

PROFIT FORECAST AS A TOOL TO IMPROVE ENTERPRISES COMPETITIVENESS

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ABSTRACT

This article is devoted to the analysis and model forecasting of enterprise profits to enhance its competitiveness using the meat processing industry as a case study. The research, based on correlation analysis identifies factors generating business profits; builds a dynamic regression profit equation taking into account the economic performance of the enterprise; proposes a model for managing the process of enterprise competitiveness improvement which includes a constant and continuous monitoring and analysis of the company marketing strategy.

Key Words: *Enterprise Profit, Dynamic Regression Equation, Company Competitiveness, Economic Efficiency, Competitiveness Indicators, Enhancement of Efficiency, Meat Processing, Competitiveness Forecasting Methods, Model for Managing the Process of Enterprise Competitiveness Improvement*

INTRODUCTION

Forecasting methods are successfully applied for business performance comprehensive assessment and improvement. The aim of the simulation is to get new information about the studied objects, which are not related with the initial data.

The general method of systems research, when the efficiency is affected by both external and internal factors (product demand, price fluctuations, and others), is the economic-mathematical modeling, which is the theoretical analysis and practical actions directed at development and use of models. In this case, the model is the image of the real object (process) in material or ideal form (i.e. described by the signs in a particular programming language), reflecting the significant properties of the simulated object (process), and replacing it during research and management. The simulation method is based on the principle of analogy, i.e. the possibility of direct study of a real object through a review of similar and available models.

It is known that the profit is one of the economic indicators of the company performance. Therefore, the investigation of this indicator dynamics to prospective forecasting is an important objective of our study. The forecasts of the profit volume are one of the tools to increase the validity of decisions, reduction of the possible adoption of sub-optimal decisions during assessment of company economic performance.

MATERIALS AND METHODS

The study of economic indicators of the meat-packing companies was performed by Keramidou I., Mimis A., Fotinopoulou A., and Tassis C.D., who investigated the trends of industry development (Keramidou et al., 2013). However, the problems of these processes

modeling were omitted in these studies. To research the problem, we have referred to the articles of Ketels C., Ye G., Mukhopadhyay S.K., Chen H.L., Chen C., Liu C., Wei N., Mehrabad M.S., Anvari M., and Saberi M., who investigated the assessment and modeling to identify the effect of various factors on the company competitiveness. (Ketels, 2013)

RESULTS

The accurate forecast requires taking into account a number of factors and their dynamics for a certain period. There are complicate relationships between various factors, therefore, their effect is complex and cannot be considered as a simple sum of isolated influences. In this case, the multivariate correlation-regression analysis allows the quantitative assessment of particular factors influence.

To analyze and study the effects on the performance variable (volume of profit from sales of the investigated objects) of the factorial features x_i , the following indicators have been considered: volume of sales of the Kazan meat-packing plant (Russia), production cost, cash income of the population per month and per capita, the average monthly nominal wage of workers, production of cattle and poultry for slaughter, the import volume of meat, population size, average producer's prices for cattle (in live weight), average producer's prices for pork (in live weight), average import prices for fresh and frozen meat, and the average price of electricity. (Ye and Mukhopadhyay, 2013)

The influence level of these factors was determined by the correlation analysis of stepwise multiple regression with the gradual reduction of the independent variables (the method of step-by-step inclusion-exclusion of factors).

The pair correlation coefficients obtained after analysis revealed the five most important factors to be included into the final model (multiple regression equation) (Table 1).

Table 1
THE CORRELATION DEGREE OF THE IDENTIFIED FACTORS AND PROFIT RECEIVED OF KAZAN MEAT-PACKING PLANT (KAZAN, RUSSIA) FROM SALES

Factor	Correlation coefficient
x_1 – volume of sales (thousand rubles)	0,82
x_2 – production costs (thous. rubles)	- 0,78
x_3 – unit value of imports (thous. rubles)	- 0,58
x_4 – production of cattle and poultry for slaughter in the Russian Federation (thous. tons)	0,14
x_5 – total imports of meat (thous. tons)	- 0,24

To build the final forecasting model of the volume of sales based on the Multiple Regression program of STATGRAPHICS system, the coefficient of multiple regression (multiple determinants) (R-squared), the coefficients of the regression equation – standard error coefficient (Std. error), the Student's coefficient (t -value), and the autocorrelation coefficient (Dur. Wat.) have been calculated. The estimated values of these indicators for Kazan meat-packing plant are shown in Table 2.

Table 2 suggests that there is direct relationship between the volume of profits received by Kazan meat-packing plant (y) from sales, volume of sales (x_1), and production of cattle in the Russian Federation (x_4), and inverse relationship between y and x_2, x_3, x_5 .

