of the process



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In accordance with the principles of system analysis of industrial plant Biological wastewater treatment BWT is a biochemical technological system (BChTS) comprising a set of units interrelated with material, thermal and information flow, each of them has a hierarchical structure [3]. BWT can be divided into interconnected subsystems characterized by a hierarchical structure. Management tasks at each level of the hierarchy of production are different, but the general objective is wastewater treatment to standard indicators or to provide working-level water supply [4].

One of the major way in the study of complex systems which serve BWT is a information approach based on the mathematical modeling of the object [5]. Modeling and computer experiments with model - replacement facility are an effective means to create a management system, consider the behavior of the object in emergency situations, to evaluate its structure and control laws, as well as to take into account the stochastic nature of disturbances [6, 7]. There are two approaches to the modeling of real objects. In the first approach the object is represented as a dynamic system with continuous variable. The functional mathematical model of the object is a system of ordinary differential equations, partial differential equations and algebraic polynomials obtained by the regression analysis to characterize the input (output) of the system. This approach is widely used in modeling chemical processes with a continuous organization of the process [8, 9] provided that it is stationary and the immutability of physical and chemical parameters. In the second approach, the object is represented as a dynamic system with discrete events (DSDE). These include manufacturing systems, assembly lines, computer networks.

This DSDE class also includes discrete-continuous biochemist technological systems. Solving problems of management organization of such discrete dynamical systems requires the use of special mathematical methods. Traditionally, for this purpose there are used methods of finite automata, logical-linguistic and simulation models, as well as of the theory of graphs and networks, Petri nets (PN) [10]. Based on a comparative analysis, as the main mathematical modeling of the theory is selected the PN. The PN allow to simulate discrete concurrent asynchronous processes [10], to obtain a graphical representation of the network, describe the system at different levels of abstraction, present the system hierarchy [11], analyze models using modern application package.

#### 4. Application of the Results

Using the system analysis methods allows the development of a control system of wastewater treatment installation of petrochemical plants, which includes the construction of a mathematical model of the lower and upper levels of functioning. On the lower level of functioning there is determined an analytical model of the bioreactor. This allows you to provide wastewater treatment to the maximum allowable concentration. On the upper level of functioning, network models are built in a joint venture that provides flow control to install.

Block diagram of Biological wastewater treatment (BWT) installation is shown in Figure 1.

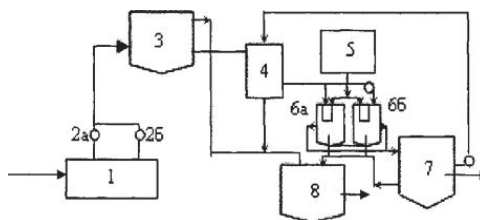


Fig. 1. Block diagram of Biological wastewater treatment (BWT) installation

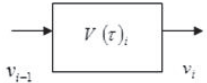

Block diagram of the apparatus includes: 1 - drive effluents; 2a and 2b - pumps; 3 - primary clarifier; 4 – averager; 5 - capacity for micro-organisms and bio-stimulants; 6a and 6b - jet settlers; 7 - secondary settling tank; 8 - slurry tank .

Upper level of bioremediation process of OW in industrial plants can be efficiently described by PN [12]. To describe this system, we propose the use of N-schemes based on mathematical apparatus PN, one of its advantages is the possibility of representing the network model in analytical form to automate the process of analysis, and graphical form for clarity of models [10].

In the analysis of chemical-engineering or a biochemical process flow diagrams there should be considered the main limitation of the formalism of N-schemes which consists in the fact that they do not consider the temporal characteristics of the simulated systems, since the response time of transition is considered to be zero. Given these

104 conditions, we propose to use MPN - PN of the form  $C = \langle P, T, I, O, M, \tau_1, \tau_2 \rangle$  [13],  
 105 where  $T = \{t_i\}$  - finite nonempty set of symbols (transitions) estimated from the number of servings of conventional  
 106 products with a continuous feeding in the apparatus of the flowsheet;  
 107  $P = \{p_i\}$  - finite nonempty set of symbols (position) which are understood many devices flowsheet;  
 108  $I: P \times T \rightarrow \{0, 1\}$  - input function which gives the set of its position  $p_i \in I(t_i)$ ; for each transition  $t_i$ ;  
 109  $O: P \times T \rightarrow \{0, 1\}$  - output function which displays a transition to a set of output positions  $p_i \in O(t_i)$ ;  
 110  $M: P \rightarrow \{1, 2, 3 \dots\}$  - function labeling (marking) network which assigns to each position a non-negative integer  
 111 equal to the number of labels in this position, changing in the process of the network.  
 112 Actuation of the transition instantaneously changes the markup  $M(p) = (M(p_1), M(p_2), M(p_3) \dots M(p_n))$  for marking  
 113  $M'(p)$  by the following rule:  
 114  $M'(p) = M(p) - I(t_i) + O(t_i)$  (1)  
 115 Equation 1 indicates that a transition  $t_i$  removes one of each tag of its input position and adds one tag to each of  
 116 the output positions.  
 117  $\tau_1: T \rightarrow N$  и  $\tau_2: P \rightarrow N$  functions that define the time-delay at the transition and time delay in the position.  
 118 The dynamics performing MPN is defined by the marks movement simulating the balance of discrete flows of  
 119 intermediates in a defined limits on the volume of device BWT setting.  
 120 For chemical-technological industries in analytical and graphical form the status of individual devices (positions)  
 121 process can be represented in Table 1.  
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**Table 1.** The status of individual devices (positions) in the technological process of analytical and graphical forms

Technological scheme of the device	Model of the device in the form of a Petri net
	
<p>where <math>v_{i-1}, v_i</math> - flow rate at the inlet and outlet of the <math>i</math> - unit (<math>m^3 / s</math>);  <math>V(\tau)_i, V_{oi}</math> - complete and current output of the <math>i</math> - unit (<math>m^3</math>).  <math>I(t_i) = v_{i-1} \Delta \tau</math>  <math>O(t_i) = v_i \Delta \tau</math>  <math>V(\tau)_i \leq V_{oi}</math>;</p>	<p>p1 - position informing the current volume of the portion of the precursor in the machine;  <math>M(p1) = V_{oi}</math>;                  p2 - position informing the current volume of the treated portion of the machine;                  p3 - position informing the availability of free space in the device;  <math>M(p2) = V_{oi} - V(\tau)_i</math>;                  t1 - transition simulating the load of intermediate portions in the device;                  t2 - transition simulating the processing the loaded portions;                  t3 - transition simulating the discharging the treated portions.</p>

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 126 The considered PN modification allows to analyze the functioning of the system units under emergency situations,  
 127 switching the control at the network layer, as well as technological schemes discrete-continuous processes for  
 128 sustainable, stable system state.  
 129 Efficiency of wastewater treatment at the facility is defined by the management of the technological process directly  
 130 on the lower level by making the kinetic modes of the bioreactor. Depending on the indicators of pollution of wastewater  
 131 there are supplied metered nutrients, biocatalyst, there balanced the acid number, bioremediation temperature.  
 132 Mathematical model of biokinetics is described in an analytical form as a system of equations:  
 133  $V \frac{dB^{(i)}}{dt} = (B^{(0)} - B^{(i)}) * v + q_B V$  ; (2)  
 134  $V \frac{dS^{(i)}}{dt} = (S^{(0)} - S^{(i)}) * v - q_S V$  . (3)  
 135 Initial conditions:  
 136  $B^{(0)} = const, S^{(0)} = const$  , (4)  
 137 where  $B^{(0)}, B^{(1)}$  - concentration of microorganisms, respectively, in the input stream and the mixing zone;  $S^{(0)}, S^{(1)}$  -  
 138 concentration of hydrocarbons of oil, respectively, in the input stream and in the mixing zone;  $q_B$  - growth rate of the

139 microorganisms;  $q_s$  – rate of oil oxidation by microorganisms;  $V$  - volume of a zone of the apparatus;  $\nu$  - flow rate.  
 140 Kinetic characteristics of the process  $q_B$  and  $q_s$  are determined by empirical relations 5 and 6:

141 
$$q_B = \frac{m_{max}SB}{(1+H^+/K_1+K_2/H^+)(K_S+S)\exp[(t_{opt}^0-t^0)^2/d](1+C_{cat}/K_{cat1}+K_{cat2}/C_{cat})} - K_d B; \quad (5)$$

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$$q_s = \frac{1}{Y_s} \frac{m_{max}SB}{(1+H^+/K_1+K_2/H^+)(K_S+S)\exp[(t_{opt}^0-t^0)^2/d](1+C_{cat}/K_{cat1}+K_{cat2}/C_{cat})}, \quad (6)$$

143 where  $m_{max}$  - is maximum specific growth rate of microorganisms;  $K_d$  - is rate constant of microorganisms dying;  
 144  $Y_s$  - is coefficient for substrate binding amount of biomass and amount of the past on its growth substrate (hydrocarbons);  
 145  $K_S$  - is half-saturation constant (affinity constant to the substrate);  $K_1$  and  $K_2$  - are inhibition constants by hydrogen ions  
 146 ( $K_1$  describes inhibition in acidic region ( $H^+ \gg K_1$ ));  $K_2$  - describes the inhibition in the alkaline region ( $K_2 \gg H^+$ );  $H^+$  - is  
 147 hydrogen ions concentration;  $t_{opt}^0$  - is temperature optimal for microbial growth;  $t^0$  - is current temperature;  $d$  - is  
 148 temperature range;  $C_{cat}$  - is concentration of biocatalysts compounds;  $K_{cat1}$  and  $K_{cat2}$  - are effective inhibition constants -  
 149 activation in their respective fields,  $pK_1$  and  $pK_2$  - are dissociation constants.

150 Identification of kinetic parameters of the reaction rate  $q_B$  and  $q_s$  was based on data obtained in the plant  
 151 laboratory.

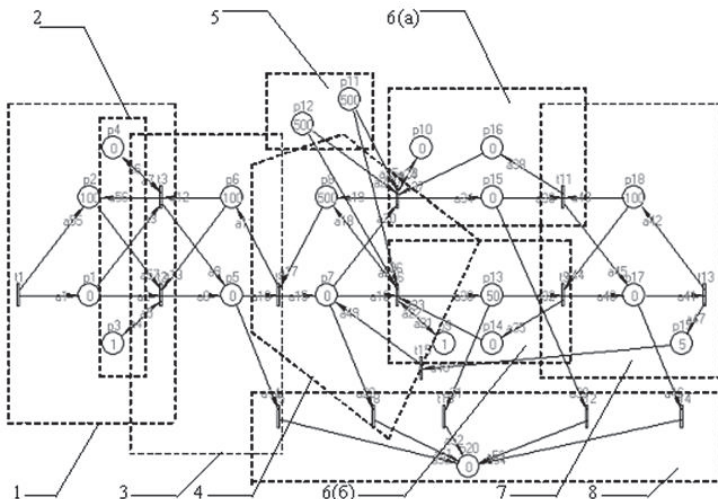
152 The system of equations 2 and 3 is solved together with the equations of the kinetics of biochemical transformation  
 153 5, 6 by Runge-Kutta method [13].

154 Model calculations are performed on an example of Jet settlers. The permissible degree of OW bioremediation is  
 155 achieved by controlling the flow rate of wastewater fed to the bioreactor inlet.

156 Thus, we developed a mathematical model of the process of OW bioremediation in JS, which is the basic model to  
 157 describe this process, defines the operation of the plant of OW cleaning with an neutralization efficiency of petroleum  
 158 products to the maximum allowable concentration for 1.2 hours of cleaning and it allows to intensify this process for  
 159 temporary parameter.

160 To manage the process of OW bioremediation on the upper level, a mathematical model of the technological  
 161 scheme and its software implementation is developed. The mathematical model of OW bioremediation is developed as  
 162 MPN which implementation helped to explore the communication system and the laws of functioning of the unit as a  
 163 whole. Also there are constructed the models of the main devices implementing OW bioremediation process [12]. Of the  
 164 PN models of typical devices was synthesized a model of the entire system (Fig. 2).

165 Using the PN model we have developed a software package of the technological feasibility of OW bioremediation  
 166 module simulating the operation of bioremediation in virtual time. With SCADA- technology means TRACE MODE was  
 167 designed software package of process control system of biological OW treatment [14]. The system of technological  
 168 process control allows to perform supervisory control of the main elements of the management system, stop the system  
 169 BWT and analyze its state as a whole, and in order to anticipate emergency situations [5].  
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 172 **Fig. 2.** Model of the process module as MPN

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## 5. Conclusion

Ensuring environmental safety of petrochemical plants, characterized by significant amounts of pollutant discharge, involves the solution of problems of the organization of the technological wastewater treatment plants to the level of standard indicators or water recycling. The implementation of this task is defined with the information analysis of technological process through the development of a mathematical model in the form of OW bioremediation.

The technique of two-level system of technological process modeling BWT proposed in the work, allows the analysis of such industrial units operation in a dynamically changing process parameters and in a timely manner to prevent the occurrence of environmental risks.

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# Measurement of Cognitive Growth Factors of Regional Economy Based on Panel Data

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## Abstract

The article seeks to demonstrate the need for improved mesoeconomical measurement by separating the sphere of production and dissemination of knowledge and formulate an approach to the measurement of cognitive factors in the economic growth of the regional economy. This suggests presenting a classification of growth factors, theoretical principles of knowledge management, knowledge base and the methods of multivariate data analysis: crossed classification and panel data. The study intends to provide a method for measuring changes in the economy of the region under the influence of new knowledge by means of an econometric analysis of the knowledge indicators system - predictors of the cognitive factors of economic growth in the region. The author applies a multidisciplinary approach to the study, carrying out a synthesis of scientific publications on the problems of economic growth, knowledge management, and accumulation of knowledge in the information space of the region, applied analysis. It is emphasized that there is the need for multivariate statistical methods in the analysis of stochastic information. It is proposed to measure and simulate the spatial heterogeneity of the innovation economy based on panel data. The article stresses the need for and the importance of measuring cognitive growth factors for the innovation regional economy. The result is a methodical approach to the calculation of integral indices on the basis of a system of knowledge indicators in the regional economy. The article presents the more conceptual judgments and general recommendations. Therefore, future studies can perform more detailed calculations and experimental development. The presented methodical approach can be useful for improving the monitoring in the system of the state strategic planning to increase the efficiency of innovation and gain competitive advantages of the region's economy.

**Keywords:** economic growth, knowledge management, innovations, regional economy, models of panel data, integral index.

## 1. Introduction

### 1.1 New knowledge as a source of competitive advantage

The most important strategic resource in today's innovation economy is information; as knowledge is useful information, transformed into the ability to act effectively (Harrington, 2008). Information and knowledge are what many corporations increasingly manufacture, sell and acquire. It is emphasized that innovation as the ability of corporation to continuously innovate, what entails important organizational outcomes (Galunic and Rodan, 1998; Quintane *et al.*, 2011), is determined by the creation, distribution, and the embodiment of new knowledge into products and services. Therefore, the information and knowledge embodied in products and services are the most important result of industrial activity, the primary source of value (Grant, 1993; Drucker, 1995) and sustainable competitive advantage (Nonaka, 1991) of not only one individual corporation, but also a separate economic activity, sector, region and the country as a whole.

### 1.2 Cognitive growth factors

Modern growth theories focus on the study of endogenous, monetary, institutional and technological factors of economic growth (Barro, 1997; Jones and Charles, 1999; Grigoreva and Fesina, 2014). In this case the assumption of constant technology levels in the neoclassical production function  $F(K, L, T)$  (Barro, 1997) is weaker nowadays. The role of knowledge as an endogenous factor of economic growth determines the need to improve the quantification and applied analysis of innovation primarily by improving the mesoeconomic dimensions. The endogenous nature of knowledge determines the feasibility of defining the separate classification group of growth factors - cognitive factors. Therefore, in order to improve the monitoring in the system of the state strategic planning (Naveh *et al.*, 2012; Ismagilov I., 2012; Zarova and Musikhin, 2013) for the measuring and modeling of the interaction between qualitative and quantitative cognitive factors of production activities with the parameters of economic growth and the dynamic equilibrium of the

58 regional socio-economic system the system of knowledge indicators can be used in the context of economic activities,  
59 sectors and regions.

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### 1.3 The system of regional accounts as a knowledge management system in the mesoeconomics

63 Based on the classification criteria of knowledge (Nonaka and Takeuchi, 1995; Polanyi, 1966; Eck, 1998; Bounken, 2004),  
64 the system of regional accounts for the quantitative description and analysis of the generalizing results of economic  
65 development is a complex control system of mesoeconomic knowledge and information base of cost knowledge  
66 indicators. The system of regional accounts is a direct tool for managing the lifecycle of mesoeconomic knowledge:  
67 knowledge creation - the accumulation of knowledge - knowledge transfer - the dissemination of knowledge - the  
68 application of knowledge - new knowledge creation and removal of obsolete knowledge, and creates a field of interaction  
69 between activities, sectors and knowledge. Despite the large number of scientific publications in the field of corporate  
70 knowledge, the problems of knowledge management and knowledge-based management in the mesoeconomics are  
71 hardly studied. The problem of production and dissemination of knowledge was investigated in the middle of the last  
72 century by the example of the United States economy (Machlup, 1966): the economic aspects of the production and  
73 dissemination of knowledge were studied and the costs and number of employees in five groups of economic activities  
74 (research and development, education, mass communication, information technology, information services), called "the  
75 sphere of production and dissemination of knowledge", were measured. It should be noted that this definition does not  
76 have a unique interpretation; it is not defined in the Standard of the System of National Accounts (The System of National  
77 Accounts, 2008). However, the main function of corporations - to integrate knowledge into goods and services in order to  
78 obtain a competitive advantage (Grant, 1993; Drucker, 1995; Nonaka, 1991) greatly expands the boundaries of this  
79 sphere. In our opinion, it is the sphere of production of goods and services as a whole, which carries out the integration of  
80 information resources, ideas and experience of the corporation staff, social interaction, and innovation - new knowledge.

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## 2. Materials and Methods

84 The author used the materials of scientific publications and the official collections of the state statistics services. The  
85 researcher generated the development goals of the innovation economy and the methods of multivariate data analysis in  
86 order to develop approaches for measuring cognitive endogenous growth factors.

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## 3. Results and Discussion

### 3.1 Analysis of multidimensional data by crossed classification

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92 The analysis of multidimensional data in general is to solve two problems: reducing the dimensions and studying the  
93 relationship between the characteristics of all the sample objects. The problem of multidimensional data analysis was  
94 called "statistics -  $\bar{p}_{ij}$ " in the 70-s of the XX century. In a study (Rabinowitz, 1973) the method of crossed classification of  
95 the statistical elements of the set by the average value was proposed, where the set is divided into groups according to  
96 the factors of direct action and into subgroups according to the factors of the reaction on the analyzed efficiency index.  
97 The specificity of the method of multidimensional groups where productive efficiency index presents the statistical  
98 function of the average relationship ( $\bar{p}_{ij}$ ) between production factors is proved by the author with the help of correlation  
99 and regression analysis methods. In the study (Rabinowitz, P., 1973) the following regression equation is proposed:

$$\bar{Y}_{(\sum \frac{X_{ij}}{X_j})} = a_0 + a_1 \sum \frac{X_{ij}}{X_j} \quad (1)$$

100 There is a modified classical system of normal equations to determine the parameters of the regression:

$$\begin{cases} na_0 + a_1 \sum \frac{X_{ij}}{X_j} = \sum Y_i \\ a_0 \sum \frac{X_{ij}}{X_j} + a_1 \sum (\frac{X_{ij}}{X_j})^2 = \sum Y_i \sum \frac{X_{ij}}{X_j} \end{cases} \quad (2)$$

$$a_0 = \bar{Y} - ja_1 \quad (3)$$

102 By substituting the coefficient  $a_0$  with the expression (3) in the second system equation we obtain:

$$(Y - ja_1) \sum \frac{X_{ij}}{X_j} + a_1 \sum (\frac{X_{ij}}{X_j})^2 = \sum Y_i \sum \frac{X_{ij}}{X_j} \quad (4)$$

103  
104  
105  
106 Thence



$$a_1 = \frac{\sum Y \sum \frac{X_j}{\bar{X}_j} - \bar{Y} \sum \frac{X_j}{\bar{X}_j}}{\sum (\frac{X_j}{\bar{X}_j})^2 - 2 \sum \frac{X_j}{\bar{X}_j}} \quad (5)$$

After a series of transformations it is obtained:

$$a_1 = \frac{\sigma_y \sum r_{xy_j} V_{x_j}}{\sum V_{x_j}^2 + \sum (2rx_j x_{j+n} V_{x_j} V_{x_{j+n}} + 2rx_{j-n} x_{j+n} V_{x_{j-n}} V_{x_{j+n}})}, \quad (6)$$

Where  $r_{xy_j}$  is linear coefficient of pair correlation,

$V_{x_j}$  - coefficient of variation.

If grouping is initiated on three factors, then

$$a_1 = \frac{\sigma_y (r_{y1} V_{x1} + r_{y2} V_{x2} + r_{y3} V_{x3})}{V_{x1}^2 + V_{x2}^2 + V_{x3}^2 + 2r_{x1x2} V_{x1} V_{x2} + 2r_{x1x3} V_{x1} V_{x3} + 2r_{x2x3} V_{x2} V_{x3}} \quad (7)$$

In the research (Rabinowitz, 1973) the feasibility of studying the relationship by crossed classification using  $\bar{P}_{ij}$  - model for any number of factors (n) was proved.

### 3.2 Analysis of panel data

Currently, one of the most popular tools in the econometric studies of multidimensional data is panel data analysis. Panel data consist of repeated observations of the same sample units, which are carried out in successive periods of time. Therefore, panel data combine the analysis capabilities as of time series and spatial observations. It becomes possible to consider and analyze the differences between the individual economic units that cannot be done in the framework of standard regression models. We can point to a number of advantages in using the panel data (Eliseeva, 2014):

- Panel data allow taking into account individual heterogeneity;
- Panel data provide less collinearity and more assessment efficiency;
- Panel data give an opportunity to study the dynamics of changes in the individual characteristics of units in the aggregate;
- Panel data are better able to identify and measure the effects, which are not definable only in the time series, or only in the spatial data;
- Panel data allow us to design and test more complex behavior patterns;
- Panel data make it possible to avoid the bias associated with the aggregation of data;
- Panel unit root tests have standard asymptotic distribution, in contrast to the problem of non-standard distribution.

In a class of unidirectional models the unified model assumes that the units of population have no individual differences. The fixed effects model:

$$Y_{it} = \alpha_i + X_{it} \beta + \varepsilon_{it}, \alpha_i = z_i \alpha. \quad (8)$$

It assumes that each unit has its own specific individual characteristics that are constant over time for each object. Its assessment was prepared using the method of least squares to the expression:

$$(y_{it} - \bar{y}_i) = (x_{it} - \bar{x}_i) \beta + (u_{it} - \bar{u}_i) \quad (9)$$

If the units of the population differ in their individual characteristics, but these differences are random in nature, in this case it is better to consider a model with random effects (random effects model):

$$Y_{it} = X_{it} \beta + \alpha + u_i + \varepsilon_{it}. \quad (10)$$

Its assessment is determined by the executable generalized method of the least squares, which weighs excesses in accordance with the structure of the covariance matrix and estimates the variance as parameters. Two-way panel data model with fixed effects in addition to the individual effects also includes time effects:

$$Y_{it} = X_{it} \beta + \alpha_i + \gamma_t + \varepsilon_{it}. \quad (11)$$

Panel data provide the investigator with a large number of observations, increasing the number of freedom degrees, reducing the dependence between the explanatory variables, and the standard errors of the estimates (Ratnikova, 2006). Panel data models enable us to trace the evolution of the individual characteristics of all the sample objects in the time.



3.3 System of knowledge indicators of the regional economy on the basis of panel data

To measure cognitive endogenous growth factors the study presents a system of knowledge indicators of the regional economy. The construction of the system of knowledge indicators of the regional economy can be directed to the calculation of three integral indices:

- Integral leading index (index dynamics precedes changes in the economic development);
- Integral matching index (index dynamics coincides with changes in the economic development);
- Integral lagging index (index dynamics is behind the changes in the economic development).

The calculation of integral indexes is based on the statistical reporting indicators that characterize the innovative development of the region and are presented in Table 1.

**Table 1.** System of knowledge indicators of the regional economy

The life cycle of knowledge	Indicators of knowledge - predictors of cognitive growth factors
Creation	The number of employees in research and development, th. Pers.
	The share of spending on research and development in the gross regional product, %
	The amount spent on training and retraining, mln. Rub.
	The share of organizations implementing technological, organizational and marketing innovations in the reporting year, %
Accumulation	The number of produced advanced technologies, units
	The share of the manufacturing sector in the gross value added, %
	Investments in fixed assets, mln. Rub.
	The volume of innovative products and services, mln. Rub.
	The expenditure on technological innovation of the organizations, mln. Rub.
Transfer	Special costs associated with environmental innovations, mln. Rub.
	Provision of information and communication technologies
Exchange process	The number of personnel engaged in research and development, th. Pers.
	The amount spent on training and retraining, mln. Rub.
Application	The number of organizations engaged in research and development, units
	The share of the manufacturing sector in the gross value added, %
	The share of forwarded innovation products in the gross regional product, %
	The impact of the expenditure on technological innovation, mln. Rub.

The selection and evaluation of indicators are carried out on the basis of theoretical and practical criteria: theoretical criteria (validity of economic theory, relevance, and appropriateness); practical criteria (frequency of publication, regularity, sufficient sample size, the stability of the calculation method).

The calculation of integral indices involves determining the weighting coefficients of the knowledge indicators included in the index. The application of the expert evaluation method (Delphi approach), widespread in practice, introduces subjectivity into the definition of weighting factors in the calculation of the integral index of the regional innovation development. Noteworthy is an approach that determines the weight of each indicator, based on the calculation of pair correlation coefficients, which represent the estimation of the closeness of the relationship between changes in performance over time (Raikaya et al., 2009). And in the literature it is proposed to determine the weighting coefficients based on the econometric approach (Mamaeva, 2012). In the first stage indices are selected - knowledge indicators ( $Y, X_1, X_2, \dots, X_k$ ). One of the selected indicators is seen as a productive indicator  $Y$  to construct a regression model. For each  $i$ -th region, a linear regression of the selected productive indicator for other indicators of knowledge is designed:

$$Y = a_0 + a_1 X_1 + a_2 X_2 + \dots + a_k X_k \tag{12}$$

To construct a regression that takes into account the individual characteristics of each region (economic activity, sector of the economy), you should use the panel data model with fixed effects. In the second phase,  $\gamma_j$  – weighting coefficients are calculated, which show the contribution of each  $j$ -th indicator of knowledge in changing the effective index:

$$\gamma_j = \frac{R_{yx_j} \cdot \beta_j}{R^2}, j = 1, \dots, k, \tag{13}$$

where  $R_{yx_j}$  is coefficient of pair correlation between factor  $X$  and the dependent variable  $Y$ ,  $R^2$  – coefficient of

187 determination of the constructed model,  $\beta_j$  – standardized regression coefficient, which is determined by the indicators of  
188 standard errors in defining the variables  $x_j, Y$ :  $\beta_j = a_j \cdot \frac{\sigma_{x_j}}{\sigma_Y}$ . If regression analysis was carried out correctly, then  $\sum \gamma_j = 1$   
189 .□ The weighting factor for Y is set equal to unity. At the third stage the integral index for the i-th region (economic  
190 activity, sector of the economy) is calculated by the formula:

$$I_i = \sum_{j=0}^k \gamma_j \cdot \frac{x_{ij}}{\max x_{ij}}, \quad (14)$$

191  
192 Where  $x_{ij}$  is the value of j-th knowledge indicator for the i-th object. The sample provided by panel data, is  
193 previously divided into time periods and within each of them the parameters are led to a comparable form by normalizing.

194 Together with dynamic indicators of knowledge it seems appropriate to measure the regional proportions for the  
195 study of spatial aspects of the innovation economy:

- 196 - Measurement of changes in the spatial structure of innovation and cognitive factors of production;
- 197 - Change of the production specialization in the aspect of regions and economic activities;
- 198 - Change of specialization in the context of the integrated economic activities (manufacturing, agriculture, etc.);
- 199 - Changes in the territorial structure of the indicators of human capital and innovative capacity across regions  
200 and economic activities.

201 Measuring and modeling of spatial heterogeneity of innovation can be accomplished by constructing a group of  
202 econometric panel data models in the sections: the production of knowledge in the regions; the dissemination of  
203 knowledge in the regions; the results of development of the production sphere and dissemination of knowledge.

204

#### 205 4. Conclusion

206

207 The author set out the method of multidimensional groups applying relations to the average, and a panel data model with  
208 fixed effects, for which estimation the deviations from the average are used. These methods make it possible to identify  
209 the influence of signs-factors taking into account the individual heterogeneity of the sample objects. The use of these  
210 multivariate methods of the applied analysis enable to measure and model the changes in the level of economic  
211 development of the region under the influence of new knowledge. Based on these methods, the proposed system of  
212 knowledge indicators, which is conceptually outlined in this article, is necessary for strategic planning and decision-  
213 making in the management to improve the efficiency of innovation. The application of econometric approach in the  
214 construction of the integral index allows you to have a reliable and efficient tool for differentiation of innovative  
215 development of the regions. Definition of cognitive factors of economic growth as a classification feature in the  
216 methodology of mesoeconomic measurements will make it possible in the future studies to model the trend of economic  
217 development in the light of innovation activities and analyze the effectiveness of innovation in the region.

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# The Use of Regional Accounts System when Analyzing Economic Development of the Region

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## Abstract

The article emphasizes the need to develop the methods to analyze and forecast economic performance based on indicators of regional accounts. It reflects the main problems of introducing the system of National Accounts of 2008 into practice of the Russian statistics: improving the methodology of calculating the System of National Accounts; adaptation of analytical approaches and theoretical models to the knowledge base and practical analysis of the socio-economic development of the region. The attention is focused on the complexities of applied analysis of regional accounts indicators. Directions for growth modeling of the regional economy are systematized. Based on the theoretical and practical criteria, the system of statistical indicators of the region's economic development is adapted.

**Keywords:** regional economy, the system of national accounts, gross domestic product, economic growth, a statistical indicator.

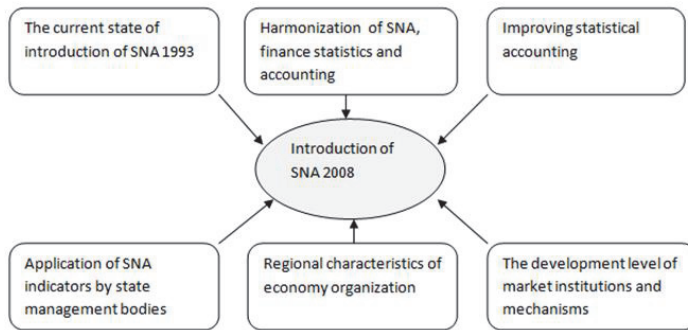
## 1. Introduction

The system of regional accounts reflects all stages of the production cycle: production, distribution, income redistribution, and their end-use for consumption and accumulation. This allows to analyze the basic ratios and proportions (between the production of goods and services production, consumption and production, consumption and accumulation, productive and nonproductive consumption, between primary, secondary and disposable incomes, etc.) and to simulate growth. In its turn, modeling as an interdisciplinary analytical tool of applied economic analysis becomes relevant and demanded in the development of management decisions both at the corporate and the state levels. This determined the line of the research, its theoretical and practical significance.

Using national accounts allows to improve analysis of region's economic development. Therefore, the objective of this study is to systematize methodological problems in analyzing region's economic development and the development of practical recommendations for analytical use of indicators of the regional accounts system. The research is based on modern approaches to the calculation methodology and applied analysis of indicators of the system of regional accounts. Also it presents factors of introducing System of National Accounts (SNA) 2008, the modeling directions for economic growth, the typology of the relationships between economic variables, the role of econometric techniques in the applied economic analysis. Information basis for the study is SNA developed by the Statistical Commission of the United Nations in 2008, as well as materials of scientific publications, materials of the federal and regional agencies of the state statistics.

## 2. Method

Changes in SNA 2008 are concentrated in the sections that relate to non-financial assets, financial services and financial instruments, the rest of the world (balance of payments), the general government sector and the public sector, research developments. The success of the introduction of SNA 2008 provisions by the federal and regional statistical agencies depends on several factors, presented in Figure 1.



57  
58  
59 **Figure 1. Introduction factors of SNA 2008**  
60

61 Due to the introduction of SNA 2008 provisions by the federal and regional statistical agencies there have been a number  
62 of issues that have to be solved to ensure the application of economic analysis [1, 2, 3, 4]. Firstly, the general  
63 methodological issues:

- 64 - improving the method of calculating the consumption of fixed capital on the basis of the perpetual inventory  
65 method; evaluation of fixed assets at replacement cost;
- 66 - harmonization between national accounts and other systems of macroeconomic indicators, in particular,  
67 statistics of public finance with the purpose of billing for the sector of state administration;
- 68 - improving methods for the calculation of holding gains (losses);
- 69 - improving methods for the determination of financial intermediation services which are measured indirectly;
- 70 - improving the calculation of productivity measures reflecting the changes in the labor force; development of  
71 methodology for calculating the productivity of capital and total productivity.
- 72 - Secondly, the methodological issues of evaluating SNA indicators:
- 73 - harmonizing calculation of consumer price indices as expenditures deflators for the final consumption of  
74 households, the price indices for exports and imports of goods, price indexes for non-market services with the  
75 international standard;
- 76 - harmonizing the methods for assessing the stock of assets, stocks, financial assets with the rules of SNA  
77 2008;
- 78 - improving the mechanism of estimating gross domestic product (GDP) and its components in real terms.

79 Analysis of academic papers reveals two most important problems in the applied analysis of indicators of national  
80 accounts system.

81 Firstly, multiple constraints on the relationship in the national accounts, on the possibility of changes in  
82 macroeconomic variables. There are two main areas of economic growth modeling [5,6,7,8]. The first one is connected  
83 with the construction of the production functions which link economic growth with the dynamics of the factors of  
84 production. The second one involves production modeling and consumption on the basis of multi-sectoral models and  
85 inter-sectoral balance [9]. In the first case, the economy is seen as an integral, unstructured unit. Resources are the  
86 arguments, and the gross output or gross domestic product is the function. In the second case, the economy is structured  
87 and consists of a finite number of sectors, or "clean" industries that produce one or more products. Economic growth is  
88 modeled on the basis of supply and demand balance in the economy. Since the relationship in the system of national  
89 accounts express logical links, modeling uses a system of equations. Expenditure of one economic agent is a resource of  
90 another one, and an equality between financial and non-financial resources and their use must be observed in respect of  
91 each economic agent. In the academic literature the typology of relationships between variables identifies economic static  
92 and dynamic connections, technical connections, connections in behavior and background connections [9,10]. Economic  
93 static and dynamic connections determine the relationship between variables and regularity of changes in some of them.  
94 Technical connections are determined by the production process. Connections in behavior reflect the presence of social  
95 habits, regularity in the actions of economic agents. Background connections are defined by regulation and legislation.

96 Secondly, a major obstacle in the construction of regional econometric models is an insufficient number of  
97 observations to select the most proper dependencies and to estimate parameters, which is due to less completeness and  
98 consistency of regional statistics, shorter time series of data by the region. We agree with the fact that this circumstance

limits to the construction of models which are least demanding to the source data [8,11]. The main information problems in regional calculations include the difficulty in obtaining information at the stage of the quarterly estimates for certain categories of enterprises; problems with the use of the residency concept, getting information about extra-regional territories; discrepancy in classification of activities when forming indicators of output, value added and wages across regions; the complexity of the re-adjustment of GRP in real terms.

### 3. Results

The use of regional accounts together with econometric methods and expert judgments allows to have a more accurate and flexible way of forecasting and planning in justifying economic policies [6,12]. In a market economy, it is especially important to identify the phases of economic development based on long-term dynamics in order to determine the turning points that have prognostic properties. In this regard, the purpose of analyzing the development of the region is the prediction of changes in the phases of development. We propose a system of three summary statistical indicators of economic development in the region: 1. an aggregate leading indicator is a group of statistical indicators, for which index dynamics is preceded by changes in the index of industrial production. 2. an aggregate coinciding indicator is a group of statistical indicators, for which the index dynamics coincides with changes in the index of industrial production. 3. an aggregate lagging indicator is a group of statistical indicators, for which the dynamics of the index lags behind the changes in the index of industrial production.

When selecting indicators included in each aggregate statistical indicator, we used a number of theoretical and practical criteria. Theoretical criteria include the economic rationale for the inclusion of an indicator in the group; a sufficiently deep description of the economic process selected; the maximum relevance of the indicator for the Russian economy. Practical criteria: frequency of publication (monthly data), timeliness (regular data), the duration of the series (a sufficient number of measuring points without interruption), stability (minimal risk of data revision). Based on these criteria, we have proposed indicators which reflect the development of the non-financial, financial sectors of the economy and the "rest of the world" (Table 1).

**Table 1.** Indicator system of the region's economic development

№	Indicator	Sector of the economy	Source of data
<b>Aggregate leading indicator</b>			
1.	Oil price in the world market, USD/barrel	"the rest of the world"	The Federal agency for state statistics
2.	RTS index	Financial sector	The Russian trading system
3.	Money supply M2, bn	Financial sector	The Central bank of the Russian Federation
4.	Credit rates for non-financial organizations, %	Financial sector	The Central bank of the Russian Federation
5.	The output volume of mineral resources in the region, ths.t	Non-financial sector	The Regional office of the Federal agency for state statistics
6.	The stock price of the leading companies in the region	Financial sector	The Russian trading system
7.	Gross value added in the region, mln. rub.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
8.	Inventories in organizations, mln. rub.	Non-financial sector	The Regional office of the Federal agency for state statistics
<b>Aggregate coinciding indicator</b>			
9.	The number of employed in the economy of the region, th. pers.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
10.	Real disposable incomes, ths. rub.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
11.	Retail trade turnover, mln. rub.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
12.	Wholesale trade turnover, mln. rub.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
13.	Capital productivity in industry, rub.	Non-financial sector	The Regional office of the Federal agency for state statistics
<b>Aggregate lagging indicator</b>			
14.	The number of the unemployed in the region, th. pers.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics
15.	Deposits of the population in the region, mln. rub.	Financial sector	The Central bank of the Russian Federation
16.	The retail price index in the region, %	Non-financial sector	The Regional office of the Federal agency for state statistics
17.	The wholesale price index in the region, %	Non-financial sector	The Regional office of the Federal agency for state statistics
18.	Investments in fixed assets, mln. rub.	Non-financial and financial sectors	The Regional office of the Federal agency for state statistics

Cumulative indexes for each indicator are defined as a linear combination of the selected indicators:

$$y = \delta_1 x_1 + \delta_2 x_2 + \dots + \delta_j x_j + \dots + \delta_n x_n, (1)$$

where y - the cumulative index,

131  $x_j$  - the structural elements of the cumulative index,  
132  $\delta_j$  - weight with which structural elements are included in the cumulative index.  
133 Each indicator is included in the respective indicator with the defined weight. The weights can be determined on  
134 the basis of the correlation analysis between a particular indicator and the reference index of industrial production:

$$\delta_i = \frac{\sum_{j=1}^n r_{ij}}{\sum_{j=1}^n \sum_{i=1}^n r_{ij}} \quad (2)$$

135 where  $r_{ij}$  - paired correlation coefficient between the  $i$  index and  $j$ - reference index of industrial production ( $i, j = 1, 2,$   
136 ...,  $n$ ),  
137

138 Moreover, the pre-selected economic indicators are presented to dimensionless numbers, for example, chain index  
139 numbers which show growth rates. An important step is the adjustment of seasonal effects as in the summary reference  
140 index of industrial production, and in the components of each indicator. For the seasonal adjustment procedure the  
141 values of the seasonal component is calculated using the moving average method and the construction of additive or  
142 multiplicative time series model. Then each indicator is compared with the reference index and the main problem is  
143 solved, that is for how much dynamics of each indicator outpaces, coincides or lags behind the reference index of  
144 industrial production. This allows us to estimate the turning points in the business cycle, that is, periods which are  
145 characterized by a sharp decrease or increase in business activity. One can apply the calculation of functions interrelation  
146 between the time series of indicators and reference index of industrial production at various time lags. The lag for  
147 maximum cross-correlation coefficient indicates the period of advancing or lag. For coinciding indicator maximum  
148 correlation coefficient is, by definition, corresponds to the zero lag. It is also possible to apply methods of mathematical  
149 statistics to assess the simultaneity of statistical indicators. Loss of dynamics simultaneity of statistical indicators is a  
150 token of a turning point in the economic cycle. For statistical evaluation of the simultaneity degree of statistical indicators  
151 coefficient of concordance is used, the hypothesis of statistical insignificance in the concordance coefficient (randomness  
152 in the assessment of simultaneity) is checked with the help of Pearson criterion. Another approach to highlight the turning  
153 points is a trend analysis. First, you need to compare the actual values of the reference index of industrial production with  
154 trend values. The local maximum of the actual value ratio to the trend is a peak, and a local minimum is a trough, the  
155 peak and the trough are break points in the business cycle. The break points for statistical indicators are defined similarly  
156 and then they are compared with the reference indicators.  
157

#### 158 4. Conclusions

159 Introduction of SNA 2008 requires a long period, and significant effort by the statistical agencies and other offices which  
160 are responsible for the formation of macro-economic statistics. Currently a number of changes in the definition and  
161 classification of some indicators, in the accounting and reporting, in the program of sample surveys are being introduced,  
162 there has been an increased interaction of statistical offices with the Ministry of Finance and the National Bank and  
163 coordination of their efforts to introduce the new SNA, government finance statistics and balance of payments. The use of  
164 econometric methods together with the national accounts allows to have a more accurate and flexible way of forecasting  
165 and planning when justifying economic policy. Based on the dynamics of statistical indicators in comparison with the  
166 reference index one can talk about trends in the economic development of the region. For example, a synchronous  
167 indicator speaks of the transition to economic growth, and the synchronous coinciding indicators testify of the stabilization  
168 of economic development, synchronous lagging indicators - sustainable economic development. The results obtained  
169 allow us to assess the trends in the economic development of the region based on indicators of the production account,  
170 to analyze the dynamics of the sectoral structure of output, standard of living, to make inter-regional comparisons, to  
171 develop strategic objectives of economic policy.  
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# Application of Linear Programming in Budgeting Costs for the Compensation of Employees

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## Abstract

The article contains a theoretical and methodological aspects of budgeting expenditures on compensation of employees based on the determination of optimal values of the limited financial resources of the company. We propose a logical organization of budgeting the expenditures using linear programming. Recommended are calculations and measures to control the cost of remuneration in accordance with the objectives of the company.

**Keywords:** expenditures on employee compensation, budgeting, linear programming, labor productivity.

## 1. Introduction

Budgeting system is of special importance to generate information which is necessary to prioritize company's current activities and to provide a basis for assessing opportunities to improve compensation expenses. It allows to generate information about distribution and consumption of resources allocated for employee pay and stimulating payments to employees. In order to harmonize current and future challenges and the results achieved in effective use of financial resources for personnel compensation in the budget cost management it is advisable to use linear programming which contributes to optimization of expenditure level for compensations for short term and the creation of a system of coordinates for both the business as a whole, and for expenditure on compensations.

## 2. Method

The economic essence of linear programming is to study the operations associated with the determination of optimal values of the objective function of linear variables coupled with the use of limited resources. At the same time mathematical logics of factors interchangeability should always be combined with logically sound understanding of the nature of the phenomenon studied.

Within budget costs management of compensations linear programming is effective to solve the problems of funds rational use for employee pays and incentive payments. In particular, when budgeting systematic incentive payments, it is advisable to correct these expenses as a result of changes in the correlation of average increase in the employee pay for every one percent increase in worker's productivity. For this reason, to determine the maximum coefficients for computing systematic incentive payments it is possible to use the method of the generalized problems from of linear programming.

