Research of Human Capital in View of Labour Potential of Staff: National Companies Case Study

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Abstract

Today, in a constantly changing economic situation in the world innovations are the driving forces of the global economy, where one of the main places takes labor potential of human capital. For this reason, we evaluated the human capital of the Volga Federal District and its region on the example of the Republic of Tatarstan for the period from 2013 to 2016 (projected) year and the forecast until 2020, taking into account the labor potential of the national enterprise. This study is based on the application of the following research methods: analysis and synthesis, systematic and integrated approach, factor analysis, structural-functional, statistical and representative approaches. In the study, we obtained the following results: calculated indices of human capital in each region of the Volga Federal District and Russia, conducted its evaluation with the calculation of the labor potential of the national company and the counting of the forecast of development of human capital in the Republic of Tatarstan.

Keywords: Human Capital, the Labor Potential of Staff, Human Resources, the Overall Index of Human Capital Development.

Introduction

At the present stage of development, the Russian Federation increasingly attempts to strengthen innovation processes, which should create the conditions for a new stage of development of the country (Cecina, 2013, p. 241). Often, standard and conventional methods of production factors management, including human capital and labor potential, begin to lose their effectiveness and become more constraints (Gurieva et al., 2016; Korableva and Kalimullina, 2016 b). These circumstances lead to a reduction in the efficiency of the use of modern innovative programs in the field of human capital and labor potential of the enterprise personnel (Dmitrieva et al., 2016, p. 203), (Varvarigos and Arsenis, 2015, p.145). Huge role in the development of new economic

forms and import substitution, so urgent at this stage of development of Russia plays an innovative component of human capital.

For this reason, there is a need for the development of methodologies for assessment of innovative human capital and labor potential of the staff of enterprises of various spheres of economic (Latyshev and Akhmetshin, 2015). This is due to the fact that it is innovation and innovative activity are driving forces for the development of all sectors of the economy, and the development of labor potential of the staff of enterprises primarily (Korableva and Kalimullina, 2014). Development and testing of a representative approach in the evaluation of human capital, as well as the accounting of the labor potential of staff based on the experience of one of the leading enterprises of Tatarstan, will allow to analyze the trends of human capital development, as well as to characterize the state of the Republic of Tatarstan labor potential as a factor of human capital development, and in the future of the Volga Federal District and Russia overall (Zubakov and Mustafin, 2015; Gabidullina, 2014).

Traditionally, Tatarstan has high education, research and innovation and employment potential. In this paper we consider the prospects of development of labor potential on the basis of the national enterprise, closed joint stock company of workers (CJSC) "National Enterprise Naberezhnochelninsky Cardboard and Paper Mill after S. P. Titov (CPM)". The choice of the enterprise due to the fact that this national company for over 16 years actively developed and upgraded assessment of employment of staff potential. Thus, in this paper we offer tested methodology for assessing the human capital of the region, taking into account the level of development of labor potential of enterprises. Calculations and analysis were based on data for the period 2013-2016 years, with forecasts up to 2020 (Gorodnikova, et al., 2015, p.320).

Literature review

For a complete picture of the current state of the level of development of innovative human capital is necessary to consider different approaches to its assessment. So, first of all we find indicators of human capital, and then offer the option indicators of the labor potential evaluation on the example of one of the leading enterprises of the Republic of Tatarstan. (Gimaeva, 2011, p.111; Husnutdinov et al, 2016).

The technique is based on the finding of a number of values which are indicators of formation and application of innovative component of human capital:

1) The indicator showing the level of the population with higher education:

$$I_{Ed} = \frac{(N_{St} + N_A + N_D)}{N_{EAP}} \quad (1)$$

Where: N_{St} – number of students; N_A – number of PhD students; N_D – number of people with PhD; N_{EAP} – the number of economically active population in the subject.

2) The level of expenditures on the education in the Region:

$$I_{EOER} = \frac{\sum_{EOE}}{\sum_{TES}} \quad (2)$$

where: Σ_{EOE} – the amount of expenditure on education; Σ_{TES} – total expenses of subjects in the period.