The form of correlation was empirically determined, according to which, it was suggested that linear dependence and multiple regression equation for Kazan meat-packing plant is as follows:

$$Y = -71661,36 + 0,45x_1 - 0,42x_2 - 12,04x_3 + 10,98x_4 - 8,85x_5 \quad (1)$$

Table 2
REGRESSION ANALYSIS FOR KAZAN MEAT-PACKING PLANT

Variables	Coefficient	Std. error	t-value ($p < 0,05$)	R-squared	Dur. Wat.
a_0	-71661,36	46768,48	-1,53	0,79	2,3
a_1	0,45	0,09	4,71		
a_2	-0,42	0,08	- 5,12		
a_3	-12,04	1,94	- 6,20		
a_4	10,98	2,36	4, 65		
a_5	-8,85	1,81	- 4,90		

Each equation coefficient shows the influence level of appropriate factor on the analyzed indicator at a fixed position of other factors. The changing of each factor by unit the y changes to appropriate regression coefficient. Absolute term of an equation shows the average effect on the result feature of unaccounted factors. (Chen et al., 2013) In particular, the model shows that the increase of sales volume by thousand tons increases the profit by 0,45 thousand rubles in average if the influence of other factors is constant. The increase in the production of cattle and poultry for slaughter by thousand tons increases the profit by 10,98 thousand rubles. In the same time it should be noted that the increase in production cost by a thousand rubles reduces the profit by 0,42 thousand rubles in average, increase of average import prices by a thousand rubles results in a decrease in profit by 12,04 thousand rubles in average, and the increase of meat import by a thousand tons decreases the profit by 8,85 thousand rubles in average if other equal conditions are equal. (Mehrabad et al., 2011)

One of the most important characteristics of the quality of the selected regression equation and the adequacy of the model is the multiple determination coefficients. The determination coefficient for the econometric model developed for Kazan meat-packing plant is $R-SQ = 0,79$. This coefficient shows that the variation of the profit volume of 79% is determined by all above-mentioned factors. Consequently, the selected factors significantly influence the volume of net profit of the studied companies. Average import prices for fresh and frozen meat are shown in Table 3.

Table 3
**THE PREDICTIVE ECONOMIC INDICATORS IN DIFFERENT TRENDS FOR KAZAN MEAT-
PACKING PLANT**

Indicators	Volume of sales, thous. rubles	Production cost, thous. rubles	Average import price of fresh and frozen meat, USD	Production of cattle and poultry for slaughter, thous. tons	Volume of meat imports, thous. tons
Parameter	x_1	x_2	x_3	x_4	x_5
Type of trend	Exponential	Exponential	Linear	Linear	Linear
Equation of trend	$y = 1389475 \exp(-0,165 x)$	$y = 1328408 \exp(-0,172 x)$	$y = 230,9x + 672,4$	$y = 160,2x + 7099,0$	$y = 115,7x + 670,3$
Coefficient of determination (R^2)	$R^2 = 0,975$	$R^2 = 0,980$	$R^2 = 0,810$	$R^2 = 0,676$	$R^2 = 0,832$
Predictive value by year:					
2013 (8)	369557,9	334219,4	2520,142	8380,802	1595,878
2014 (9)	313174,5	281267,3	2751,107	8541,007	1711,574
2015 (10)	265393,6	236704,6	2982,072	8701,212	1827,269

Durbin-Watson autocorrelation coefficient (DW) indicates the presence or absence of autocorrelation and varies from 0 to 4. If DW is 2, then there is no breach of the prerequisites of the least squares method (LSM). For Kazan meat-packing plant, DW is 2.3, i.e. there is no autocorrelation that indicates the sufficient quality of a model.

To forecast using the multiple regression equations obtained above, the trend indicators $x_1 - x_5$ have been found. The trends for the indicators $x_1 - x_2$ are exponential and $x_3 - x_5$ are linear. Types of trends, the determination coefficients, and the predicted values for these indicators are shown in Table 3.

Substituting the predictive values of indices $x_1 - x_5$ shown in Table 3 into the model of sales volume, the forecast of sales volume of Kazan meat-packing plant for 2013-2015 was received (Table 4).