## 3. Results

We investigate the possibility to apply the approach proposed to cost budgeting of employees pay on the example of JSC "Shoe Factory" Spartak, one of the oldest shoe companies in Russia. This company uses two sets of coefficients for computing systematic incentive payments:

- 1) for accomplishment of a plan in the range from 0 to 1,0;
- 2) for the turnover of the designs (for the substantive and support staff) and for non-standard work day (for managerial staff, engineers and technical workers) in the range from 0 to 0,3.

When budgeting costs of compensations it is necessary to determine the values of the above coefficients that can be corrected to comply with the correlation between employee pay increase and one per cent increase of worker's productivity. To do this, we are given two numeric vectors with eleven coordinates each. Coordinates of the first mean change rate in the average value of the employee pay, the coordinates of the second mean rate of change in labor

56 productivity. The coordinates are changed sequentially from 1,0 to 2,0 in increments of 0,1. At the same time, we  
57 presume that the value of the basic compensation per worker, and the value of worker's productivity in the planning  
58 period may remain at the same level (the coefficient is 1,0), or to increase at least twice (the coefficient is 2,0). With these  
59 vectors  $M_1$  matrix is constructed (Table 1).  
60

61 **Table 1.** Matrix of correlation between change rates of the average value of the employee pay and labor productivity  
62 ( $M_1$ )  
63

Value		Change coefficients of average value of employee pay										
		1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0
Change coefficients of worker's labor productivity	1,0	1,00	1,10	1,20	1,30	1,40	1,50	1,60	1,70	1,80	1,90	2,00
	1,1	0,91	1,00	1,09	1,18	1,27	1,36	1,45	1,55	1,64	1,73	1,82
	1,2	0,83	0,92	1,00	1,08	1,17	1,25	1,33	1,42	1,50	1,58	1,67
	1,3	0,77	0,85	0,92	1,00	1,08	1,15	1,23	1,31	1,38	1,46	1,54
	1,4	0,71	0,79	0,86	0,93	1,00	1,07	1,14	1,21	1,29	1,36	1,43
	1,5	0,67	0,73	0,80	0,87	0,93	1,00	1,07	1,13	1,20	1,27	1,33
	1,6	0,63	0,69	0,75	0,81	0,88	0,94	1,00	1,06	1,13	1,19	1,25
	1,7	0,59	0,65	0,71	0,76	0,82	0,88	0,94	1,00	1,06	1,12	1,18
	1,8	0,56	0,61	0,67	0,72	0,78	0,83	0,89	0,94	1,00	1,06	1,11
	1,9	0,53	0,58	0,63	0,68	0,74	0,79	0,84	0,89	0,95	1,00	1,05
	2,0	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1,00

64 Coordinates of the first vector recorded in the first line  $M_1$ , and of the second - in the first column. Elements ( $m_{ij}$ ) of  $M_1$   
65 matrix are completed by the following rule:  $m_{ij} = m_{0j} / m_{i0}$  ( $i, j \geq 1$ ). Elements of the main diagonal are equal to one, those  
66 that are located above the main diagonal are more than 1,0 and those lower will be less than 1.0. For further reasoning,  
67 elements less than or equal to one are suitable, as it is only with this correlation that rate of change in worker productivity  
68 will equal or exceed the rate of change of the average employee pay. Therefore, the  $M_1$  matrix is transformed to a  $M_2$   
69 matrix (Table 2).  
70

71 Elements of  $M_2$  matrix are used to calculate the planned expenditure on staff remuneration, including expenses for  
72 systematic incentive payments taking into account corrected coefficients. To do this, the general formula for calculating  
73 the expenditures for employees' compensation is applied:

$$74 \quad EC_{\text{worker}} = EC_{\text{employee.pay}} + IP + EC_{\text{syst.incentive.pay}} \quad (1)$$

75 where:  $EC_{\text{employee.pay}}$  – the expenses for employee pay, MU.;

76  $EC_{\text{syst.incentive.pay}}$  – expenses for systematic incentive payments, MU.;

77 IP – insurance premiums accrued on payments to employees, according to the legislation, MU.  
78

79 **Table 2.** The transformed matrix of correlation between change rates of the average employee pay and labor productivity  
80 ( $M_2$ ).  
81

Values		Change coefficients of average employee pay										
		1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0
Change coefficients of worker's labor productivity	1,0	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	1,1	0,91	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	1,2	0,83	0,92	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	1,3	0,77	0,85	0,92	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	1,4	0,71	0,79	0,86	0,93	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	1,5	0,67	0,73	0,80	0,87	0,93	1,00	1,00	1,00	1,00	1,00	1,00
	1,6	0,63	0,69	0,75	0,81	0,88	0,94	1,00	1,00	1,00	1,00	1,00
	1,7	0,59	0,65	0,71	0,76	0,82	0,88	0,94	1,00	1,00	1,00	1,00
	1,8	0,56	0,61	0,67	0,72	0,78	0,83	0,89	0,94	1,00	1,00	1,00
	1,9	0,53	0,58	0,63	0,68	0,74	0,79	0,84	0,89	0,95	1,00	1,00
	2,0	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1,00

According to formula 1 the expenses of employee pay are known; insurance premiums can be neglected as their influence is insignificant; and the last addend is calculated as a linear combination of expenses for employee pay per each worker and correctable coefficients of computing systematic incentive payments that have to be defined. It is possible to simplify the task, as the expenses for employee pay are of the same amount for a particular grade. In general, these correctable coefficients are two  $n$ -dimensional vectors ( $n$  - number of grades of remuneration). For each grade one should calculate some correctable coefficients that form an element set of the  $n$ -dimensional vector:

$$K_x = (K_{x1}, \dots, K_{xn}) \quad (2)$$

$$K_y = (K_{y1}, \dots, K_{yn}) \quad (3)$$

where:  $K_x$  is the first set of correctable coefficients of computing systematic incentive payments;

$K_y$  is a second set of correctable coefficients of computing systematic incentive payments.

It is known that all the elements of the  $K_x$  vector are in the interval of  $0 \leq K_{xi} \leq 1$ , and the elements of the  $K_y$  vector are in the interval  $0 \leq K_{yi} \leq 0,3$ , where  $i$  is the number of coordinates of the  $n$ -dimensional vector ;  $i = 1, \dots, n$ . These correctable coefficients may reach zero only when:

$$A = EC_{worker} - EC_{employee.pay} = 0 \quad (4)$$

where:  $A$  is the expenses for systematic incentive payments ( a variable (a functional));

$EC_{worker}$ ,  $EC_{employee.pay}$  have the same meaning as in formula 1.

To determine the minimum or maximum functional with additional inequality constraints on the unknown variables, we used a method to summarize the objectives from linear programming. To this end, we solve the system whose results allow to define a fixed set of correctable coefficients of computing systematic incentive payments -  $K_{x_i}, K_{y_i}$ :

$$L(K_x, K_y) = (K_{x_1} + K_{y_1})a_1 + (K_{x_2} + K_{y_2})a_2 + \dots + (K_{x_n} + K_{y_n})a_n - A = 0 \quad (5)$$

$$0 \leq K_{x_i} \leq 1, 0 \leq K_{y_i} \leq 0,3, i = 1, \dots, n$$

where:  $L(K_x, K_y)$  - the difference between a linear combination of the expenses for employee pay by grades and of correctable coefficients for computing systematic incentive payments, and  $A$  functional.

$a_n$  - planned expenditure on employee pay of the  $n$ -th grade.

As a result, hyperplane in  $2n$  dimensions space and the hypercube (a convex set) are formed in the same space. If these sets disjoint, it is necessary to find at least one point of intersection. As this point we understand some fixed set of correctable coefficients for computing systematic incentive payments -  $K_{x_i}, K_{y_i}$ .

We consider two cases for searching the unknown coefficients. The first case is a special case, when the number of grades is equal to one, i.e.  $n = 1$ . In this variant, there are two independent variables, therefore, it is the Cartesian coordinate system in a plane. Area of finding a solution is a rectangle with parallel sides to the axes  $OX$  and  $OY$ , with the two sides lying on these axes. Hyperplane in this case is a right line posed by the equation:

$$L(K_{x_1}, K_{y_1}) = K_{x_1}a_1 + K_{y_1}a_1 - A = 0 \quad (6)$$

where  $A$  has the same meaning as in formula 4;

$L(K_{x_1}, K_{y_1}), a_1$  have the same meaning as in formula 5 with a single grade.

Results of value calculation of expression on the left side of formula 5 in the vertex of the rectangle with coordinates  $B(0,0), C(1,0), D(0,0.3), E(1,0.3)$  can provide several options:

- 1) value  $L(B), \dots, L(E)$  have the same sign;
- 2) there is at least one value of  $L$  that is equal to zero;
- 3) at least two values of  $L$  have opposite signs.

With the first variant the situation has no solution. With the second variant the attack is the vertex of the rectangle whose substitution of  $L$  gives zero. In the third variant, the equation of the right line should be drawn through the vertices of the rectangle with opposite  $L$  values and find the point of intersection of expression 5 with the right line found which will be the desired solution, since if the line intersected with a rectangle, any point lying on the line within the rectangle is a solution. In this case, the fact that the area is convex is used.

When considering the general case of the search for the desired coefficients one should use the algorithm of the precedent discussed above. First, it is necessary to calculate the values of  $L(K_x, K_y)$  at the vertices of the hypercube. To do this, it is necessary to substitute coordinates of all possible sets of coefficients that can be formed from the values of 0, 1.0; 0, 0.3. The first two values are used only for  $K_x$ , and the second two - only for  $K_y$ . Next, one must check which of the previous variants takes place. The conclusions are the same as the first special case, so further calculations are carried out for the third variant, when at the points with  $(K_{x'_1}, \dots, K_{x'_n}, K_{y'_1}, \dots, K_{y'_n}), (K_{x''_1}, \dots, K_{x''_n}, K_{y''_1}, \dots, K_{y''_n})$  variable  $L$  has different signs. Accordingly, the equation of the right line is drawn in the  $2n$ -dimensional space:

133 
$$\frac{Kx_1 - Kx'_1}{Kx_1 - Kx'_1} = \frac{Kx_2 - Kx'_2}{Kx_2 - Kx'_2} = \dots = \frac{Kx_n - Kx'_n}{Kx_n - Kx'_n} = \frac{Ky_1 - Ky'_1}{Ky_1 - Ky'_1} = \frac{Ky_2 - Ky'_2}{Ky_2 - Ky'_2} = \dots = \frac{Ky_n - Ky'_n}{Ky_n - Ky'_n} \quad (7)$$

134 To solve the system of equations 5 and equation 7, the last expression is converted to a parametric form:

135 
$$Kx_1 = Kx'_1 + t(Kx''_1 - Kx'_1),$$

136 ...

137 
$$Kx_n = Kx'_n + t(Kx''_n - Kx'_n),$$

138 
$$Ky_1 = Ky'_1 + t(Ky''_1 - Ky'_1), \quad (8)$$

139 ...

140 
$$Ky_n = Ky'_n + t(Ky''_n - Ky'_n).$$

141 where :  $Kx'_1, \dots, Kx'_n; Ky'_1, \dots, Ky'_n; Kx''_1, \dots, Kx''_n; Ky''_1, \dots, Ky''_n$  – the coordinates of the one and the other of the points  
142 of correctable coefficients for computing of systematic incentive payments in which the values of L variable are opposite;

143  $t$  – parameter of the right line recorded in formula 7.

144 To find the  $t$  value, expression 8 is substituted into formula 5 and the desired quantity is calculated:

145 
$$t = \frac{A - (Kx'_1 + Ky'_1)a_1 - (Kx'_2 + Ky'_2)a_2 - \dots - (Kx'_n + Ky'_n)a_n}{(Kx''_1 - Kx'_1 + Ky''_1 - Ky'_1)a_1 + (Kx''_2 - Kx'_2 + Ky''_2 - Ky'_2)a_2 + \dots + (Kx''_n - Kx'_n + Ky''_n - Ky'_n)a_n} \quad (9)$$

146 Then defined are formulas for the calculation of the unknown correctable coefficients for computing systematic  
147 incentive payments corresponding to each grade:

148 
$$Kx_i Kx_i + \frac{A - \sum_{k=1}^n (Kx'_k + Ky'_k)a_k}{\sum_{k=1}^n (Kx''_k - Kx'_k + Ky''_k - Ky'_k)a_k} \times (Kx''_i - Kx'_i) \quad (10)$$

149 
$$Ky_i = Ky_i + \frac{A - \sum_{k=1}^n (Kx'_k + Ky'_k)a_k}{\sum_{k=1}^n (Kx''_k - Kx'_k + Ky''_k - Ky'_k)a_k} \times (Ky''_i - Ky'_i) \quad (11)$$

150 where:  $Kx_i, Ky_i$  - correctable coefficients for computing systematic incentive payments corresponding to each  
151 grade of remuneration;

152  $n$  - the number of grades;

153  $k$  - the index of summation by the numbers of grades.

154 According to formulas 10 and 11, the optimal set of coefficients by type of incentive payments is calculated. Given  
155 these coefficients that are calculated by the proposed method based on linear programming, the expenditure budget for  
156 employees compensation in the shoe company studied is produced (Table 3).

157  
158 **Table 3.** The recommended techniques for budgeting expenses for employee remuneration using linear programming (on  
159 the example of JSC "Shoe company "Spartak")  
160

Position / Profession	Grade	Staff number, person	Expenses for employee pay rub.	Coefficients of computing systematic incentive payments				Expenses for incentives, rub.		Expenses for employee remuneration, rub	
				uncorrectable		correctable		Based on uncorrectable coefficients	Based on correctable coefficients	Based on uncorrectable coefficients	Based on correctable coefficients
				implis	hmen	work day/turno	implis				
1	2	3	4	5	6	7	8	9=(4x5)+(4x6)	10=(4x7)+(4x8)	11=4+9	12=4+10
Business unit supervisor	9	1	12000	1,0	0,3	0,83	0,16	15600	11902	27600	23902
Shop foreman	8	4	40000	1,0	0,3	0,83	0,16	52000	39672	92000	79672
Total for managerial staff			52000	x	x	x	x	67600	51574	119600	103574
Operating personnel											
Operational area№1 (cutting and machining details of shoe bottom)											
Detail cutter	4	3	17941	1,0	0,3	0,83	0,16	25697	19605	43638	37546
Machinist	2	3	13801	1,0	0,3	0,83	0,16	19767	15081	33568	28882
Assembly worker	4	5	29901	1,0	0,3	0,83	0,16	42829	32675	72730	62576
etc.											
Total for operating personnel			1387873	x	x	x	x	1987901	1506561	3375774	2894434
Total for support personnel			39881	x	x	x	x	56594	43177	96475	83058
Total for business unit			1479755	x	x	x	x	2112095	1601312	3591850	3081067

161 <sup>1</sup> – calculated by formula 10;

162 <sup>2</sup> –calculated by formula 11.

164 **4. Conclusions**

165  
166 These results demonstrate that the use of linear programming in budgetary management of expenses for compensation  
167 contribute to a more efficient funds allocation for the payment of workers. Since by linear programming it is possible to  
168 determine the optimal coefficients for computing staff incentive payments which take into account the most appropriate  
169 level of change in the correlation between an increase in the average amount of labor remuneration for one percent  
170 increase in worker productivity. In addition, the proposed approach to budgeting funds for remuneration assumes joint  
171 responsibility of the company's employees for results, as correctable coefficients are calculated on the basis of the labor  
172 remuneration of all staff, not just the production staff.

173 Thus, the use of linear programming in the budgeting system helps organizations to optimize the expenses for  
174 compensation and to encourage workers to increase productivity.

175  
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## Model of Sustainable Development of the Region

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### Abstract

Assessment and analysis of the main characteristics of the socio-economic development of regions are among the most important ones that allow to solve strategic issues of the choice of optimal solutions in the sphere of regional governance and development prospects. As a rule, the division of groups and corresponding to them types (classes) of districts, each of which has significant, qualitative differences, is the result of such studies. Such division into groups objectively exists in any regional system, regardless of the level of organization. We offer to consider adaptation changes of the integral potential capacity, which includes essential components, such as natural resources, production, social units, assessment of their compliance with each other, as one of the variants of the possible approach for the balanced territorial development and performance of territorial systems.

**Keywords:** stable development, stochasticity, spatial differentiation, potential, territory.

### 1. Introduction

Stochasticity [1] that provides the mode of mixing and leads to fluctuations on the micro level, because of which the level of sustainability of systems of the higher ranks reduces, but which also provides the possibility of their transition into a new balanced state, is the basic principle of operation of such units [2,3].

The authors developed the method of modeling and simulation of assessment of the performance sustainability level [6,7,8] and the prospects of the balanced development of both the individual subsystems, as well as the system as a whole [9], on the materials of evaluation of the production and territorial potentials [4,5]. The model allows for the retrospective, current and prospective state of the natural resources, demographic, agro-resource, industrial and infrastructural capacity potential of the area [10], involves determination of the predictive scenarios of the regional organization of the society, depending on the changes of external and internal conditions and it may serve as a basis for making well-founded reasonable regulatory decisions in the changing economic, social and political conditions. [11] Its use is capable, if necessary, to build a forecast scenario of economic development and the system of population displacement in the region, as well as to become operational and effective tool for management and prediction of social-economic processes in the region, in particular, to identify the areas and sectors of the economy which are the most favorable for the application of capital for the nearest, as well as for the longer-term prospect[12].

In this case, the regional socio-economic priority should be analyzed and estimated according to the following scheme-model (Figure 1):



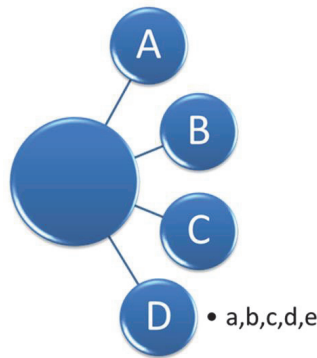


Fig.1 Algorithm of assessment of the regional socio-economic priority

- A. Assessment of the integrated resource potential of the area and its components which takes into account the current condition and possibilities of the natural resources, demographic, agro-resource and infrastructural potential of the region.
- B. Assessment of the current state of the productive capacity of the region, its size and distribution throughout the territory (industry, agriculture, construction).
- C. Assessment of correlation of the current level of development and the location of production to the resource potential of the area. This assessment should identify (for the region and its individual parts) the level of efficiency of the level and allocation of the economic sectors from the perspective of resource capabilities, as well as the degree of influence of external – in relation to the region – conditions on its economy.
- D. Development of methods of identification and evaluation of possible prospects of economic development and the system of settlement (or wider – the territorial organization of society – TOS). These methods are the parts of the model that allows to solve the following problems:
  - a) Determination of the elements of the resource potential, the lack of which sets back the social and economic development of cities and districts of the region
  - b) Assessment of the situation which should be in the future, with the possible placement of various industries in definite locations (areas) of the enterprises.
  - c) Determination of the most favorable points (areas) for each potentially located enterprise (industry).
  - d) Assessment of sustainability of economic development of cities and regions and the social standard of living in the region.
  - e) Determination of options of forecast scenarios of the development and economic location of the region depending on the prevailing internal and external conditions (growth poles, possible socio-economic situations and expected socio-economic areas).

## 2. Method

The authors propose the following algorithm for integrated assessment of the territory and determination of rational variants of the balanced territorial organization.

1. Background information is given in the table 1, where

Table 1

$k \setminus 1$	$V_1$	$V_2$	...	$V_i$	...	$V_m$
1	$V_{11}$	$V_{12}$	...	$V_{1i}$	...	$V_{1m}$
2	$V_{21}$	$V_{22}$	...	$V_{2j}$	...	$V_{2m}$
:	:	:	:	:	:	:
K	$V_{k1}$	$V_{k2}$	...	$V_{ki}$	...	$V_{km}$
:	:	:	:	:	:	:
N	$V_{n1}$	$V_{n2}$	...	$V_{ni}$	...	$V_{nm}$

- 90  $k$  – number of evaluation object (OTE),  $k = \overline{1, n}$   
 91  $i$  – number of evaluation factor (aspect),  $i = \overline{1, m}$   
 92  $V_{ki}$  – rank of  $k$  OTE for the 1<sup>st</sup> factor  
 93  $q_i$  – rank of the 1<sup>st</sup> factor that reflects its comparative significance  
 94  $V_i$  - designation for the 1<sup>st</sup> of Table 1 (if that is the same – the vector of ranks of the 1<sup>st</sup> evaluation factor).  
 95 2. Table 1 is converted into Table 2 of ranks "with weights", where  
 96  
 97  
 98

**Table 2**

k\1	R <sub>1</sub>	R <sub>2</sub>	...	R <sub>i</sub>	...	R <sub>m</sub>
1	r <sub>11</sub>	R <sub>12</sub>	...	r <sub>1i</sub>	...	r <sub>1m</sub>
2	r <sub>21</sub>	R <sub>22</sub>	...	r <sub>2i</sub>	...	r <sub>2m</sub>
:	:	:	:	:	:	:
K	r <sub>k1</sub>	R <sub>k2</sub>	...	r <sub>ki</sub>	...	r <sub>km</sub>
:	:	:	:	:	:	:
N	r <sub>n1</sub>	r <sub>n2</sub>	...	r <sub>ni</sub>	...	r <sub>nm</sub>

99  
100  $r_{ki} = (m + 1 - q_i) V_{ki}$   
101

102 3. Matrices of pairwise comparisons are constructed for all  $i = 1, m$

103  $[1, \text{if } r_{ki} < r_{j1}$

104  $B_i = || b_{ikj} ||_{n \times n}$ , where  $b_{ikj} = \{0, \text{if } r_{ki} = r_{j1}$

105  $-1, \text{if } r_{ki} > r_{j1}$

106 Matrices  $B_i$  have the property of antisymmetry, i.e.  $b_{ikj} = -b_{ikj}$

107 for all  $1 = \overline{1, m}$  and  $j, k = \overline{1, n}$ , that is why it is enough to calculate only the elements that are above the main  
108 diagonal.

109 4. Matrix of coherence of factors is constructed, and generalized coefficients for all factors are calculated.

110  
111 Matrix of coherence of factors is as follows:

112  $E = || e_{il} ||_{m \times m}$ , where:

113  $e_{il} = \varepsilon(R_i \cdot R_l) = 1 - Sil$  - measure of closeness of vectors  $R_i$  and  $R_l$  ;

114  $Sil = S(R_i \cdot R_l) = n(n-1) - \text{normalized distance between the vectors } R_i \text{ and } R_l$  ;

115  $\Delta il = \Delta(R_i \cdot R_l) = \sum_{k=1}^n \sum_{j>k}^n | b_{ikj} - b_{ljk} |$  - distance between the vectors  $R_i$  and  $R_l$  .

116 Symbol  $j>k$  means that only the elements of the matrices  $B_i$  and  $B_l$ , that are above the main diagonal are involved  
117 in calculations.

118 For all  $1 = \overline{1, m}$  generalized coherence coefficients are calculated:

119  $e_l = \frac{1}{m-1} \sum_{i=1}^m e_{il}$

120 Matrix  $E$  and coefficients  $e_l (l = \overline{1, m})$  are printed out.

121 5. Coefficient of concordance is calculated:

122  $\alpha = \frac{\sum_{k=1}^m r_k}{m^2(m+1)^2(n^2-1)_n}$ ,  $r_{ki} = \sum_{i=1}^m r_{ki}$ ,  $k = \overline{1, n}$ ,  $\bar{r} = 1/n \sum_{k=1}^m r_k$ .

123 Then the value  $x^2 = \alpha n(n-1)$ .

124 Values  $\alpha$  and  $x$  are printed out.

125 6. Determination of compromise ordering.

126  
127  $\min r_{k^*} = r_{k^*1}$  is determined. Then the number  $r^*_{k^*1} = 1$  is attributed to OTE with index  $k_1 \text{ } 1 \leq k_1 \leq n$ .

128 Then,  $\min r_{k^*} = r_{k^*1}$  is calculated. Then the number  $r^*_{k^*2} = 2$  is attributed to OTE with the index  $k_2 \text{ } 1 \leq k_2 \leq n, k_2 \neq k_1$ .

129  $\min r_{k^*} = r_{k^*1}$  is determined. Then the number  $r^*_{k^*3} = 3$  is attributed to OTE with the index  $k_3 \text{ } 1 \leq k_3 \leq n, k_3 \neq k_1, k_2$ , etc., unless all  
130 OTE are ranked.

131 If any  $\min r_{k^*}$  is not the only one, then the same number equal to arithmetic average of seats, divided among

132 themselves these OTE, is attributed to corresponding OTE.

133 It is possible to verify the correctness of the ranking:

134  $\sum_{k=1}^n r_{ki}^*$  should be equal to  $\frac{n(n+1)}{2}$

135 Vector  $R=(r_1^*, r_2^*, \dots, r_n^*)$ , where  $r_k^* = r_{k_i}^*$ , when  $k=k_i$ , is the result of item 6. Vector  $R^*$  is printed out.

136 7. Matrix of pairwise comparisons that corresponds to the vector  $R^*$ , is constructed

137  $\begin{cases} 1, & \text{if } rk^* < rj^* \\ \end{cases}$

138  $B^* = || b_{kj}^* || n \times n$ , where  $b_{kj}^* = \{0, \text{if } rk^* = rj^*\}$

139  $\begin{cases} -1, & \text{if } rk^* > rj^* \\ \end{cases}$

140 Matrix  $B^*$  possesses the property that  $b^*ki = -b^*ki$  for all  $k$  and  $i$ , so only elements above the main diagonal are  
141 calculated.

142 8. Values are calculated for all  $i = \overline{1, n}$

143  $\varepsilon^*i = 1 - S_i^*$ , where  $S_i^*$  - normalized distance between the vectors  $R_i$  and  $R^*$ , (ref. item 4).

144 Then the value  $\varepsilon^* = \sqrt[n]{\prod_{i=1}^n \varepsilon^*i}$  is calculated.

145 Valued  $\varepsilon^*i(i = \overline{1, m})$   $b \varepsilon^*$  are printed out.

146 9. Values  $\rho_k = \sum_{m=1}^m \varepsilon^*r_{ki}$  are calculated for all  $k = \overline{1, n}$  and then printed out.

147 Max  $\rho_k$  is calculated for all  $k = \overline{1, n}$

148  $1 < k < n$

149  $\lambda_k = \frac{\max \rho_k}{\rho_k}$ . Values  $\lambda_k (k = \overline{1, n})$  are printed out.

150

151

152

### 3. Conclusions

153

154 The rank 1 corresponds to the most preferred alternative;

155 The rank  $n$  corresponds to the least preferred alternative;

156  $1 - \varepsilon_i^* = 1$  means that there is complete coincidence of preferences assigned by the vectors  $R_i$  and  $R^*$ ;

157  $1 - \varepsilon_i^* = 0$  says about maximum discrepancy of comparable preferences;

158  $\lambda$  - coefficient of concordance - consistency of all factors;

159  $P_k$  - quality measure of OTE from the position of compromise that reflects its place in the set of values of the  
160 required assessment (the less  $P_k$  is, the higher the quality is);

161  $\lambda_k$  - transformed quality measure (the higher  $\lambda_k$  is, the higher the quality is).

162

163

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# Differentiation of the Territory of Tatarstan Republic into Zones Due to their Significance for Domestic and National and International Tourism

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## Abstract

*Tourism has an advantageous multiplier effect and serves as an accelerator of the social-economic development. Using a method of a component analysis the most significant indexes for differentiation of territory of Republic Tatarstan with purposes of recreation and tourism were detected. Map - models were constructed and by their superposition the integrated map of a recreational potential of Tatar Republic was obtained and the attractive areas for rest and tourism were detected.*

**Keywords:** recreational system, domestic tourism, international tourism, division into districts, tourist zone.

## 1. Introduction

To organization the environment, to preserve and to maintain its condition in accordance with the requirements of environmental management is necessary for recreational activities. In this regard, good organization of recreational activities is possible only if recreational needs are accepted as the starting positions [1], [2]. In the study of organization of recreational activities the complex structures, the elements of which are closely interconnected by direct links and feedback, are revealed. Thus, the system consisting of heterogeneous but interrelated components – natural and cultural-historical recreational resources, engineering and infrastructure facilities, recreation organizers and leisure travelers, is formed and developed. In the frames of this territorial-recreation system (TRS) recreational activities is implemented; it is characterized by functionality, integrity, hierarchy, stability and dynamics [3]. As any complex system, it will consist of subsystems which form integral formations. That is why, it is necessary to consider it as an industrial and territorial model.

The aim of the work is spatial analysis of recreational-touristic system of the Republic of Tatarstan. We offer to distinguish two groups of factors that give rise to the demand to create the TRS and to realize this demand. The first group determines the basic properties of the TRS: integrity, diversity, dynamism and reliability. The second group of factors is connected with properties and processes occurring in the system (recreational resources, accommodation, production, transportation, etc.).

Вторая группа факторов связана со свойствами и процессами, происходящими в системе (рекреационные ресурсы, расселение, производство, транспорт и др.).

## 2. Methods

The concept of spatial-network analysis is proposed as a model of the research process of the recreational complex as a system. Nature of the research is necessary to carry out in two directions: the study of object-centered systems in the areas of the territorial concentration of natural-geographical and socio-cultural recreational resources of the region and subject-centered recreation systems formed in cities and suburban areas [4].

The integral picture of the distribution of the values of recreation and tourism potential (TRP) on the territory, received in the frames of OTE, with the administrative districts of RT as these frames, was the result of the first stage.

The evaluation analysis of the recreational potential of the Republic of Tatarstan and possibility of its use showed that there are many unsolved problems, and the methodological aspect is among them: the problem of assessment of recreational resources, determination of the degree of possibility of ratio of various environmental components, the problem of territorial differentiation and recreational zoning and construction of a series of single-scale functional maps-models [5].

Natural, cultural-historical and socio-economic resources were analyzed. 3 key figure blocks that are analyzed, with the following calculation of partial integral estimates and interpretation of the results, were identified as a result. The principle of objectivity and comparability of results was the main basis of the evaluation [6].

The widely used in statistics and geography method of the sum of normalized values by the maximum index using the following formula was used for calculation of the block values of natural-recreational, cultural-historical, infrastructural and recreational-touristic potentials:

$$ИП_i = \sum_{j=1}^m k_j a_{ij}$$

where  $ИП_i$  – the integral indicator of the corresponding block  $i$ ,

$a_{ij}$  – normalized value of the  $j$ -indicator of the resourcing of the  $i$ -region;

$k_j$  – weighing coefficient of  $j$  indicator;

$k_j = \frac{I_j}{I_{max}}$ , where  $I_j$  – information value of  $j$ -indicator determined as the sum of all coefficients of correlation of  $j$ -indicator with the others;  $I_{max}$  – maximum value of information value among all indicators.

This form of calculation of the block index allows to determine the point of recreation-resource potential of the area, and the index share in recreational-touristic potential – with the help of the weighing coefficients determined by expertise. Integral natural and recreational potential is determined from the table by six natural components. Due to the fact that the climatic, geological and geomorphological resources do not have significant diversity within the studied area, and the other resources (balneology, hydrological, PA) often determine recreational specialization, the weighing coefficients were used, and the final value of the integral natural-recreational potential for every municipal district is defaulted (Table 1).

Cultural and historical heritage of the region plays an essential role in the formation of recreational-touristic potential [7]. The integral index of cultural and historical recreational potential was obtained in result of the evaluation of availability of the territory of the Republic of Tatarstan by cultural and historical sites by five groups of indicators (Table 1).

**Table 1.** Recreational-touristic potential of regions of the Republic of Tatarstan

Region	Blocks of formation of recreational-touristic potential			Integral total recreational-touristic
	Natural-recreational	Cultural-historical	Infrastructural	
Agryzsky	1,8	2,3	3,5	7,6
Aznakaevsky	2,3	3,1	3,3	8,7
Aksubaevsky	2,7	2,3	2,5	7,5
Aktanyshsky	4,0	3,3	3,1	10,4
Alekseevsky	3,7	2,5	3,4	9,6
Alkeevsky	2,0	2,7	3,0	7,7
Almetyevsky	2,6	2,7	3,1	8,4
Apastovsky	2,2	3,2	2,8	8,2
Arsky	3,3	2,7	2,7	8,7
Atrinsky	3,0	3,3	2,8	9,1
Bavlinsky	2,0	2,3	2,4	6,7
Baltasinsky	3,1	3,4	3,3	9,8
Bugulminsky	3,0	3,3	2,3	8,6
Buinsky	4,3	3,3	2,4	10
Verkhneuslonsky	2,7	3,0	3,1	8,8
Vysokogorsky	3,3	3,3	3,1	9,7
Drozhzhanovsky	3,3	2,5	2,7	8,5
Elabuzhsky	3,7	3,3	3,5	10,5
Zainsky	2,3	2,3	3,4	8
Zelenodolsky	4,5	2,9	3,3	10,7
Kaibitsky	2,5	3,1	3,0	8,6
Kamsko-Ustyinsky	2,2	2,5	3,4	8,1
Kukmorsky	3,6	3,4	2,9	9,9

Laishevsky	3,3	3,3	3,4	10
Leninogorsky	3,2	2,4	3,3	8,9
Mamadyshsky	3,0	3,1	2,7	8,8
Mendeleevsky	2,7	3,1	3,7	9,5
Menzelinsky	3,0	2,9	3,4	9,3
Muslyumovsky	2,8	2,4	3,5	8,7
Nizhnekamsky	3,7	3,1	3,3	10,1
Novosheshminsky	2,0	2,8	3,3	8,1
Nurlatsky	4,1	3,2	2,7	10
Pestrechinsky	3,2	3,4	3,4	10
Rybno-Slobodsky	3,0	3,1	2,7	8,8
Sabinsky	3,7	3,4	3,5	10,6
Sarmanovsky	2,4	3,4	3,1	8,9
Spassky	2,4	2,3	3,4	10,1
Tetyushsky	1,9	3,0	3,2	8,1
Tukaevsky	3,5	3,3	3,7	10,5
Tyulyachinsky	3,6	2,9	3,0	9,5
Cheremshansky	3,0	3,4	2,7	9,1
Chistopolsky	3,0	2,7	3,3	9
Yutazinsky	1,9	3,2	3,2	8,3

85

86 Infrastructure capacity was obtained taking into account the available statistics that characterize the level of development  
87 of recreational facilities in the municipalities. Integration of block estimates allowed to provide a generalized integral  
88 recreational and touristic potential.

89 Comprehensive analysis of the recreational use of the territory is necessary to assess the current condition and  
90 prospects of development of the system. Recreational zoning – the division of the regional territory by uniformity of  
91 features and the nature of recreational use – is one of the key methods of the analysis [8,9]. Verification procedure of the  
92 boundary, when isolated OTE with similar values which tend to localize in certain parts of the territory and which form the  
93 core are outlined, was used.

94

### 95 3. Results

96

97 The map of the Republic of Tatarstan that lets to talk about the existing object-centered systems in the areas of territorial  
98 concentration of administrative districts, became the result of the studies [10, 11]. Geographically, the functional structure  
99 of the republic has a polycentric structure of the territorial-recreational system. Typology of RTR is determined in three  
100 directions: the main functional focus on external or local demands and the level of development of the structure.

101

102 Typology of the regions of the RT with determination of of taxonomic rank (first, second and third) was carried out.  
103 The recreational-touristic areas of local significance (PTT) make up the third level with the lowest values (6,7-8.3). The  
104 recreational-touristic areas (RTR) of regional significance with values ranging from 8.4 to 10 will make up the second  
105 level. The recreational-touristic complexes (RTC) of the federal and possibly international importance with values more  
106 than 10 will make up the first level. it is possible to set up 10 recreational-touristic areas according to the final total index  
107 of the recreational-touristic potential of natural-recreational, cultural-historical resources and conditions of socio-economic  
108 development presented in the municipality, within the republic (Figure 1).

109

110 Three regions of the republic (Zelenodolsky, Elabuzhsky and Spassky) have federal importance for the  
111 development of recreation and tourism. The lack of common borders and remote location from each other allows to  
112 consider them as independent and self-sufficient development centers. The analysis of the factors of formation and  
113 development of every region shows that they are and will be the centers of recreation. This is due to the presence of  
114 unique recreational resources that meet the requirements of the most mass cycles of pastime. The territories of the  
115 regions are historically characterized as the most developed part. Recreational specialization influences the organization  
116 of the territory. Optimization processes and efficiency increase of service of holidaymakers will play an important role to  
117 optimize.

118

119 Prikazansky RTR includes three municipalities (Laishevsky, Vysokogorsky and Verkhneuslonsky). The total area is  
5139.3 square kilometers. The territory can be considered as an forming recreational complex, the functional  
specialization of which is of recreational and educational character orienting the local population for the weekend rest.  
Analysis of the factors of formation and development shows that areas near the large metropolitan area (Kazan), with



120 high potential of recreational demand and a high coefficient of transport accessibility will become areas with high  
121 concentration of recreational-touristic institutions aimed at short-term rest.

122 Environmental and event tourism is a promising direction. Creation of different types of recreational parks,  
123 organization of folk art festivals will be important issues of the organization.

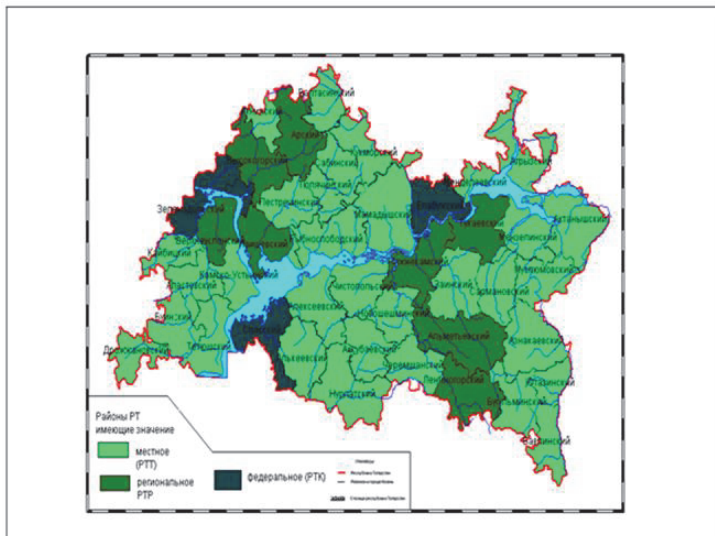
124 Arsky RTR corresponds to municipality of the same name; it is an independent integral system. Such isolated  
125 location is due to the remoteness from the capital and the presence of rich cultural-historical potential that allows to  
126 develop recreational-cognitive and ethnographic direction.

127 Prikamskaya RTR includes the territory of 4 regions, which is 8,010 km<sup>2</sup>. It can be regarded as a young  
128 recreational area of medical and health character. Availability of the resort of national importance (Bakirovo) and the  
129 regional network of health centers "Tatfel" favors the formation of the zone to serve the demands of population of  
130 industrial cities. Future prospects are connected with the development of natural and recreational resources. All these  
131 regions are about the same in terms of material and technical facilities and transport-geographical location. Available  
132 reserves of balneology resources are small but they allow us to build a number of republican sanatoriums. Tukaevsky  
133 and Nizhnekamsk regions can be both the republican, as well as the federal centers of medical and health and  
134 environmental spheres.

135 Predvolzhskaya RTR includes 6 districts (Kaybitsky, Kamsko-Ustyinsky, Apastovsky, Tetyushsky, Buinsky,  
136 Drozhzhanovsky). The total area is 7453.2 km<sup>2</sup>. Recreational potential is low. The group of regions is not adapted and not  
137 promising for development of recreation and tourism industry, except the Tetyushsky region. Some territories can be  
138 used only for short-term rest and for summer camps and recreation camps of local importance.

139 Prekamskaya RTR includes eight municipal districts with total area of 11222.3 km<sup>2</sup> 11. Values of some potentials  
140 [12] are, as a rule, average or below average. The level of infrastructural capacity is low. The area is characterized by  
141 combination of relatively intact nature and economic development. There are prerequisites for organization of some  
142 recreational activities (especially the fishing and hunting).

143



144

145

146

**Fig. 1.** Recreational-touristic zones of the Republic of Tatarstan

147

148 Zakamskaya RTR includes 7 regions with a total area of 12049.3 km<sup>2</sup>. This area is mainly the region of rural settlements.  
149 There is a close relationship of peculiarity of population settlement with historical-cultural resources (Chistopol, Bilyarsk).  
150 Position areas can be defined as a "backup" for recreation not only close to his industrial areas, but also the more remote  
151 areas. Recreational activities will only participate in local entities, specialization in the development of cultural recreation.

152 Location of the regions can be determined as "reserve" for recreation of not only nearby industrial areas, but also  
153 of more remote ones. Recreational activities will participate only in local entities, narrow specialization in development of  
154 cultural-educational recreation.

Vostochnaya RTR includes 11 districts with a total area of 16831.2 km<sup>2</sup>. In the near future the group will not be universally and evenly mastered. Overall recreational territory of the region is either mastered weakly (Zainsky, Bugulminsky, Menzelinsky), or is not mastered. We can assume that recreational areas around cities or regional centers for a short rest of local population will form there.

#### 4. Conclusion

The structure of the recreational-touristic resources of the republic is comparable with development trends of the world tourism, and it allows to say about preferential development of such directions as cruise, educational, event, ecological, medical and health tourism and leisure. However, now we can say just about the potential of the republican tourism as the possibility of its development to a greater extent rather than about its real development.

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# Calculation of Product Costs of Dairy Cattle Breeding in Russia

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## Abstract

This article considers a scheme to calculate the production cost of dairy breeding products in Russia. It offers scenarios to improve it by changing calculation schedule, arranging cost accounts, determining the most reasonable cost allocation bases between joint products.

**Keywords:** calculation, production cost, expenses, cattle breeding, milk, cattle offspring, agriculture, accounting.

## 1. Introduction

Production cost, calculated by the system of accounts is of utmost importance in Business Management System. [1-5]. It serves to provide the most meaningful estimate of inventory value, and in certain cases to set the selling value, to analyze changes in cost effectiveness when changing turnout, to compare profitability of different products, and to estimate their production efficiency, etc. [2].

## 2. Theory

In cattle breeding expenditure accounting items and calculated items do not coincide. Expenditure accounting items are usually groups of animals of mostly the same age which produce the same type of products. Calculated items are all types of products obtained from these animals [4].

The current Russian record keeping system provides cost accounting for livestock management on the control account "Core production", sub-account "Cattle-breeding", setting up a separate sub-ledger subsidiary account for each accounting item. During a calendar year the debit side of the account reflects the expenses on cattle, poultry and fur farming management, the credit side reflecting the target production cost of the derived agricultural products. At the close of the year after expensing capital costs and closing off aggregative clearing accounts there comes the time to calculate the actual cost of production.

In dairy breeding we take the total reproductive management cost for a milking herd less the cost of by-products (dairy sludge) taking into account the actual expenditures connected with its collection. The resting amount of expenses includes cost of milk (90%) and calf crop (10%), taking into consideration their actual body weight at birth. Having divided the resulting cost data on certain products production by its total amount, we obtain the prime cost of 1 hundredweight of milk and 1 calf, which constitute the calculation items.

The given procedure has a number of significant shortcomings:

- The schedule of cost accounting (which is usually conducted at the close of the calendar year) does not meet the requirements of current economic environment;
- Analytical accounting does not specify by-products, for which reason the control and quality of cost distribution between by-products get reduced;
- In dairy breeding while identifying one calf at birth the living weight is ignored;
- The net cost of body weight gain in the reproductive herd is not calculated;
- The correspondence criteria used to relate joint-cost goods are rather conditional;
- The product self-cost is calculated without regard to its quality.

### 3. Result

The author conducted a critical overview of the above noted problems and offered the following ways to eliminate them:

- 1) Prime cost calculation which is conducted at the close of the year makes it possible to carry out only a look-back study of the annual performance and does not provide any short-term information to manage the production, thus hindering control. But unlike a routine analysis, even an in-depth post factum analysis can only detect the failures and losses, but not prevent them.

Moreover, the given procedure does not allow detecting seasonal fluctuations in the product net cost (pasture and farm), does not consider the period of animal's life (dry or lactation).

