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Identification of Strategic Alternatives in Agribusiness

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Abstract

The article deals with the problems of strategic management using the methods of multidimensional statistical analysis. In agribusiness, the gap may occur in the use of modern management tools; therefore, the strategies used by agricultural producers are not always formalized. To study the latent strategies as the models of economic behavior, the technique of identification of strategic alternatives was developed based on the system use of the cluster analysis, trend analysis, and the method of canonical correlations. The proposed technique allowed identifying four latent strategies used by Russian agricultural producers in the production of grain. A detailed study of the parameters of economic activity of the two model enterprises representing the strategies of costs minimizing and intensification allowed to draw comparative conclusions concerning the influence of the nature of spending on the outcomes, dynamics, and stability of the production and its effectiveness.

Keywords: latent strategy, agribusiness, entrepreneurial style of management, production of grain

1. Introduction

The issues of forming strategies play an important role in the management of organizations development. Since the introduction of the concept of strategic management, numerous papers on various aspects of the process of building a strategy, choosing strategic alternatives, and generalizing the experience in this field have been published. However, these issues remain in the focus of researchers. Still, the problems of using various strategic planning tools are of great interest (Kalkan and Bozkurt, 2013; Zahradníčková and Vacík, 2014), as well as the peculiar features of the strategic analysis (Guerras-Martín *et al.,* 2014; Greco *et al.,* 2013, Steigenberger, 2014), etc.

Many authors focus on sectoral singularities of the strategic process. In particular, agribusiness is represented by a large number of small businesses whose owners need consulting in management. Therefore, the publications consider the opportunities for improving the strategic decision-making support (Garcia-Fuentes *et al.,* 2013; Le Gal *et al.,* 2011; Phillips *et al.,* 2014; Tanure *et al.,* 2013). Another peculiar feature of agribusiness is the significant differences of natural and economic conditions of production in different regions. Therefore, many studies are related to the study of the prerequisites of using certain strategies (Hazell, 2013; Lansink *et al.,* 2003; Ondersteijn *et al.,* 2006; Zorom *et al.,* 2013).

At the same time, countries with developed market economy have much experience in strategic planning in agribusiness (Lopes and Ross, 2012; Ferguson and Hansson, 2013). Developing countries fall behind in the use of modern methods of management, so the studies are more often devoted to the construction of a strategic management system, search for new initiatives, identification of growth centers (Brenes *et al.,* 2014; Darmansyah *et al.,* 2014; Kuzmitskaya and Ozerova, 2014; Njegovan and Jeločnik, 2013, Silva *et al.,* 2014).

However, the absence of formally approved strategies does not mean that strategic approaches are not applicable in the management of agribusiness. Our studies allow formulating the working hypothesis as follows: a typical strategy of agribusiness companies in Russia is the latent strategic importance as manifestation of the entrepreneurial style of management. In accordance with the classification of types of strategies proposed by H. Mintzberg, this management style is characterized by the formation of a strategy in the form of a half-conscious process that is not always formalized and that goes on in the mind of the leader – the entrepreneur (Mintzberg and Waters, 1985). The vision, formed in the course of this process, as a result of long study of the logic of the industry operation, in-depth understanding of current trends, is of informal personalized nature and serves for the manager as a basis to making specific decisions, including revision of the chosen course of action to adapt to

changing conditions.

2. Methodology

To verify the suggested hypothesis, we developed a method of identification of strategic alternatives in agribusiness based on the use of methods of the cluster analysis and canonical correlations. Its overall scheme is shown in Figure 1.