3) The indicator characterizes the level of education of the employed population:

$$I_{EEP} = \frac{N_{EPHE}}{N_{ANEP}} \quad (3)$$

where: N_{EPHE} – the number of employed population with higher education in the studied period; N_{ANEP} – the average number of employed population.

4) Indicator showing the change of labor productivity level in the region:

$$I_{LPL} = \frac{V_{GRP_1}}{N_{EP_1}} : \frac{V_{GRP_0}}{N_{EP_0}} \quad (4)$$

where: V_{GRP_1} / N_{EP_1} – the ratio of regional product gross to the average annual number of employed population in relation to the previous year.

5) The indicator, which shows the number of personnel engaged in research and development:

$$I_{RP} = \frac{N_{RP}}{N_{EP}} \quad (5)$$

where: N_{RP} – the number of personnel engaged in research and development; N_{EP} – the number of employed people in the region.

6) The indicator characterizes the shipment of innovative products:

$$I_{IP} = \frac{V_{IP}}{V_{GRP}} \quad (6)$$

Where: V_{IP} – the volume of shipped innovative products; V_{GRP} – gross regional product.

Calculating all the factors, we can calculate the formation of the human capital in the Republic of Tatarstan:

$$I_{HCform} = I_{Ed} * I_{EOER} = \frac{(N_{St} + N_A + N_D)}{N_{EAP}} * \frac{\sum_{EOE}}{\sum_{TES}} \quad (7)$$

Where: I_{Ed} – coefficient of higher professional education in the region; I_{EOER} – the level of expenditures in the region directly to education.

I_{HCform} – 0,0142.

We have the human capital index were found. This index shows the population of the Republic of Tatarstan opportunities of staff reproduction in the short term, the effectiveness of training of which is largely determined by the total cost for education in the Republic of Tatarstan.

A) Calculate the use of the human capital in the field of innovation:

$$I_{UseHCiInnov} = I_{RP} * I_{IP} \quad (8)$$

$I_{useHCinnov}$= 0,0066* 0,0212 = 0,00205.

B) Using the human capital in the modernization of the economy:

$$I_{UseHC\,modern} = I_{EEP} * I_{LPL} \quad (9)$$

$I_{UseHCmodern}$ = 0,91283*1,06354842 = 0,9708.

The use of the labor potential in the innovative sphere is important during the economy transformation (Korableva and Kalimullina, 2016 a). We conclude that for the evaluation of human capital application is necessary to summarize both of these parameters, then the use of human capital:

$$I_{UseHC} = \frac{I_{UseHCiInnov} + I_{UseHCmodern}}{2} \quad (10).$$

We find the use of labor human capital: I_{UseHC} = (0,9708 + 0,00205) / 2 = 0,4864.

This parameter indicates the possibility of human capital to technological modernization and creating an innovative product (Osadchy and Akhmetshin, 2015a). To determine the result of the human capital necessary to take into account the possibility of use and formation, therefore,

$$I_{HC} = \frac{I_{HCform} + I_{UseHC}}{2} \quad (11)$$

I_{HC}= (0,4864+0,0142) / 2 = 0,25.

It follows that the final figure of the Republic of Tatarstan human capital for 2013 is 0.25. Accordingly, in order to compare the final figure of the human capital with other regions of the Russian Federation, it is necessary to conduct a similar evaluation of a number of regions in this calculation method (Table 1).

Table 1. An integral component of the human capital of Russian regions (in comparison with the Republic of Tatarstan)

Region	The size of the final index of human capital			
	2013	2014	2015	2016 (forecast)
Bashkortostan	0,21	0,19	0,23	0,22
Tatarstan	0,25	0,23	0,24	0,27
Nizhny Novgorod region	0,23	0,21	0,25	0,24
Sverdlovsk region	0,20	0,19	0,20	0,21
Moscow	0,36	0,34	0,37	0,37
Saint Petersburg	0,35	0,35	0,38	0,36
Novosibirsk region	0,31	0,29	0,30	0,31
Tomsk region	0,21	0,20	0,19	0,22
Samara region	0,22	0,23	0,22	0,21
Average value	0,26	0,24	0,26	0,27

According to the analysis there are shortcomings in the system of formation and use of human capital in the Republic of Tatarstan. For Tatarstan emphasis on innovative training of personnel for the territory of priority development and special economic zones needed (Dmitriev, 2011, p. 111).