Therefore we can conclude that the current procedure to account livestock products cost does not provide efficient output or running control and cost analysis. Monthly or seasonal calculation of self cost for animal products will allow us to remove defects.

It is typically considered that the main deterrent of monthly calculation of self cost for animal products is evaluation of the farm feed, produced during the current year and fed to the cattle, by the target net cost. However, if expensing the feed as incurred, we assess them at market (reasonable) value expense, the cost accounting will cause no problems.

- 2) The by-product in dairy breeding is animal manure. Its value is subtracted from the overall budget for livestock breeding and the resting sum is distributed between joint-cost goods. The manure obtained is assessed according to the amount of expenses on its removal and management, including: the cost of bedding (straw, chaff, sawdust, etc.), depreciation amount of basic tools to clean manure from farms and dung-yards, expenses on its removal from dung-yards, management, disinfection, etc. One of the recent trends in its treatment is recouping waste stream biogas. This trend is still new in our country, but it progresses fast and a number of farms are already introducing biogas units. In response to the increased interest in this farm product we should estimate its efficiency. Recording dung by expenses on its removal, management and recycling, together with its possible price evaluation, will make it possible to achieve the purpose in view and increase control over cost value. In our opinion to tighten the control over cost allocation there is a need to introduce a separate accounting item (subsidiary account) "By-products" in all regions.

- 3) Use of one head of calf crop as a calculation item, ignoring its weight at birth.

Dairy breeding currently calculates net cost of 1 head of calf crop. But dairy cows' calves can differ in weight (from 20 to 50 kg.). Market price of calves is often set according to their weight. For this reason we think it necessary to estimate the price of calves regarding their actual weight at birth. Therefore the calculation object should be changed; and 1 hundredweight of calf crop should be used instead of 1 head.

But the most debating point is the problem of allocating expenses between different types of joint-cost products.

At various times regulatory accounting documents in Russia provided different methods to calculate self-cost of animal products. For example, in the 1980s in dairy breeding the expenses on reproductive herd management were distributed between the joint-cost products by using coefficient method, where 1 hundredweight of milk equaled to 1, and 1 head of calf crop - to 1.5. To get the total sum of units responsible for cost allocation, these indexes were multiplied by the amount of product. By-products had fixed prices: 1.5 rubles per ton for dung, 2 rubles per item for still-born calves' jacket, etc. [6].

A similar cost allocation method (by relating milk to calf crop and expressing one product in terms of the other) is adopted in a series of other countries. For instance, in Poland 1 kg. of calf liveweight equals to 6 liters of milk, in Hungary 1 hundredweight of milk equals to 14.3 kg. of calf liveweight.

From the 90s onwards management cost of a reproductive herd net of by-product cost is distributed between milk and calves in the ratio 90/10 respectively. This system to calculate prime costs is based on feed stuff metabolic energy and is highly approximate and simplified.

The case is that feed stuff metabolic energy consumption to produce joint-cost animal goods depends on multiple factors, including animal breed; pregnancy and lactation stage; efficiency index; body energy balance: when the balance is positive, the efficiency of using exchange energy to secrete milk is approximately 70%, with the negative balance it equals to 85% [7]; nutrient composition of animal feeding [8], etc.

And another thing, feed stuff exchange energy as a cost allocation base can be justified with regard to feed consumption as a separate prime cost item. But what the exchange energy has to do with the wages, herd depreciation, basic cattle handling facilities, etc. is unclear. Such a simplified cost allocation to joint-cost products leads to a significant misrepresentation of self-cost information for each product, and hence the level of its profitability. Nevertheless, to run a business effectively and to reach adequate managerial decisions the company's management team needs exact information.

110 It is for this reason that the most disputable questions are those of cost allocation between different types of joint  
111 products.

112 4) Introduction of body weight gain in reproductive herds as an additional calculation item

113 During the whole useful lifespan, animal bodyweight changes when moved to reproduction herd, and consequently  
114 change the economic benefits, the organization can derive from butchering and selling (as the purchase price is set in  
115 rubles for 1 kg. of live weight). Under standard conditions animals' body weight grows in the course of their lifetime. It is  
116 clear that this increase is associated with certain expenses on their keeping. For this reason a number of authors  
117 consider it necessary to introduce another calculation item apart from the others already existing in dairy breeding, that of  
118 "reproductive herd bodyweight gain", including cost value of liveweight gain in animal value enhancement (fixed assets  
119 account). Thus we will not only calculate the end animal product cost more accurately (without transferring expenses  
120 involved in liveweight gain to milk and litter), but will also give true and fair information on main herd animals value, as  
121 well as calculate depreciation in the sufficient amount to maintain animal reproduction.

122 However, first, we should bear in mind that changes in animal's live weight throughout its life is a natural process:  
123 during the whole period of gestation the cow's weight grows, then drops after calving (to up to 100 kg., including calf  
124 weight, afterbirth, amniotic fluid), and later on the cow gets recovered and gains weight again. Second, there are various  
125 factors to affect weight fluctuations, such as lactation, diseases, weather conditions, stress, etc., which despite being  
126 short-term can have an impact on weighing thus falsifying the data on weight increment either positively or negatively.

127 Third, recent studies have proved the fact, that a way to increase cow calf productivity is to increase the weight of  
128 bred heifer (500-700 kg. after calving) and advanced practices immediately took it on board. Therefore if breeding heifers  
129 we aim to get high weight (not fearing obesity), their weight gain while being in the main herd will not be so significant.

130 Summing up all the above mentioned facts we can say that during the period in herd the cow doubtlessly gains  
131 weight, which is associated with certain expenses. Nevertheless, a true physical count is much complicated. In some  
132 cases it is not high, and sometimes it can be a negative quantity, that is the reason why we consider it useless to  
133 introduce this calculation item.

134 5) Use of relevant indexes which make allowance for animals' biological peculiarities and technical process

135 There exist a great many of opinions on the problem of choosing the most appropriate overhead base: to express  
136 the offspring cost in terms of total milk loss resulting from reproduction process [9], to calculate heifer self-cost at birth on  
137 the basis of average cost of keeping a cow in inter-lactation period for no less than two months [10], to apportion costs  
138 over joint products [11].

139 Milk and calf production are mostly simultaneous, interdependent, and interconnected processes. That is why it is  
140 impossible to adjust fair expenses for each product. Any cost allocated to joint products will be relative.

141 Net cost calculation can give only approximate results of rather subjective nature. For this reason we consider it  
142 more suitable, convenient and effective for daily and tactical management to control revenue expenditures without  
143 associating them with the ultimate product cost.

144 But in some instances (while making certain managerial decisions) data on the product full cost is required  
145 (normally, target figures). For that purpose we offer to use the market price (i.e. the prospective sales revenue) for the  
146 product with due consideration of its quantum of output as a basis for cost allocation.

147 Needless to say, that this possibility is not an ideal and unprejudiced cost allocation base to provide accurate  
148 information on each joint product cost. As previously stated, milk and calf production form a single process which cannot  
149 be divided, that is why it would be fully justified to expect approximately the same return from both joint products. An  
150 additional advantage of this method is its simplicity and availability.

151 6) Cost allocation by items

152 It is only the total cost, related to performing joint product manufacturing operations that is allocated. The charges  
153 associated with producing particular by-products should be included in the corresponding product cost. For example, the  
154 immediate expenditures on calf crop should include the following elements:

- 155 - Salary, including allowances for:
- 156 a) Calving;
  - 157 b) Effective cow mating;
  - 158 c) Rectal examination;
  - 159 d) Calf labeling;
- 160 - Expenditures on cow mating;
- 161 - Cost of veterinary drugs;
- 162 - Artificial insemination centers keeping costs (depreciation, renovations to the premises, equipment repair,  
163 energy supply, heating, etc.);

- 164 - Maternity barns keeping costs (depreciation, renovations to the premises, equipment repair, energy supply,  
165 heating, bedding cost, etc.).  
166 Milk cost includes:  
167 - Salaries, including allowances for milkers;  
168 - Cost of keeping milking parlors;  
169 - Cost of keeping milking equipment;  
170 - Cost of abstergents and cleaning agents used while milking and washing milking equipment;  
171 - Cost of keeping milk storage facilities and refrigerators.

172 Direct expenditure accounting provides the most substantive linkage between costs and calculated items, which  
173 gives a more valid production cost index for certain types of joint products. Conditional allocation of direct costs, involved  
174 in producing a certain product, gives substantially less reliable production cost figures for joint products.  
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#### 176 4. Conclusion

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178 We expect the proposed methods of calculating livestock product cost to solve the problems and largely improve the  
179 quality of information obtained. Although on a number of occasions use of these methods leads to more complicated  
180 computations and longer working hours, growing implementation of Management Information Systems for accounting in  
181 agro-industries will solve this problem.  
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# The Necessity for Taxable Capacity Assessment for the Segments of the Insurance Market

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## Abstract

This paper describes the current taxation problems of the insurance market constituents and finding solutions to these problems. Perfection of tax regulation for the insurance market constituents bases on quantifying its taxable capacity by major market segments.

**Keywords:** insurance market, insurance market constituents, taxation, tax regulation, taxable capacity.

## 1. Introduction

The practice to implement state tax regulation under conditions of insurance market shall, from our point of view, be based on distinct understanding of potential tax abilities of the insurance market. Therefore, the necessity for assessment of insurance market taxable capacity is reasonably sufficient and in the long term management of tax risks at the enterprises of the insurance industry. [9] The necessity for assessment of insurance market taxable capacity, in its turn, requires the definition "taxable capacity" to be specified.

## 2. Theory

Studying and sizing the taxable capacity in terms of today's Russia is quite a new scientific field. Therefore, there are a lot of papers in the Russian and foreign practice that attempt to formulate the definition "taxable capacity".

Summarising the dedicated research data available in the modern domestic theory, we think that it is practical to identify such main approaches to define "taxable capacity" as:

- Maximum possible tax payment on a given territory (fiscal approach);
- Potential budget per-capita income, which may be earned from inter-budgetary relations (inter-budgetary approach); and
- Resources subject to be budgetary accumulated through tax payments (resource approach).

In addition, we don't challenge other approaches to define "taxable capacity" to be available, however we believe that generally the above mentioned approaches are the trends for studying this issue that may include the alternate approaches as well.

It should be noted that the theoretical and applied study of taxable capacity includes not only this definition but also its quantitative estimation (calculation). Most of the existing estimation methods of the taxable capacity assume its assessment on a nationwide scale and base on the estimation of the taxable capacity of the country-subdividing regions. At that, the theory and practice of budgetary and tax regulation suggest that the advanced economies have amassed the experience in quantitative estimation of taxable capacity of the regions and in respective inter-regional comparisons and classifications. Analysis of this experience provides a number of key methodological postulates being basis for the



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quantitative determination of taxable capacity.

Based on individual approaches, procedures, formulas to assess the taxable capacity proposed by different authors, we have summarised, analysed and systematised the main taxable capacity assessment techniques and provided with a comparison characteristic in terms of advantages and disadvantages as shown in Table 1.

**Table 1.** Assessment techniques for insurance market taxable capacity and their comparison characteristic

Technique	Description	Advantages	Disadvantages
<i>1. Assessment techniques of insurance market taxable capacity at a macroeconomic level (state-wide)</i>			
<i>1.1. Assessment techniques based on economic income indexes</i>			
GRP-based assessment (Gross Regional Product or income produced)	As the multiplication of a share taken by the insurance industry in the GRP of a country and the mean effective tax rate over the country.	- Easy calculation	- Lack of sufficient statistic data; - The GRP volume does not consider the disequilibrium of tax bases and taxation rates in different regions; - The calculation of the GRP value does not include tax efforts of regional insurance markets; and - The GRP value is published with an error.
Assessment based on per-capita income (earned or disposable income)	As the multiplication of a share taken by the insurance industry in the GRP of a country or a region, the mean effective tax rate over the country and the population rate of the country or the region.	- Easy calculation; - Dependence of budget revenues of a country or a region on income level	- Lack of sufficient statistic data; - The GRP volume does not consider the disequilibrium of tax bases and taxation rates in different regions; - The calculation of the GRP value does not include tax efforts of regional insurance markets; - The GRP value is published with an error; and - The population rate does not take into account that the entire population employs insurance services
TTR-based assessment (total taxable resources)	On the basis of total taxable resources	- More accurate reflection of actual taxable resource volume	- Calculations require a sufficiently large amount of statistic data; and - Calculations take more hours.
<i>1.2. Assessment techniques based on a representative taxation system</i>			
Assessment based on building a representative system of tax indexes	On the basis of total (federal, regional, local) taxes, which uses estimated taxation base and countrywide average tax rate for each particular tax.	- Reliability and objectivity of assessment; and - Real possibilities to form taxation bases are taken into consideration.	- High labour intensity of calculations; - Lack of sufficient statistic data on taxation bases; and - High requirements to data comparability.
Assessment based on relative tax revenues	On the basis of total taxation bases and rates for individual taxes (major returns).	- Real possibilities to form taxation bases are taken into consideration; and - Less information required for calculations.	- High labour intensity of calculations; - Lack of sufficient statistic data on taxation bases; - High requirements to data comparability; and - The technique is less reliable and intrinsic.
Assessment based on correlation-regression analysis	On the basis of a model of functional relationship between some factors that influence on the taxable capacity value, e.g. taxation base for a tax payable by insurance market constituents and actual receipts of related payments.	- Significant objectivity; - Revealing dependence between factors; and - Low labour intensity.	- The technique is complicated for usage due to ambiguity of factor selection; and - Hard to compare the results by the regions.
<i>1.3. Assessment techniques based on conversion of tax form data</i>			
Assessment based on additive property of taxable capacity	As total taxable capacities of individual taxes payable by insurance market constituents. In the reduced form, the taxable capacity is a sum of total taxes paid by insurance market constituents to all the budgets.	- Availability of database for calculations; - Predictability through analysis of taxation base; and - Distinction between tax types results in sufficiently accurate figures.	- The technique bases on actual data and does not consider the current and future states of taxation base.

Technique	Description	Advantages	Disadvantages
Assessment based on a simplified method	As total taxable capacities of limited 'underlying' taxes subject to be paid by insurance market constituents with further revaluation of taxable capacity over the remaining taxes.	– Availability of database for calculations; and – Data for calculations are taken from a single data source.	– The technique bases on actual data and does not consider the current and future states of taxation base; and – The technique does not cover the total taxes and their taxation base.
Assessment based on an actual method	On the basis of the amount of actual tax payments from all insurance market constituents inclusive of increase in tax liabilities.	– Easy calculation; and – Availability of database for calculations.	– The calculation uses actual data only; and – Complicated prediction since the information on taxation base is not in use.
<i>1.4. Assessment techniques based on correction of actual tax payments in the region</i>			
Assessment based on correction of the tax payments collected in the base year	On the basis of actual tax payments made by all insurance market constituents in the base year as corrected in line with the subsequent amendments of laws and regulations	– Relatively easy calculation; and – Availability of database for calculations.	– The calculation is sufficiently subjective; – The calculation does not take tax activity of regions into account; and – Low reliability and accuracy of calculation results.
<i>2. Assessment techniques of taxable capacity at a microeconomic level (enterprise)</i>			
Assessment of taxable capacity based on the tax burden of an insurance market constituent	Assessment of taxable capacity based on the tax burden of an insurance market constituent	Assessment of taxable capacity based on the tax burden of an insurance market constituent	Assessment of taxable capacity based on the tax burden of an insurance market constituent
Assessment of taxable capacity based on the taxable resources of an insurance market constituent	Assessment of taxable capacity based on the taxable resources of an insurance market constituent	Assessment of taxable capacity based on the taxable resources of an insurance market constituent	Assessment of taxable capacity based on the taxable resources of an insurance market constituent

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The study has revealed that the common calculation method is not available for such essential measure as the taxable capacity so far. There are various approaches and suggestions on how to calculate the taxable capacity of a region, territory, municipality, tax payer etc.

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It should be noted that the method of correlation - regression analysis presented in the works of authors such as Zhang Q., Peng C., Kim S., Lee J., Luo Y., Nie J., Young E.R. [1; 4; 6; 7; 10; 11]

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We believe that it is feasible to apply these approaches to calculate the taxable capacity of the insurance market. To be noticed is that not all of the existing techniques may be used for assessment of insurance market taxable capacity. Techniques that base on the estimation of value added for individual industries can be distinguished among them. In addition, some calculation methods require information, which is hard to get. Studying the taxable capacity assessment techniques enabled their grouping and adapting for the analysis of taxable capacity for insurance market and verification of their advantages and disadvantages. We believe that taxable capacity can be analysed both at the macroeconomic level, i.e. the entire national insurance market or individual regions, and at the microeconomic level, which means combined analysis of individual insurance market constituents.

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### 3. Results

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Thus, from all our assessment techniques, the taxable capacity of insurance market may be calculated by the assessment techniques based on a representative taxation system and analysis, where the tax form data are converted with particular assumptions. The following assumptions can be identified: Only limited number of insurance market constituents – insurance companies – may be analysed to facilitate the assessment of insurance market taxable capacity as no tax reporting is provided for other insurance constituents. Furthermore, from all taxes subject to be paid by insurance companies, the tax reporting is formed generally from the income tax. Regarding other regional and local taxes to be paid by insurance companies, data are published without breakdown by their types. The tax reporting does not contain data of taxation bases with respect to the taxes to be paid by insurance companies, which complicates the prediction. Moreover, in practice the concept of isolated double insurance and insurance in the implementation of investment funds in the Russian economy, which is also true today. [3]

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Table 2 presents the values of insurance market taxable capacity for the Republic of Tatarstan in terms of income tax paid by insurance companies from 2008 through 2012 as provided in columns with different techniques. In accordance with the assessment technique based on representative system, the calculation of taxable capacity for the income tax paid by insurance companies of the Republic of Tatarstan uses data on profits of insurance companies subject to imposition of taxes and respective income tax rates.

**Table 2.** Quantification of taxable capacity for the insurance market of the Republic of Tatarstan with respect to the income tax paid by insurance companies over a period of 2008 through 2012

Year	Taxable capacity for income tax (mln. rubles)			
	Assessment based on representative system of tax values	Assessment based on correlation-regression analysis	Calculation based on additive property of taxable capacity	Assessment based on actual method
2008	74,2	76,4	92,9	86,2
2009	120,4	125,3	134,4	143,1
2010	241,8	245,8	256,1	262,3
2011	221,3	226,7	238,6	245,4
2012	180,9	185,4	195,4	204,2

The correlation-regression analysis produced a linear function of dependence of two variables being taxable profit of the Tatarstan's insurance companies liable to tax over the period under review and the income tax rate. The calculation based on additive property of taxable capacity used formal tax data, particularly, accrued income taxes over the relevant period including corrections to the amount of related actual tax payments received. Actual income taxes received were taken as a basis for the assessment of taxable capacity based on actual method including corrections for increase in tax liabilities of the previous year: from the formal tax data 1-NOM "About receiving tax payments and other revenues by the budget system of the Russian Federation from the primary industries" and 4-NOM "Report of tax, due, fine liabilities and tax sanctions into the budget system of the Russian Federation over the primary business activities".

The results of Income Tax Capacity calculation for the insurance companies of the Republic of Tatarstan based on the techniques provided were used for analysis of how to implement the Income Tax Capacity by comparing the calculation data with actual return of corporate income tax over the respective years. The resulting data are given in the below Table 3.

**Table 3.** Results of Corporate Income Tax Capacity assessment for the insurance companies of the Republic of Tatarstan over a period of 2008 through 2012

Year	Total returns of corporate income tax (mln. rubles)	Implementation of Corporate Income Tax Capacity (departure from actual value), (mln. rubles)			
		Assessment based on building a representative system of tax values	Assessment based on correlation-regression analysis	Calculation based on additive property of taxable capacity	Assessment based on actual method
2008	72,8	1,9	4,9	27,6	18,4
2009	117,6	2,4	6,5	14,3	21,7
2010	237,5	1,8	3,5	7,8	10,4
2011	218,7	1,2	3,7	9,1	12,2
2012	177,9	1,7	4,2	9,8	14,8

As is seen from the Table 3, the calculated values differ from actual values of income tax returns for the respective period. The comparative assessment of the taxable capacity calculated differently shows that values of assessments that are based on representative system and correlation-regression analysis differ less from the actual returns by 1.8% and 4.56% on average, accordingly. Less accurate are the assessment techniques that base on additive property of the taxable capacity and actual method with both showing an average difference of 13.72% and 15.5%, accordingly.

It is important to note that the results of Corporate Income Tax Capacity assessment for Tatarstan's insurance market using the described techniques are estimative since they had been obtained by a unilateral analysis of taxation base and cannot be final criteria to determine the tax capabilities of the Tatarstan's insurance market. A general problem of optimal strategies for insurance, consumption and investment in a changing economic environment described by a

126 continuous-time regime switching model. [5] Indeed, authors found that the insurance sector in Saudi Arabia and Jordan  
127 lags behind most of the other developing economies in Asia and Europe. Also, full implementation of the insurance  
128 regulatory Information System (IS) and publication of a clear regulatory ladder could support the taking of early and  
129 consistent intervention action on insurance companies. [8]

130 Moreover, the assessment technique with more accurate results of implementing the insurance market taxable  
131 capacity enables calculation of taxable capacity for other taxes subject to payment by all insurance market constituents.  
132 The taxable capacity of the insurance market segments may be also analysed as well as in terms of voluntary and  
133 compulsory insurance. But this will require suitable statistics data on taxation bases that are not always available. It is for  
134 this reason that the insurance market taxable capacity is complicated regarding the regional and local taxes as the tax  
135 and statistics forms do not break down by these taxes. Also, the information on taxable items and taxation bases for the  
136 members of the Russian Federation is not available.

#### 137 138 4. Conclusions

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140 Based on the results of the study conducted and summarising the approaches to define the “taxable capacity” that exist in  
141 the economic theory and practice, we would propose the following definition of the insurance market taxable capacity: It is  
142 a dynamically changing at every specific period set of taxation bases in value terms, which function depends on the effect  
143 of tax regulation tools. Therefore, the existing taxation and tax regulation system is not able to accurately predict tax  
144 payments that pre-determines its further improvement. More than that evaluation of systemic risk is based on a detailed  
145 financial analysis of the insurance industry, its role in the economy, and the interconnectedness of insurers. The primary  
146 conclusion is that the core activities of U.S. insurers do not pose systemic risk. [2]

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## Tax Debt Individual Customers in the Russian Federation

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### Abstract

*This article is devoted to topical issues of taxation of individuals and the resulting tax liabilities. Managing tax debt is of great importance as the macroeconomic conditions for the transition to sustainable development and improve competitiveness. In our opinion, the management of tax arrears - it's not only the performance of the tax authorities of their duties to collect the debt, but also the formation of the system of economic relations that arise between the state (local government), business entities and individuals regarding the payment of fees. Relevance of the topic is due to increased tax liabilities of individuals in the Russian Federation, as a result, it is necessary to find the optimal tax instruments of debt management.*

**Keywords:** tax; taxation; individuals; tax arrears; management of tax arrears.

## 1. Introduction

One of the mechanisms of influence on the national economy and the formation of the financial resources of the state is the tax system and collection of taxes and fees characterizes its effectiveness. However, continued non-payment reduce the effectiveness of tax relations and limit the government's ability to finance investment and social projects. In addition, the study of the tax debt is necessary to bear in mind the level of confidence in the government and the taxpayers' willingness to pay their taxes. Trust contributes to a sense of goodwill among people, strengthen democracy, and reduces the transaction costs of economic exchange. [3]

Timeliness and completeness of tax revenue is the key to the efficient functioning of the economy of the state. It should be noted that the fight against manifestations of tax evasion is one of the most pressing topics of debate and controversy in the world community. [8] Also, before you go directly to the concept of the tax debt, we would like to note that the issue of taxes is necessary to consider a combination of factors that go beyond their own interests and which have as the main foundation of some aspects of social norms, morality, altruism, justice. [1] The concept of the tax debt has been studied by Mr. Treisman D. in article "Fiscal pathologies and federal politics: Understanding tax arrears in Russia's regions". [11]

The tax debt is the important indicator of the successful tax revenue mobilization through the tax system of the country. The magnitude and rate of change of the tax debt is largely due to the influence of various factors. However, the legislative definition of "tax debt" in the Tax Code of the Russian Federation doesn't exist. There are regulations on issues of collection of tax arrears, tax refund, tax liability, however, the legislative definition of "tax debt" can not be found.

## 2. Theory

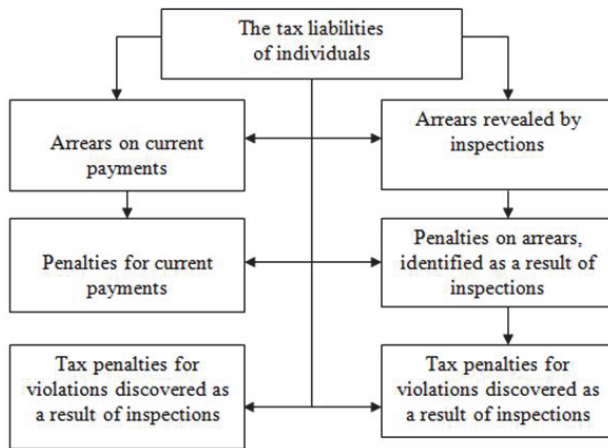
The concept of "debt" is defined by the presence of debt and outstanding liabilities (explanatory dictionary S. I. Ozhegov. Encyclopedic Dictionary of Economics and Law defines "debt" as the amount of debt. Debt is the final result of the obligated person, caused by the delay in performing duties or his incomplete performance. Tax debt is the final result of unlawful actions (inaction) of the obligated person, caused by the delay in the implementation of tax obligations, or its

57 incomplete execution. Before considering the direct tax liabilities of individuals, it is necessary to define a specified  
58 category. Individuals are participants of tax relations. In accordance with Article 11 of the Tax Code, individuals are  
59 citizens of the Russian Federation, foreign citizens and stateless persons. An individual is a person as a subject of rights  
60 (the bearer of rights and obligations). An individual has a legal capacity in the Russian legislation. An individual acquires  
61 the legal capacity at birth and ceases at the moment of death, and the full capacity of an individual acquires at the age of  
62 18. In general, a person can have different legal statuses, sometimes several at once, such as a stateless person, a  
63 citizen, a foreigner, an individual entrepreneur, the founder of the legal entity.

64 We can conclude that the tax liabilities of individuals are the total amount of outstanding obligations to pay  
65 statutory taxes and fees assessed penalties for late payment of taxes and fees, and penalties for violation of tax  
66 legislation, expressed in the form of money by the citizens of the Russian Federation, foreign citizens and persons  
67 without citizenship.

68 Crokidakis N. consider that the agents (individuals) may be in three different states, namely honest tax payers, tax  
69 evaders and undecided, that are individuals in an intermediate class among honest and evaders. [5]

70 The following types of tax debts of individuals represented in the Figure 1.  
71



72  
73  
74  
75

Fig. 1. Types of tax debts of individuals

76 As of September 1, 2014 the tax liabilities of individuals in the Russian Federation is 96 bln rubles, which is 12% of the  
77 total arrears of taxes and levies, according to the Federal Tax Service of the Russian Federation. As of July 1, 2014 the  
78 tax liabilities of individuals in the Republic of Tatarstan is 815 mln., which is 10% of the total arrears of taxes and levies,  
79 according to the Office of the Federal Tax Service of Russia in the Republic of Tatarstan. The role of taxes on individuals  
80 in the formation of the consolidated revenues rather insignificant, since the payment of taxes on individuals is  
81 approximately 7-8% of the consolidated budget of the Russian Federation. However, the formation of the local budget tax  
82 receipts from individuals are the main element in the formation of budget revenues. In addition, administration of taxes on  
83 individuals should be given a leading role as the category of individuals is the most numerous category of taxpayers and  
84 the further development of tax administration can achieve a significant increase in income from the category of taxes on  
85 individuals.

86 In the article the author Bierbrauer F.J. pointed out that the main result will depend on the provision of public  
87 goods, which is associated with the redistribution of the tax system. [2] It should be noted that in the world there is an  
88 experience of the United States, where the average tax shall be distributed, the properties of the joint distributions paid  
89 taxes and revenues, and explores the impact of taxes on the marital status and number of children. [7] In identifying the  
90 causes of the tax debt should be kept in mind the implications of ethical behaviour on the effect of a redistributive tax-  
91 transfer system. In choosing their labour supplies, individuals take into account whether their tax liabilities correspond to  
92 what they view as ethically acceptable. If tax liabilities are viewed as ethically acceptable, a taxpayer behaves ethically,  
93 does not distort her behaviour, and chooses to work as if she were not taxed. [4]

94

95 **3. Results**

96  
97 In world practice developed a two-period dynamic model of individual choice, considering an individual that has been  
98 already audited and detected as tax evader, who knows that Tax Authorities are looking for her to cash the due amount.  
99 [6] And there are three hypotheses about the nature of federal tax arrears in Russia in the second half of the 1990s are  
100 tested empirically. Tax arrears can be a result of: 1) liquidity problems in firms, 2) redistributive subsidies of the federal  
101 government, or 3) regional political resistance to federal tax collectors. [9]

102 We, in its turn, to analyze and identify the dynamics of the ratio of debt reduction of individuals to total debt and tax  
103 revenues give statistics for the Republic of Tatarstan for each analyzed year from 2009 to 2012. in Table 1.

104 **Table 1.** Indicators of changes in the levels regulated by the tax debts of individuals

Indicators	2009	2010	2011	2012
The total amount of tax revenue individuals in the consolidated budget of the Russian Federation, thous. rubles	5 043 748	5 880 683	6 888 900	7 879 554
The total debt of individuals, thous. rubles	1 225 312	1 146 457	1 099 919	1 374 641
Regulated debts of individuals, thous. rubles	643 323	636 523	437 645	557 286
Debt forgiveness of individuals, thous. rubles	487	1 346	1 531	10 000
Efficiency level of the decommissioned and settled the debt in relation to total debt, %	53	56	40	41
The effectiveness of regulated tax debt in relation to the tax revenues for the year, %	13	11	6	7

107  
108 The effectiveness of reducing debt (decommissioned and regulated) in relation to the total debt at the beginning of the  
109 year is a general indicator that allows you to determine the level of debt reduction and includes the results of the  
110 settlement of tax liabilities in relation to the level of the total aggregate debt. It is calculated by the following formula 1:

111 
$$(Uz + Sp) / Obz * 100 = Rez1, \tag{1}$$

112 where Uz – regulated debts of individuals;

113 Sp – cancel the debt uncollectible;

114 Obz – the total combined debt at beginning of year;

115 Rez1 – effectiveness of reducing debt.

116 The highest rate in the Republic of Tatarstan in 2010 years- 56%, in 2009 performance indicator was 53%, in 2011  
117 and 2012 level of efficiency decreased and amounted by 40% and 41% respectively. The result of this summary indicator  
118 will be effective if the rate of the reporting period is higher than in the previous period, that is, the more accrued according  
119 to the results of tax audit, the more additional accrual amounts shall be settled through foreclosure, offsetting due to  
120 overpayment or written off due to the impossibility of recovery. General indicator is the effectiveness of regulated tax debt  
121 in relation to the tax revenues for the year. It allows us to estimate the extent of influence of the tax debt resolution  
122 mechanism to increase tax revenues to the budget system. Indicator in relation to the tax revenues can be found using  
123 the following formula 2:

124 
$$Uz / NaIP * 100 = Rez2, \tag{2}$$

125 where Uz – regulated debts of individuals;

126 NaIP – the total amount of tax revenue for the year individuals;

127 Rez2 – improving the efficiency of tax revenues.

128 General indicator is the effectiveness of regulated tax debt in relation to the tax revenues in the period of 2009-  
129 2012. It determines the decrease in the efficiency of settled tax debt - a decline from 13% to 7%. Therefore, in relation to  
130 the tax revenue the settled debt is reduced. Efficiency summary measure Rez2 is also determined, as an indicator of  
131 Rez1 compared to the same period of the previous period.

132 In the research Meshkov R. A. defined target criterion "debt credited" repaid and debt tax debt to the tax revenues  
133 to the budget system." According to the author, the ratio of the selected indicators selected is not successful because the  
134 written-off debt is a debt to be uncollectible, cannot be compared with the tax revenues.

135 Dynamics of two general indicators is the criteria. Its achievement and exceedance can be used in the  
136 comprehensive analysis of the tax authorities. The annual increase in the size of additionally accrued amounts for taxes,  
137 interest and penalties increase the total tax debts of individuals. These amounts take precedence over the value of the  
138 consolidated tax revenue, which includes recover the debt and debt relief, deemed to be uncollectible. Results of general  
139 indicators for the reporting period reflect the efficiency of the tax authorities, and should be compared with the  
140 corresponding previous period. Evaluating the effectiveness of reducing the tax debts of individuals allows you to monitor



system additionally charged and collected sums. Meshkov R.A. proposed settlement criterion composite indicator for objective assessment and adjustment fund bonuses of tax inspections. Under the bonus payment is considered payment of sums of money to government employees over the basic salary in the form of material incentives for the results achieved in the tax regulations. In practice, the tax authorities criterion composite indicator to establish the relationship of particular indicators amounts recovered and amounts written off in relation to the total tax debts of individuals. The four-year period analysis in the Republic of Tatarstan has shown that the income tax payments due to the implementation of the voluntary-declarative, notification, warning, and forced forms of interim increases annually with relation to debt forgiveness. Evaluation of the composite indicator can be presented in the form of a four-promotion system, shown in Table 2.

**Table 2.** The rating is a summary measure of the tax debts of individuals

Condition	Point
If $Uz/Obz \geq Sp/Obz$ ; $AWG \leq 0$	4
If $Uz/Obz \geq Sp/Obz$ ; $AWG > 0$	3
If $Uz/Obz < Sp/Obz$ ; $AWG \leq 0$	2
If $Uz/Obz < Sp/Obz$ ; $AWG > 0$	1

where Uz – regulated debts of individuals;  
Sp – cancel the debt uncollectible;  
Obz – the total combined debt at beginning of year;  
AWG – comparison of tax losses from non-payment of debts to the budget with the same previous period, that is, changes in one year.

Evaluating the effectiveness of reducing the tax debt is carried out on a four- point system and calculated as the maximum value of the above criteria to the total number of criteria:

- 1 point - inefficient;
- 2 and 3 points -average efficient ;
- 4 points - highly efficient.

Four-point system promotion proved the opportunity to assess the activities of the tax inspection starting with the desk and on-site inspections and ending the use of the full range of measures of tax debt settlement individuals. Full and complex activities of the tax inspection in conjunction with the tax control and tax regulations determined by high-performance score.

Summary criterion will solve the problem of reducing the tax debt exactly on the enforcement proceedings, repayment under deferral of installments, and in the application of preventive, security forms, and not on the writing off debt. Tax authorities should implement the principle of the effectiveness of the settlement of tax arrears. This principle will take steps to resolving unpaid taxes aimed at increasing tax revenues and reducing the tax debt. Effectiveness of the system for recovery of taxes and fees means minimizing the applied methods of settlement of unpaid taxes and maximize their positive effect. Divergent factors influence on the size and dynamics of the analyzed parameters including pendulum migration and their tax potential, the degree of corporate enterprises operating in the region, the level of tax compliance of taxpayers, the content of the regional budget policy in terms of managing debt repayment. The algorithm for calculating general indicators and composite criterion for activities aimed at reducing the tax debt to total debt and in relation to tax revenues, will be easy to apply as to that of other regions as well as to Russia's total indicators.

#### 4. Conclusions

On the basis of the study of theoretical issues and practical aspects of the tax debts of individuals, we came to the conclusion that the tax payable including should be analyzed in order to study a tipping point when the investment is replaced by reinvestment. [10] On the basis of the study a four- point system evaluating the effectiveness of reducing the tax debt will have the greatest value from the point of estimating the higher tax authority performance additionally charged amounts subordinate tax authorities.

An example of such an evaluation can be generalized indicators and a combined criterion of reducing the tax debt. This determines the location or position of each region or tax inspection used a rating scale. The proposed method provides a comprehensive assessment of the territorial divisions of the Federal Tax Service, which allows for a comparative analysis between the subjects of the Russian Federation, as well as within the subject, and to identify the

causes of such indicators to identify specific activities for the next reporting period, in order to increase the effectiveness of the settlement and to reduce tax liabilities.

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# Effect of License Holder's Cost-Flow on Long-Term Development of Oil Industry

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## Abstract

The paper considers issues of the effect of the license holder's costs-flow on the possibility of increased investments in the operating process at the expense of mineral resources tax variation. The account flow of subsoil users is the sum of expenses of operating (current) and investment activities. The movement of a cash flow as a difference between profitable and account parts, for the enterprises of oil production characterizes financial stability and profitability of the company. As showed the carried-out analysis if to consider an account stream of operating activities of the oil-extracting enterprises, it appears that it by 5,6 times exceeds expenses of an investment stream.

**Keywords:** mineral resources production tax, oil production, enhanced recovery methods, product cost, cost-flow, economic benefits.

## 1. Introduction

The paper discusses the main options for perspective development of oil production in the oil facility at the expense of license holder's cost-flow, based on model calculations of changes in the mineral production tax (MPT) rate as the main item of expenditures.

The data obtained can be used for further analysis and deeper understanding of license holder's cost-flow, as the sum of operating (current) and investment costs.

According to the results of the study the following conclusions were made:

- MRT has the largest share in the license holder's cost-flow;
- the use of reduction factors to the MPT rate significantly increases the investment potential of oil companies;
- additional funds by reducing the cost-flow should be directed to the future development of production with an increase in the final oil recovery factor;
- integrated use of additional funds through the drilling of new wells and application of modern technologies and enhanced oil recovery (EOR) methods provides the most benefits
- when assessing the amount of additional resources from the reduced MRT rate it is necessary to consider the emerging benefit from the additional oil production as a source of the multiplier effect;
- an additional source of funding for long-term development of oil production by reducing the license's holders cost-flow will allow at least to stabilize oil production by field over a short period.

## 2. Method

Most recently adopted legislation to some extent reduces the tax burden on the final figures of the license's holder and establishes the financial basis for the perspective development of industrial production [1-5].

Consider the effect of reducing the MPT (decrease of cost-flow) on the stable oil production by means of model calculations.

Increase in oil production ( $\delta q$ ) after the first year of using the reduction factors to the MPT rate in order to engage additional reserves in the development, and enhance the competitiveness of enterprises is shown in Fig. 1.

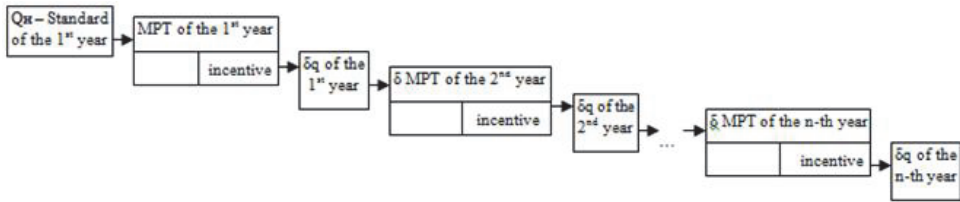


Fig. 1. Flowchart of oil production increase by reducing cost-flow of the first target year

Reduction in MPT rate, given the investing of the released funds into the development of industrial sites, provides increase in oil production not only as a result of initial investment, but also for the future due to the multiplier effect.

Then the annual growth of oil production from the MPT relief can be described by a square matrix of the triangular form:

	$t_1$	$t_2$	$t_3$	...	$t_{n-1}$	$t_n$
$\Delta Q_1$	$\delta q_{11}$	$\delta q_{12}$	$\delta q_{13}$	...	$\delta q_{1n-1}$	$\delta q_{1n}$
$\Delta Q_2$	0	$\delta q_{22}$	$\delta q_{23}$	...	$\delta q_{2n-1}$	$\delta q_{2n}$
$\Delta Q_3$	0	0	$\delta q_{33}$	...	$\delta q_{3n-1}$	$\delta q_{3n}$
⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮
$\Delta Q_{n-1}$	0	0	0	...	$\delta q_{n-1n-1}$	$\delta q_{n-1n}$
$\Delta Q_n$	0	0	0	...	0	$\delta q_{nn}$

Additional oil production (Q) due to non-recurring costs of MPT differentiation (q) of any year t will be described by the formula

$$\Delta Q_t = \sum_{i=1}^t \delta q_{it}, \text{ for } t = t_1 \dots t_n.$$

Model calculations of the use of funds from the MPT differentiation for the increase in the oil recovery factor (ORF) by drilling additional wells (densening of well patterns) for one of the oil fields of Tatarstan are shown in Fig. 2.

### 3. Result

Using the base-case scenario, the prospective oil production has been declining by 10% annually and by the end of the target period (25 years) was 26.3 thousand tons (17.5% of the original annual oil production).

Reduction of MPT by 25% according to the base-case scenario will allow to increase the additional volume of oil production by 987 thous. tons. According to this scenario, oil production is expected to reach 63.7 thous. tons in the final target year, which is 2.4 times more than in the basic scenario. In addition 55 new wells are introduced to the development.

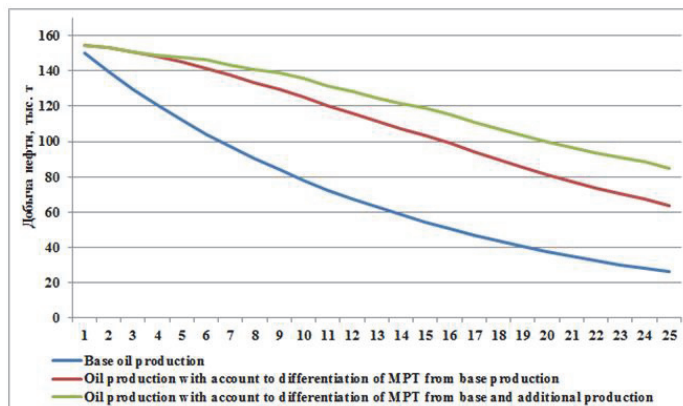
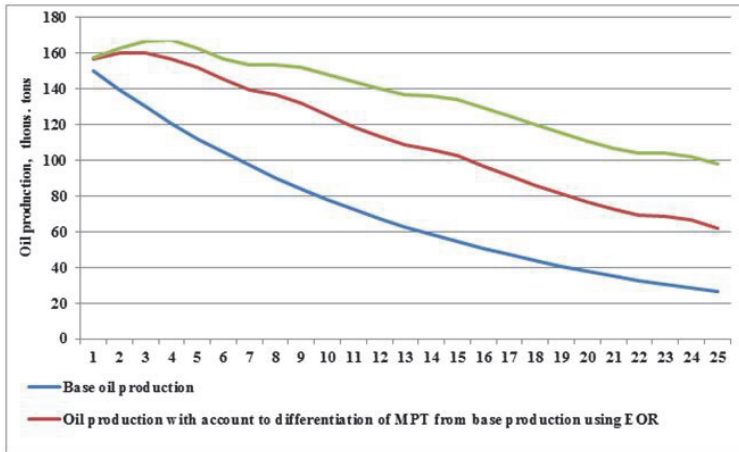


Fig. 2. Dynamics of oil production from the reduction of cost-flow by drilling new wells

78 Introduction of additional wells increases the additional oil production and, therefore, provides an additional amount of  
79 funding by reducing cost-flow, which allows to drill 22 new wells and provide a more gradual decline in oil production by  
80 the years of the target period. According to this scenario, in the final target year, oil production is expected to reach 85  
81 thous. tons.

82 Increase of the final oil recovery factor (ORF) and the combination of new drilling and large-scale application of  
83 EOR due to additional oil production from reduced cost-flow is shown in Fig. 3.