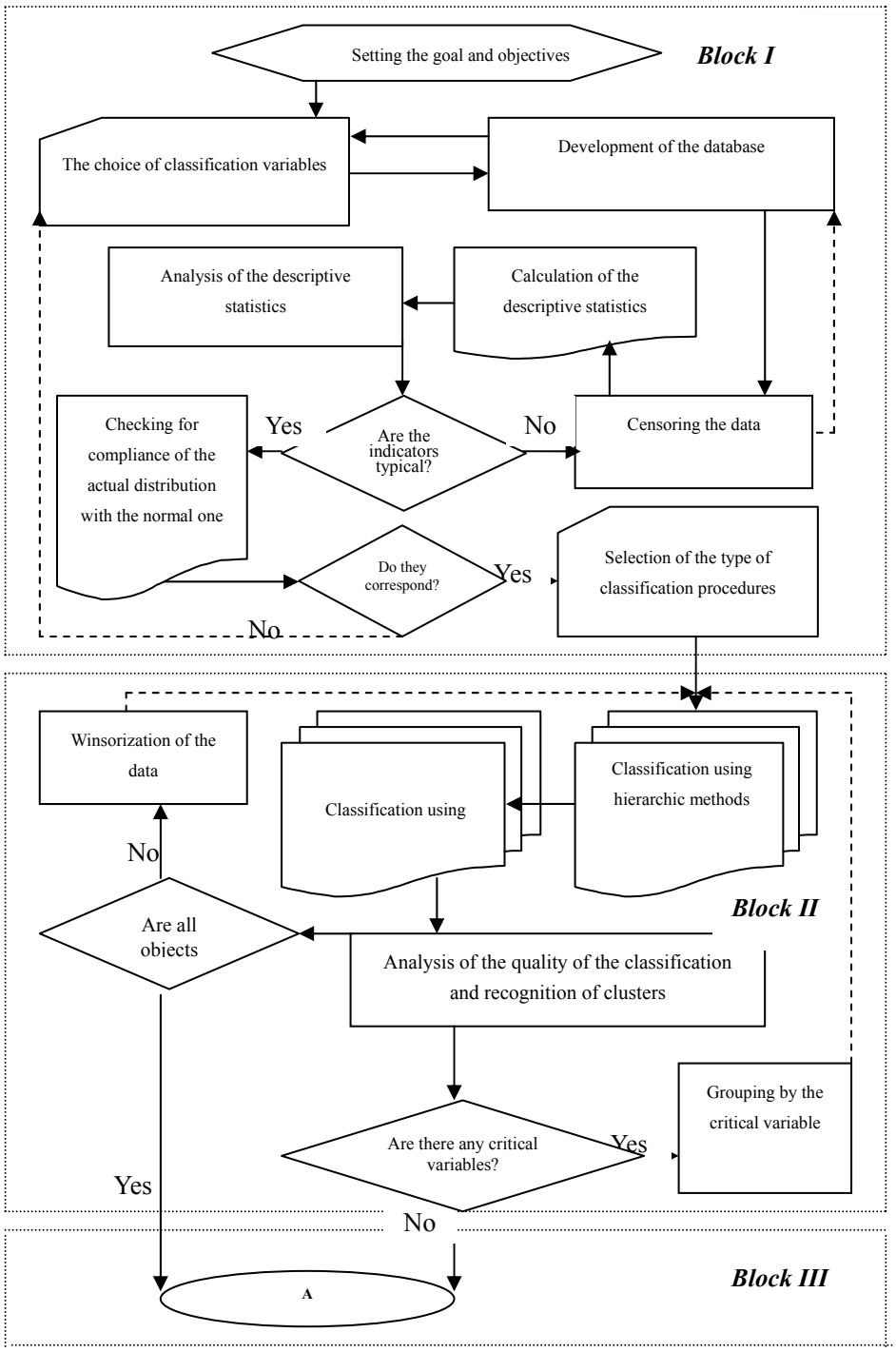

Figure 1. Scheme of the technique of identification of strategic alternatives (the beginning)