Table 4
**FORECAST OF PROFIT VOLUME OF THE KAZAN MEAT-PACKING PLANT UNTIL 2015
RECEIVED BY MULTIPLE REGRESSION ANALYSIS**

Indicator	Forecasted periods		
	2013 (8 period)	2014 (9period)	2015 (10 period)
Sales profit, thousand rubles	1822,703	-3355,57	-8186,36

Figure 1
PREDICTED PROFIT OF THE KAZAN MEAT-PACKING PLANT FOR 2013-2015

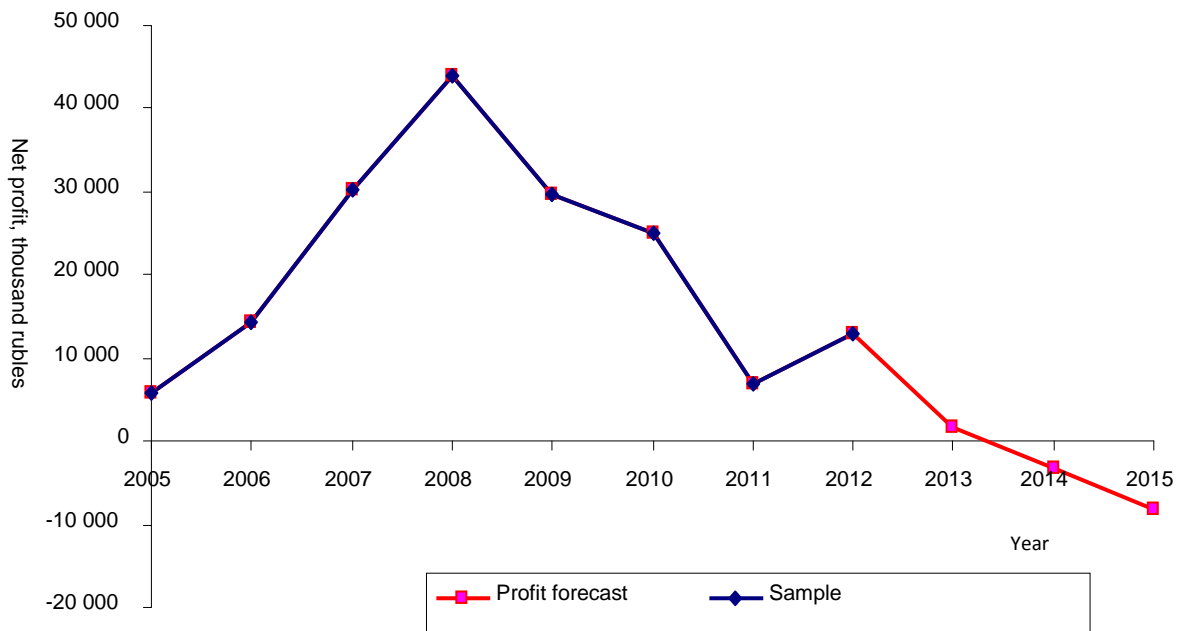


Fig.1 shows the tendency of decrease in profit of sales since 2008 that require the implementation of specific measures aimed at changing the existing declining trend of the performance indicators of Kazan meat-packing plant.

CONCLUSIONS

According to the performed forecast, the company will reach period of losses by 2015 if the existing situation continues (Fig.1). This situation has occurred largely due to decrease of the sales volume, which is related to the loss of market share during the analyzed period. At the same time, the decrease in revenue from sales was higher than decrease of production costs that caused the higher decrease in sales profit of the company. Thus, the measures to improve the financial stability and solvency are required to increase the competitiveness. Competitiveness of the products depends on different factors, criteria, and indicators determining the competitive advantages on the market and the ability to manage it, develop individual behavior model on the market in case of crisis situation.

To influence the internal business processes, the implementation of specific management tools that will stimulate the orientation in the environment and increase the economic performance of the company are required.

A specific feature of the proposed model on Fig. 2 is taking into account of the regular and continuous monitoring and analysis of the marketing strategy of the company.

In present conditions, the permanent and continuous monitoring of the products competitiveness is one of obligatory conditions. Development of efficiency of methods to achieve and maintain a competitive advantage on the market of meat products requires the

assessment of consumer preferences based on monitoring of competitiveness of production of meat-packing industry.