84 The use of tax incentives according to the base-case scenario will allow to produce further 989 thous. tons.  
85 According to this scenario, in the final target year, oil production is expected to reach 61.8 thous. tons, in addition 41 new  
86 wells are introduced to the development, the scope of EOR application will be 475 well operations. This will allow to  
87 increase oil production by 4 thous. tons in the first years of the target period.  
88



89  
90  
91 **Fig. 3.** Dynamics of oil production to reduce the cost-flow by drilling new wells and EOR  
92

93 Additional oil production provides an increase in the amount of funding by stimulating MPT. It will enable to drill 22 new  
94 wells and carry 645 well operations using EOR technologies, which ensure a higher level of annual oil production by the  
95 years of the target period. According to this scenario, in the final target year, oil production is expected to reach 97.7  
96 thous. tons, that is 3.7 times more than in the base-case scenario development. In the target period it is planned to  
97 produce further 1.6 million tons of oil, and the state budget will receive additional 2.2 billion rubles only from MRT.  
98

#### 99 4. Conclusion

- 100 • Cost-flow of oil companies include operating (current) and investment costs;
- 101 • the largest share in the cost-flow of oil companies belongs to MPT, which is 54% overall of the cost-flow;
- 102 • the use of reduction factors to the MPT rate significantly increases the investment potential of oil companies by  
103 reducing cost-flow;
- 104 • additional money released by reducing cost-flow should be directed to the future development of production  
105 with obligatory increase in ORF;
- 106 • integrated use of additional funds through the drilling of new wells and application of modern EOR  
107 technologies provides the most benefits;
- 108 • when assessing the amount of additional resources by reducing the cost-flow one must consider the emerging  
109 benefit from additional oil production by an annual incentive which provides a multiplier effect;
- 110 • additional source of funds for long-term development of oil production by reducing the license's holders  
111 cost-flow will at least allow to stabilize oil production at the enterprise in the short term.  
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## Tax Regulation of Activity of Agricultural Commodity Producers

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### Abstract

*The article is devoted to the current problems of tax regulation in the field of agricultural production in the Republic of Tatarstan and necessity of solving them. In our opinion, improvement of tax regulation of agricultural production in the Republic of Tatarstan should be carried out by means of development of effective mechanisms of tax regulation of activity of agricultural commodity producers of the Republic of Tatarstan, which in turn, would promote its further dynamic development.*

**Keywords:** agricultural production, agricultural commodity producer, taxation, tax regulation, unified agricultural tax.

### 1. Introduction

Agriculture, providing satisfaction of needs of the population for the foodstuffs, takes an important place in economic system of the state. Today, agricultural production and distribution system is becoming more and more interdependent, integration and globalization. Two major themes in the direction of agricultural products around the world today, include ensuring the safety and improve the quality [1]. Recently, the critical issues of food security and rising food prices have led the development of the concept of multifunctional agriculture, food security and socio-economic and environmental sustainability to the forefront of agricultural policy [2]. It is generally believed that trade liberalization results in a less stringent environmental standards, which suggests that the policy of regulation of trade and the environment are positively correlated [3]. Effective development of agricultural sector of economy of Russia depends not only on natural and climatic conditions, but also on support from the state in the form of creation of favorable economic conditions of management. Now agricultural production is one of the major and dynamically developing branches of domestic economy, it is shown in the main financial performance of development of this branch in the Republic.

Tax regulation, being the most important instrument of state administration, can influence the development of national economy of the country and its separate branches, including means of support and ensuring financial stability of development of agricultural production. Transition to the innovative model of development has become a fait accompli in many developed countries. As international experience shows any state is able to be one of the leading economies due to comprehensive innovative development even without having abundant natural resources reserve [4]. This also applies to agriculture.

During transformation and reforming of tax system of the Russian Federation it is necessary to provide the differential approach to the mechanism of taxation and tax regulation of activity of agricultural commodity producers, and to take into account features and specifics of this important branch of domestic economy.

### 2. Theory

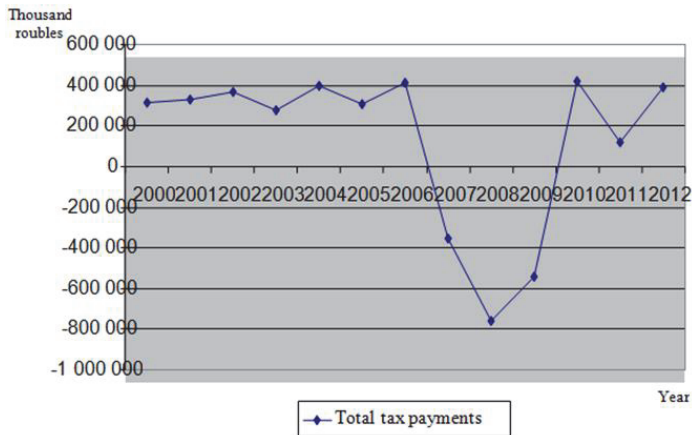
As we have noticed, tax regulation is one of the effective instruments of state regulation of agricultural production. Now according to existing tax legislation agricultural commodity producers have the right to choose the most acceptable system of taxation. As an alternative to the general tax regime these categories of taxpayers have the right to use a



57 special tax regime in the form of taxation system for agricultural commodity producers.

58 The critical analysis of practice of taxation of agricultural commodity producers in our country allows to draw  
59 conclusions on disproportion existence between growth rates of agricultural production and level of taxation of the  
60 territorial entities involved in this sphere. A conventional view is that export subsidies are inferior to output subsidies as a  
61 means of supporting farm prices. However, when there is an excess burden associated with general taxation measures,  
62 due to the distortions in markets arising from collection of taxes and any other costs associated with tax collections,  
63 export subsidies may be a component of the most efficient producer price support policy [5]. Fig. 1 shows data on  
64 dynamics of receipt of all tax payments to the budget system of the Russian Federation on activity of agricultural  
65 commodity producers of the Republic of Tatarstan from 2000 to 2012.

66



67  
68

69 **Fig. 1.** Dynamics of receipt of all tax payments to the budget system of the Russian Federation on activity of agricultural  
70 commodity producers of the Republic of Tatarstan from 2000 to 2012., in thousand roubles.

71

72 These data demonstrate that steady reduction of receipt of tax payments from activity of agricultural commodity  
73 producers of the Republic of Tatarstan is observed since 2006, despite the positive tendency in 2011. Such indicators are  
74 the direct consequences of tax reforms carried out concerning the agricultural commodity producers directed on  
75 extension of the list of tax subsidies and decrease of tax burden of this branch. Boosting efficiency is a top priority in the  
76 development of any economic system. Creating a trouble-free Russia is impossible without innovative socio-economic  
77 development, effective implementation of demographic programs, creating quality jobs, effective social control, effective  
78 guarantees for the protection of property and fulfilling contracts, the competitiveness of key factors for running a business,  
79 the efficiency of state power, combating corruption and a number of other crucial factors [6]. Russia is not typical for the  
80 maximum reduction in the tax rate on income tax. Zero rate is used only in special areas of technical innovation, and  
81 subjects of the Russian Federation shall have the right to reduce the tax rate only to a certain level. This will not affect the  
82 formation of the tax revenues of the budget system, unlike indicators in developing countries [7]. Speaking about the tax  
83 subsidies provided to agricultural commodity producers first of all it is necessary to cancel zero tax rate on income of the  
84 organizations which since 2013 is applied termlessly by this category of taxpayers, lowered tax rates on land tax and  
85 property tax of the organizations, and also removal of some types of property from structure of items of taxation on  
86 transport tax and the main thing is a voluntary order of transition to a special tax regime in the form of taxation system for  
87 agricultural commodity producers. The last feature makes this regime not quite popular among this category of taxpayers  
88 because its application doesn't give the chance to agricultural commodity producers to use tax deduction on value added  
89 tax and consequently to compensate this tax from the budget. The main problem of taxation of activity of agricultural  
90 commodity producers and their unwillingness to switch to payment of a unified agricultural tax are also connected with  
91 this circumstance.

92 It is obvious that the idea of carried-out tax reforms concerning activity of agricultural commodity producers is in  
93 decrease in their tax burden that first of all is directed on increase of growth rates of agricultural production,  
94 competitiveness of agricultural production and interest of the territorial entities involved in this branch, increase in gross  
95 domestic product. Review of tax incentives and research their effectiveness in different countries show that the

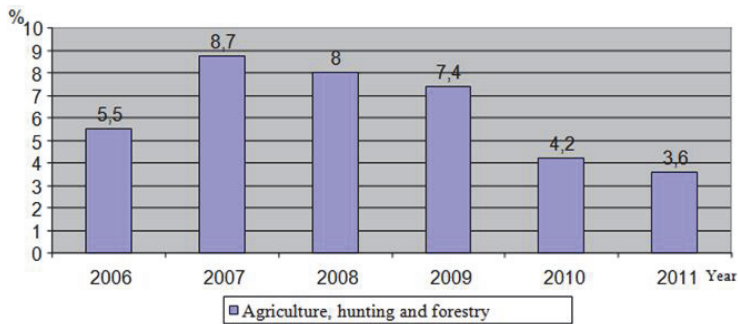
developing countries in order to attract investment minimizes the corporate income tax rate, used tax holidays, investment credits, which reduced the tax revenues of the budget system [8], [9].

At the same time, the analysis of tax burden on the main types of economic activity in the Russian Federation, presented in Table 1, demonstrates its low level. In particular, considering the fact that agricultural production is a rather developed sector of economic activity and it participates actively in creation of gross domestic product, along with such branches as the extractive and manufacturing industries, construction and real estate activities. Развитие экономики сельского хозяйства исследовали такие авторы как Chen, Y., Chen, Y., Han, J.[10], Yuan, Q.M., Feng, D., Liu, J. [11].

Data on dynamics of tax burden in the branch of agricultural production are presented in fig. 2.

**Table 1.** Tax burden by types of economic activity in Russia from 2006 to 2011 in percent

Type of economic activity	2006 year	2007 year	2008 year	2009 year	2010 year	2011 year
Extraction of minerals	45,1	54,8	46,0	30,8	30,3	33,2
Other public utilities, social and personal services	16,8	18,2	37,9	37,3	22,3	23,9
Real estate activities, rent and service	18,2	29,5	30,0	23,7	19,7	22,2
Hotels and restaurants	10,7	16,3	19,4	18,0	12,9	12,5
Construction	11,9	15,9	14,5	16,2	11,3	12,2
Fishery, fish breeding	13,7	15,3	13,7	12,6	9,3	7,6
Transport and communication	11,7	15,0	13,3	13,0	9,8	9,7
Manufacturing industry	7,2	10,5	9,6	9,3	7,2	7,1
Production and distribution of electricity, gas and water	7,3	9,0	8,2	7,1	5,3	4,8
Agriculture, hunting and forestry	5,5	8,7	8,0	7,4	4,2	3,6
Wholesale and retail trade, household services	3,8	2,7	3,0	3,0	2,4	2,4



**Fig. 2.** Dynamics of tax burden in «agriculture, hunting and forestry» in Russia from 2006 to 2011, in percent.

Having compared fig. 1 and fig. 2, it is possible to note that exactly the period of the highest level of tax burden is characterized by the largest volume of compensation of value added tax from the budget by the agricultural producers applying a general regime of taxation.

On the other hand, at application of a special tax regime in the form of taxation system for agricultural commodity producers, relief from payment of a value added tax leads to increase in expenses on acquired material resources for its amount as the value added tax amount completely belongs to expenses that leads to production rise in price. In fact, there is a hidden transposition of value added tax to the ultimate consumer as it is a multiple stages tax and the exception of any stage of taxation leads to increase in the price of goods for the ultimate consumer at the stage of passing of agricultural raw materials through the enterprises of processing industry. Thus we come across the problem of formation of pricing. Consumers of agricultural products are organizations and entrepreneurs, applying a general regime of taxation, and who lose the right for value added tax deduction at buying goods from agricultural commodity producers who do not assess and set it out.

Следует также отметить, что the sector of agriculture needs protection for its critical role in responding to human needs as well as its vulnerability to various risks. This risk factor emanates from sector's high dependence to natural

127 conditions and it is mainly this factor, which necessitates protection. Insurance is one way to cope with natural risks  
128 involved in agricultural activities [12]. This factor affects the tax burden on the industry "Agriculture, hunting and forestry"  
129 in Russia.

130 Comparison of advantages and disadvantages of transition to special tax regime in the form of system of taxation  
131 for agricultural commodity producers underlines that the question of expediency of application of the general or this  
132 special regime of taxation remains debatable.

### 133 3. Results

134 We draw the following conclusions and offer certain recommendations for the improvement of tax regulation of activity of  
135 agricultural commodity producers.

136 First of all, the taxation system for agricultural commodity producers has to emphasize not only fiscal function, but  
137 also regulating and stimulating functions which will allow to invest financial flows in agriculture for stimulation of  
138 development of agricultural sector.

139 In our opinion, now it is necessary to support new agricultural organizations. Applying general regime of taxation,  
140 such organizations bear high tax burden and thus they have no right to pass to system of taxation in the form of a unified  
141 agricultural tax for agricultural commodity producers in connection with non-performance of seventy-percentage criterion.  
142 Such position of the young agricultural organizations will be a negative and discouraging factor in development of  
143 agricultural sector.

144 It is necessary to use foreign experience of dating of agricultural production by fixing lower rate of a value added  
145 tax on agricultural production, and to count difference to compensation from the budget of repayment of obligations for  
146 other taxes and fees.

147 One of the directions of solving the problem of a value added tax may be the development of the lowered rates of  
148 this tax for buyers of agricultural production made by the organizations (payers of a unified agricultural tax), and also  
149 giving opportunities to consider an input value added tax at realization of goods (works, services), acquired at the  
150 organizations (payers of a unified agricultural tax) to the organizations applying the general system of taxation.

151 The alternative option is used to allow agricultural producers to fulfill tax obligations on a value added tax according  
152 to the order provided by Art. 145 of the Tax Code of the Russian Federation. In case the sales revenues don't exceed 2  
153 million roubles for the calendar quarter, the agricultural producer is exempted from fulfillment of tax obligation for a value  
154 added tax. Value added tax paid to suppliers of goods, works, services used in the production activity, is considered as a  
155 part of expenses for taxation by a unified tax. If scales of activity exceed the established criterion, the organization  
156 becomes the payer of value added tax.

157 Taking into account seasonality of production of agricultural production it is necessary to fix legislatively calendar  
158 year as the tax period without use of the reporting periods on the main taxes paid by agricultural producers. Transfer of  
159 the moment of fulfilment of obligations on income tax of the organizations, a unified agricultural tax, corporate property  
160 tax, and also a value added tax by agricultural producers whose activity has seasonal nature, for the end of calendar year  
161 will allow to increase considerably financial stability, both certain economic territorial entities, and branch in general and it  
162 will allow to reduce derivation of own current assets by purchase of the material values necessary for carrying out  
163 agricultural works.

164 It is important to use the mechanism providing relief of owners from land tax, in case of carrying out a complex of  
165 actions directed on restoring soil fertility in the sum actually spent by them for this purposes.

166 We think, that regional authorities of territorial entities of the Russian Federation should work out and introduce the  
167 adjusting factor for each natural ecosystem which would correct taxable base on a unified agricultural tax towards  
168 reduction or increase depending on a climatic zone and structure of soils. And the agricultural organizations applying a  
169 general regime of taxation could correct taxable base on an income tax on this factor.

170 We believe, that the implementation of these proposals, will promote the formation of economically reasonable  
171 system of taxation of agriculture that finally, will allow to provide stable development of the branch and achievement of  
172 food security of the country. Thus, in our opinion, reforming of the system of taxation of activity of agricultural commodity  
173 producers, shouldn't be only in granting new tax privileges instead of liquidated ones, and can be aimed at providing such  
174 conditions of taxation which would take into account specifics of economic activity, including features of formation of  
175 financial flows in agriculture.

#### 4. Conclusions

On the basis of the research of theoretical issues and practical aspects of tax regulation of activity of agricultural commodity producers in the world and national practice and in particular in the Republic of Tatarstan it is possible to draw a conclusion that there are a lot of unresolved questions in this field. We consider, that it is necessary to carry out alternative calculations for the purpose of minimization of conditions of establishment of considerably differentiated relative levels of taxation in the process of working out methodical recommendations concerning questions of improvement of taxation of agricultural commodity producers. Extent of alignment for the agricultural enterprises of estimates of level of relative tax burden has to be the most important criterion in this case.

Besides, first of all, the system of taxation for agricultural commodity producers has to emphasize not only fiscal function, but also regulating and stimulating functions which will allow to invest financial flows in agriculture for stimulation of development of agricultural sector.

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## Ecological Damage at Pollution by Oil Products on the Example of R. Shava, Nizhny Novgorod Region

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### Abstract

Article is devoted to the analysis of the ecological damage caused to water object – the river Shava and to wetland Shava of the Nizhny Novgorod Region, injured with accident at oil spill in 2007. Environment components, the most sensitive to oil pollution are analyzed and allocated. The economic assessment of consequences of pollution is carried out.

**Keywords:** oil pollution, ecological damage, small rivers, fauna, flora, soils, water.

### 1. Introduction

As a result of the accident from the Almeteyevsk-Nizhny Novgorod oil pipeline which took place in March, 2007 in the Kstovsky region of the Nizhny Novgorod Region there was a pollution of water ecosystems of the river Shava and wetland of river Shava diesel fuel. Thus the food supply of fish resources (a phytoplankton, a zooplankton, a zoobenthos) and fish resources of the river Shava suffered, ground deposits and coastal soil are polluted, and the part of water vegetation and fauna was lost. The purpose of the conducted research is the complex assessment of the ecological damage caused to water object (to river Shava and wetland of river Shava) at an emergency (Mingazova, 2014).

For an assessment of full ecological damage natural researches with sampling and studying of structural indicators of components of an ecosystem of water objects were conducted. Further the analysis of the existing emergency was carried out; the assessment of impact of an emergency on various components of the environment was carried out. The received information allowed to make an economic assessment of consequences of pollution of water objects oil products.

The assessment of impact of an emergency on food supply of fish resources and fish resources of the river Shava is carried out; calculation of the damage caused to fish stocks of river Shava by emergency oil spill; calculation of damage to water object for hydrochemical indicators; calculation of damage to fauna; calculations of the damage caused to a soil cover of wetland of river Shava; an assessment of the damage caused to vegetation.

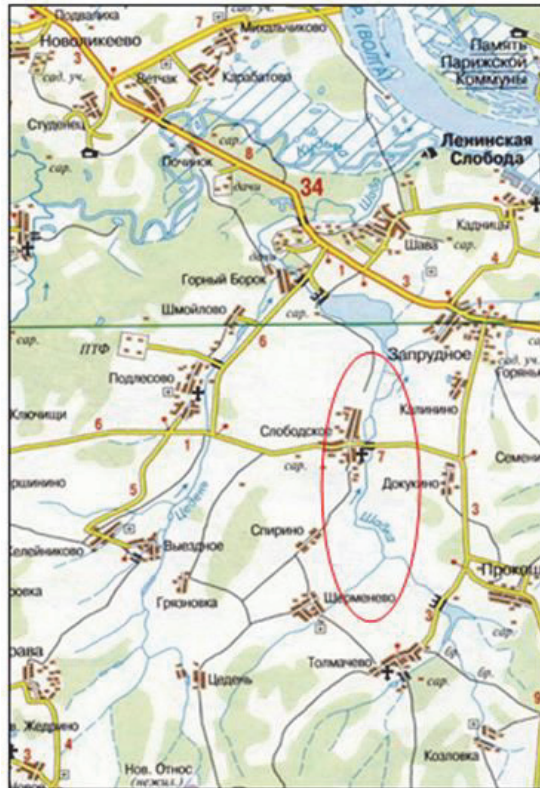
### 2. Methods

In calculations of damage from emergency oil spills were used, generally modern techniques of the Ministry of Natural Resources and Environmental Protection of the Russian Federation. Branch and regional techniques weren't used in order to avoid disputed issues at coordination of the extent of ecological damage. The used techniques are well applicable to situations with emergency oil spills. For carrying out calculations were used: for an assessment of damage to soils "A technique of calculation of the extent of the harm done to soils as to object of the environmental protection" approved by the Ministry of Natural Resources and Environmental Protection of the Russian Federation, the order of July 8, 2010 N 238., it is intended for cases of emergence of emergency and emergency situations of natural and technogenic character (for example, emergency oil spill). For a damage assessment from pollution of water object "The technique of calculation of the extent of the harm done to water objects owing to violation of the water legislation" was used. Damages to fauna were assessed by "A technique of calculation of the extent of the harm done to the objects of fauna included in the Red List of the Russian Federation, and also to other objects of fauna which aren't relating to objects of hunting and fishery and the environment of their dwelling". Calculation of damage to fish resources of the river Shava was carried out

56 by "A technique of calculation of the damage caused to fishery as a result of dumping in fishery reservoirs of sewage and  
57 other waste" (it is approved by Ministry of Fisheries of the USSR on August 26, 1967 No. 30-1-11 (the Technique ...  
58 1967).  
59

### 60 3. Results

62 The river Shava flows in the Kstovsky district of the Nizhny Novgorod Region (fig. 1). The river Shava is inflow of the  
63 second order of the Volga River – inflow of the river of Kudma – right-bank inflow of the Volga River, belongs to the rivers  
64 low-studied in the hydrological relation.  
65



66  
67  
68 **Fig. 1.** The river Shava on the map of the Nizhny Novgorod Region.  
69

70 In 18 km from a source of river Shava forms extensive wetland ("the Bog Shava" - a conservation monument).  
71 After passing through wetland the river Shava forms, the handmade Borkovsky pond. After the Borkovsky pond the  
72 waters dumped from a dam come via the artificial channel to the bed of the river Shava.  
73 At emergency flood from a slope surface oil products (diesel fuel) got to the river Shava. Diesel fuel got also to the  
74 finishing pond of "Borok" formed by a dam on the river Shava, and further in the river to Kudma. Accident pollution of the  
75 river Shava resulted, from a nature sanctuary of regional value "the Bog "Shava", fish-breeding ponds of Fish Farm  
76 "Borok" and lands of agricultural purpose of "Zaprudnovskoye" farm.  
77 The most part of oil products is accumulated by peat soils of wetland of river Shava around accident. The total  
78 amount of the spread oil product made 309,05 m<sup>3</sup>. Borders of distribution of an ecologic disaster area are rather great  
79 and it is connected, first of all, by hit of diesel fuel to the river Shava, and then possible hit in the Volga River.  
80 In this work damages to biological resources (to hydrobionts, fauna, vegetation), to soils, water objects are  
81 assessed.



#### 4. Damage to Biological Objects

Falling in a reservoir, oil products made adverse effect on food supply of fishes, i.e. on phyto - and a zooplankton, a benthos and the highest water vegetation.

For an assessment of damage research of a condition of biological communities (a phytoplankton, a zooplankton, a zoobenthos) by the standard hydrobiological methods, estimates of quality of waters on physical and chemical and hydrobiological indicators was conducted. Points of control included sites above a pollution place, around accident, in a place of a confluence of river Shava in a pond, below a pond at the exit of river Shava.

When studying a phytoplankton quality of water by the Zhukinsky's classification (An ecological assessment ..., 1990) during the spring period changed from the class "pure" of the categories "the very pure-quite pure" at stations above and below flood to the class "dirty" of the category "the very dirty" on a place of intake of oil products. Improvement of quality of water in process of removal of station of selection from an oil spill place was noted.

The community of a zooplankton in the river Shava differed in a low specific variety, low sizes of quantitative indices, the broken structure of communities throughout the river.

On indicators of a zoobenthos it is possible to draw a conclusion on decline in quality of water owing to emergency dumping of oil products, communities of organisms in the place of accident underwent the greatest influence; on an entrance to a pond and above a flood place the community of a zoobenthos is in a steady safe state.

When studying a fish fauna it is revealed that impact on a fish fauna was made the period of a freezing and later. As a result of the made impact of oil products fish was dormant, in a consequence it was dead on river length about 10 km (to the Borkovsky pond and after it). Directly on a site of research about 2 km long the lost fishes of such types as a silver carp, small fry, a perch and the bream were found. Total lost individuals, by results of natural researches on the studied site were about 500 pieces.

When comparing impact on hydrobiological components of an ecosystem it is revealed that the zoobenthos and a fish fauna underwent the greatest influence.

The average on all biological components influence is estimated at 4,25 points and interpreted as "strong". Influence affected also on other biotic components (a gerpetofauna, an intomofauna, etc.).

As for a benthos, it is the most vulnerable component of water ecosystems owing to smaller mobility of organisms, the big period of restoration. Oil products collapsed eventually, the heaviest fraction settled on a bottom therefore there was a full death of benthos, mostly motionless and inactive (epifauna) and forms which are burying (infauna) and also considerable death of mobile forms (onfauna) on a site about 125 sq.m, the general biomass of 1787,5 mg.

Further the damage caused to stocks of fishes by violation of natural reproduction as a result of death of producers is defined. As for small fry, in view of shallowness of river Shava (0,2-1,0 m) this look spawns or in its lower reaches and that is more probable - in the river of Kudma which inflow is the river Shava. The general damage at the cost of the lost fish makes 2340 rubles for a site of the river of 2 km (below the Borkovsky pond). Taking into account that the death of fish was noted during the different periods on a site of the river about 10 km long, it is possible to accept that the damage to fishery made (2,340 t.r. x 10/2) about 11,7 thousand rubles.

The total amount of damage to fishery calculated on the volume of capital investments (To) of actions for preservation and reproduction of fish stocks, necessary for implementation, at a stage of the scheme and in projects on building of fish-breeding objects makes 20,1 t.rub. (for the followed site of the river Shava about 2 km long). Taking into account that the death of fish was noted during the different periods on a site of the river about 10 km long, it is possible to accept that the damage to fishery will make (20,1 t.rub. x 10/2) about 100,5 t. rub (hundred thousand five hundred rubles). This sum is offered to be taken as total on an amount of damage to fishery of the river of Shava. The damage is given for 2007, without inflation during 2007-2011.

#### 5. Damage to Fauna

By results of the researches conducted in 2007 and 2011 years are revealed that the territory of a nature sanctuary – "The Bog Shava" differed in a considerable specific variety before pollution as a result of emergency flood of 2007.

Wetland "Shava", according to department of protection of fauna of the Ministry of Agriculture of the Nizhny Novgorod Region, was a habitat valuable to the animals living near the water (a beaver, a muskrat, a mink American, a steppe polecat, an ermine, a raccoon dog) and songbirds. In the gerpetofauna of a bog Shava 3 species is revealed (a lake frog, a grass frog, ordinary grass-snake). In avifauna were noted: the big black-tailed godwit, a snipe, double snipe, a lapwing, the heron, a ruff, a great number of ducks (a wild duck, etc.), seagulls, sea-swallow, ducks, herons, in 2007 was marked out a white stork, a great number of songbirds ("The report of employees of the reserve Kerzhensky"). In



136 avifauna in the spring of 2007 the rare protected species – the white blue tit included in the Red List of the Nizhny  
137 Novgorod Region and the Red List of Russian Federation was revealed at the place of accident.

138 Emergency flood in 2007 was resulted by pollution of wetland Shava, thus: habitats of animals are destroyed;  
139 individuals of directly lost animals are marked out.

140 As a result of the happened accident harm to objects of fauna is done: employees of the reserve "Kerzhensky" in  
141 2007 noted destruction of 929 exemplars of amphibians, 1 ex. of reptiles, 174 ex. of birds, 6 ex. of mammals.

142 Settlement data on the area which underwent pollution and data of the reserve "Kerzhensky" on quantity of the lost  
143 individuals formed the basis of calculations of the damage caused to fauna. The extent of the damage caused by  
144 destruction of habitat, caused to objects of fauna, not belonging to invertebrate animal species made 605 900 rub (six  
145 hundred five thousand nine hundred rubles).

146 The extent of the harm done by destruction of the soil and other habitats of invertebrate animals makes 87,298  
147 million rubles (eighty seven million two hundred ninety eight thousand rub). The losses which are giving in to calculation  
148 from death of objects of fauna made 70 000 rub (seventy thousand rubles). The general extent of damage to fauna  
149 makes 87, 974 million rub (eighty seven million nine hundred seventy four thousand rubles) in the prices for 2007 (without  
150 inflation during the period from 2007 to 2011).

151 The most strongly negative impact affected such groups of organisms as soil invertebrates, reptiles, near water  
152 birds and mammals.

153

## 154 **6. Damage of Vegetation**

155

156 On the basis of studying of specific structure of wood and shrubby vegetation at the river Shava it is revealed that this  
157 vegetation is typical for inundated habitats. Rare especially protected species of trees and bushes were not revealed. The  
158 condition of wood and shrubby vegetation of wetland Shava is characterized as weakened that is connected with a  
159 number of factors (hydrological conditions of bogs, abnormally droughty summer of 2010, anthropogenic factors – a cattle  
160 pasture, a mow cleaning). Therefore it is correct to track impact on wood and shrubby vegetation of consequences of  
161 accident of 2007 it isn't possible, the caused damage currently can't be accurately defined in a cost form.

162

## 163 **7. Damage to Water Object**

164

165 The extent of the damage caused to water object by emergency pollution by oil products paid off by three methods:

- 166 1) calculation with the admission that all volume of the spread oil products (namely 309,05 m<sup>3</sup>) got to water of  
167 river Shava, the river Shava by emergency pollution by oil products made the extent of the damage caused:  
168 519,280088 million rubles;
- 169 2) calculation for the available data on concentration of the dissolved and emulsified oil products in water of river  
170 Shava from March 12 to March 15, made the extent of the damage caused to river Shava by emergency  
171 pollution by oil products in 8, 527328 million rubles;
- 172 3) calculation, according to the provision of the Technique about calculation of the damage caused to water  
173 object by emergency pollution by oil products in the absence of reliable data about the volume of the polluting  
174 substances which got to water, the extent of the damage caused to river Shava by emergency pollution by oil  
175 products, made 3,72 million rubles.

176 Taking into account the fact that at accident the considerable part of oil products was accumulated by peat soils of  
177 wetland of river Shava around accident, and also from the point of view of methodical validity calculation for 5  
178 concentration of the polluting substances in March, 2005 is represented the most acceptable. Respectively, the most  
179 acceptable extent of the damage caused to a site of the river Shava from the place of accident to an entrance to a  
180 finishing pond at emergency pollution by oil products of a site the sum of 8, 5273275 million rubles is represented.

181 Taking into account the last remark, the total amount of the damage caused to river Shava at emergency pollution  
182 by oil products (damage to water object + damage to fish stocks) makes 8,527328 million rubles + 0,101 million rubles =  
183 8,628328 million rubles.

184

## 185 **8. Soil Damage**

186

187 According to the obtained data for 2011, the studied soils of wetland Shava belong to type of alluvial inundated soils.  
188 Soils of this type are characterized by high biological activity and high potential fertility. Pollution is noted on a place of  
189 emergency flood (at crossing of the river Shava on a bog Shava). Here pollution was noted after carrying out recovery

actions in 2009, remained in the form of residual quantities also in 2011. Oil products on this site were observed up to the depth of 1 m. On other sites of wetland Shava oil products were noted in insignificant quantities at depths within 0-50 cm.

The content of oil products in the soil during the period from May to June, 2011 changed at stations from 106,5 mg/kg at background station to 220-4693 mg/kg on a place of emergency flood. In a certain degree the place of emergency flood is more polluted. The decision of arbitration court of the Nizhny Novgorod Region of 20.01.2010 approved criteria of completion of recovery (remediation) work – achievement of the content of oil products: in soils of a coastal strip of river. These criteria (DOSNP) is lower on a watercourse from the place of accident to a confluence with a finishing pond of fish farm of "Borok" at a depth from 0 to 30 cm – to 850 mg/kg.

By results of researches of 2011 it is possible to draw a conclusion on considerable decrease (in comparison with 2007) contents of oil products in a soil layer (on average to 100-150 mg/kg in a blanket that corresponds the accepted DOSNP criteria of restoration which is 850 mg/kg). More polluted is a site 2, in an oil spill place.

For calculation of the damage caused to soils in 2007 as a result of accident the area of pollution taking into account a rating by a current and a hydrological situation of 2007-2011 was determined. It is calculated, that Shava in 2007 with the area of a bog and the river of 50,8084 hectares underwent pollution of the soil of wetland (that is more than 50 hectares) while Shava makes the area of all bog to 400 hectares). Thus, not all territory of wetland of river Shava was subjected to pollution, but only soils about 1/8 parts of all bog – protected area "Bog Shava".

The damage paid off according to the maximum content of oil products in the soil in 2009, in the absence of fuller data suitable for calculations, on all territory for 2007. Calculation was carried out on two sites (the place of accident – 1,947 hectares and the polluted wetland site at high water level – 48,857 hectares). The damage on soils at the place of accident made 116,82 million rubles, to soils in the territory of wetland - 762169200 rub.

Oil products on the river Shava and bogs Shava makes the general total damage from pollution as a result of accident of 2007 of soils according to settlement data makes 878, 989 million rubles. Considering that calculation was carried out according to 2009 (during decrease in concentration as a result of application of recovery actions by the owner of the oil pipeline), the damage for 2009 could be more. Therefore, the damage, available to calculation, from pollution of soils makes not less than 878 million 989 thousand 200 rub.

## 9. Conclusions

At calculation of ecological damage to the river Shava and to a bog Shava the following results are revealed.

Oil products on the river Shava and a bog (wetland) Shava makes the general total damage from pollution as a result of accident of 2007 of soils on settlement these 878,9892 million rubles.

Total amount of damage to water object at pollution by oil products and damage to fish stocks makes 8,628328 million rubles.

The general extent of damage to fauna makes 87,974 million rubles in the prices for 2007.

The damage to fishery makes about 100,5 t. rub (hundred thousand five hundred rubles). It isn't possible to calculate damage to flora in view of lack of reliable data about death of plants.

Having compared the received results it is possible to draw a conclusion on the greatest economic damage to soils. Soils appeared the most vulnerable component at emergency oil spill. Also extensive damage is caused to fauna that is explained by accommodation this territory of valuable bird species and mammals.

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## Banking Capital in Russia: Sufficiency, Adequacy of Market Value Evaluation

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### Abstract

The article deals with the problem of insufficiency of banking capital in Russia and questions of its market value evaluation. Insufficient capitalization of Russian banks is justified, empirical market price is calculated.

**Keywords:** commercial bank, market value, banking capital, stock market, gross domestic product.

The objective of this article is to justify the the problem of the insufficient capitalization of Russian commercial banks and to test the gipohthesis that the market value of banking capital in Russia is underestimated.

Methods of scientific research: abstraction, synthesis of data related to separate banks and its analysis after all necessary calculations will be performed, graphic method.

After the financial crisis of 2008 the problem of the insufficient capitalization of Russian commercial banks is becoming less discussed.

Originally, problem of low capitalization and questions of adequacy of the evaluation of market value of commercial banks appeared in Russia in the late 1980s.

Since the reforms and the restructuring of Russian banking system which began in the late 1980s evaluation of the market value of banking capital was analyzed as a part of evaluation of market value of commercial bank in a whole. Russian economists investigated instruments of the process of evaluation of market value of banking capital, studied methods and approaches, upgraded them. However, holistic research of inner essence of banking capital, conceptual approach to the evaluation of the market value of banking capital wasn't developed yet.

It is quite naturally, that in 1990s the economists began investigate approaches and methods of evaluation of market value of commercial bank, because quantity of commercial banks increased rapidly in the early 1990s and reached a pick in 1997 (2,6 thousands of bank in Russia were registered). In line with growing quantity of banks Mergers and Acquisition (M&S) market appeared. Unpredictability of Russian economics in 1990s forced economists to quickly react and to investigate the problem of low banking capital and it's evaluation.

Thus, K.A. Reshotkin created the methodology to assess the market value of the bank on the basis of management accounting data.

T.N. Mozgaleva, A.V. Zheglov and I.P. Golovina investigated practice aspects of using of approaches of market value evaluation relatively to banks.

V.M. Rutgaizer, A.E. Buditsky, I.A. Nikonova and R.N. Shamgunov as well as B.B. Leontyev and Kh.A. Mamagzhanova studied problems of evaluation of intangible assets and goodwill of banks.

I.A. Nikonova developed recommendation of using of liquidation value of bank.

A.V. Vernikov, A.A. Philippova, T.A. Vladimirova and A.A. Khlebnikov investigated practice aspects of using the comparative approach of the evaluation, proved possibilities of using different multipliers.

Almost all domestic researches used corporate financial management achievements and designs which describe conceptual foundations of the business valuation. So, Russian economists used articles and books written by R. Brealey, S. Myers, A. Damodaran, M.J. Gordon, H. Markowitz and W. Sharp.

T. Koupland, T. Koller and J. Murrin proved the possibility of using approaches and methods of evaluation previously used in corporate finances relatively to banks.

P.S. Rose, J. Sinki, J. Stern – are the key authors classified technics, approaches and methods of evaluation of the market value of banking capital.

So, there are no domestic researches related to the evaluation of market value of banking capital in Russia. Possibly, due to this for almost 30 years of the development, Russian banks are still absent among top-rated banks in international bank rankings.

For example, the international rating of the largest banks ranked by capitalization for 9 month of 2013 contains 4

56 Chinese banks, only 3 from USA and no Russian banks [15].

57 There are no Russian banks among the largest 10 banks ranked by total assets for 2013 [9]. It should be noted,  
58 that the main quantity of banks from top 10 are also from China. France and UK banks are represented by 2 banks and  
59 the only bank from USA. First 100 banks contain 13 Chinese banks in total and only two Russian ones: Sberbank is 54<sup>th</sup>,  
60 VTB is 94<sup>th</sup>.

61 Intangible assets are also may be indicators which allow us to rank the largest banks. Based on the data of the  
62 most valuable banking brands for 2014 [16] we held a comparative analysis of market value of Russian and Chinese  
63 banks.

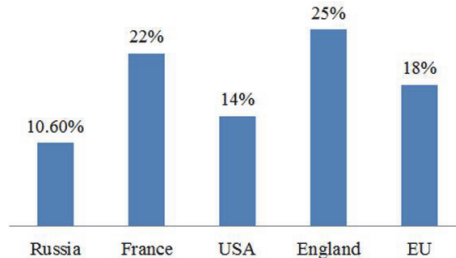
64 **Table 1.** Comparative analysis of market value of Russian and Chinese banks [16]  
65  
66

Country	Name	Brand market value, 2014, mln USD	+/- for 2014 versus 2013, mln USD
China	China, total	108 751	16 099
Russia	Sberbank	10 950	-3 210
	VTB	3 264	921
	Russia, total	14 214	-2 289

67 Chinese banks increased its' brands market value included in top-100 by 17%, while Russian banks cheaped by 13%  
68 [16]. The declining is mainly caused by cheaped Sberbank brand by 3,2 bln USD [16].

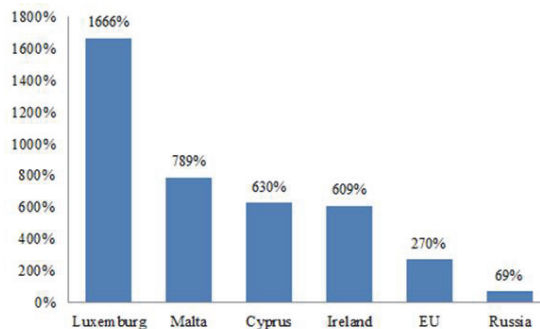
69 Overall, international banking ratings described are independent from each other. Its show the fact that Russian  
70 banks are still not capitalized enough. At the same time Chinese banks are aggressively grow and lead some of ratings  
71 analyzed.

72 In addition to ratings, values of such important indicators as bank assets/Gross Domestic Product and Banking  
73 Capital/Gross Domestic Product in Russia are much lower than western countries' values. For details, please see the  
74 graph below.  
75



76 **Picture 1.** Bank capital/GDP by countries [11, 14]  
77  
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79 The value of bank capital/Gross Domestic Product is the lowest from all countries researched. Even if targeted in  
80 "Strategy of the development of the banking system until 2015" level at 14-15% will be reached [1], Russian value will be  
81 much lower than almost all western countries.  
82



83 **Picture 2.** Banking assets/GDP by countries [2]  
84

85 The potential of growth is rather huge. To reach European Union level Russian banks' assets should be grater 4 times.  
 86 Banking capital is interacted with economics in a whole. The fact of almost the same speed of growth of banking  
 87 sector and overall economics is confirmed by the following data.  
 88

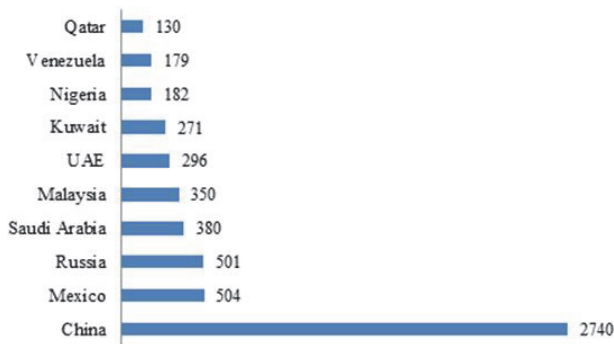
89 **Table 2.** Russian and Chinese GDP for 2011-2013, bln USD [10]  
 90

Country	2011	2012	2013	Growth, bln USD	Growth, %
China	11 189	12 256	13 395	2 206	19,7%
Russia	2 363	2 486	2 556	193	8,1%

91  
 92 We held the comparative approach of the dynamic of Russian and Chinese GDP. As a result, we have identified that  
 93 Chinese GDP increased by almost 20% for 2011-2013. This fact reflects the potential and also overall effectiveness of  
 94 usage of all resources.

95 Low development of economics and outflow of capital are main factors which prevent the growth of banking capital  
 96 in Russia.

97 By the way, outflow of capital is still exist even in 2000ths.  
 98



99  
 100 **Picture 3.** Volume of illegally exported capital for 2000-2009 [17]  
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103 In accordance with the picture above we see that Russia is the third country ranked by illegally exported capital.  
 104 Consequently, 501 millions of USD are absent from banking sector.

105 Taking into account all international ratings and low volume of economic indicators described above we conclude,  
 106 that the banking capital in Russia is insufficient and should be developed.

107 Nevertheless, it is impossible to stop the outflow of capital immediately. The process of the acceleration of  
 108 economics – is long-term process. Nowadays we should use instruments that's impact on banking capital is quicker.

109 We assume that banking capital in Russia is underestimated on the stock market.

110 With the objective to test our hypothesis we will calculate the empirical market price of ordinary shares of banks  
 111 listed on the Moscow exchange. We will compare calculated results with fact one.

112 Test of the hypothesis is held with the usage of formula [13, 210]:

$$113 P = EPS \times P/E$$

114 where P – empirical market price of ordinary shares;

115 EPS – earnings per share of bank;

116 P/E – price/earnings (net profit) ratio for Banks and Finances market of Moscow exchange.

117 The population for test includes 5 largest Russian banks listed on Moscow Exchange:

- 118 – Sberbank of Russia;
- 119 – Bank VTB;
- 120 – Bank of Moscow;
- 121 – Bank Vozrozhdenie;
- 122 – Bank Saint-Petersburg.

123 The period of investigation is 2010-2013. We didn't not performed extrapolation of the data for 6m of 2014 due to

124 unpredictability of politic situation. So, we assume, that forecasted figures for 2014 may be deviated. Moreover, since  
125 30.06.2014 market value of ordinary shares of all analyzed banks significantly decreased. For example, the market price  
126 of shares of Sberbank of Russia declined by 14% by 30.08.2014.

127 Sources of information for the calculation:

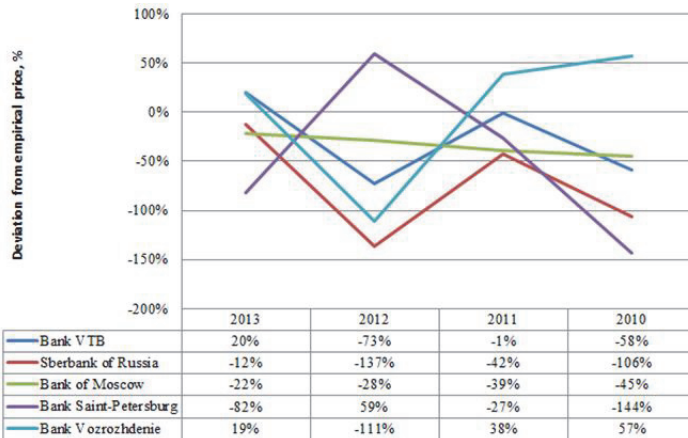
- 128 - the official site of Moscow Exchange for stock price;
- 129 - financial statements in accordance with International Financial Reporting Standards (IFRS) for earnings per  
130 share;
- 131 - P/E ratio is calculated as average for a full calendar year.
- 132 - P/E ratio for Banks and Finances market of Moscow Exchange is calculated with accordance with following:
- 133 - ratio for market is average from banks and companies included in the calculation of Moscow Exchange index  
134 (MOEX) excluding Moscow Exchange due to its reorganization in 2011.
- 135 - if P/E is below zero we use P/E=0;
- 136 - preferred shares are excluded from the calculation.