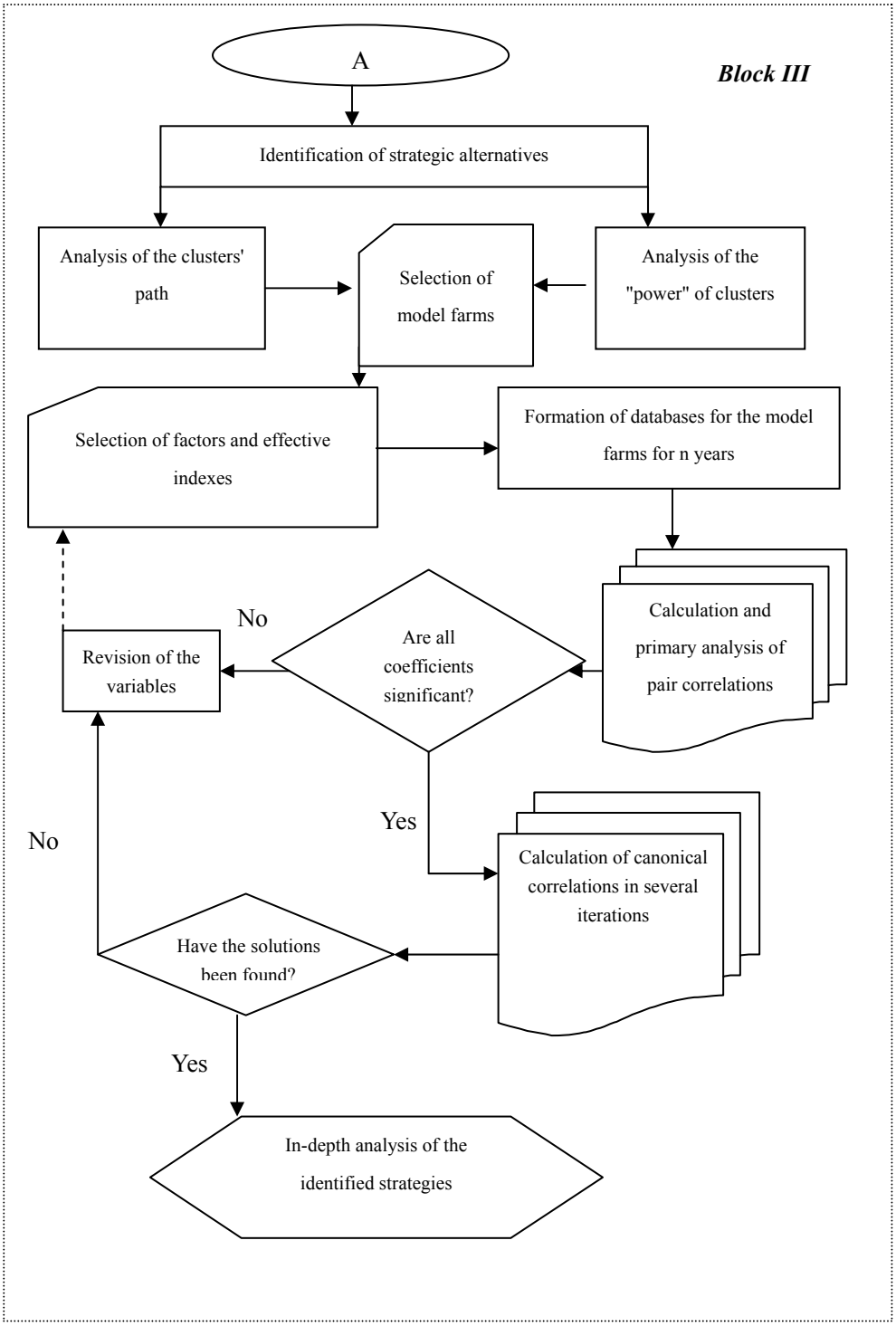

Figure 1. Scheme of the technique of identification of strategic alternatives (end)

The technique of identification of strategic alternatives was implemented based on the data on the production and sale of grain by large and medium Russian agribusiness enterprises for three years. These businesses are located in the second dry natural economic zone of the Stavropol Region, which is considered to have the grain-growing and sheep-breeding specialization. This area consists of nine administrative districts, on the territory of which there are 109 large and medium-sized agricultural enterprises. For the study, we selected 88 farms. The censoring was based on the atypical specialization of individual enterprises (poultry farms, vineyards, etc.), the transformation of a number of organizations (change of the legal form, bankruptcy) during the reviewed

period, as well as the presence of atypical data identified based on the analysis of the descriptive statistics.