Development of new methods for assessing human capital will form a new business community, whose work will be adjusted to the requirements of the economy and the creation of innovative productions (Krotkova et al., 2016; Sattarova and Gabidullina, 2015). Assessment of the region's human capital can not be effectively carried out without regard to the employment potential of the enterprises. Organizations need to have a high employment potential of its personnel and be able to properly evaluate it (Pozdeeva, 2014, p. 16). An important element – to develop indicators to evaluate the factors of formation of labor potential. This research for more than 16 years is developing on National Enterprise "Naberezhnochelninsky Cardboard and Paper Mill after S.P. Titov (CPM)".

Today the plant is the leader of the 180 producers of pulp and paper industry for the production of corrugated packaging with a market share of almost 7.6%. It is the third largest manufacturer of corrugated products in Russia (Figure 1). In toilet paper producing Tatarstan ranks first among the 40 regions with the result of 193.9 million rolls. In the production of cardboard boxes the Republic of Tatarstan is on the 4th position among 56 regions – 68.4 million sq. m. As for the issue of all kinds of cardboard CPM takes the 7th place among the 41 enterprises in the industry with the index 28,9 thous. tons. In the production of all kinds of paper mill occupies the 9th place among the 48 enterprises in the industry – 34.5 thousand tons (Sudakova, 2014, p. 3), (Gapsalamov, 2013).

Staff turnover indicator is one of the important parameters describing the potential of employees. This turnover rate is the lowest among enterprises of the region. Over the past 5 years it ranges from 1.4 to 2.7 (Figure 1).

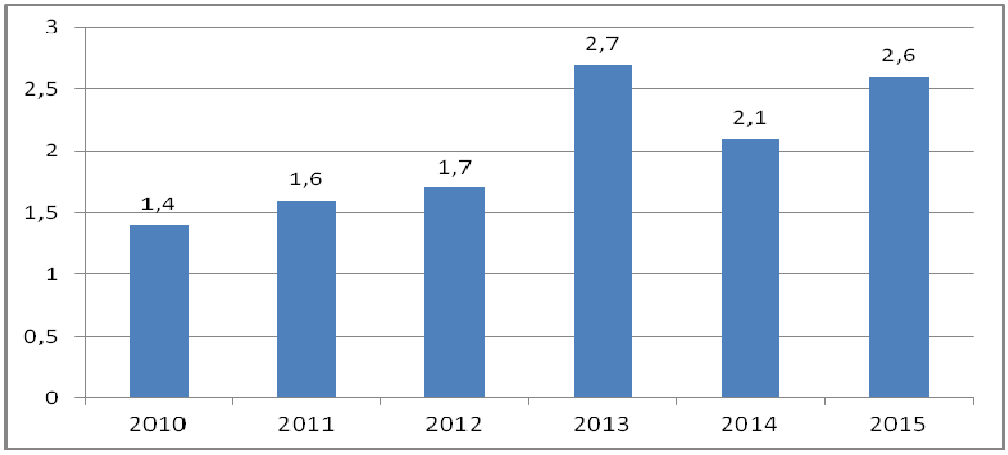

Fig. 1. The fluidity of the CPM staff (Ktek.) From 2010 to 2015.

The second indicator – the level of education of staff. Thus, the estimated coefficient level of education (IE), is determined by the ratio of the share of workers with secondary and higher professional education in the total number of employees:

IE = NEwEd / TNofEmp (12), where NEwEd – the number of employees with secondary or higher education (pers.); TNofEmp – the total number of employees (pers.).