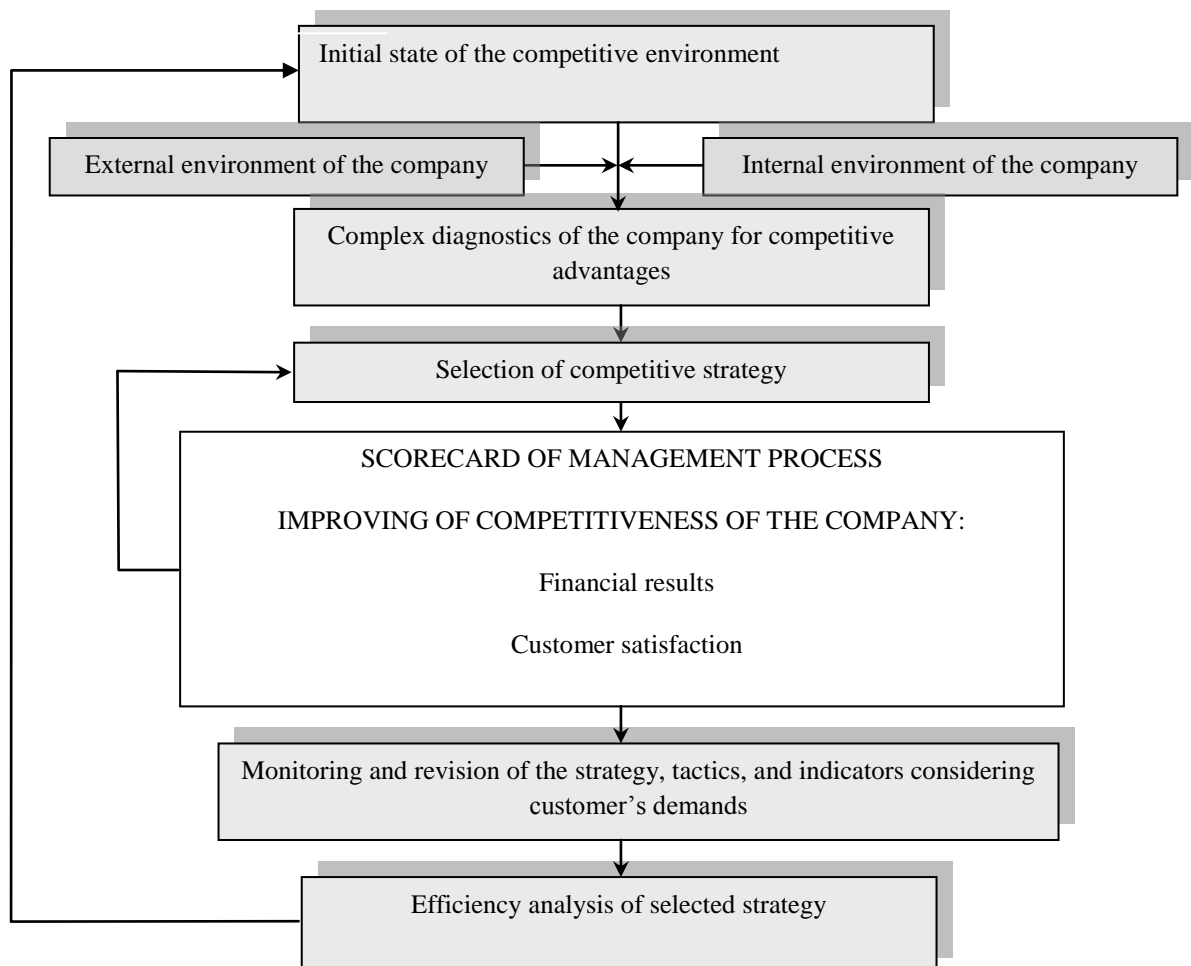
Introduction of the products competitiveness monitoring into the assessment method of consumer preferences is a prospective direction to increase the competitive advantages of meat-packing companies.

The general objectives solved during economic monitoring of competitiveness of meat-packing products, in our opinion should include:

- 1) Development of a group of indicators providing a holistic overview of the products of meat-packing company, and the conditions of the external and internal environment of the company based on the methods of mathematical transformation of individual indicators into integral ones.
- 2) Collection and systematization of information about the condition and development of products of a meat-packing company and its competitors at all stages of the life cycle.
- 3) Elaboration of software for processing the information received after economic monitoring of the competitiveness of the meat-packing company.
- 4) Ensuring a regular and visual presentation of the results of economic monitoring of competitiveness as the reports for managers and technical specialists of the meat-packing company.

Once the objectives are performed, the economic monitoring of competitiveness becomes a universal research and practical tool for the monitoring of products competitiveness.

Figure 2
MODEL OF MANAGEMENT FOR A COMPANY OF THE MEAT-PACKING INDUSTRY TO INCREASE THE COMPETITIVENESS AND MARKET SHARE



SUMMARY

Thus, the analysis of the factors stipulating the competitiveness of products and identification of the problems of the meat-packing industry has revealed the following management tools of the competitiveness of meat-packing products as the conditions to increase the efficiency of the integrated management system:

1. Analysis and formation of consumer's preferences in particular products of meat-packing company and promotion of a healthy lifestyle;
2. Development of trust to a regional brands and development of image of the product built on the main consumer's preferences;
3. Monitoring of products competitiveness of the meat-packing industry;
4. Implementation of quality control systems;
5. The policy of formation of the appearance of the final products (including packaging);
6. Price policy;
7. Formulated policy and development of new products.

Development of new meat products is one of the directions for building competitive advantages of products of the meat-packing company. Expansion of the variety of the products is a basis for increase of the sales volume and allows the exploration of the new market segments. The principle of systematic control of the development of new meat products requires taking into account the multistage life cycle of a product beginning from development of the composition, pilot production, experienced sales, introduction to the market and etc.

CONFLICT OF INTERESTS

The author confirms that the provided data do not contain any conflict of interests.

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