137 As a result of investigation we have calculated following amounts of P/E ratio for Banks and Finances market of  
138 Moscow Exchange:

140 **Table 3.** Calculated amounts of P/E for Banks and Finances market of Moscow Exchange for 2013-2010 [3, 4, 5, 6, 7, 8]

Indicator/Period	2013	2012	2011	2010
P/E	5,7	11,0	6,4	26,1

142 After that we have calculated empirical market prices of ordinary shares of banks listed and compared its with fact prices.  
143 The result of comparing is presented below.



146 **Picture 4.** Deviation of market price of ordinary shares of 5 Russian banks from empirical price for 2013-2010.

147 Amounts below zero shows underestimated prices per share. Respectively, amount above zero – overestimated prices  
148 on the stock market.

149 As we can see from the data above, on 2010 ordinary shares of 4 of 5 banks were underestimated from 45%  
150 (Bank of Moscow) until 144% (Bank Saint-Petersburg). For the period analyzed stock market systematically  
151 underestimated the real market value of banking capital of key banks listed on Moscow Exchange, as a result, the value  
152 of all Banks and Finances market is underestimated. The potential of growth is partially used for 2011-2013 and 2013  
153 data shows that ordinary shares of Bank VTB are overestimated by 20% and shares of Bank Vozrozhdenie are  
154 overestimated by 19%. It is should be noted, that Bank VTB's shares are overestimated for the first time from 2010.

155 Ordinary shares of Sberbank of Russia are underestimated by 12% and amount in 2013 is the minimum for the  
156 period analyzed.

157 Most underestimated capital of Bank Saint-Petersburg (82%), however this bank is not one of the largest banks in



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Russia.

The fact that such banks as Bank Saint-Petersburg and Bank Vozrozhdenie are key banks for Moscow Exchange while the largest banks are not listed on the stock market is real problem for banking sector.

The table below shows the status of top-10 Russian banks ranked by capital according to form 123 (Basel-III) on the stock market.

**Table 4.** Status of listing of ordinary shares of Russian largest banks on the stock market [11, 12]

No	Name	Capital, billions rubles, 2014	Ordinary shares listed on the stock-market?
1	Sberbank of Russia	2 227	Yes
2	Bank VTB	651	Yes
3	Gazprombank	445	No
4	Rosselkhozbank	274	No
5	VTB 24	246	No
6	Alfa-Bank	223	No
7	Bank of Moscow	192	Yes
8	Unicreditbank	135	No
9	FC Otkritie	116	Yes
10	Promsvyazbank	102	No

169

Only 4 of top-10 Russian banks conducted initial public offering (IPO) and its' shares listed on stock market. It is should be noted that total capital of top-10 banks above equals more that 60% of Russian banking sector. Due to the fact of low stock market penetration of Russian banks, investors analyzing overall Banks and Finances market, make solutions based on the limited and incomplete information. Information used is not related to all the largest banks.

Due to results obtained after the calculation performed we conclude that instruments of the evaluation of market value of banking capital should be developed with the objective to solve the problem of low capitalization of Russian banks.

The development of instruments of adequate evaluation of market value of banking capital is one of the fastest ways of the incensement of banking capital in Russia because it is related just with methodology and there is no need to wait while overall economics will be accelerated.

Results of calculation performed prove the gypothesis that the market value of banking capital of Russian banks is under estimated and the developing of instruments of it's evaluation should be developed.

Additional reserve of inreasegment of banking capital is stimulating of IPO of the largest Russian banks.

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## Special Role of Credit Institutions in the Russian National AML/CFT System

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### Abstract

The credit organizations, as one of the subjects of financial monitoring, serve as the main supplier of information to the Russian Financial Intelligence Unit database, and play a special role within national AML/CFT system. Balancing between the responsibility for compliance with anti-money laundering legislation and need to maintain the customer base, banks face additional risks that arise due to the tightening of regulatory requirements and the fierce competition in the banking market. This article discusses the structure of the national AML / CFT system, analyzes the place and role of credit institutions in the national AML / CFT. Suggests ways to optimize the performance of the credit institutions in the field of AML / CFT by establishing a mechanism of interaction of all subjects of financial monitoring.

**Keywords:** AML / CFT, credit organizations in the national AML / CFT system, financial monitoring, internal control system, criteria for suspicious transactions

Credit institutions are the subject of initial financial monitoring and play a special role in the national AML / CFT system. Russian banks are the main providers of information to the database of Rosfinmonitoring, what is more volume of that information increases every year: 95% of the messages received in 2013 fell to credit institutions (Figure 1). Those figures increased by 3.2% compared with the previous year.<sup>1</sup>

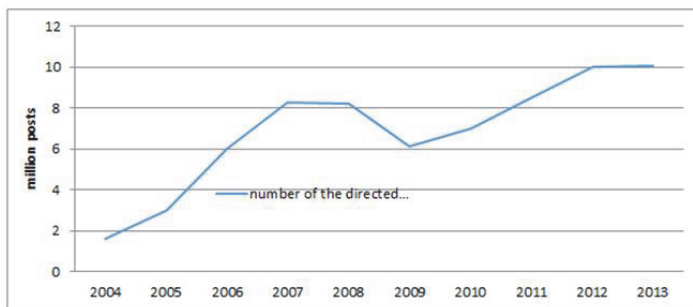


Figure 1. Dynamics of volumes of informing of Rosfinmonitoring by credit organizations <sup>2</sup>

Analysis of the activities of credit institutions in the national AML / CFT system indicates a high risk of involvement of the Russian banking sector in the scheme, aimed at the legalization of proceeds from criminal activity and the existing system to prevent this kind of attack on Russian banks needs improvement. Today the share of the Russian banking sector involvement in crimes related to money laundering is quite high. According to the Russian Interior Ministry, the situation in the credit and financial sphere is the most crime from the perspective of money laundering: it accounts for

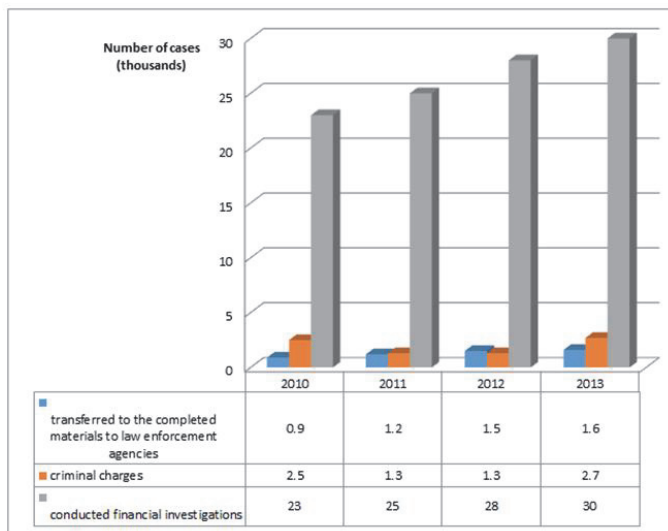
<sup>1</sup> Official website of the Federal Service for Financial Monitoring. Access mode: <http://www.fedsfm.ru>

<sup>2</sup> Compiled by the authors according to annual reports of Rosfinmonitoring

44 35.8% of the total identified in various sectors of the economy of crime.<sup>3</sup> The Federal Service for Financial Monitoring  
45 conducts financial investigations in coordination with federal executive authorities based on data received from credit  
46 institutions. Total amount of financial investigations through combating money laundering has increased in 2013 by 11%  
47 in relation to 2012 which was more than 30 thousand Investigations. (Figure 2).<sup>4</sup>

48 Analysis of data shows that the percentage of the number of transferred material on completion of the investigation to  
49 the total number of financial investigations is extremely small, that suggests a large amount of information from the  
50 banks and nonoptimal efficiency of the Federal Financial Monitoring Service. In our opinion one of the reasons for this  
51 situation is that the state has taken over the functions of criminal law and administrative suppression of criminal abuse in  
52 the banking sector, while most of the work on the organization of the system detect and legislator laid prevent this kind of  
53 criminal assault mainly on the banks.

54 Feature of the national AML / CFT system is the absence of the principle of feedback between the public and the  
55 banking sector, i.e. the principle of one-way interaction, namely the detection of bank operations subject by the money  
56 laundering legislation bank forms and sends information about the operation to the Federal Financial Monitoring Service.  
57 However, there is no notices or directives from the Federal Financial Monitoring Service of the measures to be taken in  
58 relation to the customer. The current practice, in our opinion, leads to an increase in disparities between the number of  
59 incoming messages from banks and the number of actions taken against violators legislation by the Federal Financial  
60 Monitoring Service.  
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64 **Figure 2.** Results of operations Rosfinmonitoring based on information received from credit institutions.<sup>5</sup>

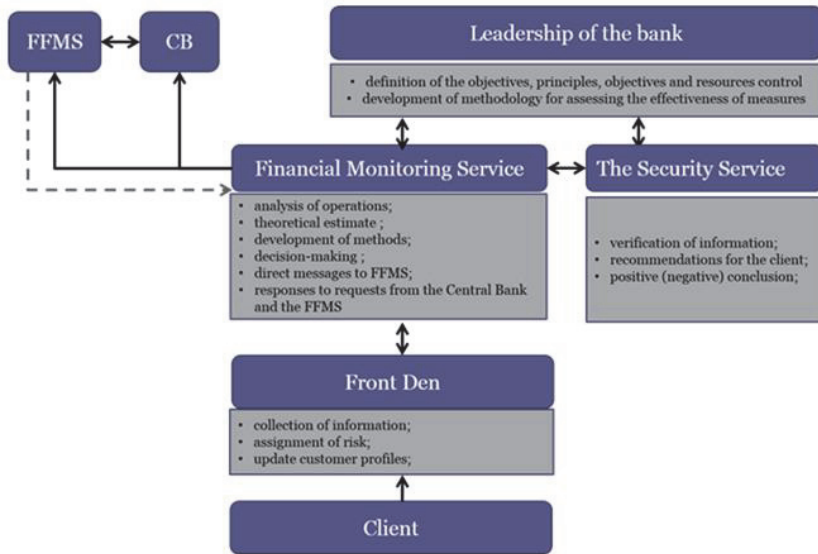
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66 In our opinion, the organization of interaction of the controller and agents of financial monitoring should be amended as  
67 follows: first - a legal requirement "feedback" between the links of the AML / CFT; the second - to the approach of  
68 informing about the "suspicious transaction" approach to information about "suspicious customers." In this case, it is  
69 crucial to identify specific legislative action (penalties), undertaken by credit institutions in respect of "unscrupulous"  
70 customers. As such sanctions can serve as the introduction of a client into a single database of undesirable clients, which  
71 will be available for use by all entities of financial monitoring. We represent the possible structure of the organization's  
72 internal control system for AML / CFT in a commercial bank, provides for a "feedback" (in the form of evaluation of the  
73 AML / CFT, the direction of the recommendations create a database of undesirable clients, etc.) from the regulator  
74 (Figure 3).

<sup>3</sup> Official website of the Ministry of Internal Affairs of the Russian Federation. Access mode: <http://mvd.ru>

<sup>4</sup> Official website of the Federal Service for Financial Monitoring. Access mode: <http://www.fedsfm.ru>

<sup>5</sup> Compiled by the authors according to annual reports of Rosfinmonitoring



**Figure 3.** Structure of the organization's internal control system for AML / CFT in a commercial bank. Compiled by the authors.

In our opinion, one of the main conditions for effective functioning of the system is independent of the direction from the other activities of the bank. Responsibility for internal control in the AML / CFT system and risk management of the bank involvement in these processes is on the head / board of directors of the credit institution. Division of internal control, a strategy for risk management of the bank involvement in the process of money laundering, which includes a set of rules on the basis of which decisions are made and how to select the option of these solutions (strategy, risk tolerance, or, on the contrary, the strategy of containment of risk). In this case, the approach developed by the bank must give the bank's management to conduct a differentiated policy against customers so that the risks assumed by banks correlated with the income from the provision of banking services. All data obtained during the identification and study of the client, shall be entered in the electronic application form, to which employees will have permanent access to the online mode, in order to inform the risk management process involving the bank in the process of money laundering. Financial Monitoring Service of the bank, conducting testing procedures for a specific client to sign compliance of its operations criteria of suspicious transactions (transactions) as defined by law, request the documents proving the legitimacy of the activities of the client and analyzes the operations of all of its accounts. In this case, coordination is required with the security of the bank to verify the authenticity of documents, check for negative information to the client and to make a positive (negative) decision on its operations.

Law established a mandatory grounds for banks documenting information on a number of transactions, the terms of which the commission to refer them to the transactions carried out for ML / FT. Obviously, some of these in the Act do not have reason to objective criteria, and the development of such criteria directly assigned at the discretion of the banks. In this case, the imperfection of the legislation, in our view, is that there are no uniform criteria clearly defined, and the unity of approaches to determining the nature of the transactions carried out since in some workers with respect to the transaction may have suspicions, and others, the same transaction will not cause them. Therefore, informing the authorized authority will largely depend on the evaluation and appreciation of specific employees of the bank, i.e. would be devoid of objectivity, uniformity of approach and provide the opportunity to create an environment involving employees of the bank, and, consequently, the bank, in the criminal scheme. In order to prevent the dual interpretation of the legislation, propose the creation of a closed list of criteria for suspicious transactions, regularly edited, depending on the economic situation in the country and the world.

So, on the one hand, credit institutions as agents of the national AML / CFT have to comply with the requirements of the money laundering legislation because their activities are associated with a high risk of involvement in the process of legalization of proceeds from crime. On the other hand, in a competitive environment for Russian banks need to

109 maintain and expand its customer base in order to improve business - performance and maintain a stable position in the  
110 banking market. In the course of finding the optimal balance between these objectives, the commercial banks face  
111 additional risks being subjected to sanctions by the regulator as a result of improper performance of duties in the field of  
112 AML / CFT, unconscious involvement of the bank in the process of money laundering and the risk of churn as a result of  
113 loss of goodwill. In view of the foregoing, in our opinion, the Russian banking system need the introduction of a list of  
114 "negative customers" as defined by legislation, which will allow banks to carry out activities in the field of AML / CFT in  
115 conditions of equal competition. In this case, clients who are illegal activities, will eventually be removed from the credit  
116 and finance, as subjects of financial monitoring, guided by this list will be able to refuse service in a timely manner  
117 potentially unwanted customers. On the other hand, the presence of a closed list of criteria for suspicious transactions  
118 and the use of common approaches to determining the nature of the transactions carried out, to avoid subjectivity in  
119 shaping decisions on the identified operations and minimize the risk of commercial bank involvement in the illegal  
120 scheme.

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## Standard Regulation of Corporate Management

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### Abstract

Management of corporation through its standard regulation, in comparison with the standard national system of standardization, is more expedient as there is an opportunity to establish corporate rules of development and application of the standards taking into account structure and specifics of industrial corporation and/or area of its activity taking into account interests of all interested parties, including regional interests. For creation of own system of standardization in corporation it is necessary to analyse kinds of activity, to establish, what are expedient for regulating by means of standardization, and then to define head enterprise of industrial corporation which will perform organizational and methodical management of works on corporate standardization.

**Keywords:** corporation, management, system, standardization, standard documentation, formation, standards of the organization of industrial corporation.\_

### 1. Introduction

Developing QMS strategy at industrial corporations includes setting goals as well as choosing an algorithm for implementing basic corporate standards. According to the authors, it is best to use both the ISO 9001 and 9004 standards, consistent implementation of the provisions of these standards leads to active involvement of all other standards included in the ISO 9000: configuration management (ISO 10007), measuring systems (ISO 10012), project management (ISO 10006), management documentation (ISO / TR 10013), management of the economics of quality (ISO / TR 10014), training (ISO 10015), audit (ISO 19011). The main condition for the successful strategy of the implementation of corporate standards is active and direct participation of the top manager of the corporation. Standards of industrial corporation management (SICM) can and should establish the procedure for developing corporate standards independently, that is, corporations can take a well-documented decision and issue an approval of appropriate organizational and administrative documents on the use and recognition of the legitimacy of the previous and currently existing corporate standards [1]. At the same time the decision should be taken about step-by-step or immediate replacement of all corporate standards and / or changes in their titles. The current Russian GOST ISO 9001-2011 (section 4.2) states explicitly that this documentation can be kept in any form.

Strategy of formation of SMK on industrial corporations, along with statement of the purposes, includes also a choice of option of algorithm of implementation of basic corporate standards. According to authors, simultaneous use thus of the ISO 9001 and 9004 international standards is the best, the coordinated implementation of provisions of these standards causes the necessity of active use of all other standards included in ISO family of a series 9000: on management of a configuration (ISO 10007), on systems of measurement (ISO 10012), on management of the project (ISO 10006), on documents in the field of management (ISO/TO 10013), on management of economy of quality (ISO/TO 10014), on training (ISO 10015), on audit (ISO 19011). The main condition of development of strategy of introduction of corporate standards that it has to pass with direct participation of the first head of corporation. The Standards of the Organization of Industrial Corporation (SOIC) can and have to establish an order of development of the standards independently, that is they can make documentary issued established decision through preparation and the approval of the relevant organizational and administrative document on application and recognition of legitimacy developed earlier and at the moment the existing corporate standards [1]. The question of expediency of stage-by-stage or simultaneous renewal of all corporate standards and/or changes of their designation has to be at the same time resolved. In acting in Russia GOST ISO 9001 - 2011 (item 4.2) it is said directly that this documentation can be in any form [7].



57 **2. Method**

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59 SOPK have to be directed on creation of conditions of mutual interest of all participants of cooperation, both internal, and  
60 external, in increase of productivity and efficiency both own production economic activity, and economic efficiency of a  
61 production activity of industrial corporation. This approach to creation of system of standard regulation for corporations  
62 rather fully meets the requirements of technical regulation in the Russian Federation, is constructed on the principles of  
63 TQM and considers specifics of the knowledge-intensive production [5].  
64 The general structure of standards of the enterprise of industrial corporation is given in fig. 1.

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66 **Fig. 1.** General structure of standards of management of industrial corporation.  
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69 SICM goals are:

- 70 • ensuring compliance of corporate products, operation and services;
- 71 • improving production;
- 72 • using and disseminating the results of research and development in various corporate fields.

73 However SICM should also contribute to the general goal of standardization:

- 74 • ensuring the safety of life and health of citizens, protection of property of natural or legal persons, public or  
75 municipal property, environmental protection, protection of life or health of animals and plants;
- 76 • ensuring the safety facilities under standardization;
- 77 • improving the competitiveness of products, works and services;
- 78 • promoting compliance with the requirements of technical regulations;
- 79 • contributing to scientific and technical progress;
- 80 • securing information compatibility;
- 81 • rational use of all corporate resources;
- 82 • comparability of the assessments and test results, including economic and statistical data of corporations.

83 Obviously, in any corporate structure we can identify tasks that can be appropriately addressed through  
84 standardization. Current GOST 1.1-2002 "Interstate system for standardization.Terms and definitions" states that  
85 "standardization is an activity aimed at achieving the optimum degree of order in a certain area by establishing provisions  
86 for common and repeated use in the existing or potential problems." Moreover, that activity is manifested in the  
87 development and implementation of standards [2].

88 The advantage of corporate standardization over nationwide standardization for industrial corporations is their  
89 ability to set clear rules for corporate development and application of own standards based on the structure, operation  
90 and specificity of its activities.

91 Naturally, there are other types of documents that can solve the same problem as the standards: various  
92 technological and organizational directives, norms, rules, regulations, guidance documents, test procedures,  
93 recommendations, etc. General rules for the templates, layout and titles of certain documents, such as technological  
94 documentation, are traditionally set at the national level, and as these standards often form part of a set of standards,  
95 they are characterized by excessive complexity of the content and structure, and moreover, they are designed for  
96 traditional highly specialized enterprises in high-tech industries. It should be noted that the document forms, specified in  
97 these standards, are outdated and most modern enterprises keep and submit such documentation in electronic form.

98 In order to create your own system of standardization it is necessary to systematize corporate activities, identify  
99 those types of repeatable operations which should be managed with the help of standardization as well as designate the  
100 parent company or structural unit which will carry out organizational and methodological work on corporate governance  
101 standardization.

The next step in the SICM establishment will be the development of a set of fundamental standards which are designed to establish the following rules:

- how to develop, update and cancel the SICM;
- how to establish, designate and register SICM;
- how to use the existing national standards of the Russian Federation in the SICM;
- how to organize and monitor the compliance with the rules established in the SICM;
- how to create and catalogue a compendium of corporate standards, including information on using the documents included in this compendium [3].

The SICM compendium should include a standard for terms and definitions, which should specify the applicable terms and definitions with regard to corporate structure, as well as establish consistent interpretations of terms and definitions used in standardization of corporate activities.

### 3. Results

Overall goals of organizing corporate standardization should be laid out in a separate SICM, where it is important to specify the goals and principles of standardization for the corporation, to identify individual challenges, to determine the scheduling methodology for corporate standardization, and to define the functions of individual companies. Since documenting the QMS requires more attention, it is necessary to take a closer look at the contents of the fundamental corporate standards.

The most important is the content of the SICM establishing the rules for approving corporate standards. It is advisable to determine what information should be used in the development of the SICM. According to the authors, the development of the SICM should take into account:

- suggestions from the structural units of industrial corporations that will use these standards;
- results of project, research and development work in the corporation;
- existing national standards of the Russian Federation;
- international standards;
- experience of leading enterprises in this sector of economy and other information about the latest scientific and technological achievements;
- organizational and administrative documents of federal executive bodies.

At the same time we should not forget that when using documents protected by patents or copyright law we should comply with the rules of the Civil Code of the Russian Federation, and all the necessary information should be presented in the preface to the SICM.

Then it is recommended to appoint a manager responsible for the development and updating of the SICM.

When establishing and regulating the procedure of the SICM development, it is recommended to use the sequence of the following four stages:

- organizing the SICM development;
- drafting the SICM (first edition) and discussion among all interested parties in the corporation;
- finalizing the SICM project, its adjustment, compliance assessment and examination;
- approval of the SICM, its registration, introduction and dissemination.

The section about the organizational issues of the development and realization of the SICM should coordinate the organizational process with corporate planning documents, including plans for writing corporate standardization programs. The authors deem it necessary to establish the possibility of developing the SICM based on organizational and administrative documents of the corporate plan.

When establishing the procedure for the development of the draft version of the SICM it is advisable to compile an explanatory note, which formulates requirements for its content and design. Also it is advisable to prepare a mailing list for the draft version of the SICM to be sent for consideration in various departments. Timeframe should be established for interested parties to consider the draft standard and form an opinion.

Next a procedure for considering and discussing feedback to the draft standard should be established by the developer, and a procedure for finalizing the SICM. Additionally, it is expedient to analyze summaries of the feedback and opinions.

The next step in the corporate standardization planning should address the procedure for reviewing the final version of the SICM and its approval by all corporate structures. It is necessary to set the dates for the procedure, and everyone should be notified that after the deadline the SICM cannot be adjusted in any way. While discussing the SICM, health and safety, environmental and property issues should be considered. Those issues must be approved by the state

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control and supervision authorities that regulate these questions in accordance with the legislation of the Russian Federation.

The development of the SICM can be greatly simplified by the systematization of corporate regulatory documents which enables establishing a corporate management system based not only on the results of external influence but also the transformation of the existing management systems of all companies merged into a corporation.

Table 1 presents an exemplary list of the SICM on corporate governance, the development of which would improve the quality of corporate governance.

**Table №1.** A list of SICM

Standards of Industrial Corporate Management.	Main sections of the document
Management system. Basic issues	Structure of Management System in corporation Structure of the target subsystem Structure of the functional subsystem Structure of support subsystem Structure of outer management system Structure of management subsystem
Management system. Management of product development cycles	Structure of product life cycle in corporation Methods of predicting the production cycles of products Methods of predicting the profitability of production cycles Information and forecasting support
Management system. Principles of corporate management	The point of the system approach Principles of corporate management
Management system. General management methods	Administrative methods of corporate management Socio-psychological methods of corporate management Economic methods of corporate management
Management system. Economic grounds to improve the efficiency of corporate management	Principles of corporate management feasibility Economic grounds to improve organizational and technical level of production Economic grounds to improve the competitiveness of corporation Information support of measurement of corporate management effectiveness
Management system. Methodical support of product competitiveness	Measuring of product competitiveness Methods of studying factors of corporate competitive advantage Information support of corporate management
Management system. Marketing and corporate market strategy build-up	Concept of corporate marketing Functions of corporate marketing Building-up of standards of product competitiveness Building-up technique of corporate market strategy Information support of corporate management
Management system. Corporate pricing policy	Principles of corporate pricing Methods for price prediction
Management system. Quality control	System of corporate quality indicators Certification of products Structure of corporate quality management system
Management system. Resource-saving policy	System of product resource-intensity indicators System of production resource-intensity indicators Analysis of resource use effectiveness Development and implementation of corporate resource-saving measures
Management system . Methods of resource quota setting	Types of norms and standards of corporate management Methods of material resources quota setting for production Methods of material resources quota setting for corporate needs Methods of equipment quota setting Methods of corporate labor resources quota setting Methods of capital construction quota setting
Management system. Methods of corporate technical-organizational planning	Corporate technical-organizational indicators Methods of rating of technical-organizational level of production Methods of technical-organizational development prediction based on forms of corporate reproduction
Management system. Methods of corporate social development planning	Social development indicators Corporate social development planning
Management system. Environmental protection	Environmental protection legislation Areas of environmental protection Planning of environmental protection measures
Management system. Corporate business plans: content and development procedure	Principles of corporate planning Business plan development procedure Business plan implementation

Management system. Corporate processes organization	Principles of rational production and management processes organization Principle of commensurability Principle of corporate differentiation Forward-flow principle Principle of continuity Principle of uninterrupted process
Management system. Corporate accounting and control	Corporate accounting requirements Types of control Corporate control planning Corporate day-to-day control automation
Management system. Corporate motivation	Corporate motivation activities Quality work motivation
Managements system. Regulation	Factors of corporate regulation Methods of feedback analysis in corporate management cycle
Management system. Resource suport	Types of corporate resources Organization of production resource support Balanced methods in organization of production resource support
Management system. Methodological support	Structure of regulatory documents in corporate management Regulatory documents content requirements
Management system. Dataware	Corporate data classification and structure Data requirements Technology Information Support
Management system. Corporate legal support	Corporate management legal support requirements Corporate management regulations
Management system. Technical-organizational support	Technical-organizational support requirements Project technical-organizational structure for development and implementation of corporate management
Management system. Studying methods of macro factors influence on corporate management stability and effectiveness	Macro environment factors Assessment studying methods of macro factors impact on corporate management effectiveness Assessment of macro factors impact on corporate management effectiveness
Management system. Studying methods of regional infrastructure factors influence on corporate management effectiveness	Structure of regional infrastructure Studying methods of regional infrastructure factors influence on corporate management effectiveness Assessment of impact of regional infrastructure factors on corporate management effectiveness
Management system. Studying methods of micro factors influence on corporate management effectiveness	Microenvironment factors Studying methods of competitors Studying methods of customers Studying methods of providers Studying methods of market infrastructure Assessment of corporate microstructure impact on corporate management effectiveness
Management system. Human resource management	Principles of corporate human resource management and corporate culture Corporate subdivision and job description requirements Manager's business qualities assessment Corporate scientific labor management
Management system. Corporate structure of sociological and psychological factors	Personality and staff in corporate management Social aspects of corporate management Corporate management style Methods of reconciliation Stress management
Management system. Methods of management decisions effectiveness analysis	Principles and methods of management decisions effectiveness analysis Comparative analysis Factor analysis Value analysis
Management system. Forecasting methods of management decisions	Principles and classification of predicting methods Expert methods Extrapolation methods Parametric methods

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The given list of standards is rather indicative. The bigger the corporation is and more technically advanced its products are, the more documentation on technical standards it must have.

All SICM must have sections "Basic issues" and "Information support". In author's opinion "Basic issues" section is supposed to show the following:

- relevance of the document (in terms of the current situation at the company);

- 172 • reasons for developing the standard;  
173 • purpose of the document;  
174 • general terms and definitions;  
175 • field of use of the document;  
176 • authorities responsible for monitoring the implementation of the document;  
177 • penalty for non-compliance with the document.  
178 The indicative content of the section "Information support" should include:  
179 • information requirements;  
180 • classification of information needed for using the document;  
181 • sources of information;  
182 • technology and technical means for collecting, processing, transferring, filing and using information.

#### 4. Conclusion

It could be inferred from all the above-mentioned that unlike traditional models of documentation the process of corporate management has to be built on the foundation of systematic principles defined by corporate strategy through cause-effect relation between indicators. This allows running a corporation as a system, selectively influencing only the processes and sub-systems of corporate governance that are relevant to the implementation of the overall strategy. It ensures the strategic objectives are reached through sustainable use of resources.

The authors conclude that corporate standardization should be built on a "block-based" model, where management processes are presented in the form of interrelated actions and operations which include the following: blocks of operation, communication between blocks, logic elements, databases, all of which help increase order, improve organization and develop sectoral management models in future.

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## Experience of Field Geomorphological Research Study on the Territory of the Volzhsko-Kamsky Natural Reserve

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### Abstract

Since the 1940s on the territory of the Raifsky site of Bolshoy Volzhsko-Kamsky biospherical reserve (BVKBR) "UNESCO" the geomorphological conditions are subject to very detailed study. The study of modern geomorphological phenomena and processes on the territory of the Raifsky reserve was the main purpose of the work and geomorphological studies. Formation of the relief the territory under study is closely connected with the history of development of the valley of the Volga River. The territory of the reserve is very heterogeneous by morphology, genesis and history of the development of land forms. It is important to identify the interaction of the relief with the processes of territory development and settlement, i.e. geomorphological conditions are the pledge of successful development of the region.

**Keywords:** geomorphologic research studies, relief, creep, erosion-accumulative processes, gully erosion, reserve.

### 1. Introduction

Relief is the main element of the landscape. Many exogenous factors act influence the environment through the relief, which gives it special significance as the characteristic of the human living environment, as far as in the same climatic and structural-tectonic conditions the natural and antropogenous components of ecosystems develop differently, but in close cooperation with each another as well [1-7].

The Raifsky site of the Volzhsko-Kamsky natural reserve is situated on the left slope of the Volga valley, on its high Quarternary terraces above the floodplain. The terraced terrain is separated by valleys of the small (37 km) left tributary of the Volga river. The river Sumka and its tributaries, numerous ravines, gullies and ravines. The surface of terraces is complicated by karst and karst-suffusion cavities and craters, many of which are occupied by lakes. Quarternary alluvial deposits of the Volga river are underlain by sandy-clayey alluvial-lacustrine sediments of the Pliocene, among which the limestone and dolomite rocks of the Kazan layer of the upper sheds of the Permian system are locally preserved. Pliocene strata ranging from 0 to 140 meters performs deep (up to 100 m) valley cuttings in the Permian rocks. The lower part of the strata is composed of sand and pebble alluvium, upper – of sandy-clayey lacustrine sediments. As well as throughout the Volga region, the time of formation of these deep paleo-valleys and their deposits belongs to the Pliocene.

Paleo-relief of the Raifsky reserve area (north-western, northern and north-eastern parts) are on the southern slopes of Volga paleo-valley of Volga with absolute altitudes minus 20 – 80 meters. The southern part is located on of the limestone-dolomite paleo- watershed divide with absolute altitudes of the buried erosion surface from 0 to 65 meters. In the valley of the river Sumka near the village Ilinskoe the terrains of the Kazan stage crop out. The amplitude of the altitudes of the buried relief of the Permian terrains of all area of the Raifsky reserve is 145 m (from - 80 to +65). The course with altitudes from 0 to – 20 m forms the transition from the paleo watershed divide to the paleo-valley.

Permian and Pliocene deposits in this region are covered with Quaternary sediments everywhere; they form three clearly defined alluvial above flood-plain terraces of the river Volga. The upper terrace of the river Volga – the highest and the oldest – occupies the north-east part of Raifsky reserve. The protogenous initial surface of the terrace had absolute

56 altitudes less than 135 – 140 meters. The smooth slope of the terrace is separated by the valley of the river Sumka and  
57 the upper flow of its small (12 km) tributary of the river Sopa. The slopes of both valleys are scoured by cloughs and  
58 ravines.

59 At the bottom of the terrace the alluvium, that composes it, is represented by channel sand-gravel-pebble deposits  
60 which are opened up in the outcrops of the right bank of the river Sumka in 3 km to the North-East from the village  
61 Belobezvodnoe and up the river near the village Ivanovsky. Upslope the sands are inter-lain with siltstones, clay loam  
62 and clays representing floodplain facies. Total output of alluvial suites is up to 40 meters, its sole lies at absolute altitudes  
63 of 70 - 75 meters (30 – 35 meters above the low water level of the old Volga river).

64 Within 6 - 7 km to the North from the Lake Belobezvodnoe, near the north-eastern border of the Raifsky area the  
65 alluvium of the upper terrace leans against the terrains of the Upper Perm that compose the left valley slope of the valley  
66 of the Volga river and the surrounding it denudation plain of 170 - 200 meters height. Within 2 - 3 km to the North from the  
67 Lake Belobezvodnoe the alluvium of the lower middle terrace of Volga is joined to the alluvium of the upper terrace and  
68 older sediments of the Pliocene and the Eo-pleistocene that underlies it. Thus, the width of the upper terrace of the site is  
69 just 4 - 5 km.

70 The middle terrace stretches by the wide (10 - 12 km) strip from the West – North-West to the East – South-East. It  
71 has a wavy surface separated by the valleys of the river Sumka and its drying-up left tributary Ser-Bulak, by smooth-  
72 slope, often bogged up hollows. Cloughs and small valleys with drying-up streams are expressed in the relief more  
73 sharply. On the watershed divides between the valleys, ravines and cloughs the absolute altitude marks range within 100  
74 - 120 m. They are close to the level of the primary accumulative surface of the terrace which probably does not exceed  
75 120 - 125 meters. On the North-West the middle terrace is connected with the smooth upper slope, and it is possible to  
76 judge about the change of terrace levels only by the change of prevailing heights and geological structure. In the South,  
77 the middle terrace is separated from the lower one by the well-defined terrace with up to 40 - 45 meters height.

78 The river Sumka (36 km) is an important relief-forming element of the entire Raifsky reserve. River Valley is  
79 characterized by good development and abrupt asymmetry of the slopes: the left slope is flat, and the undergoing to the  
80 underwashing right slope is steep and high everywhere. The absolute height of the terrace is 85 m (32 m above the  
81 reservoir level). The height of the rim is 72 meters. The slope of the terrace is not forest, it is formed by diluvial clay loam  
82 and separated by numerous small gullies that accelerate erosion and gravity processes.

## 83 84 **2. Methodology**

85 Relief, its forms, parts of forms and microforms are the main object of the geomorphological study. The study of  
86 topography and exogenous processes is to describe their appearance (morphology) with field mapping, to establish their  
87 size and position in space (morphometric), to determine of their origin (genesis) and to identify the stage of development,  
88 the sequence and time of their formation (age).

89 Field studies are carried out on the territory of the Raifsky site of the Big Volzhsko-Kamsky Biosphere Reserve "  
90 UNESCO" since 2006 and are regulated by the existing methodological instructions, instructions on organization and  
91 performance of geomorphological and geological surveying works [7].

92 The following stationary and semi-stationary observations were carried out during the field geomorphological  
93 studies: the study of intensity of gully erosion processes in the buffer zone of the reserve; the study of the speed of  
94 accumulation of sand deposits on the alluvial fans of the river Sumka; the study of slope processes and creep;  
95 construction of cross sections on the site between the lakes Raifskoe and Ilnskoe along the line of pits' extension; the  
96 study of sandy sediments of terraces of Sumka and Volga; the study of the abrasion processes – underwater of river  
97 banks of Sumka; geomorphological map drawing.

98 Research work concerning accumulative, erosion-accumulative and slope processes, the study of abrasion  
99 processes was carried out on the ground. 3 sites were organized for precise alignment of all constituent elements of  
100 comprehensive observation and geomorphological survey on the territory of the Raifsky BVKBR. There the periodical  
101 monitoring for the topography and the mass of the moved material under the action of relief-forming processes was  
102 carried out since 2006.

103 Measurement technique to study the current dynamics and the specific methodology for the organization of sites  
104 varies depending on characteristics of the study of relief-forming processes and the areal coverage of researches, when  
105 the point (creep) and profile (holding of theodolite field traverse of alluvial fans, the underwater of the banks of the river  
106 Sumka) observations were applied. Standard instruments (theodolite, GPS – receiver, elevation meter) and leveling mark  
107 were used for the organization of sites.

108 The study of the alluvial fans was carried out on the areas of the river fall of Sumka into the karst lakes - Raifskoe,  
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Bezobezvodnoe and Ilinskoe. Description and laying of the theodolite field traverse, bathymetric profiles of "the Raif" lakes and building of cross sections on sites between lakes was carried out. High-altitude position of the network of intermediate points to draw detailed images of the cones on the plan using the contour was defined on the alluvial fans.

Observation of the underwater of the banks of the river Sumka was on the site of one of the largest bends of the river. Another type of work carried out within the frames of the field research, is to find the most abrasion-unstable (washed out) banks of the river Sumka and to fix them using preliminarily numbered leveling marks. The leveling marks were pitched into the ground on a small (0.5 - 1 m) distance from the edge of the washed out shore. 8 regular and 1 one-time stations with leveling marks were organized.

The study of the creep processes is an important scientific research problem to be solved in the study of the terrain. In organizing these point stations the authors used a very simple – from the technical point of view – methodology of A.P. Dedkov, V.A. Duglav and V.I. Mozzherin [8, 9]. A total of 10 exploring pits were dug, with 1,4 – 1,8 metres deep. According to the plan, these exploring pits are located on 3 lines. The first line is on the left bank of Sumka, on gentle forest slopes of the North-Western exposure; the second one – on the right convex-concave slope of the South-Eastern and Eastern exposure, and the third one – on the gentle treeless (meadow) slopes of the right bank of Sumka. The distance between the exploring pits on the lines is 250 - 320 meters in average.

In the process of foundation of the exploring creep pit in its aseismic wall that is oriented along the slope digging, metal plates of 3x3 cm in size are forced along the plumb line in 5 cm. The position of the vertical plumb line is recorded before the backfilling of the exploring pit by the iron rod (dowel) 50 cm long, driven into the bottom of the pit and on the surface on the front wall of the pit with a space of 10 cm.

### 3. Results

In the study of the territory of the Raifsky area of the BVKBR by change of the prevailing heights and the geological structure we identified six areas with surfaces and landforms confined to them. Most part of the territory (58.1%) is occupied by the alluvial middle neo- Pleistocene surface of the fourth above-floodplain terrace of the river Volga. It stretches from the West-North-West to the East-South-East and has the wavy surface divided into parts by the valley of Sumka and Ser-Bulak. The absolute level marks of the territory are from 67,4 m (the level of the lake Linëva) to 110,4 m (on the North-Western border of the reserve area). On the watersheds between the valleys, cloughs and ravines the relative heights reach 120 meters. The karst, erosion, suffusion and creep-landslide processes are developed on the surface. In some places the surface is complicated by the dunes. In the North and North-West the surface of the fourth above-floodplain terrace is connected with the alluvial Eo-Pleistocene surface of the sixth rock-defended above-floodplain terrace of the river Volga (with the square of 32 square kilometers of the area - 17.2%). The absolute marks of the territory are 76,4 (the water edge in the middle flow of the river Sumka) – 112,9 (in the North-East of the reserve) meters. The eroded surface is at the height of 125-130 meters. The surface is erosion-accumulative, the alluvium that composes it lies to the lacustrine sediments of the lower Eo-Pleistocene. The width of the surface on the site under consideration is only 3-5 km. In the places of developments of the carbonate rocks the karst and karst-suffusion cavities and funnels are found.

The delluvial-solifluction Late-Neo-Pleistocene-Holocene surface of steep (less than 10 degrees) lower parts of slopes is developed in the North, outside the Raifsky reserve. It occupies approximately 21 square kilometers (11.3%) of the shooting territory. The absolute height marks range from 86,6 m (the level of the lake Chernoe) to 126,9 (in the East – near the village Krasny Caral) and 140 m (in the West – near the village Bolotnye Kluchi). There is the development of karst-suffusion holes, gully erosion, landslides.

The alluvial Late-Neo-Pleistocene-Holocene undifferentiated surface of the floodplain, of the first and second above-floodplain terraces of the river Sumka (9 km<sup>2</sup> - 4,8% of the total area) is located within the valley of the river Sumka. The surface is significantly different on the geological structure from the coast host arrays and coastal separating watershed spaces, and it is composed of modern alluvial deposits, mainly water-saturated. The absolute level marks of the territory are 64,4 – 84,6 meters (the water's edge of the river Sumka in the middle and upper flow).

Denudation surfaces of watersheds – the erosion and solifluction Late-Neo-Pleistocene of steep (more than 10 °) upper slopes (10 km<sup>2</sup> - 5,4%) and the denudation Late-Eo-Pleistocene – Early-Neo-Pleistocene of the middle plateau (6 km<sup>2</sup> - 3,2%) are the most Northern regions covered by geomorphological shooting. Here asolute marks reach 180-240 meters. Here the river Sumka heads; erosion (gullies and ravines network with steep erosion-denudation slopes), landslide, karst-suffusion and subsiding processes are developed.

In total, in the study of alluvial cones 127 points and 5 observing stations with registration benchmarks were laid. The parts of the coastline of the river, lakes, the borders of bends of the alluvial cones of rivers were observed and

recorded and sketched out by theodolite traverse. It was found that the greatest increase of the height of the alluvial cone was on the lake Belobezvodnoe: 0.5 meters. Together with the research study of the alluvial cones the study of sand deposits of the terraces of Sumka and Volga was carried out: the grain size analysis of sands by sample testing (15–20 samples) and the particle screen analysis of sand deposits with the calculation of volume of fractions of different sizes.

In total 20 rack points with the first theodolite station were established in the study of the caving of the banks of Sumka. Shooting and measurements showed that the abrasion and displacement of the shoreline is at an average speed of 30-40 cm / year.

The study of the creep processes is an important research problem solved in the field environment [10-12]. In total 10 pits (Table. 1) with the depth of 1.4 - 1.8 meters were dug.

**Table 1.** Data on slope of creep pits

Number of creep pit	Depth of pit, sm	Number of plates	Grid coordinates (x, y)	Altitude, m	Distance between pits, m
1 <sup>st</sup> sector (forest, the left bank of the river Sumka) in azimuth 335°					
1	149	28	9356272	83	280 450
			6195892		
2	172	31	9356248	85	
			6196036		
3	134	25	9355931	81	
			6196285		
2 <sup>nd</sup> sector (nec, the right bank of the river Sumka) in azimuth 360°					
4	177	34	9355485	91	400 300 250
			6197631		
5	173	28	9355391	100	
			6197070		
6	175	33	9355552	95	
			6198410		
7	162	31	9355579	97	
			6198653		
3 <sup>rd</sup> sector (meadow, outside the village Belobezvodnoe) in azimuth 296°					
8	140	26	6198653	89	320 320
			6201554		
9	158	30	9362013	89	
			6201744		
10	157	30	9361764	91	
			6201896		

According to plan, these pits are located on 3 lines: the first is on the left bank of the river Sumka, on gentle slopes of the north-western exposure; the second one – on the right convex-concave slope of the South-Eastern and Eastern exposure, and the third one – on the flat treeless (meadow) slopes of the right bank of Sumka.