The majority of employees have secondary vocational education – 48%, higher education – 26% and another 3% will have soon, initial professional level has 5% of the employees.

Table 2. Characteristics of the number of personnel by level of education

Education	Number of employees	Number of men	Number of women	% of total amount
High professional	1734	282	139	26
Incomplete higher professional		1		3
Secondary vocational		282	162	48
General secondary		308	83	17
Initial vocational		362	103	5
Basic general		10	2	1
In total:		1245	489	100

At CPM level of education factor is: IE = 1257/1734 = 0,724.

The third factor is stability of staff:

SCoftheTeam = NEemp/TNemp (13), where NE – the number of employees who have worked at least three years (pers.); TN – the total number (pers.). The stability of the staff of the enterprise is high and equal to: SCoftheTeam = 1681/1734= 0,914.

It is believed that the greatest potential for the development of employment and productivity have a group of employees aged 28 to 50 years. Therefore, a physical disability characteristic is a factor: RofPD = NofPW/TN (14), where NpfPW – the number of workers in age 28-50 (pers.); TN – the total number (pers.) (Figure 2).

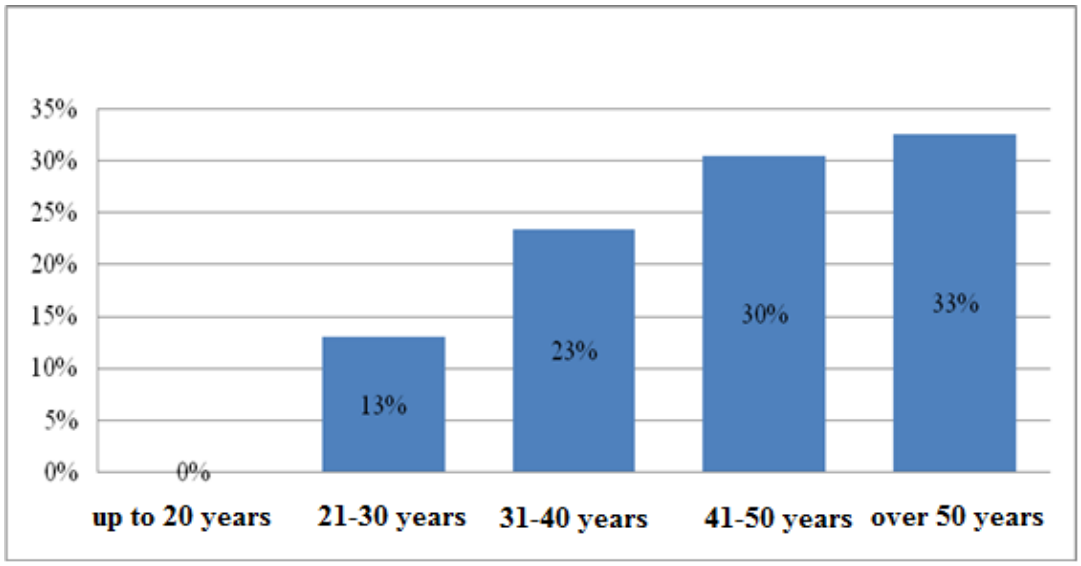

Fig 2. Age of CPM staff data

So, the coefficient of a physical disability of the enterprise: RofPD = 1057/1734 = 0,609.

One of the important factors in the assessment of national labor potential of the enterprise is to evaluate the innovation and intellectual potential of human capital (Kubenka, 2014; Kubenka and Kralova, 2013). In 2015 it received 123 proposals for development of the company from the workers of CPM, which brought 18 million rubles effect. In 2016, 292 proposals by 20.5 million rubles. Also, it's necessary to count the number of PhD employees on the enterprises and the number of patents which number currently is not calculated.

These figures confirm the importance of assessing innovation and intellectual potential of human capital, its use in the activity of enterprises (Osadchy and Akhmetshin, 2015b).