The following are the results of the main stages of the procedure of identification of strategic alternatives in agribusiness.

3. Results and Discussion

3.1 Identification of Latent Strategies Based on Cluster Analysis

To test our hypothesis about the existence of certain latent strategies in grain production, and, consequently, about the availability of a certain structure based on them in the studied population of objects, we used methods of the cluster analysis.

For formation of a multi-dimensional space of attributes characterizing the objects being studied in terms of grain production, we selected the following variables: x_1 - the cultivated area of grain crops, ha; x_2 - the grain yield, centers per 1 ha; x_3 - the cost per 1 ha of crop, rubles; x_4 - the price of 1 ton of grain, rubles.

The cluster analysis was performed using the SPSS Statistics software, which provides ample opportunities for creating clusters, formulating hypotheses for additional testing, etc. (Bühl & Zöfel, 2005).

The cluster analysis of cross-sectional data was carried out using two methods: the agglomerate hierarchical method (the Ward's method) and the iterative method (the *k* -means method). The result was the identification of the critical x_1 variable. According to it, enterprises were grouped by the square of the cultivated area of grain crops: below average (up to 4,000 ha), medium (4,000 to 6,500 ha), and above average (more than 6,500 ha).

In the second stage, the clustering of the objects based on three attributes (x_2, x_3, x_4) was conducted separately for the three blocks of the first order (the dynamic groups separately by years) and three blocks of the second order (the size groups by the square of the cultivated area). Comparison of the classifications and identification of 3, 4, and 5 clusters based on the Ward's method showed higher quality of grouping in all blocks in the case of four clusters formation, as evidenced by the lower values of the intracluster variation of parameters.

Thus, as a result of implementation of the diagnostic function of the proposed technique, in each of the nine blocks of the parent population four clusters were recognized, the stability characteristics of which could be traced both by years and by the size groups of the farms.

Enterprises in the group of the clusters of the first type (hereinafter – cluster #1) are distinguished by low expenses for production of grain crops (not more than 80% of the block average) and, as a consequence – low yields (also below 80%), the low quality of grains, as evidenced by the medium and below-medium price level. The level of prices apparently is also influenced by unfavorable conditions of sale, which is typical for companies with disadvantaged financial situation. Obviously, these enterprises from the possible alternatives chose (or had to choose) the strategy, which can be identified as the cost minimization strategy.

Enterprises belonging to the group of clusters of the second type (hereinafter – cluster #2) are distinguished by the relatively low level of expenses (mainly below average), which, however, varies in different blocks of the second order: the smaller the size of enterprises is, the higher the level of expenses is. The variation of this indicator by years is not so large.

A characteristic feature of enterprises of cluster #2 is the significantly higher, compared to the cluster #1, return on investment with the products. Yields in almost all blocks are above the average level, which is most likely the result of better industrial and technological discipline**,** than the discipline at enterprises in cluster #1. However, these enterprises seem to skimp on agro-technical measures aimed at improving the quality of products, so the price for their grain is also below the average level. Thus, the identification process gives reasons to determine the strategy of lean budget expenditures as the typical strategy for the enterprises of this cluster.

Enterprises belonging to the group of clusters of the third type (hereinafter – cluster #3) are characterized by an elevated level of costs (approximately 110-130% of the average). In this case, the grain yield is not high – it is near the average values or lower. Apparently, the efforts and additional resources are allocated to improve the quality of the products, improve the sales conditions as evidenced by the price level. I.e., we can say that enterprises of this class chose the strategy targeting manufacturing high quality products and optimizing the sales.

Enterprises that are part of the fourth type cluster group (hereinafter – cluster #4) have the highest costs of production (140-190% of the average among all blocks), which allows high yields of grain (in relative terms, not less than 120%). Products are also of high quality as evidenced by the price level, the relative limits of which range from 120 to 150%. Obviously, the strategy of the grain production selected by these enterprises can be identified as an intensification strategy.