In total 296 metal plates (25 - 34 plates per pit) were laid for further identification of mechanisms and dynamics of development of creep processes. On the basis of the data of the excavated pits after 2 years we can conclude that the displacement of soil in forested and grassland areas is observed up to the depth of 120 cm. Maximum creep rate is on the meadow areas (30 - 36 mm a year), and in the forested areas – 5-13 mm (on the left bank of the river Sumka the creep rate was 0,5 - 1 cm, on the right bank – 10-13 mm a year).

Modern soil and gully erosion affects only treeless arable lands which are particularly susceptible to human impact. These places are located in the northern part of the reserve. Erosion products are accumulated on the floodplain bench complex of small rivers [13], a large mass of sediment flows into the river Sumka and into the lakes in its valley, causing its siltation and general degradation of the drainage system [14].

#### 4. Statements

Modern relief of the Raifsky reserve owes its origin to the complex natural and anthropogenic activities.

During the geomorphological studies on the territory of the Bolshoy Volga-Kama Raifsky reserve the development

194 of modern exogenous processes, including gullying, slow displacement of soil (creep), caving of the riverbanks was  
195 studied.

196 Geological and geomorphological profiles across the strike of the main elements of the relief were set up, 10 creep  
197 pits were laid on the treeless and wooden lots of the Valley of the river Sumka, the data on the key reference sections of  
198 Quaternary deposits was obtained. In order to conduct the graphic recording of the river during the flood phase of the  
199 water regime the mapping of two alluvial cones of the river Sumka was carried out in the places of its fall into the lakes  
200 Raifskoe and Beloe. In the study of abrasion-unstable (undermined) banks and dynamics of meandering of the river  
201 Sumka it was found that the abrasion activity of the river Sumka is significant and considerably varies from year to year  
202 (0,5-0,7 meters a year). The processes upstream the river Sumka from the lake Beloe on sharp turns of the river Sumka  
203 are particularly intense in spring.

204 According to field observations and surveying work, cartographic, textual materials, as well as large-scale satellite  
205 images the geomorphological map of the scale 1: 50000 was mounted. The way of color plastics (qualitative  
206 background), i.e. the coloring by different colors and shades depending on the age of the relief surfaces, as well as the  
207 ways of areas, localized icons and linear signs, was widely used on the map.

## 209 5. Conclusion

211 The research work of the study of the relief on the territory of the Raifsky Reserve was carried out in accordance with the  
212 methodology which is the most optimal in terms of quality, time spent and technical capabilities.  
213 Further studies are of great interest for identification of the mechanism of formation of relief-forming processes, for  
214 forecasting and identification of dynamics of modern exogenous and creep processes.

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## Typology of Export Specialization of the Russian Regions

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### Abstract

*The work carries out the primary analysis of the mass economic-geographical information which includes: 1) the stage of systematization using the methods of typing and zoning, 2) the analysis of the existing sectorial and regional characteristics of the foreign trade activity of the Russian Federation. Balances of foreign trade operations of all organizations as parts of the subjects of the Russian Federation that carry out these operations in the period from 2000 to 2010 within major product groups, are in the basis of the typing. Combining the indicators of foreign trade in seven groups is according to state statistics: food supplies, supply of fuel and energy components, petrochemical products, the supply of timber and related forest products, supply of products of the metallurgical and machine-building industries, as well as the group that unites all the other types of products. In the result of the research of the branch structure of the regions' export we managed to allocate 8 types of subjects of the Russian Federation, where the regions without prevalent specialization belong to the 8th type.*

**Keywords:** export, typing, sectorial structure of the region, foreign economic activity, competitiveness.

### 1. Introduction

The modern stage of development of the Russian economy sets the state a number of important tasks. Optimization of foreign economic activity is one of these tasks [1]. According to the existing terminology, foreign trade, capital flow, the provision of services of different nature (productive and non-productive), international tourism and others belong to the main types of foreign economic relations. Among the main indicators that characterize the foreign economic activity of the state, foreign trade, exports, imports, trade balance (balance of foreign trade), export and import quotas (the share of exports and imports in GDP) and others are of particular importance [2].

The collapse of the USSR in the early 90s of the 20<sup>th</sup> century aggravated the economic crisis in our country, led to breakdown of traditional economic ties. Since 1999, the trade turnover, exports and imports in Russia gradually began to increase, and now our country has positive trade balance. Development of foreign trade is possible only if the country has the corresponding export potential which is understood as possibility of the country to export (sell abroad) available or produced resources, goods and services [3]. At the same time, today the exports of Russia has a distinct resource orientation, and Russia is on the so-called "raw needle" [4, 5].

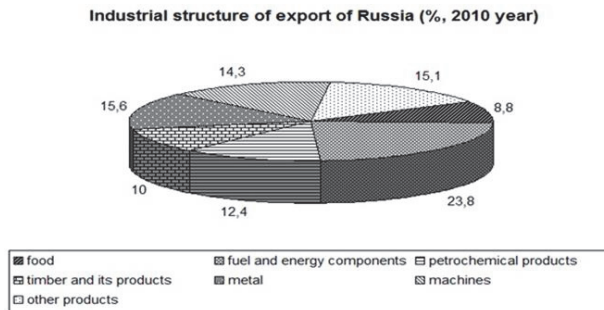
The paper presents the preliminary analysis of the mass economic-geographical information which includes the stage of systematization using the methods of typing and zoning; the analysis of the existing sectorial and regional characteristics of the foreign trade activity of the Russian Federation. The typology of the regions of Russia by industries of export specialization in order to assess their participation in international production networks is the aim of the work.

57 **2. Methodology of the Research**

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59 The primary analysis of mass economic and geographic information traditionally includes the stage of systematization  
60 which, in its turn, is always connected with the use of methods of typing and zoning. The analysis of the existing sectorial  
61 and territorial characteristics of Russian foreign trade activity, which, in the context of this study, is considered, firstly, a  
62 special stimulus of technical upgrading of the modernizing economy, and, on the other hand, the constant growth of the  
63 standard of living of the population, is not an exception.

64 It is necessary to say that the use of typology as the method of scientific research is well represented in the  
65 literature of recent years: Lipscomb and Kashbrasiev, 2008, Kontorovich, Eder, and Nemov, 2012, Chernova, 2013,  
66 Gusev, 2013 [1, 5-8].

67 Balances of foreign trade operations of all organizations as the part of the subjects of the Russian Federation that  
68 carry out these operations during the period (from 2000 to 2010) separately for the major product groups, are in the basis  
69 of our typing. According to government statistics, there is the combining of foreign trade activity indicators into groups,  
70 among which seven groups are outlined: food supplies, supply of fuel and energy components, petrochemical products,  
71 the supply of timber and related forest products, supply of products of the metallurgical and machine-building industries,  
72 as well as the group that unites all the other types of products [9]. Their ratio can vary significantly depending on the level  
73 of development of the country, internal and external conditions. In Russia, the supply of fuel and energy products plays  
74 the leading role (fig. 1).  
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78 **Fig. 1.** Industrial structure of export of Russia (% , 2010)

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80 Indicators of territorial and sectorial structures of foreign trade activities of the entity (entities) were calculated on the  
81 basis of the balance of foreign trade, and it allowed to calculate the entire set of paired coefficients of the linear  
82 correlation for each pair of corresponding sectorial structures of foreign trade activity of each of the pairs of entities.  
83 Anderson D., Sweeney D., Williams T. say that when the decision-maker is sure about the reliability of connection  
84 between two variables, in such cases it is possible to use the correlation analysis as one of statistical methods; it defines  
85 the bonding strength between two variables [10]. Applied to our problem to be solved, the authors propose a new method  
86 to determine the pair correlation between sectorial export structures of two compared subjects *i* and *j*, which can be  
87 represented by the following formula:

$$88 \quad r_{x^{(i)}x^{(j)}} = \frac{\frac{1}{n} \sum_{k=1}^n x_k^{(i)} x_k^{(j)} - \bar{x}^{(i)} \bar{x}^{(j)}}{\sigma_{x^{(i)}} \cdot \sigma_{x^{(j)}}}, \quad (1)$$

89 where the specific gravity values of the *k* sectorial structural position of export (*k* = 1,2,...,n), accordingly, for *i* and *j*  
90 entities are represented by  $x_k^{(i)}$  и  $x_k^{(j)}$ ; values of  $\bar{x}^{(i)}$  и  $\bar{x}^{(j)}$  of average relative share of the export structure, accordingly,  
91 for *i* and *j* entities, which are calculated by the formula (for *s*- entity (*s* = 1,2,...,m)):

$$92 \quad \bar{x}^{(i)} = \frac{1}{n} \sum_{k=1}^n x_k^{(i)}, \quad (2)$$

93 and by  $\sigma_{x^{(i)}}$  и  $\sigma_{x^{(j)}}$  values – standard mean square deviation of the structure of export, accordingly, for *i* and *j*  
94 entities which are calculated by the formula (for *s*- entity):

$$95 \quad \sigma_{x^{(i)}} = \sqrt{\frac{\sum_{k=1}^n (x_k^{(i)} - \bar{x}^{(i)})^2}{n}}. \quad (3)$$

96 The number *m* defines the number of subjects of the Russian Federation, and *n* – the number of structural

97 positions of export of the region – the RF subject.

98 Besides, the coefficients of correlation between the subject and the index of the averaged sectorial structure were  
99 calculated on average in Russia. These coefficients, as well as the visual comparison of the similarity of structures  
100 allowed to implement the typing subjects of subjects of the Russian Federation by indicators of foreign trade. Besides, the  
101 degree of compliance of the territorial structures of export to the corresponding structure of the foreign trade activity was  
102 determined by the methods of correlation analysis. Typing of the dynamic changes of indicators of foreign trade activity of  
103 subjects of the Russian Federation is another direction of the primary analysis of the foreign trade activity of the Russian  
104 Federation. For this we used the methods of determining the average indicators of annual growth and increase of  
105 indicators of entities of this activity.

### 107 3. Results of the Research

108 8 types of subjects were determined in the subjects' sectorial structure of export. It is necessary to say that the  
109 distribution of subjects by types is uneven. Fuel and energy type is clearly the predominant one (table 1).

112 **Table 1.** The distribution of the Russian regions by types of export specialization

Type	Number of regions
Type 1 – food	6
Type 2 – fuel and energy components	23
Type 3 – petrochemical products,	9
Type 4 – timber and its products	6
Type 5 – metal	12
Type 6 – machines	12
Type 7 – other products	9
Type 8 – absence of clear specialization	5

114 In general, the qualitative composition of the types of regions by the prevailing export specialization is as follows:

- 115 - type 1: food. It defines entities in the export structure of which there is prevalence of food exports share. It's  
116 remarkable that the majority of them are regions of the Far East that work for the perspective Asian region. In  
117 addition to seafood, some Far East regions have good potential of export of agriculture products;
- 118 - type 2: fuel and energy. It defines the entities, in the export structure of which there is prevalence of share of  
119 fuel and energy resources export (coal, oil, gas). In the typing of exports it is the largest group. The subjects of  
120 the Russian Federation that have different natural resources of energy nature –coal, gas and oil – are included  
121 in this group [11]. Two subjects of the Russian Federation –Moscow and St. Petersburg –that don't have their  
122 own natural resources but anyway have "controlling interest" of production and export of energy resources in  
123 the country, are an exception [12]. This group of subjects has regional structure of industry exports that almost  
124 coincides with national structure in which 4/5 of value of exported production falls to the share of two rough,  
125 primarily export industries – fuel and energy exports (69% of exports value) and exports of metal and  
126 handicrafts (10%) [13];
- 127 - type 3 – oli and gas. It defines those subjects, in the export structure of which the share of petrochemicals and  
128 organic synthesis prevails. Despite the considerable attention paid to the development of this part of the  
129 economic complex of the country, it is clear that now this sector of the economy plays the significant role in the  
130 saturation of the domestic market. It is possible that the deepening of such analysis in the context of individual  
131 mono- and poly-sectorial "clusters" will allow to assess their contribution into the export of petrochemical  
132 products and organic synthesis, whereas in the export of production of "the covering" subject the similar  
133 weight decreases;
- 134 - type 4 – forest. It is formed by subjects, in the total export of which the relative weight of supply of wood and  
135 its products is rather large [14]. The subjects of the south of the Far Eastern Federal District in their supply  
136 practically do not focus on trade by timber products with the neighboring countries. Gradual depletion of forest  
137 resources in this part of the country will require to solve the whole set of tasks of diversification of "forest"  
138 orientation of development of this part of the country;
- 139 - type 5 – metallurgical. It is formed by the subjects, the prevailing share of the funds received from the export of  
140 which is connected with the sales, in the first place, of metal and semi-finished products of it. First of all, it is  
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the traditional centers of production of black metal, as well as smelting centers of non-ferrous metals. It is necessary to say that in this group there are regions, in which, alongside with the industry that determines the export focus, there are other sectors with the significant relative weight of regional exports;

- type 6 – machine-building. It is formed by regions, in which the production of machine-building industries is the prevalent item in the income from export. Those subjects, in which the development of industries of the military-industrial complex is traditionally supported, are included in this group of subjects, as far as the other sub-industries of machinery engineering can not currently dictate the competitive terms to the world machine-building complex and that are focused to the national market in the manufacturing and sales of production. However, in conditions of possible fuel and energy revolution that will carry out the re-orientation to new types of energy, the gradual transition from the raw material orientation of the national economy to the creative one, with the high level of national engineering, is possible ;
- type 7 – other industries. Subjects whose export is the so-called other production, including production of chemistry, precious gems and jewelry, handicrafts, ornamental semi-precious stone, etc., are the part of this industry. The Republic of Sakha, the total volume of export of products of which considerably exceeds the total volume of export of all other subjects mentioned, is the natural leader among these subjects by export turnover. However, this Republic occupies one of the last places in the group of the most "exporting" subjects by the size of value of exported production. Over the last 30 years in Yakutia there are no conditions for development of rich coal reserves, the increase of production and exports of which could replenish energetic balance of DFO and to raise export status of the republic;
- type 8 – without prevailing specialization. The characteristic feature of the regions of this type is in approximately equal shares of several industries in regional exports, and this does not allow to refer them to some of the above-defined types. Apart from various combinations of prevalence of different industries in the structure of export the regions of this group differ by the lack of fuel-energy exports (except the Altaysky region) (fig. 2).



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Fig.2. Export Specialization of the Russian Regions

#### 4. Statements

The results of the research of the sectorial structure of Russian exports allowed to define 8 types of subjects of the Russian Federation that fairly present peculiarities of the regional exports.

These types of subjects of the Russian Federation by the sectorial structure of exports allow to say that currently the export is a fairly compact system that is connected, first of all, with sales of fuel and energy resources and metal goods outside the country. Exports of forest and its products do not constitute a significant part of export. Our studies show that in general, the export of Russia currently has a distinct resource orientation, and Russia is on the so-called "raw needle."

On the other hand, production works that are directly or indirectly connected to the traditional production of military-industrial complex that preserve the scientific and production potential, play the significant role in maintenance of the



182 export competitiveness of the national economy. The production of this complex partially re-oriented to civil needs, is  
183 more than 10% of value of national exports.

184 The study shows that during the period (2000-2010) the amount of the national exports increased by almost 3.8  
185 times. It is necessary to particularly note the development of foreign trade activity of the Sakhalin region, in which the  
186 exports for the period increased by more than 27.5 times. This occurred against the background of production and sale of  
187 fuel (oil), as well as the all-round development of production and processing of seafood. In distribution of the regions in  
188 terms of gross exports there is the extreme asymmetry.

189 In conclusion, it is necessary to say that the spatial structure of the annual amount of exports in 2010 is almost  
190 identical to the similar structure in 2000. The conclusion is quite natural – the country as a whole and in terms of entities  
191 continues to be oriented to the raw materials principle of obtaining the foreign income. It continues to "push" the country  
192 away from the process of sectorial and territorial modernization and development.

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## Modelling of Economic Growth in Russian Agriculture

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### Abstarct

*The article deals with the experience and problems of production funds building in Russian agriculture. Factors of agricultural production best reflecting dynamics of output in agriculture are substantiated. The model of agricultural production in 1996-2012 was built.*

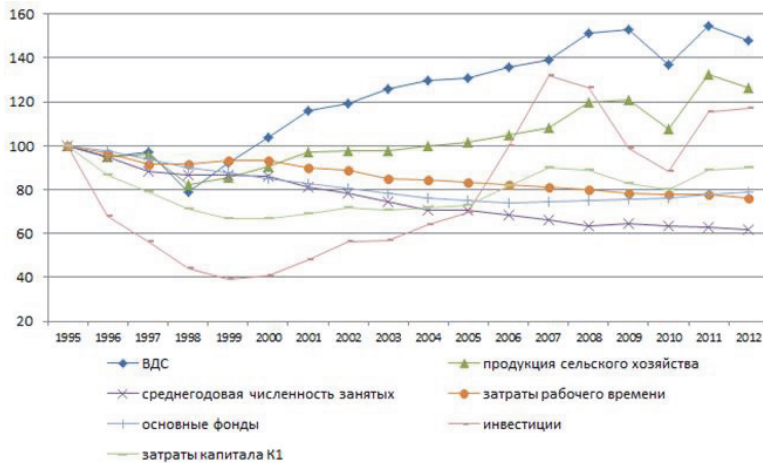
**Keywords:** *production function, agricultural production, factors of agricultural production, econometric modelling*

An important part of economic growth in agriculture is the production function connecting output with labor cost, volume of basic funds and other factors of production.

Apparatus of production functions is sufficiently well constructed for the developed market economies; many foreign and national literary works are devoted to it. At the same time, under conditions of Russian economy, essential problems of production funds building arise. The basic difficulties appear with evaluation of production factors cost of the basic funds and labor. Under conditions of intensive structural shifts, indices of traditional production factors can not reliably reflect information necessary for the production function building. For example, in 1996-2012 in agricultural organizations the number of workers decreased practically by a fourth, the cost of basic funds in comparable prices – by 21%, production of goods increased by 33%. Thus, the question arises – whether it is appropriate in Russian economy to use the production factors and functional form which the simple production function is.

The Gross Value Added (GVA) or agricultural production can be viewed as indices reflecting the output change in agriculture. The choice of output index depends on research goals, specification of production functions and moreover the availability of statistical data. The use of different indices as the output measure constrains production function and interpretation of the results obtained.

In picture 1 indices of GVA's physical volume and agricultural production are presented. As it can be seen, directions of indices change considered as output indices are equal although differ quantitatively. Physical volume of agricultural production had increased from 1995 to 2012 by 26,2%, while GVA – by 51.6%. The difference is explained by volume of interim consumption and correlation of output prices and interim consumption.



46  
47  
48 **Picture 1.** Dynamics of output and production factors in Russian agriculture in 1996-2012 (in percents by year 1995)  
49

50 The number of the employed and hours performed are as a rule regarded as evaluation of labor costs. In the first case it  
51 is supposed that labor costs are proportional to reserves of labor resources. In Russian statistics average annual number  
52 of the employed in agriculture is calculated. People who have worked in agricultural organizations and organizations  
53 serving agriculture in peasant farm economy and those occupied by individual labor activity without formation of legal  
54 entity and employed in agricultural production for sale belong to them [2, 22 p.].

55 The more precise index reflecting labor costs is the combined labor time input. On the basis of the selective  
56 research on the employment, Russian statistics calculates general amount of the hours performed at all types of works on  
57 the production of goods and services. This index characterizes a number of actually performed man-hours at all types of  
58 works on the production of goods and services (for primary and secondary employment and also agricultural, forest,  
59 hunting and fishing products in domestic economies for sale as well as for self-use on the territory of the country. It is  
60 calculated by multiplication of labor places for each kind of works over average actual working time for every working  
61 place [2, 22 p.].

62 Russian agriculture starting from 1999 is characterized by weak connection between the dynamics of output and  
63 labor costs in agriculture (pict.1) While the indices of output increased, the labor costs demonstrated the opposite  
64 tendency, the number of the employed in agriculture decreasing at a faster pace than the quantity of the hours performed  
65 that indicates the increase in the intensity of labor force business.

66 Evaluation of capital costs is the most complicated during the production function building. During its evaluation a  
67 number of questions arise on the methods of costs and estimation of their quality changes.

68 Evaluation of basic funds must be presented as an aggregated index taking into account quality changes in  
69 separate production units connected with their aging and wear and change in technological level. To build such  
70 estimation information on input funds, their productivity in comparison with those already existing, terms of the  
71 equipment's service, the cost of the equipment's repair is needed [3, 120-121].

72 Russian Statistics calculates the index of the basic funds' volume, dynamics of which in agriculture is presented in  
73 picture 1. As in case with labor cost, dynamics of the basic funds' physical volume of GVA does not reveal visible  
74 similarity with dynamics of GVA volume and agricultural production. The increase of output indices is accompanied by  
75 decrease in the index of the the basic funds' physical volume.

76 Besides, the index of the basic funds' physical volume does not consider the change in volumes of basic funds'  
77 agricultural assignment in sector «Domestic farms», despite the fact that in population's farms a remarkable part of  
78 agricultural products is produced – 43.2% in 2012. Production of agricultural goods in population's farms is hand-made, at  
79 the same time capital input is taken into account in index of the basic funds' physical volume, since in a village some  
80 operations (ploughing) are completed by the agricultural organizations' machinery.

81 From the point of view of the production function building among the considered production factors, in Russian  
82 economy factor which could influence the output dynamics is not evidently taken into account. From the formal point of  
83 view, it should be such a factor that its base index would have decreased more during decline than indices of GVA's

physical volume or agricultural production. And during rise this factor must demonstrate outstripping increase. From economic point of view, it should be such a factor that would influence significantly the dynamics of output. Many researchers view investments as such a factor. Investments demonstrate much greater decrease than output, they are important for economic growth and are scarce in Russian agriculture. Dynamics of the investments' physical volume in main capital in agriculture is shown in picture 1.

In our opinion, taking into account investments as a factor of capital input would be not correct enough, since contribution of already existing basic funds would not be considered.

Whereas, with the change towards market conditions many basic funds depreciated, old funds were not fully used. This reflects decrease in their importance as a factor of production. Besides, effectiveness of newly added basic funds is higher than the old ones. This raises methodological problem of incommensurability of the new and old basic funds during basic indices construction of the basic funds' physical volume. In such a situation it is not correct to sum up the input evaluation of the old and new funds.

The simplest way to obtain capital input estimation in which old funds input is reduced and input of the funds being introduced is increased is the aggregate's construction [4, 143p].

$$K_1 = K^\beta I^{1-\beta}, \quad (1)$$

where  $K$  and  $I$  – indices of basic funds and investments physical volume;  
 $\beta$  – constant, accepts values from 0 to 1.

According to calculations made by V.A. Bessonov [3,144p], value  $\beta = \frac{2}{3}$  well fit Russian economy. In picture 1 dynamics of capital input estimation  $K_1$  obtained on the base (1) where  $\beta = \frac{2}{3}$  is presented. Dynamics of the given index best repeats changes of output indices in comparison with the indices of basic funds and investments' physical volume.

Picture 1 evidently demonstrates that the diagrams of output indices (GVA and agricultural production) are situated higher than the diagrams of production factors indices in agriculture. This means that neither GVA nor agricultural production can be viewed as average between labor and capital input, since the result of averaging must be situated between values being averaged. Such combined dynamics of the given time rows can be described only by production function possessing level of homogeneity more than 1 or production function taken into account apart from the considered production factors, other factors resulting in outstripping increase of output in comparison with other factors of production.

Situation when input rise exceeds increase of the production factors indicates that in surroundings of  $t$  economic development occurs rather efficiently in terms of production factors use (if the factors were chosen rationally from the meaningful point of view and measured precisely enough). Such a situation is frequently interpreted in terms of high return on scale and positive technical progress.

Opposite situation when the dynamics of output is lower than the dynamics of production factors means that in surroundings of period  $t$  factors are used uneffectively. In this case situation is frequently explained in terms of low return on scale or negative technical progress. Both situations mean that in surroundings of period  $t$  linear-homogeneous production function cannot be used [1, 28p].

Thus, economic rise cannot be explained with the help of production factors such as labor and capital. Nonetheless, it can be explained by these factors' productivity rise that reflects investment in output of all other factors not taken into account directly as arguments of production function. This residual is called combined factor productivity or Solow residual named after Robert Solow – an economist who was the first one to suggest such a method in the fifties of the last century [5]. Solow considers such an approach as a measure of technical progress.

$$Y = A \cdot F(K, L),$$

where  $Y$  – indices of physical volume of production output;  
 $A$  – combined factor productivity;  
 $L$  – indices of labor costs.

We evaluated different types of production functions with different factors of labor and capital costs. As a result modified production function Cobb-Douglas taking into account technical progress was chosen:

$$Y = ae^{\rho t} K^b L^{1-b} e^u, \quad (2)$$

where  $t$  – time factor;  
 $\rho$  – permanent pace of technical progress;  
 $u$  – accidental mistake

Initial data for estimation of production function (2) are presented as basic indices (year 1995 – 100%). Index of physical volume of agriculture for all types of farms is presented as output index; index of the combined working time

136 input as evaluation of labor cost and temporal rows of three indices were used as evaluation of capital input: in model 1 –  
137 index of physical volume of basic funds, in model 2 – index of investments' physical volume, in model 3 – average  
138 geometric weighted of physical volume indices of basic funds and investments calculated according to (1), where  $\beta = \frac{2}{3}$ .  
139 Production function (2) results in linear form

$$\ln \frac{Y}{L} = \ln a + pt + b \ln \frac{K}{L} + u$$

140 And can be estimated by the method of the smallest squares. Results of the production function's parameters  
141 evaluation on the basis of annual data for the period 1996-2012 are presented in the table.  
142  
143

144 **Table.** Estimation of production factors function  $\ln \frac{Y}{L} = \ln a + pt + b \ln \frac{K}{L}$  in agriculture in Russia in 1996-2012  
145

Model	$\ln a$	$p$	$b$	Coefficient of determination	Darbin-Watson statistic
Model 1	-0,118 (0,004)	0,038 (0,000)	0,643 (0,055)	0,924	1,916
Model 2	0,004 (0,946)	0,024 (0,000)	0,176 (0,005)	0,950	2,081
Model 3	0,013 (0,795)	0,025 (0,000)	0,496 (0,001)	0,954	2,152

146 In brackets levels of parameters' values significance are presented.  
147

148 In model 1 value of output elasticity coefficient for the capital b slightly exceeds 5% level. This model is quite  
149 usable for estimation of agricultural production. However, the value of regression coefficient when b significantly exceeds  
150 international recommendations for evaluation of the capital output elasticity.

151 The use of investments capital costs in model 2 gives significant equality of regression. In this case increase in  
152 physical volume of investments by 1% increases physical volume of agricultural production by 0.176% and 1 percent rise  
153 of the combined working time input – by 0.824%.

154 The use of the combined estimation of basic funds and investments in model 3 as capital input provides output  
155 elasticity value on capital which equals 0.496. This value is significantly higher than the one used by the experts for the  
156 developed economies (0.3), however not significantly different from the capital output elasticity in the developing  
157 economies (0.4). In connection to this fact model 3 is more preferable than model 1. For model 3 production function (2)  
158 will be as follow:

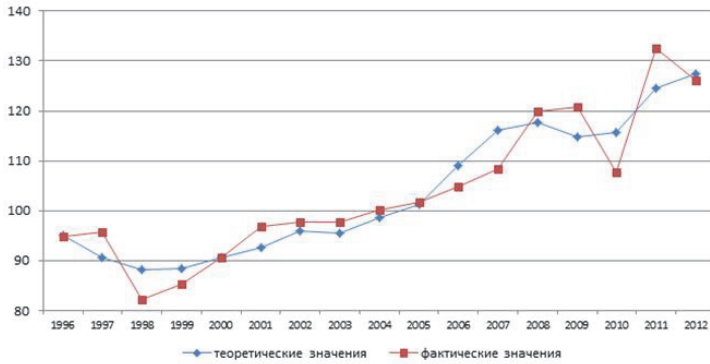
$$Y = 1,013 e^{0,025t} K^{0,496} L^{0,504} \quad (3)$$

160 In general it was noticed that more closely different estimations of factors of production repeat dynamics of output  
161 during single estimation of another factor, the smaller the coefficient of elasticity of this factor is.

162 We should note that indices of average annual number of the employed in agriculture were used as labor costs. In  
163 this case estimation of coefficient b practically did not differ from the corresponding estimations in models 2 and 3.  
164 Because of the above named lack of number of the employed, estimations of production function parameters are not  
165 given.

166 Thus, the use of the average geometric weighted of basic funds and investments indices' physical volume with  
167 weights  $\frac{2}{3}$  and  $\frac{1}{3}$  accordingly as capital cost and index of combined labor time as labor cost best reflect dynamics of  
168 agricultural production.

169 In picture 1 indices of agricultural production actually and theoretically calculated by (3) are presented.  
170



171  
172  
173 **Picture 1.** Actual and theoretical indices of agricultural production (in percents in 1995)  
174

175 The conducted analysis shows that starting from 1999 intensive increase in agricultural production was observed, pace of  
176 which significantly outpaced paces of production factors costs. The observed increase occurred after the significant  
177 decrease in agricultural production in the beginning - middle of the 90-s of the last century. Agricultural production in the  
178 comparable prices decreased in 1995 by a third, in 1998 – by 45% in comparison with 1990. At the same time production  
179 factors in 1995 remained on the level of 1990, in 1998 decreased by 10% that indicates sharp decrease in the combined  
180 factor productivity in agriculture with the beginning of market reforms. Evidently, the starting rise of productivity under  
181 conditions of the restricted number of production factors which in a higher degree can be explained by a significant rise of  
182 the effectiveness of the production factors use.

183 The continued rise of the combined factor productivity is necessary to take into account during forecasting of  
184 agricultural production, since prognostic estimations based only on the dynamics of production factors in such a situation  
185 will significantly be shifted down.  
186

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199

200 Для таблиц

201 ВДС - GVA

202 Среднегодовая численность занятых - Average annual number of the employed

203 Основные фонды - Basic funds

204 Затраты капитала k1 - Capital input k1

205 Продукция сx - Agricultural production

206 Затраты рабочего времени - Working time costs

207 Инвестиции - Investments

208 Теоретические значения - Theoretical values

209 Фактические значения - Actual values

## Trends in the Development of Labour Rights in the Beginning of the XXI Century

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### Abstract

At the turn of XX and XXI centuries the development of labour rights in the West, and today, and in Russia turns over to a new qualitative level. The employment rights of the employee of the XX century are the rights established in the industrial and partly of the post-industrial society. XXI century began, as the age of informational society in which fundamental changes took place in employment too. This inevitably led to changes in labour legislation and the list of labour rights, the development of which is on another level. In this situation, in special importance is adapting to the changes that is taking place, the achievement of high quality level of compliance with them, and defining the future perspectives of development of those or other legal phenomena. Therefore, on the basis of the revealed regularities of the development of labour rights we have defined the main trends of their development.

**Keywords:** labour law, development trends of labour rights, the expansion of labour rights, international labour standards, labour mobility.

### 1. Introduction

The XXI century began as the century of the information society, and labour rights set forth in the XX century not fit into the framework of the new social organization of labour relations. For this reason, the special urgency is got definition of tendencies of development of the totality of labour rights in the human rights system.

A kind of Manifesto for the forthcoming changes has been the release of the compilation "Labour law in the post-industrial era" [1], which was prepared by materials of the scientific conference organized in November 1993, faculty of law, University of Amsterdam. Similar to the above mentioned was the collective study "The idea of labour law" [2], which was prepared on the basis of materials of the scientific conference held in the College of St. Katerina at Cambridge University in April 2010. Trends of development of science of labour law was dedicated to the scientific conference held in April 2013 on the basis of the Kiev national University named after Taras Shevchenko and the Institute of state and law of NAS of Ukraine [3].

Two general social regularities exerted decisive influence on the development of labour rights in the new Millennium:

- 1) the technical revolution, combined with accelerated social evolution, the result of the interaction of which was the formation of a post-industrial society;
- 2) the process of globalization.

In the context of these patterns of global development of social relations connected with employment, we have identified the main trends of labour rights in the beginning of XXI century.

### 2. Trend 1. The Recognition of the International Significance of Labour Rights and the Widening of the Scope (Expansion) of Labour Law

Labour rights belong to the second generation of human rights, including in social rights, where they occupy the central place. Already the 1948 Universal Declaration of Human Rights (article 23-25) recorded a fairly comprehensive list of labour rights (the right to work, to just and favourable conditions of work, equal payment for equal work, to form trade



57 unions, to rest and others)[4]. The dominant position of labour law occupies in the system of social human rights, in  
58 particular the 1966 International Covenant on Economic, Social and Cultural rights (article 6 of 13) [5]. The 1961  
59 European Social Charter (amended in 1996) establishes that the employee has 18 labour rights [6].

60 According to experts of the International labour organization (hereinafter referred as "ILO"), a global approach to  
61 universal "threshold rights" - set of minimum rights, which may count any person, regardless of his status as employed,  
62 which, figuratively speaking, can not be sold and bought [7]. But the specific content of labour rights (guarantee of  
63 employment, minimum wage and other labour standards) depend primarily on the economic situation of the state, which  
64 is obliged to ensure that a minimum set of labour rights to the maximum available for the economic level, but not lower  
65 than defined by the norms of international law, which emphasizes a civilizational significance of labour rights.

66 "Both history and contemporary politics strongly suggest that pressure to develop more effective means of  
67 international coordination to ensure respect for labour standards will increase as international economic integration  
68 deepens. Most notably, the United States and Canada obtained agreements on labour standards in tandem with new  
69 international trade agreements" [8].

70 Labour rights are at the intersection of natural rights (on the basis of the origin) and positive rights (in order of  
71 fixing). This versatility labour right allows you to distribute this institute for other spheres of application of the professional  
72 work, which is different from the traditional labour wage (labour professional athletes, labour, state and municipal  
73 employees; persons undergoing non-military service and others). So we can talk about further expansion of the scope of  
74 the (expansion) of the regulations of labour legislation with the purpose of social protection of the labour rights of these  
75 categories of workers. For example, analysing foreign legislation and practice of its application, I. Ya. Kiselev marks the  
76 advent of the institute of "persons like workers", "quasi-workers", which to some extent spread guarantees of labour rights  
77 [9].

78 It is in this direction and goes and further improvement of the Labour code of the Russian Federation (hereinafter  
79 referred as "LC RF") [10]. In particular, it appeared the head 49.1 dedicated to the work of remote workers, and 54.1  
80 governing the work of professional athletes and coaches.

### 81 **3. Trend 2. The Offset Value Priorities in the Content of Labour Rights in the Sphere of Ensuring the** 82 **Comprehensive Development of Personality**

83 Scholars have proposed greater emphasis on individual employment rights, which are grounded in social ideals such as  
84 citizenship, autonomy and decent work [11]. Labour law provisions are intended to complement and reinforce the  
85 protection of personal non-property rights and other nonmaterial values, implemented by the civil law, in relation to the  
86 peculiarities of labour relations. They must ensure the rights and freedoms during the period of employment and, thus, to  
87 establish the status of "social citizenship" [12].

88 Due to the fact that in conditions of development of highly sophisticated technologies and distribution of computer  
89 equipment market economy cannot do without mass intellectually creative activity, to the labour market come highly  
90 skilled workers. New forms of work organization pose new requirements to the employee's personality and his ability to  
91 labour modified function of the worker.

92 In this respect the special importance acquires the right of a worker for vocational training. In the ILO 2004  
93 Recommendation # 195 "on human resources development: education, training and lifelong learning" [13] it is noted that  
94 education, training and lifelong learning are fundamental and should be an integral part of social policy of the States.  
95 Today, therefore, in every developed country created and constantly improved model of the "lifetime" of the development  
96 of the creative potential of the national workforce.

97 Thus, the values of human rights are increasingly moved from the sphere of economic and physical safety of any  
98 person in the sphere of subjective well-being and quality of working life". Personal worker rights (the right to vocational  
99 training; the right to moral encouragement, evaluation of the work achieved; the right to privacy and protection of personal  
100 data, the right to obtain information about working conditions, the right to dignity in labour activity and protection against  
101 mobbing) will become increasingly important.

### 102 **4. Trend 3. The Provision of Labour Law Labour Mobility of Workers, Formation of a Special Type** 103 **"Transnational" and "Supranational" Labour Relations**

104 The XXI century is the century of globalization, which could not be reflected on the labour mobility of workers, which more  
105 and more acquires an international issue. This trend has a positive character (for example, leads to the creation of almost  
106 worldwide market) and negative (many States are unable to find their place in the global division of labour reality that  
107  
108  
109  
110

111 leads to a regression in the legal regulation of labour relations).

112 In this regard, the UN General Assembly at its 24th special session, held in Geneva in June 2000, adopted a  
113 special policy aimed at maintaining social stability in the world. In February 2002 under the auspices of the ILO was  
114 formed world Commission on the social consequences of globalization, which concluded its work in 2004 was  
115 emphasized special importance in the global economy, respect for workers' rights and legal norms on the basis of  
116 fairness, solidarity and gender equality [14]. Ensuring effective employment in conditions of globalization were sent to the  
117 ILO 2008 Declaration on social justice for a fair globalization [15] and the 2009 Global jobs Pact [16].

118 The globalization of the labour market has put on the agenda the question of external (international) labour  
119 migration. At the turn of the Millennium international migration has become universal, reflecting the development of the  
120 globalization tendencies in different spheres of life activity of the world community. Migration is another global problem,  
121 the solution of which in the future should occur, including, and means of employment law, from the standpoint of the  
122 protection of labour rights and freedoms of all persons, regardless of their citizenship and place of permanent residence.

123 "Multiple international legal regimes - in human rights law, refugee law, labour law, trade law and criminal law -  
124 address, to some degree, the rights and privileges that should be accorded to aliens working within the territories of  
125 states parties.

126 Comprehending the effects of multiple legal regimes arising at domestic, regional, and international levels is of  
127 course a difficult business, and the challenge of doing so reacts differently with different jurisprudential sensibilities:  
128 whereas some see the gradual accretion of global constitutionalism or at least a welcome form of regulatory competition,  
129 others warn of the destructive effects of fragmentation" [17].

130 Globalization has another aspect that is associated with ever-expanding activities of transnational corporations  
131 (TNCs). The XXI century named a special level of legal regulation of labour relations will be further developed. I. Ya.  
132 Kiselev called these employment relationships as "transnational" or "supranational", which are governed by international  
133 and national labour laws and international collective agreements [18]. In the Russian legislation these problems still to be  
134 solved.

#### 135 136 **5. Trend 4. Increased Flexibility (Differentiation and Individualization) in the Legal Regulation of Labour** 137 **Relations in Combination with the Protection of Labour Rights** 138

139 The ability of modern labour law to acquire the necessary flexibility largely depends on its survival as a necessary and  
140 important for the social institute. Modern scientist A.M. Kurennoy reasonably believes that the problem of "flexibility at  
141 work should be recognized one of the national interests of the Russian Federation", the question that must be addressed  
142 both at the legislative and enforcement level [19].

143 At the turn of the century can be clearly traced the loss of industrial priority in attracting labour force. Replaced by a  
144 new type of production - flexible, innovative production and, consequently, new post-industrial types of work organization  
145 and management [20] and the emergence of non-standard forms of employment (for example, teleworkers; Agency work;  
146 part-time schedule; temporary employment).

147 Such atypical employment has its positive and negative consequences. The positive thing is that atypical  
148 employment allows to provide employment for those categories of citizens, for whom full-time employment for any  
149 reason, difficult or undesirable (older workers, single mothers, unemployed youth without professional skills and others).  
150 The negative consequences of the expansion of atypical employment are associated primarily with the absence or  
151 reduction of social protection guarantees of the labour rights of workers, with the lack of prospects for professional  
152 development, because the employer is not interested to invest in the improvement of professional qualifications. "Workers  
153 in these jobs are engaged on a casual or contract basis, few develop portable skills, experience or contacts (and so have  
154 no real career development) and often work unsociable hours" [21].

155 Therefore, the strengthening of flexibility (differentiation and individualization) in the legal regulation of the  
156 employment relationship must be combined with the protection of labour rights of the employee. You can talk about the  
157 urgent need by means of labour law to solve the problem of limits of flexibility in labour relations, to find a balance  
158 between flexibility of legal regulation of labour relations, on the one hand, and protection of employment rights of the  
159 employee, on the other.

#### 161 **6. Trend 5. Harmonization of Individual and Collective Labour Rights, Based on the Extension of Social** 162 **Partnership** 163

164 This trend is connected with expanding the scope of social dialogue (social partnership), an adaptation of collective

165 labour relations to the economic realities of the XXI century.

166 The beginning of the XXI century was marked by significant changes in the social organization of labour reality.  
167 They are associated with the strengthening of individual (private) began in the legal regulation of labour relations and the  
168 reduced role of trade unions of workers of professional solidarity.

169 Meanwhile, experts of the ILO, based on generalization of modern foreign practice of labour relations, find many  
170 indications that the employers' associations and trade unions that are adapting to the modern realities of economic  
171 globalization and growing competition. They change their structure and methods, improve the mechanisms of social  
172 dialogue. In addition, practically on all continents of the state more actively than before, take part in solving social issues.  
173 All this testifies about the General trends in the development of a legal mechanism of social partnership, its adaptation to  
174 modern conditions.

175 As an increasing number of international associations of employees and the activation of their activity, including on  
176 the basis of the legislation of the European Union (European works councils), or on the basis of agreements between  
177 multinational enterprises and trade unions (global company councils). It is not only on the mutual exchange of information  
178 and consultation, but also about the cases of framework agreements between multinational enterprises and global Union  
179 federations.

## 180 181 **7. Trend 6. The Priority of International Standards of Labour Rights** 182

183 Considering the tendency of the priority of international standards on labour rights connected with the increase of the role  
184 of generally recognized principles and norms of international labour law in conditions of globalization. It is possible to note  
185 the strengthening of the authority of international labour standards, many of which act as internal national law and even  
186 has the priority in comparison with him. Formed by the mechanism of direct provision of international legal protection of  
187 labour rights of individual workers and showing signs of becoming regional labour standards in supranational law, for  
188 example, in the countries of the European Union. In these conditions the value and the previous notions of unlimited  
189 sovereignty of the nation-state in the regulation of labour relations has been lost.

190 We emphasize that certain changes in Russian legislation, were the direct consequence of the ratification of  
191 international agreements, first of all ILO conventions. So, in 2010 our country ratified Convention # 187 on promotional  
192 framework for occupational safety and health at work 2006 [22] of ILO, that has led to the fact that the Federal law dated  
193 on July 18, 2011 # 238-FZ [23] added in the LC of the RF part 14 to the art. 209, where it was first defined the concept of  
194 professional risk. Part 15 of art. 209 of the LC of the Russian Federation for the first time defined the management of  
195 professional risks.

196 The most complete expression of the international standards of labour rights received in the ILO conventions and  
197 recommendations. The modern stage in the development of ILO standards-related activities is inextricably linked with the  
198 adoption of the 1998 Declaration on fundamental principles and rights at work and its follow-up [24], and the concept of  
199 decent work, which is to ensure that women and men had the opportunity to obtain decent and productive work in  
200 conditions of freedom, equity, security and human dignity [25].

201 Thus, the strategy for the development of labour relations in the XXI century should be based on enabling equal  
202 access of all citizens to the fundamental rights and freedoms - the right to work and social security, freedom of  
203 association, equality of opportunities of each, non-discrimination and non-forced work.

## 204 205 **8. Conclusion** 206

207 Thus, the main trends in the development of labour law can be revealed today, not at the level of divination or arbitrary  
208 projections, but based on the seeds of the future today.

209 These trends do not deny the continuity with centuries-old process of formation and development of labour law.  
210 Moreover, they reflect general and industry-specific patterns of development law. These trends will certainly have an  
211 impact on all institutions of general and special parts of labour law. Leading systematizing factors in industry are its object  
212 and method. Accordingly, the first three trends and partly fourth connected with formation of the subject of labour law in  
213 the post-industrial era. Following from these trends affect the change in the method of legal regulation of labour relations  
214 in the XXI century.