A necessary condition for increasing the efficiency of the enterprise is to increase the use of the labor potential of the enterprise (formulas 12, 13, 14): LB = IE + SCoftheTeam + RofPD / 3 = 0,724+0,914+0,609=0,746 (16).

As can be seen from the above example, improving the use of labor potential of enterprises - important factor in increasing the level of human capital, as it expands and develops the capacity of people during employment. Thus, the account of this factor is required in assessing the state of human capital, including its innovative component.

Method

Theoretical foundations of the study are the works of scientists in the field of human capital and labour potential of staff, such as T. W. Schultz (Schultz, 1993), A. Baron, M. Armstrong (Baron and Armstrong, 2007), M. Davin, K. Gente, C. Nourry (Davin et al., 2015).

Methodological foundation of the study is a system approach of the analysis. The approach is based on synthesis and complexity of the statistical analysis. (Nevretdinova, 2015, p. 551).

As the base, the authors applied an evaluation method of human capital of the region taking into account labour potential of national companies – the representative approach. The authors used statistics of the Federal and Regional Statistics Service on condition of human capital and labour potential (Zabelina et al., 2013, p.54).

In case of assessment of the level of human capital development of the Republic of Tatarstan taking into account its labour potential indicators B1–B12 were used (Table 3) (Zubarevich, 2014, p. 9).

Table 3. The indicators used to assess the human capital of the region

Indicator	Evaluation
The number of students in educational institutions for 10 thousand, number of people	B_1
The number of employees engaged in research and development, of the 10 th. people. employed in the economy	B_2
Shares of the region's consolidated budget expenditure on education, health and physical education to GRP	B_3, B_4
Specific weight of investments into education in the total volume of investment in fixed capital to GRP	B_5
Economic activity rate of the population	B_6
The level of unemployment of the population	B_7
The share of the employed population with higher education	B_8
The share of innovative goods (works, services) in the total volume of shipped goods (works, services)	B_9
The number of patents by 10 thousand. population of people	B_{10}
The number of graduate students, doctoral students, thousands of people	B_{11}, B_{12}

When calculating, importance of each indicator will be equivalent as to consider influence of each indicator on human capital development taking into account labour potential is impossible, therefore:

ECI = (B_1R + B_2R +X_3R+X_4R)/4, (19)

ILC = (B_6R + B_7R +B_8R+B_9R)/4, (20)

IIIC = (B_2R+B_3R+B_5R +B_9R+ B_{10}R+B_{11}R+$B_{12}R$.) /7, (21)

IIRHC = (ECI+ ILC+ IIIC)/3. (22) (Zabelina et al., 2013, p. 56).

For comparison, the values of parameters in different regions of Volga Federal District it is necessary to carry out assessment of human capital for the Republic of Tatarstan (Shafran, 2011, p. 229). The data will be in the area of values from zero to one (Table 4).

Table 4. Given the values of the evaluation indicators of the human capital of the Republic of Tatarstan for 2013-2016 years

Indicator	2013		2014		2015		2016 (forecast)	
B_1	1		1		1		1	
B_2	0,30		0,27		0,31		0,32	
B_3, B_4	0,43	1	0,15	1	0,26	0,77	0,49	1
B_5	0,25		0,04		0,33		0,19	
B_6	0,79		0,78		0,80		0,87	
B_7	0,81		0,76		0,68		0,79	
B_8	0,64		0,59		0,81		0,76	
B_9	0,7		0,9		0,80		0,70	
B_{10}	0,18		0,16		0,14		0,13	
B_{11}, B_{12}	1	1	1	1	1	1	1	0.89

Thus, the level of development of a given indicator depends on its approximate to unit (Gagarin, 2012, p. 12).

Further, it is important to calculate the indexes ECI, ILC, and IIIC. The indexes form the general index of human capital development taking into account labour potential. There is an example of calculation:

ECI (2013) = (1+ 0, 30 + 0, 43 + 1) / 4 = 0, 68. Accordingly: 2014=0, 61; 2015 = 0, 59; 2016 = 0, 70. We will calculate value of other parameters, in an analogous manner, with use of the following the formulas – (19-22) (Table 5).