Analysis of the composition and paths of the clusters revealed adaptive components of strategic behavior, which give reasons to include the considered style of behavior, according to the classification of H. Mintzberg, not only to the model of entrepreneurial type, but also partially to the model of learning from experience, which is characterized by the formation of a strategy under the influence of external pulses received in the course of its implementation, as well as the willingness to revise the selected course of action.

3.2 Analysis of the Activity of Model Enterprises

Based on the analysis of the intensity of the concentration (of the so-called "force" of clusters), we selected for further study the model enterprises in clusters #1 and #4, as they have the greatest differences between each other. As a model enterprise for cluster #1, the agricultural production cooperative "Chuguevsky" of the Stepnovsky district was selected (hereinafter – the agricultural production cooperative "Ch"), which is a medium-sized enterprise. During the analyzed years, it was in the area of the cluster concentration showing the center-directed path of the first order blocks. The agricultural production cooperative named after Lenin of the Soviet district (hereinafter - the agricultural production cooperative "L") was selected as a model enterprise of cluster #4 in the group of large-sized enterprises.

Studying the dynamics of indicators of these enterprises for seven years, as well as the trend analysis of the examined variables that characterize the production and sale of grain gave reasons to make a number of conclusions, the most important of which is that both strategies can be successful in terms of cost-effectiveness. However, the development of the enterprise that implements the cost minimization strategy is generally less stable at a higher growth rate of the core indicators.

To investigate the correlation of growth rates of the studied parameters of grain production we calculated the normalized values of basic indexes with removed influence of their absolute values. Normalization was performed using the following formula:

$$I_i^{\circ} = \frac{I_i}{\sqrt{I_1^2 + I_2^2 + \ldots + I_m^2}}, \quad (1)$$

where $I_i = \frac{y_n}{y_0}$ for each of the m indicators, y_n, and y_0 are respectively the initial and final levels of the temporal row.

Based on these normalized indexes, we built an economic normal, which means the ratio of tempo indicators characterizing the economic potential of the company, its development and use (Kovalev, V. and Kovalev Vit., 2006).

$$I^e_{profit} \geq 1{,}4 I^i_{profit} \geq I^e_{\cos ts} \leq 1{,}9 I^i_{\cos ts} \geq I^e_{yield} \geq 1{,}5 I^i_{yield} \geq I^e_{prices} \geq I^i_{prices} \quad (2)$$

where I^e and I^i are the indexes of enterprises implementing, respectively, the cost-minimizing strategy and the strategy of intensification.

The fulfillment of the conditions of the economic normal enables the enterprises that keep to the cost minimization strategy to accumulate the necessary "economic weight" strengthening the financial position and improving the stability of the economic activity.

3.3 Correlation Modeling of Latent Strategies

Due to what factors can the company force its development, and how do these factors differ in the two model farms? To find the answer to this question, we used the correlation analysis. Since the method of pair correlations does not allow studying the influence on the result of several factors simultaneously, and at application of multiple correlation, it is necessary to consider the effect of multicollinearity, we used the method of canonical correlations, which does not require the absence of multicollinearity of indicators. Other features of the method and the algorithm of the calculations are described in detail in the relevant literature (Tinsley and Brown, 2000).

Originally, we considered the following set of factor and effective indexes:

x_1 are the costs per 1 hectare of grain seeds (deflated), rubles;

x_2 is the price of 1 ton of grain (deflated), rubles;

x_3 is the share of costs of fertilizers in the structure of production costs in crop farming, %;

x_4 is the share of costs of depreciation and repair of fixed assets in the structure of production costs in crop

farming, %;

x_5 is the share of costs of fuel and lubricants in the structure of production costs in crop farming, %;

x_6 is the grain yield from 1 hectare, centners;

y_1 is the profit from sale of grain per 1 ha (deflated), rubles;

y_2 is the rate of return of costs for the production of grain, rubles;

y_3 is the ratio of payables to revenues, %.