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## Human Rights in a Globalized Modern World

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### Abstract

The practice of recognition and protection of "human rights" have a long history, respectively, and from the time of arising of social rights and freedoms, passed quite a few centuries. In different parts of the world, social rights and freedoms emerged and developed ambiguous. Their recognition, consolidation, compliance, security and protection of structural represent a very significant set of principles and rules governing a wide range of social relations.

**Keywords.** Rights and freedoms, protection of rights and freedoms, globalization, international law, human rights.

Aiming at getting a more accomplished and a deeper insight into the problem of human rights in a globalized modern world, one may feel an irresistible desire to disclose a complex and multifaceted nature of this category as well as to show its basis and social roots.

On this account, we find it necessary to pay attention to the nature of human rights and their connection with politics and ethics in order to systematize knowledge about human rights at a time when globalization makes an integral part of the developing interstate relations [1].

At this stage of development, globalization is more than an economic process. It is characterized by some political, economic, cultural and legal aspects, which influence on the way an individual may exercise its rights in full. This is the point where, the burning necessity of exploring human rights and fundamental freedoms of an individual through globalization results from.

Owing to the fact that the modern world order has been facing several actual problems, globalization process is contrasted to these universal challenges. Nikolay Pokrovsky considers them to include the population growth processes that are uncontrollable, as well as social and economic underrun, cultural gap, problem of education (growing rate of the illiterate people), food problem, reduction of natural resources, military threat, international terrorism, and aggravation of international relations [2].

Akmal Saidov points out that "human rights determine full value of life on the planet, make an integral part of nations' culture and the highest expression of moral and legal ideals of the humankind" [3].

It is difficult to disagree with this statement, yet we should state a fact that nowadays human rights are disregarded, because modern world and society exercise some other values.

To determine the nature of human rights, it is essential we should apply a historical approach, because the very idea of human rights has a long history. Therefore, this approach to the subject under study allows us to suggest that the origin of the idea of human rights is dated back to antiquity, while modern sense of "human rights" can be traced back to the times of bourgeois revolutions.

Rapid development and emergence of the idea of human rights at the beginning of new millennium are determined both by a modern level and character of the world civilization and the previous experience of the humankind [4].

Thus, the origin of human rights is usually studied using two approaches, the first being connected with ancient times, while the second referred to the period of formation of the bourgeois class (XVII-XVIII cc.).

Today, we can single out two periods of historical development of the conception of human rights. A. Saidov, for instance, singles out three main following trends:

- 1) Emergence of the idea of a person, an individual, as something separate, isolated from the race, community, state; as an independent subject of law;
- 2) Development of legal system, codification of laws and emergence of legal institutions in the ancient times and Middle Ages;
- 3) Formation of the concept of universal rights and laws, their applicability to each and everyone.

With regard to this approach, we would like to suggest the idea of V. Nersesyants, who points of that, from the political and legal standpoint, "the theory and practice of human rights have a long and insightful history".

56 With regard to all its novelty and peculiarities determined by modern level and character of the world civilization,  
57 nowadays the problem of human rights is based on a rich experience of the humankind mainly in the field of legal forms  
58 of organization of people's life on social and national levels, legal ways of governing social relations [5].

59 The biggest achievement of humankind in the XX c. is development and employment of the regime of the  
60 international protection of human rights and freedoms. Under international legal acts of universal character, states as  
61 subjects of the international law are obliged to enforce and protect human rights and freedoms. However, revealed in  
62 various spheres of life of the international community at different levels of intensity, globalization makes a significant  
63 influence not only on development and formation of new approaches to international regulation of interstate relations, but  
64 on the system of universal principles and norms of the international law in human rights.

65 Vladimir Kartashkin writes that globalization influenced greatly on the change of such fundamental principle as  
66 international protection of human rights. It is probably connected with the fact that advantages of globalization are  
67 enjoyed by the most developed countries, while the developing states face the growth of social discontent that could  
68 probably explode all the system of the international relations. To avoid this possibility, achievements of globalization  
69 should belong to all humankind, to all national and peoples [6].

70 However, Academician Nikita Moiseev criticizes and raises objections to the theory of "universalization" of human  
71 rights. He explains his critical view to the theory of universalization of human rights as appropriate for all people living in  
72 various countries in the following way – this is as much illusion as the idea of identical interpretation of the concept of  
73 "good". Any attempts to unify human rights show how imperfect this civilization or, to be more exact, some civilizations on  
74 this planet can be, mainly in the field of this general process of self-organization determining social development.

75 Besides, N. Moiseev excludes the possibility of global standardization of human rights because it is impossible to  
76 disregard the character of the civilization in which an individual has been raised for thousand years. With regard to this  
77 fact, rules of life were based on the principles determined by the environment [7].

78 On the other hand, global society develops towards realization of the value of an individual, therefore both  
79 international and national laws become more focused on an individual, and the international community gradually  
80 acquires characteristics of the global international system [8]. Igor Lukashik points out that this process is characterized  
81 by *de-etatisation* of the international law which means that the observance of human rights in a state can be controlled  
82 externally by the international community as well as internally by its people or any individual. *De-etatisation* is also  
83 reflected in the fact that international law brings rights of peoples and an individual to the forefront. This is the only  
84 foundation for the international order applicable for the human civilization in the XXI c. [9].

85 It is under these conditions that observance of human rights and freedoms is no longer an internal matter of a  
86 state. During globalization of the international community references to a state sovereignty may afford no excuse for  
87 human rights abuse [10].

88 In this case balance between observance of the principle of human rights and freedoms and such fundamental  
89 principles of international law as respect for national sovereignty, non-interference in the internal affairs of the country, etc  
90 may become a point of contention [11].

91 In practice, the whole problem reduces itself to the question of legitimacy of the humanitarian interference, political  
92 or economic isolation of a state with massive human rights violations. It is evident that every case requires that  
93 international community should make a well-informed decision. Taking into account that all aforesaid principles possess  
94 equal legal power, it is necessary that every single decision reflecting attitude of the international community to a certain  
95 situation should be in conformity with humanitarian goals.

96 Such fundamental principles of international law as national sovereignty and non-interference in the internal affairs  
97 of a country are restricted to human, peoples' and individual rights. If we consider these questions in the light of attempts  
98 that are made by all international community and some particular states towards observance of the fundamental  
99 individual and civil rights and freedoms, we should not consider them as interference in the internal affairs of a country.

100 However, under these conditions it is essential taking assuming that peace and safety of the international  
101 community should not be exposed to unilateral military actions or to a threat of these actions from any state. Thus, any  
102 state should be deprived of an opportunity of making independent decisions about its right to a humanitarian intervention,  
103 including use of armed forces. These actions may take place only in conformity with the UN Charter and decisions of the  
104 Security Council, in cases when all other possibilities of influence on a corresponding state have been exhausted. This is  
105 the only way balanced regulation of the international relations can be made for the sake of world order.

106 Today, we would like to point out the assumption made by Vladimir Kartashkin, because it is nowadays that we can  
107 see social explosion on the African continent, that suffered from events that caused significant political changes and  
108 replacement of state authorities in some African countries.

109 To avoid getting involved into politics, we would like to discuss some other factors that influenced on such a course



of events. Besides, it is reasonably safe to suggest that beside all other factors, this turn of events resulted from simple violation of basic human rights as well the unwillingness or even impossibility for people to live in desperate poverty.

In this respect, we would also like to add that in such complicated and controversial situations that take place in Northern African states or any other parts of the Universe we should follow human rights which should determine the limits of individual freedom and relations with the state and other individuals. Touching upon the perspectives of legal regulation, we should take into account the undeniable fact that the problem of human rights within a context of international regulation of their protection is quite well developed. It equally proves that there is a vast amount of international acts of universal character related to human rights, as well as shows deep concern of the international community to this matter [12].

However, human rights in the new millennium are characterized by the fact that their current development is in controversial conditions, which both have retained from the past times and develop now. One of such contradictions is universal globalization of social development, while on the other hand, this contradiction is represented by the willingness of certain traditional communities to emphasize their individuality by preserving their self-identity, their own special approach to human rights determined by genesis of this society and its traditions.

Processes of globalization of the modern world go in hand with ethnic and cultural self-identification of peoples that do not always accept the European values and that refer themselves to a different civilization emphasizing their individual peculiarities by insisting on their right to have their own unique culture, traditions, religion, ethic and legal norms and national identity. This may cause significant difficulties in affirming them and complicating their realization in various regions around the world.

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# Violated Copyright Protection in the Russian Federation

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## Abstract

The article analyzes international and Russian law statutes and court practice about legal protection of copyright. The main legacy problems of copyright protection including modern approaches are noted. The main types of types of violations in practice and forms of protection are shown. The article also deal with problems of application of the copyright law based on the analysis of judicial practice of the state arbitration courts of the Russian Federation. Compensation in money terms is specially attended. There is a conclusion about the need for balance between private and public interests in copyright protection.

**Keywords:** Copyright infringement, legal measures of copyright protection, Russian Federation, private and public interests.

## 1. Introduction

It is well known that any system of legal protection will not be sufficiently effective without the ability to protect the violated rights. One of the experts in this field Peter Maggs Professor of the University of Illinois argues that «in the twenty-first century the accent will shift from drawing international treaties and national systems for the protection of intellectual property rights just on paper to the establishment of effective enforcement of the protection of intellectual property»[1]. This is also true with regard to the protection of copyright as a type of intellectual property rights [2]. There is the requirement of necessity that the state ensure effective protection measures in case of intellectual property rights infringement under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement [3] and in other international treaties, such as Universal Copyright Convention [4] and World Intellectual Property Organization Copyright Treaty [5]. This is especially pertinent in connection with the entry of the Russian Federation into the World Trade Organization.

Article 5 (3) of the Berne Convention for the Protection of Literary and Artistic Works provides: "Protection in the country of origin is governed by domestic law" [6]. In accordance with the provisions of Articles 45 and 46 of the Constitution of the Russian Federation of December 12, 1993, each person is guaranteed by the state the legal protection of his rights and freedoms [7]. Today there is the possibility to assign civil, administrative and criminal responsibility in cases of copyright infringement in the Russian Federation. However, this paper will focus on the paths under civil law open to copyright protection. According to paragraph 1, Article 1248 of the Civil Code of the Russian Federation [8], disputes relating to the protection of the violated or disputed intellectual property rights are considered and resolved by the court.

The number of disputes in the field of the protection of intellectual property rights is constantly growing. According to the information provided on the website of the Supreme Arbitration Court of the Russian Federation, there were 2,996 cases related to intellectual property protection in 2011, while there were 5,069 cases in 2012. More than half of these cases involved copyright protection and related rights: 2,074 cases in 2011 and 2,192 cases in 2012 [9].

## 2. Copyright Infringement Definition

In Russian legal doctrine and practice copyright infringement is defined as any non-compliance with civil law in the use of objects of copyright. The range of copyright infringement is wide, encompassing the infringement of personal rights and the infringement of exclusive rights, which are distinguished depending on the type of violation of copyright.

Infringement of personal rights can be the violation of the integrity of the work, such as making changes to it, the assignment of authorship, the non-specificity or distortion of the author's or co-author's name when using the work, the promulgation of a work without the permission of the author, etc.

Infringement of exclusive rights is the illegal use of the work, that is, actions done without the permission of the author or copyright holder, which according to Article 1270 of the Civil Code is part of the content of the exclusive rights. These actions include copying (replaying, including in electronic form), distributing, translating, publicly performing or displaying, and publishing works on the Internet [8]. In judicial practice, the majority of cases (94%) are associated with the illegal manufacture and distribution of copies of works, that is, copies of the material objects, without permission. Such exemplars are called "counterfeit." At the same time, in Russia, as in other countries, the copying and distribution of works on the Internet is a widespread type of violation in practice. However, such cases refer to a rare species in Russian courts because of the difficulty in proving the violation and in the imperfection of the legislation in this area.

### 3. Who can Apply to the Court for Protection

Who can apply to the court for protection against copyright infringement? Obviously, this issue is of great practical importance.

First of all, an author can go to court if he did not transfer the exclusive rights to his work to anyone. When an author goes to court he is not required to prove right of authorship, because according to the Russian legislation, if there is no evidence to the contrary, then the person named on the original or copy of the work is recognized as the author. Also, in the Russian Federation copyright arises from the fact of creation and does not need state registration for its exercise. This provision is applicable also for all foreign authors who are nationals of states that are contracting parties to the Berne Convention for the Protection of Literary and Artistic Works. In accordance with Article 15 of the Convention, for the author of protected works: "In order that the author of a literary or artistic work protected by this Convention shall, in the absence of proof to the contrary, be regarded as such, and consequently be entitled to institute infringement proceedings in the countries of the Union, it shall be sufficient for his name to appear on the work in the usual manner."

A right holder who is not the author of a creative work must turn to the court to prove his exclusive ownership of the copyright. For example, he must produce an agreement on the transfer of his exclusive right. And it is important that the agreement transferred the exclusive right in full, with a right to protection; as a rule this is a 'contract for the alienation of the exclusive right' in a work (Art. 1285, Civil Code). (Prior to January 1, 2008, an exclusive right could be transferred by the publisher's (author's) agreement, which was often presented by plaintiffs in the court to confirm copyright ownership. In this case, the court had to analyze the agreement and interpret its content in order to determine the fact of the transfer of the exclusive right.) In accordance with Article 1254 of the Civil Code, the licensee can defend his rights under the exclusive license if the violation of the exclusive rights by others affects his rights.

Foreign authors and right holders have the right to appeal to the courts for protection of their rights, if provided by international treaties on copyright ratified by the Russian Federation. The Russian Federation is a party to the principal universal conventions on copyright, including the Berne Convention for the Protection of Literary and Artistic Works. There are many examples of the successful exercise of the protection of the rights of foreign right holders in the territory of the Russian Federation, the most famous involving MICROSOFT. In accordance with Article 5 of the Berne Convention and Article 1256 of the Civil Code, the legal protection regime extends to works whose authors are citizens of countries of the Union and states signatory to international treaties of the Russian Federation – in the MICROSOFT case, the United States – as well as to works of Russian authors.

### 4. Legal Measures of Protection

In case of copyright infringement legal measures of protection are applied. According to Article 1250 of the Civil Code, intellectual property rights are protected by the means provided by the Code with an allowance for the substance of the violated rights and the consequences of the violation of these rights. Specific ways to protect the violated exclusive rights are provided by Article 1252 of the Code. According to this latter article, exclusive rights to the results of intellectual activity and to means of individualization can be protected, in particular, by putting forth a claim:

- for declaration of the right,
- for restraint of acts that infringe or threaten to infringe,
- for damages,
- for seizure of material objects – against the manufacturer, importer, keeper, carrier, seller, other distributor, or bad-faith purchaser,
- for publication of the court decision on the violation and indication of the true right holder.

109 **5. Declaration of the Right**

110  
111 Declaration of the right as the way of protection is applicable where the copyright on the work of the person is attacked,  
112 denied or where there is a threat of such action. This requirement in practice implies both a recognition of copyright in  
113 general and the presence of the specific copyright of the person.

114  
115 **6. The Requirement for Restraint of Infringement**

116  
117 The requirement for restraint of infringement is used in practice in dispute resolution and may be a prohibition on the  
118 reproduction and distribution of pirated copies, a prohibition on the public display of works through the prohibition of  
119 advertising, offers for sale of copies, etc. One of the innovations of Part IV of the Civil Code is the direct indication in the  
120 statute of the possibility of the request for seizure of material objects against the manufacturer and others (listed above).  
121 These means of protection as well as the declaration of the right may be used separately or in combination with other  
122 means, e.g., the request for damages.

123  
124 **7. Request for Damages**

125  
126 Request for damages is that type of protection where the victim's property interest is satisfied by compensation to the  
127 victim for losses. It is a particular feature of copyright relations that when a copyright infringement causes little actual  
128 damage, losses can be expressed in the profits that the right holder could have expected to gain from the selling of his  
129 protected property. Justification for the size of damages, including lost profits, and a causal connection with the violation  
130 of his property rights are the responsibility of the victim, and this is often problematic. In this connection, Russian law has  
131 a special measure for redressing the possible property damage of the violation of exclusive rights. In accordance with  
132 paragraph 3, Article 1252 of the Civil Code, in case of infringement of the exclusive right the right holder shall have the  
133 right, instead of compensation for damages, to demand from the infringer payment of compensation for the infringement  
134 of the aforesaid right. In accordance with the provisions of Article 1301 of the Code, the amount of compensation which  
135 the right holder may require from the infringer can be determined in two ways: in the amount from 10,000 rubles to 5  
136 million rubles determined at the discretion of the court; in double the amount of the value of the copies of the work or two  
137 times the amount of the value of the right to the use of the work determined according to the price which in comparable  
138 circumstances is customary for the lawful use of the work. The law gives to the right holder the right to choose the  
139 method of determining compensation. At the same time, in accordance with paragraph 3, Article 1252 of the Code, the  
140 right holder is exempt from proving damages caused to him. The right holder may require the infringer pay compensation  
141 for each case of improper use of the work or for the violation as a whole. The final amount of compensation to be  
142 recovered in accordance with section 3, Article 1252 of the Code shall be determined by the court and set within the limits  
143 established by law depending upon the nature of the infringement and other circumstances, taking into account the  
144 requirements of reasonableness and justice.

145 The circumstances that should be taken into account when determining the amount of compensation particularly  
146 include:

- 147 – the nature of the violation,  
148 – the period of illegal use of the result of intellectual activity,  
149 – the degree of guilt,  
150 – the person's previous violations of the exclusive rights of the copyright owner,  
151 – the right holder's probable losses.

152 While it is necessary to comply with the principles of reasonableness and good faith, the proportionality of the  
153 compensation to the consequences of the violation is also accentuated. Currently in judicial practice the use of such  
154 measures as the recovery of compensation is widespread. But in some cases the definition of a fair and reasonable  
155 amount of compensation is difficult because the legislator has established a minimum amount of compensation for each  
156 case of violation. The courts differently understand the notion of "each case of violation."

157 Thus, the Federal Arbitration Court of the Volga Region in judgment of 21.07.2009 of case number A65-  
158 10975/2008 indicated that the author had the right to require "compensation for each of the five counterfeit copies of  
159 musical works recorded on CDs and sold. The amount of compensation may not be less than 10,000 rubles for each  
160 work." [10] Here, the Court found a copy of each work to be a single violation of the exclusive rights. At the same time,  
161 there are solutions where the court finds the single violation in the fact of the selling of one disc, regardless of the number

of works. For example, in case number A56-16684/2007 the Arbitration Court of St. Petersburg and the Leningrad Region reduced the amount of compensation to the minimum and justified this by the fact that the defendant had sold only one disc, although the disc contained recordings of several works.

However, the tendency to seek to recover 10,000 rubles of compensation for each work on a single disc still prevails. That is, if the disc contains five songs, the minimum compensation will be 50,000 rubles, if 10 songs, 100,000 rubles, etc. According to this logic, in a case involving the selling of, for example, one copy of a book of poems, compensation of 10,000 rubles for each poem should be recovered. On the one hand, indeed, the sale of a counterfeit disc is a violation of the rights of all right holders whose works are recorded on the disc. On the other hand, is the recovery of 150,000–200,000 rubles of compensation proportionate to the offense where only one disc is sold and for a small amount, on average 100 rubles, and considering that the average price of a licensed disc is 300–500 rubles for all the work regardless of the number of works that it contains. The discrepancy between violation and responsibility can upset the balance of private and public interests, the importance of which is emphasized by many experts [11].

Under these conditions, it is the court that must objectively and comprehensively evaluate all the circumstances of the particular case and give the legal and fair decision. Unfortunately, the current version of section 3, Article 1252 and Articles 1301 and 1311 of the Civil Code limit the courts substantially. Legal rules laid down in these articles do not always allow the courts to adjudicate in accordance with the principles of reasonableness and fairness. Obviously, in one case 50,000 rubles can be a significant sum for the sole proprietor, and in another case, for example, in the event of the persistent nature of the offense, 300,000 rubles will be adequate compensation for the consequences of the offense. It is good that the new edition Part IV of the Civil Code which comes into force in 01.10.2014 provides for measures aimed to the partial solving of this problem. In addition, the solution to this problem is impossible without achieving a fair balance between private and public interests in copyright. The court's decision in a particular case must be evaluated from this standpoint which presupposes compensation that is adequate and commensurate with the violation of the right holder's interests [12].

The infringer is a specific person who has infringed the intellectual property rights. In this case, civil proceedings may be instituted against the infringer regardless of the purpose of the violation of intellectual property rights and of the receipt by the infringer of any benefit from it. Different from other countries, vicarious liability is not widespread for copyright infringement in Russia. This is a defect of the Russian legislation and does not allow the court to resolve the case fairly. The courts do not examine the question of who has received benefits from the violation, and establish only the fact of the violation and who did it. It is sufficient to recover compensation from the infringer. It is important that the infringer made a profit for the infliction of an administrative penalty.

## 8. Seizure of Material Objects

Counteractions to the introduction and use of counterfeit copies of works is one of the tasks of copyright law and an obligation of the Russian Federation under international treaties. Paragraph 4, Article 1252 of the Civil Code is directed to the performance of this task. According to this article, counterfeit copies shall be removed from circulation and destroyed without any compensation whatsoever unless other consequences are provided by the law. The equipment and materials used for copyright infringement also may be seized.

## 9. Publication of the Court Decision

The existing legislation also provides other measures to protect violated rights of authors and other right holders. So, for example, it is possible to claim for publication of the judgment in the media. In case of violation of moral rights under Article 1251 of the Civil Code, compensation for moral damages under the rules established in Article 151 of the Code are applicable.

## 10. Other Measures to Protect Violated Rights

A novelty in the area of copyright protection is the introduction of Article 1253 of the Civil Code which provides for the liquidation of the legal entity and the termination of the activities of the individual entrepreneur that seriously and repeatedly violate exclusive rights.

## 11. Technological Protection of Copyright

There are also specific copyright protection measures in the Civil Code: technological protection of copyright. In accordance with Article 1299 of the Code, any technology, technical devices or their components controlling access to a work, preventing or limiting the conduct of actions that are not permitted by the author or other right owner with respect to the work shall be recognized as technical means of protection of copyright. Illegal users, so-called "hackers," routinely attempt to circumvent or "crack" technical or security software. Experts in the field of software appreciate the scope of the problem of the hacking of computer programs and databases, especially with regard to banking and other confidential information. The activities of hackers in some cases pose threats to national security. With the advancements in digital technology the problem of the legal regulation of these developments is very serious.

From the civil law point of view, the use of technological protection measures is one of the means of self-defense (Art. 12, Civil Code). According to legal doctrine, self-defense is the action that a person takes independently in order to protect his rights in the event of danger of infringement, but the exercise of self-defense rights should only be directed at preventing a possible violation, and not at causing harm. If you have works on the Internet, in the Russian reality what seems to be effective is a combination of legal arrangements with the technical means of protection. When we want to protect our property, we hang a lock on the door, for we do not expect that everyone will obediently comply with the law.

The legal regulation of the use of technological protection measures can be divided into two aspects:

- on the one hand, the (first) problem of legitimacy and limits for the use of technical means of self-defense,
- on the other hand, the (second) problem of responsibility for attacks on the technical means of self-defense (circumvention of technological measures of protection), including cases of legitimate circumvention tools.

As shown above the second problem was partially solved by the legislation of the Russian Federation. But the legislation in this area needs to be improved. Because under the current edition of Article 1299 of the Civil Code the violation includes acts of circumvention of technical means, committed with legal purposes. Also, not always will circumvention of technological measures lead directly to a breach of copyright, so-called "break-in" protection can be committed with the purpose to copy them, and with the purpose of watching. Furthermore, copying can also have a different purpose, for example, the purpose to profit, or not. All of these factors must be taken into account in the application of sanctions for the circumvention of technological measures.

## 12. Conclusion

As we can see, the civil legislation of the Russian Federation provides enough opportunities for copyright protection, and it generally contributes to enhancing the legal protection of copyright. Judicial practice in civil cases on the protection of the rights of authors shows that if the claim is reasonable, the right holder can win the case. However, the authors and right holders should exercise their rights in good faith and in a reasonable way and apply legal measures only to restore their rights, and not for punishment. This helps to achieve a fair balance between private and public interests in copyright. To punish violators, both criminal and administrative measures can be applied. The author of this paper intends to write about this in subsequent publications.

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## “The Roman Spirit” of the Code of Napoleon

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### Abstract

This article touches upon some historical aspects of codification using as an example the French Civil Code of 1804, as well as development of the Roman private law and its impact on legal systems of Western Europe and Russia. The author makes conclusion about the necessity to improve the Russian civil law, law enforcement and teaching practice of vocational subjects with regard to academic traditions of Western Europe.

**Keywords:** codification, legal system, Roman law, civil law, educational standards.

History of the Russian legal system is a miraculous entwinement of peculiarities of both the Romance and Germanic and Socialistic legal families. In the times of reforms, modernization and globalization, we irrevocably refer ourselves to legal experience, especially as we approach “milestone anniversaries”. The Code of Napoleon of 1804, that made a significant impact not only on civil law of Western Europe, but on the global legal system, is still in the scope of interest of scholars and practicing lawyers, despite being thoroughly studied by civil lawyers, historians and legal theorists.

This year is 210<sup>th</sup> anniversary of foundation of one of the oldest higher academic institutions in Russia – the Kazan University. This event has coincided with another significant date for all legal community – 210 years since adoption of the French Civil Code. The mentioned events make the reason for referring to such a historically great legal landmark.

History of codification has many examples when its result could be associated with its inspirer rather than its drafter. Thus, the Roman codes created by lawyers (the Code of Justinian was developed by ten lawyers – decemvirs), that reflected in these legal documents their personal understanding of what was right and fair, were associated with Papinianus, Gaius, Ulpianus, Modestinus and Paulus. Some other legal records do not make reference to either their creators, or their inspirers (for instance, in the beginning of the XIII c., Eike von Reggow compiled the “Saxon Mirror”, a law book containing norms of common law and legal practice of the North-East Germany that was used in many German lands and towns as an official legal source).

Works of some American legal scholars, practicing lawyers and public officials (Payne, Jefferson, Hamilton, Franklin, etc) were used for working out fundamental provisions of the Declaration of Independence of the United States and the US Constitution of 1787 that has proved its power for more than two hundred years. Common law of the United Kingdom and the United States is still developed by a community of high quality judges.

Several codes that have been made in various countries often have reference to a name of a person whose theoretic conception the given act emerged from. One of them is the Code of Napoleon. No doubt, that Napoleon took an active part in developing a draft of this legal act (thus, in particular, the Emperor chaired 57 out of 102 sessions of the Council and actively participated in discussions). However, to be fair from historical point of view, it should be emphasized that a main drafter and a “father” of the French Civil Code was Portalis, who used the Roman private law as a main source.

The blossom of the Roman law took place in the early times of the Empire (I c. BC – III c. AD). At that time, the emperors, aiming at limiting the power of the Senate, authorized the most outstanding lawyers to interpret existing legal norms that were compulsory for all public officials and judges, thus equaling acts with official interpretation to a law. From the second half of the III c., when the Emperor enjoyed the legislative power, this privilege was no longer rewarded, system of legal sources began to change and the Roman law went through difficult times [1].

Yet, caught by glossers and post-glossers, the Roman tradition didn't fall into oblivion. Thanks to reception of the Roman law, its principles were assimilated by legal systems in many European states. The influence of the Roman civilization resulted in merging of many classical doctrines that lay basis for law making and law enforcement practices. The Roman law, being “one of the most outstanding legal achievements of the humankind, was namely created by professional law makers rather than the Emperors and senators as ‘the law of the wise’ ” [2].

When working on the Civil Code of 1804 [3], its drafters used five main sources, including the classical Roman law,



56 the French common law, works of renowned French lawyers, "intermediary law" (droit intermediaire) used at times of the  
57 Revolution of 1789 – 1799 and legal heritage of the greatest French enlighteners [4].

58 The French Civil Code preserves not only the Roman terminological tradition, but Roman legal conception. Thus,  
59 the Code of Napoleon is centered on the institute of property, containing the Roman interpretation of property as an  
60 abstract and absolute right: "Property is the right of enjoying and disposing of things in the most absolute manner,  
61 provided they are not used in a way prohibited by laws or statutes" (see Article 544).

62 The Code of Napoleon borrowed and developed the Roman legal concept of equality of parties and its voluntary  
63 and irreversible basis. Consent between the parties was an obligatory condition for the contract to be valid: "There is no  
64 real consent, if it resulted from mistake, act of violence or fraud" (Article 109).

65 In France, as contrasted to its reception in Germany, the Roman law enjoyed recognition not because its being the  
66 law of the Roman Empire, but because of having high legal standards. The French law didn't break its ties with the  
67 Roman law, using its proper concepts and legal terminology or, if needed, norms of substantial law. For example, division  
68 of civil law into three main parts including "persons" (legal position of subjects), "things" (objects of law and the relevant  
69 property rights), "law suits" (means of implementations and defense), which date back to "Institutiones" of Gaius. This  
70 very system was used as basis of the French Civil Code of 1804. Founded on the Roman law with regard to  
71 circumstances, there developed law of things and law of obligations. The family and inheritance law was based on the  
72 ancient French common law.

73 Coutumes were largely used on the territory near the northern French borders. At the same time, in some districts  
74 where coutumes were spread the Roman law was not completely denied.

75 Works of famous French lawyers of the XVII and XVIII cc. Dumoulin, Coquille, F. Bourgoin, Domat, J. Pottier, K.  
76 Olivier) were as much the main reference points for developers of the Code of Napoleon as works of renowned Roman  
77 lawyers. The French civil law was built thanks to the help of practicing lawyers, who continued reception of the Roman  
78 law, but also secured the major part of the national common law [5].

79 The French publisher J. Sorel wrote about the Code of Napoleon the following: "I can hardly imagine any other  
80 country where civil law would penetrate so deeply into its customs and could become the integral part of the spirits,  
81 feelings and literature of the whole nation". We assume that J. Sorel's words may be referred to one more nation – the  
82 Romans, whose spiritual genius revealed itself primarily in development of legal forms and concepts. The Twelve Tables  
83 was a must-know of every Roman citizen.

84 The Code of Napoleon influenced much not only on development of civil law of the continental Europe, but also  
85 Russia. Thus, the project of the Civil Code of the Russian Empire of 1809 compiled by M. M. Speransky had the same  
86 three parts as the French civil Code. However, in its structure and combination of norms and, mainly, in sense of the legal  
87 institutes, the work of the great public figure and scholar V. V. Speransky had differences from the Code of Napoleon and  
88 became an important landmark in the history of the Russian legal science and methods of research and development of  
89 the Russian law. Therefore, replying to suspicions in plagiarisms, M. Speransky wrote the following to the Emperor  
90 Alexander: "Some people were trying to find proof that the Code I propose is an interpretation from French and is a mere  
91 imitation. This is a lie or lack of information which are easy to find out, for both are written. As a source, the Roman law,  
92 with all its provisions will always remain the same, but having common sense, knowing various sources and the language  
93 they are written in, one can get much use from them without imitating anything and having French or German academic  
94 background" [6].

95 The modern doctrine of the international private law [7], with reference to national sources of the international  
96 private law of foreign countries, names the Code of Napoleon of 1804 as "the oldest civil code containing norms of the  
97 international private law" [8]. Collision norms were developed thanks to the statute doctrine created in the medieval Italy,  
98 which was closely connected with an active steam of commerce among the republic type of cities and the necessity to  
99 create general principles of fair conflict resolving caused by differences of their laws (statutes). Since all these statutes  
100 had the same basis originated from the Roman law, these differences were not so serious [9].

101 The Code of Napoleon shows advantages of codification of law, as one of its main drafters – Portalis, would says:  
102 "...Laws are made with an aim of containing general principles of law, thus establishing a deep approach to a problem. It  
103 should determine principles containing different meanings and never constringe to details of every problem that may  
104 appear" [10]. However, to grasp the idea of the modern French or any other civil legislation, it is not enough to study the  
105 Code of Napoleon, one should also study main tendencies of the court practices. Thus, in particular, the French court  
106 practice, being conservative in preserving the Code text, played quite a significant role in interpreting articles and  
107 adjusting the old text to new types of relations. This is also applicable to the Russian law enforcement practice, especially  
108 judicial practice, when interpretational novelties of servants of the Themis differ much not only from the spirit, but the  
109 letter of law.

110 It is not only the Code of Napoleon that the "Roman spirit" intercepted. Now, the Roman private law is studied all  
111 around the world. In Western Europe it is considered as a possible normative basis for unification of civil and commercial  
112 law. these tendencies reflect not only the unity of legal language of participants of integration into Europe, but the  
113 possibility of unification of their professional training. Modern Russian is restoring and developing private legal traditions  
114 in the system of legal education and practice based on provisions of the Roman law, with regard to most recent  
115 experience.

116 We assume that, because of one more modernization of the Russian education, it is essential to reconsider not  
117 only federal educational standards, but teaching techniques of the fundamental subjects, including the Roman law, which  
118 are used now for teaching lawyers. The experience of some colleagues from abroad, who apply law cases in their  
119 classes helping to accumulate theoretical knowledge (and the relevant professional competences) when studying a  
120 certain legal casus, would not only help to bring the Russian education closer to the European standards, but will provide  
121 a modern graduate from the legal department with dozens of options on how to apply the acquired knowledge and would  
122 help him to "plunge into the depth" of the legal practice.

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## Unity and Differentiation of Legal Regulation of Entrepreneurial Relations in the Civil Law

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### Abstract

*In the context of unity and differentiation, the article touches upon principles of legal regulation in the civil law. The author shows that the studied principle is one of the basic ones in the system of mentioned principles. In terms of analysis of the principle, the article describes several tendencies of development of legal regulation of entrepreneurial relations in civil law. Dwelling on one of the most common types of entrepreneurial activity (commerce), the author shows several tendencies towards differentiation of legal regulation with entrepreneurial participation.*

**Keywords:** legal regulation, principles of legal regulation, civil law, subject of legal regulation in civil law, unity and differentiation, tendencies towards unity and differentiation, legal relations with entrepreneurial participation.

Modern system of legal regulation in entrepreneurial activity has not yet developed into a complex system of norms and therefore may be characterized as a compilation of general provisions that lacks any variety and complexity of problems relevant entrepreneurial activity.

No doubt, that political processes taking place in modern Russia have certain influence on economy. This includes low efficiency of the financial system and mechanisms of inter-branch capital flow, lack of competitive market environment, inefficient credit and banking environment, high administrative barriers, low legal culture in Russia. All these factors add some specific qualities to the entrepreneur as a subject of this type of activity and its results [1].

It seems that some other countries with market economy tend to develop the market system rather than to substitute it with state economy and to debate on reasonable limits of the freedom of enterprise rather than to revoke this freedom [2].

The Russian economy making switch to market relations, significant changes in the theory of legal regulation of entrepreneurial relations came out. Meanwhile, it is obvious that at the moment the Russian doctrine has not given much place to the problem of unity and diversity of this type of relations yet. Besides, law enforcement practice in the field proves the necessity to give special attention to the topic.

Aiming at defining the role of unity and differentiation in legal regulation of entrepreneurial relations, it is essential that, first of all, we should consider legal regulation and its principles, find out peculiarities of entrepreneurial relations and their legal regulation in civil law. In general, legal regulation is a system of coherently organized legal measures aimed at systemizing social relations as well as complying with interests of legal subjects. It is well known that legal regulation, for having certain legal influence, helps to define specific rights and obligations of legal subjects.

Accordingly, legal regulation is a system based on specific principles. At the same time, these principles of legal regulations may not be associated with the principles of law. Despite the fact that principles of law reflect main peculiarities of legal regulation in any branch of law, principles of legal regulation are based on organization of the relevant legal data.

Among principles of legal regulation, we can define the following: principle of legality, principle of balance between private and public legal stimulation and restriction, principle of unity and differentiation. It should be mentioned that the legal data needs systemizing. Therefore one of the basic principles of legal regulation is the principle of unity and differentiation. Besides, this principle accounts for dividing any branch of law into general and special parts, etc. Norms regulating a branch of law vary so much that a detailed differentiation is simply unavoidable.

It is evident, that legal regulation of entrepreneurial relations in civil law is also subject to these principles. It is the principle of unity and differentiation that, among other principles, reflects all peculiarities of legal regulation of entrepreneurial relations in its complex. On the other side, these relations influence greatly on the way this principle works. To define specifics of the principle of unity and differentiation of legal regulation of entrepreneurial relations in civil law, it is necessary to study these relations.

Dwelling on the entrepreneurial relations, we should firstly refer ourselves to the subject of legal regulation in civil

56 law. Structurally based on Article 2 of the Civil Code of the Russian Federation (hereinafter referred to as the CC) [3], it  
57 features relations based on entrepreneurial activity. In fact, this Article is a normative prerequisite of the unity and  
58 differentiation of legal regulation of entrepreneurial relations and contains specific features of such relations.

59 The entrepreneurial relations are characterized of a special subject, object and subject-matter. The subject of this  
60 type of relations is a person legally registered as an entrepreneur, i.e. individual entrepreneur, a company. The main  
61 object of these relations is profit, i.e. the purpose of conducting entrepreneurial activity. The subject matter of  
62 entrepreneurial relations is mainly peculiar with their contractual nature.

63 It should be pointed out that entrepreneurial relations are generally inconsistent. However, they are consolidated  
64 by a unified basis – entrepreneurial activity. Accordingly, peculiarities of the relations under examination reside in the fact  
65 that their system is based on the principle of unity and differentiation. In this respect, legal regulation of these relations  
66 may be held only in complex, i.e. including public and private legal fundamentals. The same conclusion may be made in  
67 relation to legal regulation of these relations in civil law. This should be based on the same principles, at any rate on the  
68 fact that all relations in civil law have similar characteristics (mainly property, etc), as well as differential differences.

69 No doubt, the variety of legal relations in civil law doesn't exclude, but proves the fact, that all social relations  
70 comprised by the subject of civil law have one common feature. This feature of the civil law is the most important  
71 prerequisite justifying unity of legal regulation of all spheres of social life in civil law. As a criterion that allows to separate  
72 property relations viewed as a subject of civil law from property relations governed by different branches of law, the  
73 author underlines the value oriented character of the property relations.

74 Unity, as a term, denotes similarity, complete resemblance, cohesion, integrity, solidity and interconnection. Unity  
75 in law relates to internal and indissoluble connection of all norms governing relations that make a subject of legal  
76 regulation in a specific branch of law. In the meantime, the proof that internal differentiation takes places in the framework  
77 of unity rests on the fact that, apart from general norms, it contains some special norms applicable on different levels and  
78 in various spheres of social relations.

79 Under the current circumstances, the role of differentiation keeps. Differentiation (in French, differentiation – from  
80 the Latin word *differentia* – diversity, distinction), division of the whole into separate parts, forms and levels. Although law-  
81 maker doesn't use this definition, differentiation has always been a characteristic feature of legal regulation.

82 The more developed the law, the more differentiated treatment to issues of social life it gives [4]. In fact, analysis of  
83 the recent changes in civil legislation in terms of the principle of unity and differentiation of legal regulation allows us to  
84 single out several tendencies of development of legal regulation of entrepreneurial relations. These tendencies prove that  
85 the studied principle of legal regulation has a fundamental character.

86 One of such tendencies is transformation of rules related to entrepreneurial activity into general norms of civil law.  
87 This tendency has become evident after adoption of the Conception of Civil Legislation of the Russian Federation [5]. For  
88 instance, since March 1<sup>st</sup>, 2014 the main source of the civil law has become a custom with no indication to a sphere of its  
89 development and application instead of a custom of commerce [6]. We that the concept of a custom of commerce should  
90 be preserved as one of the types of customs.

91 When customs develop, behavior of participants in civil legal relations become essential. The important role in  
92 development of common norms is played by judicial and arbitral practice and non-governmental organizations activity in  
93 unofficial codification of such norms. Compilations of rules they make are applied if there is reference to them in an  
94 agreement.

95 One of the most significant codifications of the kind are International Rules for the Interpretation of Trade  
96 Terms, Incoterms, that are used in International Trade Law [7]. Special place in private legal unification is taken by  
97 UNIDRUA Principles of Universal Commercial Contracts [8,9].

98 Another example of development of general norms in civil law from special norms are new rules on resolutions of  
99 general meetings (see Article 8 of the CC). In order to settle a fair balance of interests between all members, these  
100 resolutions of general meetings (resolutions of corporate members, resolutions of property holders, resolutions of  
101 creditors in cases of bankruptcy, etc) are enlisted as legal facts that basically encourage development of rights and  
102 obligations.

103 One more recent tendency in development of legal regulation in civil law of the examined relations is development  
104 of degree of differentiation of legal regulation of entrepreneurial relations, as a result, creation of a new type of civil legal  
105 norms in the corresponding sphere. Thus, for instance, one of the innovations of a new law related to the institute of  
106 agency is introduction of irrevocable power of attorney (see Article 188.1 of the CC). In the meantime, it may be issued by  
107 a person conducting entrepreneurial activity.

108 Thus, transformations in governing economy bring about such economic situation when a more efficient legal form  
109 is inter-branch differentiation of legal regulation of entrepreneurial relations. At this point any differentiation of legal

110 regulation should be conducted in terms of the rule permitting diversities, if they are justified, proved and pursue  
111 constitutionally approved aims, while applicable legal means relevant these aims fit them.

112 It is essential to determine basis of differentiation of legal regulation of entrepreneurial relations. Since defining  
113 prerequisites of differentiation of legal regulation may allow to find the basis, essence and aim of the civil legislation.  
114 Besides, it may help to avoid subjective and random differentiation of legal regulation of entrepreneurial relations.

115 We can disclose the prerequisites of differentiation of legal regulation on the following example. No doubt, that  
116 from the legal point of view entrepreneurial activity is a systematic contractual activity having private and public  
117 significance, as well as their fulfillment. In the meantime, it is know that the main type of contracts made by an  
118 entrepreneur to get profit is sale and purchase agreement. In terms of this agreement and in accord with the Civil Code of  
119 the Russian Federation (see Article 30), there can be defined separate types of contractual obligations.

120 Purchase and sale type of agreement (see Section 30 of the RFCC) can have several subdivisions according to  
121 their contractual obligations, which includes retail purchase, delivery of goods, including goods for state requirements,  
122 agricultural procurement contract, power supply service, real estate sale, business sale agreement. Besides, in order to  
123 provide single economic area in the Russian Federation by setting requirements for companies and maintaining  
124 commerce, there came out a new Federal Law from December 12, 2009 No 381-FL "About the Fundamentals of the  
125 State Control over Commerce in the Russian Federation" [10], etc. Accordingly, apart from general provisions, commerce  
126 in trade business is also legally governed by some special norms corresponding to public interests.

127 In terms of the unity of the subject of civil legal regulation we can single out relations in entrepreneurial activity. In  
128 the meantime, legislation in the related field may be differentiated not only on the basis of the regulated relations but  
129 public interest.

130 Summing it up, we can point out to the fact that legal regulation is a system of legal measures based on certain  
131 principles, including the principle of unity and differentiation as one of the most important. This principle helps to organize  
132 the existing legal data, dividing it to several parts (General Part, Special Part, etc). Besides, the principle of unity and  
133 differentiation is methodically significant. As it was stated before, it helps to find out a serious of tendencies to  
134 development of the civil legal regulation of entrepreneurial relations.

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## Gender in Multidimensional Peacekeeping Operations: Sexual Violence in Conflict

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### Abstract

Sexual violence, abuse and mass rapes became a method of warfare long ago. Women and children are the most vulnerable category of the population becoming victims of crimes of all parties to the armed conflict. In most cases, their security and protection is the task of UN peacekeeping missions and regional organizations in peacekeeping. However, the reverse side of the Peacekeeping Operations "medal" is commitment of acts of violence by the peacekeepers. This situation undermines credibility of the UN and evokes a negative attitude of the civilians to UN personnel and members of the military contingent of operation. This article describes the problem of commitment of sexual harassment and abuse by the peacekeepers, UN activities to resolve the situation, as well as issues regarding prevention, investigation and punishment for such crimes at the present stage.