Table 5. The index values of human capital of the Republic of Tatarstan for 2013-2016 year

The value of human capital indicators	Indexes, by year			
	2013	2014	2015	2016 (forecast)
Educational capital index(ECI)	0,68	0,61	0,59	0,70
The index of labor capital (ILC)	0,74	0,73	0,76	0,77

Index of innovation and intellectual capital (IIIC)	0,54	0,49	0,53	0,52
The general index of the region's human capital	0,65	0,61	0,62	0,66

The general index of human capital development in the region in comparison with 2013 for the beginning of 2016 (forecast) tends to growth. Many indicators from 2013 to 2016 have positive trend, except IIIC. It is explained by expense reduction on education (McGuirk *et al.,* 2015, p. 971).

Results and discussion

Let us carry out the comparative characteristic of all regions of the Volga Federal District about the level of human capital development (Table 6).

Table 6. The combined index of human capital of the Volga Federal district for the year 2013-2016

VFD Region	Overall index of human capital, years			
	2013	2014	2015	2016 (forecast)
Republic of Bashkortostan	0,43	0,40	0,41	0,43
Kirov region	0,34	0,36	0,36	0,40
Mari El Republic	0,30	0,30	0,31	0,36
The Republic of Mordovia	0,53	0,51	0,54	0,56
Nizhny Novgorod Region	0,57	0,52	0,51	0,56
Orenburg region	0,25	0,25	0,21	0,22
Penza region	0,38	0,40	0,36	0,35
Perm Krai	0,33	0,26	0,18	0,18
Samara Region	0,51	0,50	0,47	0,52
Saratov region	0,37	0,37	0,42	0,39
Republic of Tatarstan	0,65	0,61	0,62	0,66
Udmurt republic	0,40	0,37	0,34	0,40
Ulyanovsk region	0,41	0,43	0,32	0,39
Chuvash Republic	0,33	0,33	0,36	0,37

Thus, we carried out assessment of indexes of human capital development, taking into account including labour potential of the companies in the Republic of Tatarstan. We have found that the most effective management of human capital development is carried out in the presence of information on its real condition, potential and forecast value (Table 7) (Coen-Pirani, 2015, p. 111), (Mustafin, 2015, p. 104), (Mishagina, 2015, p. 1011).

Table 7. Prognostic value human capital development in the Volga Federal District in the years 2017-2020

Years	2017	2018	2019	2020
Republic of Bashkortostan	0,43	0,41	0,41	0,43
Kirov region	0,36	0,35	0,37	0,38

Mari El Republic	0,31	0,31	0,32	0,33
The Republic of Mordovia	0,52	0,53	0,53	0,54
Nizhny Novgorod Region	0,55	0,54	0,52	0,54
Orenburg region	0,23	0,24	0,23	0,23
Penza region	0,38	0,38	0,38	0,36
Perm Krai	0,30	0,26	0,22	0,22
Samara Region	0,52	0,50	0,49	0,50
Saratov region	0,39	0,38	0,40	0,41
Republic of Tatarstan	0,64	0,64	0,61	0,60
Udmurt republic	0,38	0,38	0,37	0,37
Ulyanovsk region	0,35	0,34	0,35	0,37
Chuvash Republic	0,41	0,39	0,38	0,36

Conclusions

We need gradual and extensive study of all aspects that make up the process of human capital creating. It is necessary to take into account the specificity of each region and its businesses, and then the process for improving the use of human capital will be the most effective, and benefit not only individual regions of Russia, but the entire state as a whole (Wietzke, 2015, p.298), (Sadriev et al., 2016).

For Tatarstan emphasis on innovative training programs for regional clusters, the territory of priority development and special economic zones needed. In Tatarstan, the problem is big omission and an obstacle in improving the economic development of the region (Silos and Smith, 2015, p. 640), (Matveev, et al., 2016. p.116).

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