The first phase of the calculations for the two model enterprises using the STATISTICA software suite confirmed the peculiar feature of the method, which resides in the fact that a large number of variables can lead to a degenerate matrix of pair correlation coefficients and indeterminacy of the solution. Therefore, the variable x_2 was excluded from further analysis due to the limited capacity of agricultural impacts on the dynamics of this indicator. The decision to exclude the effective index y_2 was made in view of its close relationship with index y_1 and the greater importance of the latter in the framework of the ongoing research. Based on the analysis of pair correlation coefficients, we also excluded the variable x_5. The variable x_4 was also removed since the coefficient with it is much lower than the others are.

We will show the results through the example of the agricultural production cooperative "Ch".

For the reduced set of variables, the maximum canonical correlation coefficient is equal to 0.996, and the corresponding canonical variables are represented by the formulas:

$$U_1 = 0.1197\, x_1 - 0.6637\, x_3 + 0.6268\, x_6 \quad (3)$$

$$V_1 = 0.9661\, y_1 + 0.1694\, y_3 \quad (4)$$

The vectors of the ratios of canonical variables are standardized values of the original variables.

When checking by the Bartlett criterion, we found that for the first canonical correlation coefficient $r_1 = 0.996$, the critical value of the χ^2-criterion for the given level of significance at 0.05 was equal to 15.51 (the calculated value $\chi^2 = 16.29$). For $r_2 = 0.886$, the calculated value of the criterion is equal to $\chi^2 = 2.31$, where its critical value at the same level of significance $\chi^2 = 7.81$. The first canonical correlation coefficient is statistically significant, the second one is insignificant.

The significance of differences of the maximum correlation coefficients for the original and reduced set of variables was assessed using the Fisher's z-transformation and criterion (5):

$$t_{obs} = (z_1 - z_2)\sqrt{\frac{n-3}{2}}, \quad (5)$$

where $z_k = 0.5 \ln \frac{1+r}{1-r}$, z_1 is the value for the original set of variables; z_2 – for the reduced set; n – the number of observations.

The result is:

$$z_1 = 0.5 \ln \frac{1+0.9965}{1-0.9965} = 3.1732, \quad z_2 = 0.5 \ln \frac{1+0.9961}{1-0.9961} = 3.1190, \quad t_{obs} = 0.07666.$$

At the significance level of 0.05, the normalized normally distributed value is set to t = 1.96. t_{obs} is less than t, so the difference between the canonical correlations of the original and reduced sets of attributes is insignificant. Consequently, the factor x_4 (the share of expenses for depreciation and repair of fixed assets in the structure of production costs in crop farming) can be excluded from consideration in this case. This means that we will further use the canonical variables represented by the formulas (3) and (4).

In the expression (3), the coefficient at x_1 is noticeably lesser than the other coefficients. However, taking into account the value of the variable x_1 (the cost per 1 ha of grain seeds) within this study, we did not exclude this factor from further consideration.

The value of the maximum correlation coefficient r_1 is close to 1; therefore, the connection between the resulting linear combinations of the original variables is close, i.e. the variation of the effective attributes – the specific profit from the sale of grain and the payables to revenue ratio – is significantly affected by the variation of the factors x_1, x_3, x_6.

With regard to the values of the coefficients of the variables (factors and effective indexes), the analysis of their levels is not so much important in this study as the comparison of the coefficients of the two model enterprises. The sequence of factor attributes ranked by the level of impact on the effective indexes has the form: $x_3 \succ x_6 \succ x_1$.

Similar calculations were made for the data of the agricultural production cooperative "L". Canonical correlation coefficients were equal to:

$r_1 = 0.992$; $r_2 = 0.883$.

Assessment of the significance of these factors by the Bartlett criterion showed that the first one is statistically significant and the second is insignificant.

For the reduced set of variables, the maximum canonical correlation coefficient is equal to 0.992, and the canonical variables have the form:

$$U_2 = 0{,}3082\ x_1 + 0{,}0242\ x_3 + 0{,}7150\ x_6 \quad (6)$$

$$V_2 = 0{,}9872\ y_1 + 0{,}1595\ y_3 \quad (7)$$

Application of the Bartlett criterion confirmed the statistical significance of the obtained result. The discrepancy between the maximum correlation coefficients for the original and reduced sets of variables according to the criterion (5) is insignificant.