**Keywords:** peacekeeping forces; sexual harassment; sexual abuse; sexual exploitation; The United Nations; safety and protection of women and children; criminal jurisdiction; responsibility of peacekeepers; gender training for peacekeepers.

"Conflict-related sexual violence is not specific to one country or continent: it is a global risk" - said Ms. Margot Wallstrom, Special Representative of the Secretary-General on Sexual Violence in Conflict, presenting in February 2012 the Secretary-General's annual report on conflict-related sexual violence to the Security Council [1].

Sexual violence against women and children is committed today not only by the warring parties. The cases of criminal acts committed by military men and other contingent of the mission against local civilian population in peacekeeping operations have increased in recent years.

Sexual crimes during UN multidimensional operations are not a new phenomenon: there is sufficient documentary and informal evidence to indicate that over the past decades there have been many instances of the personnel engagement in such acts, including liaising with adult prostitutes, demanding sexual favours in return for food or employment, sexual assault, rape and paedophilia [2]. Meanwhile, if the crimes against the UN personnel are often discussed, incidents of criminally punishable acts committed by the peacekeepers are actually not considered in the doctrine of the international law.

The problem has attracted an increased attention not so long ago in connection with cases of sexual exploitation and abuse by UN peacekeepers against the local population in the Democratic Republic of Congo. It turned out that the UN peacekeeping personnel was involved in crimes such as pedophilia, forced prostitution, rape, etc. This is not surprising, civilized Europeans do not go to hotspots to separate the warring parties any more, now these trips are made by soldiers of the Third World who have other standards of conduct and accustomed to lawlessness at home. As of today, the largest suppliers of "blue helmets" are Bangladesh, Pakistan, Nepal and India.

One of the first documents regarding commitment of sexual harassment and violence against the civilian population by peacekeepers was resolution 1325 (S/RES/1325 (2000) adopted by the Security Council at its 4213th meeting, on 31 October 2000.

According to the resolution, the following liabilities are assigned to the missions' contingent:

to respect fully international law applicable to the rights and protection of women and girls, especially as civilians, in particular the obligations applicable to them under the Geneva Conventions of 1949 and the Additional Protocols thereto of 1977, the Refugee Convention of 1951 and the Protocol thereto of 1967, the Convention on the Elimination of All Forms of Discrimination against Women of 1979 and the Optional Protocol thereto of 1999 and the United Nations Convention on the Rights of the Child of 1989 and the two Optional Protocols thereto of 25 May 2000, and to bear in mind the relevant provisions of the Rome Statute of the International Criminal Court; Calls on all parties to armed conflict to take special measures to protect women and girls from gender-based violence, particularly rape and other forms of sexual abuse, and all other forms of violence in situations of armed conflict. [3].

Despite the adoption of the document the situation became even more complicated in subsequent years. The number of allegations of sexual assault against UN peacekeepers and other personnel of the organization has increased



57 more than twofold. This was reported by UN Secretary General Kofi Annan who called this situation "very serious."

58 British non-governmental charitable organization "Save the Children" published a report disclosing numerous  
59 cases of violence, including sexual abuse, against children by UN personnel in hotspots and disaster areas.

60 According to the report, more than half of the children said they were victims of sexual harassment, and each of  
61 them could recall ten or more cases with participation of the employees of the twenty-three peacekeeping and  
62 humanitarian organizations. Minimum age of the victims is 6. Many children were pressured to have sex by force or in  
63 exchange for food and money. The UN personnel in the report is also accused of verbal sexual abuse, child trafficking  
64 and forced prostitution.

65 The report (to which the organization "Save the Children" gave the name "Not one to turn to") is based on  
66 confidential interviews conducted by its employees with 129 girls and 121 boys aged between 10 and 17 years in Haiti,  
67 Sudan and Cote d'Ivoire, the world's poorest countries where the UN personnel is currently working. The study showed  
68 that 18% and 23%, respectively, were able to recall ten or more of incidents of sexual abuse by employees of  
69 peacekeeping missions. So, the boy aged 14 who worked in the UN camp in Cote d'Ivoire, said that the UN soldiers  
70 demanded to bring them girls to the barracks, insisting that they should be not older than 8 years. A 15-year-old  
71 respondent from Haiti spoke about employees of peacekeeping mission who suggested to her and her two girlfriends  
72 chocolate and about 3 dollars for oral sex. "I said no, but some of the girls did it and got the money", she added.

73 As for other UN agencies, the agency UNICEF which assists children registered two cases of sexual intercourse  
74 with minors. The World Food Program is currently investigating a scandal which was dubbed "sex in exchange for food".  
75 The UN High Commissioner for Refugees reported to Secretary General about 10 cases of this kind in his department.  
76 The United Nations Volunteers Programme (UNV) reported two sexual harassment allegations [4].

77 In pursuance of General Assembly resolution 57/306 of 15 April 2003 the United Nations Secretary-General on  
78 October 9, 2003 promulgated the Bulletin on Special measures for protection from sexual exploitation and sexual abuse  
79 addressed to all UN personnel [5].

80 The first section of the document states the following definitions:

81 The term "sexual exploitation" means any actual or attempted abuse of a position of vulnerability, differential  
82 power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual  
83 exploitation of another.

84 The term "sexual abuse" means the actual or threatened physical intrusion of a sexual nature, whether by force or  
85 under unequal or coercive conditions.

86 In accordance with the Declaration on the Elimination of Violence against Women of the year 1993 (Article 1), the  
87 term "violence against women" means any act of gender-based violence that results in, or is likely to result in, physical,  
88 sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of  
89 liberty, whether occurring in public or in private life [6].

90 In accordance with the Bulletin Special measures for protection from sexual exploitation all UN structural units  
91 must comply with certain standards prohibiting specific actions treated as sexual exploitation and sexual abuse.

92 As we know, military members of the national contingent provided by the Government are subject to the  
93 Government's exclusive jurisdiction. In view of recent developments and taking into account the recommendations of the  
94 Special Committee on mandatory provisions of the UN SG Bulletin for members of national contingents, the UN General  
95 Assembly in its resolution 60/289 of 8 September 2006 recommended the Secretary-General to provide as soon as  
96 possible the Member States with the revised draft model memorandum of understanding between the United Nations and  
97 Member States contributing resources to the United Nations peacekeeping operations, which is contained in Chapter 9 of  
98 the Guidelines for contingent-owned equipment, dated December 22, 2005. The revised draft model memorandum  
99 contains a lot of new provisions, and today many states contributing resources to UN missions signed it and the  
100 memorandum entered into force for those States; in some countries it is currently under consideration.

101 The key reform of the memorandum is the inclusion of the standards of peacekeeping contingent conduct into  
102 article 2 - "Documents constituting the memorandum of understanding". According to new Article 7 bis, all members of  
103 the Government's national contingent shall be bound by the United Nations standards of conduct that are set out in the  
104 Bulletin UN SG 2003 as well as the Code of Personal Conduct for "Blue Helmets" and "We Are United Nations  
105 Peacekeepers". The Government shall promulgate the standards in a form or manner that makes them binding under  
106 their laws upon all members of its national contingent. This can be achieved in various ways: by incorporating of the  
107 relevant rule into the national legislation, or in the form of command orders or internal regulations. The main responsibility  
108 for disciplinary action lies with the commander of national contingent.

109 In the event that UN has reason to suspect that any member of national contingent has committed an act of  
110 misconduct, it shall inform the Government and can initiate an administrative investigation with assistance from the Office



of Internal Oversight Services, or a joint investigation with the troop-contributing country with the help of national experts of Legal Affairs. Similarly does the Government of the country that signed the memorandum: it shall immediately inform the United Nations on the suspected act of misconduct.

Signing the Memorandum of Understanding the Government of the troop-contributing country undertakes to exercise jurisdiction in respect of any crimes or offences that might be committed in violation of the UN standards of peacekeeping personnel conduct.

Following the adoption of the UN Security Council resolution authorizing the peacekeeping operation, a formal invitation is sent by the United Nations to the potential troop-contributing country in the form of a note verbale. Negotiations on the memorandum of understanding are then undertaken with the troop-contributing country, and a predeployment visit may be made by a representative of the Department of Peacekeeping Operations to provide a report to the troop-contributing country on the outcome of that visit. It is followed by negotiations, and it is often the case that the memorandum of understanding may not be signed for some months. The Special Committee concerns precisely such situations - when there is a gap in the legal regulation.

The UN Group of Legal Experts, created specially to handle the problem, presented its recommendations on December 18, 2006 [7]. The group started from the premise that each troop-contributing country must act in accordance with its own legal system to ensure compliance with the provisions of the Secretary General's Bulletin irrespective of whether it is done with the use of military or criminal justice. The Group report lists the ways to make provisions of the UNSG Bulletin legally binding upon the countries in the period prior to the conclusion of the memorandum. These are the following:

- a) including in the note verbale one of the appropriate statements;
- b) involvement of administrative resources of the UN force commander or the head of the UN mission, which may make orders binding upon military contingents;
- c) designation of intolerance for sexual exploitation in the Security Council's resolution authorizing the operation;
- d) implementation of relevant norms in national law.

Almost a quarter of complaints about the cases of sexual exploitation and abuse by peacekeeping operations contingent, which are registered by the UN Department for Peacekeeping Operations, is directed against the UN personnel. Currently, the prosecution of the UN staff (officials and experts on mission) is problematic because of their immunity under international law. The UN General Assembly also created a special Group on legal issues to develop recommendations ensuring that the UN staff and experts under any circumstances would not be exempted from criminal liability for criminal acts during the Peacekeeping Operations. The report submitted by the Group draws attention to a few basic questions.

The first question. *Grounds for bringing to criminal responsibility.* If the host State has functioning legal system, the crime should be investigated and prosecuted in accordance with the law of that State. In the opposite case, solution of the question may be affected by a number of factors:

- a) adoption of the Code of Conduct of the said persons which will treat the committed acts as crimes;
- b) determination of conduct as criminal in the state in which investigation is carried out;
- c) differences in criminal laws of the Member States;
- d) availability of immunity of this category of persons;
- e) presence of the alleged offender in the state where investigation is carried out.

The second question. *Ways of bringing to criminal responsibility.* In general, it must be said that the Group gave priority to the execution of jurisdiction of the host State, which may be achieved by:

- a) appropriate arrangements with the UN regarding a waiver of immunities of the persons who committed criminal acts;
- b) each mission investment with the executive power;
- c) hybrid tribunals creation (like the Special Court for Sierra Leone, the Extraordinary Chambers in the Courts of Cambodia).

In addition, the Group took into account that another state can execute criminal jurisdiction over the crimes basing on the active and passive personality principles. In this case, the Group recommends adopting international convention, the text of which has been specifically designed and annexed to the report.

The report also considered the issue of exercise of jurisdiction over the UN personnel by international judicial body - the International Criminal Court or a Tribunal especially established on the grounds of the Security Council Resolution (similar to tribunals for the former Yugoslavia or Rwanda). The Group made recommendations concerning procedures of possible investigations conducted in connection with the crimes committed by the UN personnel.

On March 7, 2008 the UN General Assembly adopted Comprehensive strategy on assistance and support to

victims of sexual exploitation and abuse by the United Nations staff or related personnel, which contains recommendations to states on organization of such actions, including creation of special services and centers [8]. It is planned to create a United Nations focal point to coordinate and monitor implementation of the Strategy to ensure that the process of referring complainants, victims and children born as a result of sexual exploitation and abuse is simple, safe and respects the need for confidentiality, dignity and non-discrimination.

On June 19, 2008 at the 5916th meeting the UN Security Council adopted Resolution 1820 (2008), in which the Council:

- a) Requests the Secretary-General, in consultation with the Security Council, the Special Committee on Peacekeeping Operations and its Working Group and relevant States, as appropriate, to develop and implement appropriate training programs for all peacekeeping and humanitarian personnel deployed by the United Nations in the context of missions as mandated by the Council to help them better prevent, recognize and respond to sexual violence and other forms of violence against civilians;
- b) Requests the Secretary-General to continue and strengthen efforts to implement the policy of zero tolerance of sexual exploitation and abuse in United Nations peacekeeping operations; and urges troop and police contributing countries to take appropriate preventative action, including pre-deployment and in-theater awareness training, and other action to ensure full accountability in cases of such conduct involving their personnel;
- c) Encourages troop and police contributing countries, in consultation with the Secretary-General, to consider steps they could take to heighten awareness and the responsiveness of their personnel participating in UN peacekeeping operations to protect civilians, including women and children, and prevent sexual violence against women and girls in conflict and post-conflict situations, including wherever possible the deployment of a higher percentage of women peacekeepers or police;
- d) Requests the Secretary-General to develop effective guidelines and strategies to enhance the ability of relevant UN peacekeeping operations, consistent with their mandates, to protect civilians, including women and girls, from all forms of sexual violence and to systematically include in his written reports to the Council on conflict situations his observations concerning the protection of women and girls and recommendations in this regard;
- e) Requests the Secretary-General and relevant United Nations agencies, inter alia, through consultation with women and women-led organizations as appropriate, to develop effective mechanisms for providing protection from violence, including in particular sexual violence, to women and girls in and around UN managed refugee and internally displaced persons camps, as well as in all disarmament, demobilization, and reintegration processes, and in justice and security sector reform efforts assisted by the United Nations.

On September 16, 2009 the UN published a UN SG Report "Women, Peace and Security". It contains information regarding the UN system activities carried out in the context of gender in the UN multidimensional operations.

Despite the encouraging statistics, acts of misconduct by peacekeeping personnel, according to the victims, still occur. In response, the UN and Member States ensure that all credible allegations are investigated and appropriate action is taken when allegations are substantiated.

At the last 68th session the United Nations General Assembly adopted the Secretary-General's report "Special measures for protection from sexual exploitation and sexual abuse" [9] which, in addition to the reports of sexual harassment and abuse on the part of the UN system organizations, contains measures taken by the organization to resolve the problem. These are the following: prevention of misconduct, enforcement of the UN standards of conduct and the remedial actions.. In particular, before deployment the UN provides training and education for contingent missions on conduct and discipline. For example, the United Nations rules forbid sexual relations with prostitutes and with any persons under 18, and strongly discourage relations with beneficiaries of assistance (those that are receiving assistance food, housing, aid, etc... as a result of a conflict, natural disaster or other humanitarian crisis, or in a development setting).

Great importance is given to preventing impunity for the crimes committed. The UN investigates its own staff. When allegations of misconduct involving military and police personnel are substantiated, the UN may repatriate the individuals concerned and ban them from future peacekeeping operations. The disciplinary sanctions and any other judicial actions remain the responsibility of the national jurisdiction of the individual involved.

Besides, it is assistance to victims of sexual exploitation and abuse committed by the UN personnel.

United Nations Secretary-General Ban Ki-moon said: "The United Nations and I personally are profoundly committed to a zero-tolerance policy against sexual exploitation or abuse by our own personnel. This means zero complacency. When we receive credible allegations, we ensure that they are looked into fully. It means zero impunity" [10].

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## Genesis of Competences of Local Government of Federal Subjects in Russia

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### Abstract

The basic law of Russia recognizes and guarantees local self-government. Declared that it independently within their authority and is not included in the system of bodies of state power. The legal basis of local self-government is a system of legal norms, on the basis of which it is formed and implemented, including legal norms, which is also contained in the decrees of the President of the Russian Federation and the resolutions of the government of Russia. The article gives a detailed review of the relations arising in the process of formation and realization of powers of the subjects of the Russian Federation in the sphere of regulation of local authorities.

**Keywords:** Local self-government, the subject of the Russian Federation, local authorities, state power.

Local government may exist where it is built as a decision making legal institute, with a representative organ having autonomous budget and power to make local laws and elected directly by local population with the help of secret voting [1].

Taking into account historically complicated genesis of federative relations in Russia, where every new historical period was marked by various political events, we should specify these periods first.

Meanwhile, development of local government in the United States can also be characterized as a historically complicated process. "Some are created by direct state action - through a charter, for example - but most are created because state statutes authorize citizens in a particular geographic area who need or desire local services to form a local unit of government" [2].

It should be taken into account that historical periods may be divided depending on objects and goals of studying specific historical events. Thus, for instance, when analyzing nation-state building in the Russian Soviet Federated Socialistic Republic (hereinafter referred to as RSFSR), historians tend to single out periods beginning from most significant events after the October revolution and to developed socialism. Any period is viewed as a historical epoch characterized by fundamental transformations in social and political life [3].

Political scientists have a different view on division of historical periods. They study the Russian federalism and single out periods according to changes of political course of the ruling elite [4]. When analyzing genesis of the Russian state generally and the Russian federalism in particular, legal scientists prefer to mark out periods when Russian constitutions were adopted [5]. In this respect, we assume that with regard to the Russian history, we should single out periods marked by division of competences in regulating local government between the federal center and federal subjects regarding adoption of the Russian constitution in effect. Using the European Charter of Local Self-Government as a case study, we can find out how legal regulation of the local government is changing [6].

The Fifth All-Russian Congress of Soviets was highlighted by adoption of the Constitution of the RSFSR. Articles 53-60, 62 of the said document were dedicated to the problem of competences of local government. It seems that the constitutional basis was insufficient for defining competences of local governments. From all the norms only Article 62 of the Constitution contained a wording that regional and provincial authorities could enjoy the right to control local councils (i.e. all regional Councils were controlled by regional authorities, while provincial Councils under provincial authorities. The exception was made for city councils that didn't belong to district Councils, etc). Besides, regional and provincial Councils and their Executive Committees were authorized to revoke resolutions of the local Councils, informing the Central Soviet government.

Analysis of constitutional norms allows us to conclude that subjects of the Russian Federation enjoyed a limited scope of competences in regulation of local government. Their functions were restricted to controlling over local authorities and revoking some of the Councils' decisions. Meanwhile, the Federation (represented by its central bodies) had to be informed about all cases when decisions of local Councils could be revoked by provincial Councils, as well decisions of the regional Councils. Besides, as it comes from the analysis of constitutional norms, the Federation

56 established norms of representation in the Council congresses at every level of political power [7].

57 Thus, the first constitutional acts reveal centralizing tendencies in regulating local governments.

58 This period of improving (by way of centralization) practices in realizing competences at every level of the state  
59 power in the RSFSR continued until adoption of the first Constitution of the USSR and then the Constitution of the  
60 RSFSR in 1925.

61 When analyzing this period, we should take into account the fact of creation of the USSR in 1922, which  
62 determined further development of legislation relevant regulation of local authorities. Adopted in January 31<sup>st</sup>, 1924, the  
63 Constitution of the USSR completed legal implementation of the USSR as a federal state. The Treaty on the Creation of  
64 the USSR from December 31<sup>st</sup>, 1922 didn't stipulate creation of the Soviet of Socialistic Republics, but nevertheless, it  
65 could contain some fundamentals for forming a unified state. Therefore the period of creation of the USSR as a unified  
66 state was over after adoption of a new constitution at the beginning of 1924.

67 As far as the peculiarities of the Constitution of 1924 are concerned, the mentioned document didn't contain  
68 chapters or specific articles concerning regulation of local government. These decisions were supposed to be made by  
69 the republics. Actually, constitutions of the Union republics contained chapters concerning local Councils, as well as  
70 norms on cooperation of local government agencies in the Union republics.

71 However, building the Soviet state required that the Union of SSR should uniform all issues concerning  
72 organization of local government. Establishment of universal fundamentals of legal position of local councils viewed from  
73 the perspective of the Union was determined by the necessity to increase their role in nation-state building as well as to  
74 neutralize differences in creation, competences and forms of mass work, which did not result from specific conditions of  
75 some Union republics.

76 Analysis of legal acts shows that from the very beginning local government agencies in the USSR were flexible in  
77 determining competences of local Councils. In some cases, taking into account the necessity of uniformity in solving  
78 electoral, financial and other issues, the Union regulated some local governments by issuing associated legal acts. In  
79 other cases the Union could be restricted to adoption of similar or general provisions worked out with the help of  
80 representatives of the Union republics. These exemplary acts of advisory character made basis for preparing and  
81 adopting relevant laws in the Union republics and their subjects [8].

82 Laws of the Union contained fundamentals concerning the role of the Union in local governments. They stipulated  
83 local Councils as supreme authority, enabling them to deal with local matters as well as participate in discussion of  
84 regional, provincial, republic and all Union matters. The USSR not only erected this fundamental principle, but determined  
85 sharply all competences of the local Councils in regions where they reflected tendencies throughout the Union, i.e. they  
86 participated in governing fields under jurisdiction of the Union or Union and republics. For instance, this refers to articles  
87 concerning competences of the Councils in strengthening the defense capability, taxation, state statistics, etc.

88 Analysis of some other normative acts of the USSR concerning issues of building the Soviet state prove that the  
89 Soviet law maker tended to centralization. These tendencies are very vivid not only in normative acts, but the  
90 competences of local Councils in social and cultural development, but in acts of organization and mass work of these  
91 Councils.

92 The Union government agencies adopted acts concerning relations between the local authorities and supreme  
93 Soviet authorities, and correspondingly set goals for Central Electoral Commissions of the Union and autonomous  
94 republics, formed the structure of executive committees of the local Councils.

95 Legal regulation of local authorities in corresponding period witnessed increase of centralistic tendencies. As has  
96 been pointed out in legal literature, increase of "centralization was historically determined by the necessity of uniting all  
97 political and economic efforts to find solutions to socialistic reconstruction as well as by the class war that took place  
98 during socialistic transformation of the country".

99 The said period marked by development of competences of subjects of the Russian Federation in regulating local  
100 government was over after the adoption of the Constitution of the USSR in 1936 and the Constitution of the RSFSR in  
101 1937.

102 The Constitution of the USSR from December 5<sup>th</sup>, 1936 was of the same centralistic tradition as its predecessor.  
103 For the first time ever a constitution (Chapter VIII) was dedicated to local governments. This Chapter determined  
104 fundamentals of the national legislation concerning local Councils including their system, way of forming and term of  
105 tenure, basic competences, types of legal acts, executive boards and their relations with the Council and senior executive  
106 boards. However, this didn't imply that the role of the USSR in legal regulation of local governments would increase.

107 After adoption of the Constitution of the USSR in 1936, all republics were involved in working our new constitutions  
108 until March 1937. The period from March 1937 to January 1938 was highlighted by adoption of constitutions in  
109 autonomous republics that were enacted by the Supreme Councils of republics.

110 The situation with centralization of competences of local governments remained almost unchanged, for the volume  
111 of these competences was redistributed across levels of power from time to time. This situation in the USSR and the  
112 RSFSR as its part didn't change until adoption of the new Constitution of the USSR and then the Constitution of RSFSR.

113 The Constitution of USSR from October 7<sup>th</sup>, 1977 contained norms on organization of local government. Thus, its  
114 Preamble pointed out preservation of ideas and principles of the Constitutions of 1918 and 1936. Therefore many rights  
115 of the USSR stipulated by the Constitution of 1936 were preserved and even extended. According to Soviet scholars, the  
116 principle difference of this new Constitution from the previous ones lay in the fact that it contained an open list of  
117 competences [9].

118 To follow provisions of the Constitution of 1977, the new Constitution of RSFSR of 1978 established almost the  
119 same rules concerning its status as a part of the USSR and competences in regulating local governments. This shows its  
120 subordinate character to the USSR. However, this subordination was determined by distribution of powers that was not  
121 so important and clear. It seems that law makers didn't see any need in establishing constitutional norms concerning  
122 distribution of competences between the USSR and its republics.

123 The same situation was with the Constitution of RSFSR of 1978 that copied norms of the mentioned USSR  
124 Constitution relevant competences of autonomous republics. Limits of these competences remained absolutely unclear,  
125 because, the same as the USSR Constitution, the Russian Constitution enlisted competences of the RSFSR

126 This referred to the fact that the RSFSR was still on its way to become a federation. This could be explained by the  
127 fact that the ideology of the Soviet federalism was based on centralization of the most important political powers.

128 Period from 1979 to 1985 was marked by stagnation and crisis of the Soviet state system. It could be difficult to  
129 organize properly local government agencies when legal regulation was going through serious changes.

130 At the end of the 80s the Soviet authorities intended to give a new impulse to development of local government  
131 agencies. However, changes that took place in political life made it quite complicated a task. Therefore in April 9<sup>th</sup>, 1990  
132 there was adopted a law concerning "The General Principles of Organization of Local Government and Local Economy of  
133 the USSR", which determined new tendencies in developing local government agencies, principles of their formation and  
134 functioning as local governments, as well as self-organization of local population. According to Article 7 of the aforesaid  
135 Law, local government agencies were subject to the Constitution of the USSR, constitutions of the Soviet and  
136 autonomous republics, laws of the USSR, Soviet and autonomous republics.

137 Meanwhile, this Law didn't constitute clear division of competences among the USSR, Soviet and autonomous  
138 republics in regulating local government. The problem remained even after adoption of the Law "About Local Government  
139 of the Russian Federation" from July 6<sup>th</sup>, 1991. Moreover, among the existing federal subjects only republics had a right  
140 to make local legal acts concerning local government issues, i.e. laws concerning local government, local referendum,  
141 elections in local Councils.

142 Local government agencies and administrations of provinces, regions, autonomous regions and autonomous areas  
143 were to foster development of the system of local government. However, they could not make decisions regulating local  
144 government agencies.

145 Adoption of the Constitution of the Russian Federation in 1993 highlighted a new stage of development of  
146 competences of federal subjects in the Russian Federation. It gave birth to a new model of relations between the Russian  
147 Federation and its federal subjects. Article 71 of the Constitution codified matters of authority, while Article 72 entrenched  
148 matters of joint authority of the Russian Federation and its subjects. Likewise, fundamentals of organization of local  
149 government underwent changes. According to Article 72, sub-section "n", codification of general principles of organization  
150 of the system of agencies of state power and local government are subjects to joint competence of the Russian  
151 Federation and its subjects.

152 A federal law concerning local government started developing in 1994. In compliance with a plan of priority  
153 measures on realization of the first President's Message to the Federal Assembly, the government of the Russian  
154 Federation prepared a draft federal law concerning general principles of organization of local government. In December  
155 1994 it was introduced to the State Duma.

156 The Law concerning "General Principles of the Organization of Local Government in the Russian Federation"  
157 contained provisions of all three versions of the project. This Law became a type of compromise, though it was based on  
158 one of the deputy's projects.

159 In August 28<sup>th</sup>, 1995 the Law was signed by the President of the Russian Federation; in September 1<sup>st</sup>, 1995, after  
160 being published, it came into legal force. Thus, the Law highlighted a new stage in developing legal basis of local  
161 government.

162 Recently great efforts have been taken to find ways of dividing competences between Russia and its federal  
163 subjects in various fields of social life including local government. In 2001 and 2002, the Presidential Committee created



164 by a presidential decree prepared quotations for dividing competences among federal agencies of state power, state  
165 power agencies of the federal subjects and local government agencies. These efforts culminated in adoption of a new  
166 Federal Law concerning "General Principles of the Organization of Local Government of the Russian Federation" in  
167 October 6<sup>th</sup>, 2003.

168 However, the analysis of genesis of competences of the Russian federal subjects in managing local government  
169 allows us to make the following conclusion.

170 Competences of federal subjects in a state where federalism makes a principle of state structure can be subject to  
171 a cyclic historical process. Centralization and decentralization of competences in governing local agencies can regularly  
172 alternate with one another. Regular change of these periods doesn't imply that this federation is unsustainable or  
173 unstable.

174 Development of such a complex institute as local government presupposes systematic reconsideration of  
175 proportions determining scope of rights regulating local government [10].

176 It is no easy matter to find the right balance in defining the scope of rights concerning local authorities. This can be  
177 explained by the fact of dynamic development of society and state. Therefore it is difficult to avoid shifting from  
178 centralization to decentralization of competences in regulating local government in a federative state. It is essential that  
179 periods of such changes should not result in critical forms of concentration or deconcentration of government agencies.  
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## Legal Status of the Embryo in Legislation of the Republic of Yemen: Comparative Research on Provisions of the Islamic and International Law

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### Abstract

*The article touches upon the problem of determining status and protection of the rights of the embryo in the legislation of the Republic of Yemen from the point of view of the Islamic and international law.*

**Keywords:** legal status of the embryo, Legislation and the Republic of Yemen, Islamic law, international law in the status of the embryo.

Embryo is a stage of development of an organism from zygote to birth or breaking the eggshell. Prenatal development of a human being lasts for about 270 days and is usually divided into embryo (germ) and fetal periods.

The Quran contains data embracing periods from preliminary development of a human embryo to birth: "Indeed, We created man out of an extract of clay. Thereafter We put it as a drop into a safe lodging. Then We made the drop into a clot, then We made the clot into a little lump of flesh, then We made out of that little lump of flesh bones, then We clothed the bones with flesh, and then We brought it forth as another creation. So blessed be Allah, the Best of creators [2]".

The problem of protection of the right of the embryo has not been carefully studied yet, though attempts to work out new doctrines on protection of these rights have been made both in the Islamic and international law. At the same time, it should be pointed out that fundamentals of the Islamic doctrine should be close in such a way to make an integral part of regulation in the international law. Meanwhile, we can hardly misunderstand that the Islamic system of legal norms and religious and moral rules established by the Quran and Sunnah cannot fit in full degree or be similar to all elements of regulation in the international law. It should be pointed out that, in our view, the problem of interpretation of rights of the embryo is not sufficiently studied in some other social and political sciences that are not associated with the Arab world.

Theory of human rights is under careful consideration in the international law. However, main fundamentals of the Islamic law have not yet received adequate attention in the context of international legal prescriptions. We have to admit that in many cases international lawyers are prejudiced against some provisions of the Islamic law. This deprives a research from objectivity and in many cases can distort its main point. Obviously, this results in misinterpretation of some approaches and provisions of the Islamic law concerning human rights and protection of rights of children.

Comparing fundamentals of the relevant conceptions in the international and Islamic law, it is important to give a fair view to protection of rights of the embryo in the Islamic law, in the classical (the Quran and the Sunnah) and the modern Yemen law at the constitutional and field specific levels. We assume that this conception has an international legal component. Especially since rights of the embryo, as a legal phenomenon, have not always been subject of independent research.

The Islamic law presumes that children are the divine mercy and a natural human need. The Islamic Sharia encourages people to give birth to children in order to preserve the human race and prohibits sterilization of men and women, hysterectomy, abortion unless medically necessary, any methods that can terminate reproduction of humankind. A child enjoys the right to be born from a lawful marriage between a man and a woman [3]. The role of children in Islam, the essence and wisdom of reproduction are reflected in one of ayats of the Quran:

"Wealth and children are the adornment of the life of this world. But the good righteous deeds that last, are better with your Lord for rewards and better in respect of hope" [4]. «To Allah belongs the kingdom of the heavens and the earth. He creates what He wills. He bestows female offspring upon whom He wills, and bestows male offspring upon whom He wills. Or He bestows both males and females, and He renders barren whom He wills. Verily, He is the All-Knower and is Able to do all things" [5]. This ayat reveals that children are a gift and mercy of the Almighty, that love to children, male or female, is in nature of every human being and is one of virtues of this world reminding us of a greater

56 mercy that we can get in the other world only if we live the just life.

57 We can conclude that rights of a future child are protected in the Islamic Sharia before its parents are married.  
58 Exercise of this right determines the atmosphere in which a child would grow. Parents are considered the best protectors  
59 of rights of their child. Therefore Islam pays much attention to instructing people on how to choose the right spouse and  
60 to comply with the principles of successful marriage in conformity with the norms of the Islamic Sharia.

61 The rights to life, safety and development of a child are considered from the moment a child begins to form from an  
62 embryo that should be protected and secured, according to the Islamic doctrine. A child in this form is considered as an  
63 already living human being created by Allah, despite the fact that it is still in the womb. This implies obligatory provision of  
64 health care and healthy food to a pregnant mother. Muslim husband is compelled to provide his pregnant wife with  
65 financial support. The Almighty said: "And if they are pregnant, then spend on them till they lay down their burden" [6].

66 According to Muhammad's assumption reflected in hadithes of Muslim and al-Bukhari, a fetus that is less than 120  
67 days has no soul yet: "Indeed, any of you (at the beginning) is formed in the womb of your mother within forty days in the  
68 form of a drop, then it remains there as a clot for forty days and for forty more days in the form of a little lump of flesh, and  
69 the Allah sends an angel who should write down four things. He is told: "Write down his deeds, his destiny, his lifetime  
70 period and if he will be happy or unfortunate", after that he is forced in with the spirit" [7].

71 According to that, Article 2 of the Cairo Declaration on Human Rights presupposes that life is a gift of the Almighty  
72 and a guaranteed right to everyone. People, society and state are obliged to protect this right from any offences; life  
73 cannot be taken, unless otherwise specified by Sharia. Protection of human life during the time given by Allah to an  
74 individual is a compulsory prescription of Sharia [8].

75 The moment of beginning a human life is considered in medical and legal literature as practically significant.  
76 Development of auxiliary reproductive techniques and new the then-unheard-of possibilities, post-mortal reproduction  
77 programmes, the problem of life of the embryo and right of the child to be born grows in significance not only in the ethical  
78 sense, but in the civil and criminal law [9]. Meanwhile, we should admit that this problem is viewed from various angles.

79 The absolutist position is based on absolute value of a human embryo at all levels of its development [10], because  
80 from the biological point of view a human being as a biological individual is formed right after the fusion of parents' cells  
81 creating a unique set of genes. As a biological structure, the embryo is not similar to any female organ, because it is a  
82 human being growing inside its mother's body. The embryo is a 'future human being' rather than a part of a female body.

83 It is for protection of the embryo's life that Islam prohibits abortion, unless its mother can be removed from a real  
84 threat only by way of abortion. It is based on general prohibition on murder: "You should not kill any living being whom  
85 Allah has forbidden to kill except by right" [11].

86 Legitimacy of abortion in case of real threat to mother's health rests on several Sharia principles, including, for  
87 instance, the principle of an urgent situation: "Unless you are forced to do it", and the one that life of a mother is more  
88 important than the embryo's life, because the former is basis, while the embryo is its derivative. According to the  
89 Almighty: "No mother should be harmed through her child" [12]. In fact, it deals with choosing between the bad and the  
90 worst - mother is already alive and keeps living, while a child's life is a probability, which is yet unreal. Nevertheless,  
91 Islam prohibits doing the embryo any harm, therefore it allows a pregnant woman not to keep a fast during the Ramadan  
92 and compensate it later [13].

93 Doing the embryo any harm or any attempts to take its life are flatly banned in Islam - it is a human being created  
94 by Allah and no one has a right to take its life, even its father or mother. It is symptomatic that even in case pregnancy is  
95 resulted from a sinful impregnation, a mother would be prohibited to make abortion, because a child is not guilty for deeds  
96 of its parents. The Almighty said: "No bearer will bear the burden of another" [14]. It should be pointed out that this  
97 prescription is reflected in Preamble of Declaration of the Rights of the Child of 1959, which goes as follows: "The child,  
98 by reason of his physical and mental immaturity, needs special safeguards and care, including appropriate legal  
99 protection, before as well as after birth" [15].

100 Meanwhile, the problem of determining initial period of a child's life was debated much during discussions of the  
101 Preamble and Articles 1 and 6 of a project of Convention on the Rights of the Child of 1989. Thus, the mission from  
102 Vatican suggested inserting a phrase from the Declaration of the Rights of the Child of 1959 "before as well as after birth"  
103 into one of the paragraphs of the preamble of the Convention. This suggestion was supported by members of the  
104 Working group who had opposite views.

105 Those who supported the suggestion of the Vatican mission explained their position by the fact that their national  
106 laws contained provisions concerning protection of rights of the child from the moment of conception. This position was  
107 supported because it is relatively neutral to the problem of abortion and doesn't indicate the moment from which  
108 protection of the unborn child begins. Those who were against this position referred to the fact that every nation has their  
109 own laws concerning abortion, therefore if they accepted the provision it would not allow many states to ratify or join the

110 convention. As a compromise, they suggested avoiding any references to than in the convention. This opinion was  
111 supported.

112 Fierce debates took place when discussing Article 1 containing definition of a child. Missions that supported  
113 conceptions establishing the moment of fertilization as the beginning of life suggested that this provision should be  
114 included into the definition of a child. As a result, the Article reads as follows: "For the purposes of the present  
115 Convention, a child means every human being below the age of eighteen years".

116 In complete conformity with the Christian views (Vatican's view), throughout its development the embryo should be  
117 considered as a valuable human being enjoying the right to life from the very beginning - linkage of a male and a female  
118 gametes. This helps to grow a zygote with a unified nucleus containing a unique and a specific programme of  
119 development of the future human being. Pregnancy is just the process of maturation and growing of a new human being.  
120 This approach corresponds to basic ideas of the Islamic Sharia.

121 Among international treaties of a regional character containing guarantees of rights of the child, special attention  
122 should be paid to the Cairo Declaration on Human Rights in Islam of 1990 [16]. In this respect, we can hardly disagree  
123 with I. A. Mikhailovsky, who suggests that "no other subjective civil law can have such a complex subject-matter  
124 embracing medical, philosophical, biologic, religious and legal constructions, peculiar mixture of which reveal itself in all  
125 aspects of life - from the moment of development of this right, i.e. the right to life of the conceived but unborn children"  
126 [17].

127 In literature the embryo is considered as a human creature having a value and the right to live from the moment of  
128 conception. Therefore it is prohibited to perform any actions that could complicate or terminate its development. Thus, the  
129 state should provide conditions for development and protection of life at any stage. A renowned religious figure Imam Al-  
130 Ghazali believes that abortion is a crime against an already living human being. He considers conception as "readiness to  
131 get life".

132 Analysis of the modern legislation of the Republic of Yemen revealed some inconsistency relevant the subject  
133 under examination. Thus, the Constitution of the Republic of Yemen of 2001 doesn't specify the moment when human  
134 rights take their legal effect. If, as a comparison, we refer to Article 16 of the Constitution of the Russian Federation we  
135 can see that it reads that "fundamental human rights and freedoms are inalienable and shall be enjoyed by everyone  
136 since the day of birth".

137 Similar approach can be seen in the industry-specific legislation of the Republic of Yemen containing definition of  
138 the moment of birth. Thus, according to Article 320 of the Criminal Code of the Republic of Yemen of 1994 stipulates that  
139 the moment of birth of a child is the moment of separation of a fetus from a mother's organism by way of delivery, when it  
140 can breathe and shows other vital signs (crying, sneezing, breathing or moving). In the context of comparative legal  
141 studies, it should be mentioned that these provisions are similar to those of Article 49 Section 1 of the Federal Law of the  
142 Russian Federation "On Fundamental Healthcare Principles in the Russian Federation" stipulating that the moment of  
143 birth of a child is the moment of separation of a fetus from a mother's organism by way of delivery. The Civil Code of the  
144 Republic of Yemen of 1991 (Article 37) determines that a human being acquires personality at the moment of birth and  
145 loses it at the moment of death.

146 Meanwhile, according to the Law of the Republic of Yemen No (45) from 22/9/2002 "On the Rights of the Child",  
147 the state should provide medical assistance to a child during pregnancy, delivery and after the birth. Article 68 of the  
148 aforesaid Law establishes responsibility of the state to provide necessary treatment or surgical intervention the soonest  
149 possible in order to avoid any kind of obstacles or harm to a child's health in the future. Legal rights of the child are  
150 applicable both to the embryo and a child after the birth (ст.70).

151 At the same time we proceed from the assumption that, according to Article 4 of the mentioned Law, the right to life  
152 is absolute and cannot be diminished.

153 As a comparison, we should mention that the Federal Law "On Fundamental Guaranteed of Rights of the Child in  
154 the Russian Federation" from July 24<sup>th</sup>, 1998 stipulates that health care organs should protect a child from any arbitrary  
155 interference restricting its right to life. It may be assumed that health care organs are obliged to take measures helping to  
156 protect rights and legal interests of the conceived but unborn children. This is not so much determined by legal acts as a  
157 complex interpretation of the Russian legislation. Thus, Article 3 of the Federal Law "On State Benefits for Citizens with  
158 Children" from May 19<sup>th</sup>, 1995 presupposes a number of maternity allowances, lump-sum allowances for those who  
159 registered in medical institutions during early pregnancy, and not only after the child is born. It seems that maternity  
160 allowance is paid not only for supporting mother's health but for protecting the health of an unborn child, i.e. it meets with  
161 a child's interests as well.

162 This is proved by the fact that a conceived child may be considered a lawful heir long before the birth. According to  
163 Article 1116 of the Civil Code of the Russian Federation, a child conceived while its ancestor is alive can be called for

164 inheritance. In legal literature reasonable consideration is given to the fact that, when it comes to a conceived child as an  
165 unborn legal heir, the procedure of certification of inheritance rights should be delayed, inheritance can be distributed only  
166 after this legal heir is born (see Articles 1166, 1163 of the Civil code of the Russian Federation).

167 Modern criminal legislation of the Republic of Yemen doesn't contain specific norms designed to protect the life of  
168 a fetus (the embryo) during the prenatal development and deliver. It should be pointed out that if termination of pregnancy  
169 was made by forth actions of the offender they are qualified as willful actions in accordance with Article 239 of the  
170 Criminal Code of the Republic of Yemen (Abortion made without consent of a pregnant woman) or Article 240 of the  
171 Criminal Code of the Republic of Yemen (Abortion made with consent of a pregnant woman).

172 Article 234, section 2, of Abortion made without a consent of a pregnant woman (Intentional homicide), the same  
173 as Article 105, section 2, sub-section "g" of the Criminal code of the Russian Federation, considers murder of a woman  
174 known by the killer to be in a state of pregnancy as one of the qualified *corpus delicti*. It can be assumed that, to some  
175 extent, in this case the fetus (the embryo) is yet implicitly protected. Responsibility is strengthened by the fact that harm is  
176 doubled (this is a murder of not only a woman, but a fetus (an embryo). According to Article 239 of the Criminal Code of the  
177 Republic of Yemen (as well as to the Article 111 of the Russian Federation), the criminal responsibility is incurred  
178 irrespective of the fact if any harm to the health of a pregnant woman was made. The very fact of termination of  
179 pregnancy resulting from the offender's actions is enough.

180 According to the legislation of the Republic of Yemen, the fetus has a right to be in family relations with its lawful  
181 father and mother after the birth see Articles 14, 15, 20, 21 of the Law "On Rights of the Child in the Republic of Yemen".  
182 With regard to this fact, it is prohibited to perform any actions that could provoke doubts on account of blood ties between  
183 a child and its parents. The issue of blood ties between a child and its parents is of much significance in the Islamic  
184 Sharia. However, this prescription is not absolute in a sense that it is related to natural children only. The Islamic Sharia  
185 prohibits adultery, prescribes the waiting period after the divorce (iddah) for the divorced or widowed people and allows  
186 marriage only after the end of this period in order to secure blood ties from mixing. Those who study fundamentals of  
187 Islam consider that preservation of kindred is one of the main objectives of Sharia. The Almighty Allah said: "Call them by  
188 the names of their fathers; it is more just in the sight of Allah. But if you do not know their father, then they are still your  
189 brothers in religion and those entrusted to you. And there is no blame upon you for that in which you have erred but only  
190 for what your hearts intended. And ever is Allah Forgiving and Merciful" [18]. In Islam an illegitimate child is considered a  
191 human being enjoying all rights bearing no responsibility for the actions committed by its parents. Thus, according to the  
192 Article 1035 of the Civil code of the Republic of Yemen, heirs on testacy and at law are any citizens conceived while their  
193 lawful ancestor was alive and born alive after the testimony is opened.

194 Thus, it should be pointed out that the legislation of the Republic of Yemen relevant the subject under study  
195 features some contradictory elements and flaws. According to laws, human being acquires legal competence exclusively  
196 after the birth. On the constitutional level, before the birth the embryo is not explicitly protected from any attacks to its life.  
197 We assume that Article 30 of the Constitution of the Republic of Yemen should be amended with the following wording:  
198 "The state shall guarantee that a human life is protected from the moment of conception". The corresponding  
199 amendments should be made to other legal acts. This provision doesn't contradict in any aspect to the mentioned  
200 international legal acts.

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