In the expression (6), the coefficient at x_3 is noticeably lesser than the other coefficients. However, taking into account the importance of this variable (the share of the cost of fertilizers in the structure of production costs in crop farming), and considerations of the comparative analysis of the two model farms, this factor was not excluded.

The maximum correlation coefficient $r_1 = 0.992$ is close to 1, so the correlation between the resulting linear combinations of the original variables is close. At that again, we need to note that in both groups of input variables there are indicators, the changes of which are closely related to each other. In this case, the sequence of factor attributes ranked by the level of impact on the effective indexes looks different: $x_6 \succ x_1 \succ x_3$.

The analysis showed that the change in the specific profit from the sale of grain is mostly influenced by the variation of influence production costs per 1 ha and the yield of grain crops. However, while for the agricultural production cooperative "Ch" the value of the pair correlation coefficients is, accordingly, 0.64 and 0.68, for the agricultural production cooperative "L", the correlation of the mentioned factors and the effective index is notably closer – 0.88 and 0.93, accordingly.

A different picture emerges if we assess the impact of factors-attributes on the financial position of the farms, which is indirectly estimated through the ratio of payables and the revenue. For the agricultural production cooperative "Ch", all the coefficients of the pair correlation are negative; meanwhile the correlation for x_1, x_4, and x_6 is close: the pair correlation coefficients take values between -0.69 and -0.82. Noticeable inverse correlation was detected between the two effective indexes y_1 and y_3. Obviously, the decrease in payables based on the increasing efficiency of grain production as the main product is the most important result of the implementation of the strategy of costs minimization in the model enterprise.

In the agricultural production cooperative "Ch", which is characterized by a stable financial position, the amount of payables in relation to the revenues for the past 5 years was low (between 5.6 and 12.8%), and its changes were not associated with the improvement of the grain production efficiency. This was confirmed by the coefficient of pair correlation between y_1 and y_3 equal to -0.27. We also failed to detect any noticeable impact of the factors-attributes x_1, x_3, and especially x_6 on the effective index y_3. As for the correlation of the variables x_4 and y_3, the pair correlation coefficient for which is equal to $r = -0.84$, it probably can be placed in the category of the conjugate ones. The fact is that for the first three years of the analyzed period based on the noticeable increase in grain prices and revenues, there was a dramatical reduction in the ratio of payables and the revenue at the enterprise. During the same period, due to the acquisition of new machinery, the share of depreciation increased. In general, the share of expenditures for maintenance of the fixed assets grows at both enterprises being one of the reasons for the overall increase in costs, which is confirmed by the pair coefficients of correlation of the mentioned variables.

The differences in the correlation of the factor x_3 with other variables are also notable. The medium intensity correlation is observed between the changes in the share of costs for fertilizers in the structure of production costs and the yield fluctuations in the agricultural production cooperative "L" ($r = 0.56$), whereas no such correlation was detected in the agricultural production cooperative "Ch". The reason is that for seven years, the

enterprise implementing a strategy of costs minimization, had applied fertilizers only three times, and judging by the amount of the costs, in insufficient quantities. Accordingly, weak inverse correlation was detected between the share of the costs for fertilizers in the structure of production costs and the profit margin from the sale of grain.

The comparison of canonical variables allows confirming, complementing, and often clarifying the conclusions drawn based on the analysis of the matrix of pair correlations coefficients.

First of all, we should note the significantly higher level of coefficients at the variable y_1 (the profit from sales of grains per 1 ha) as compared to y_3 (the ratio of payables to revenues). At that, the ratio between the coefficients in the formulas (4) and (7) is approximately equal. This points to the same role of effective variables for both enterprises and indirectly confirms the correctness of their choice.

Among the factors, the most stable by the intensity of influence on the effective indexes was the variable x_6 – the grain yield from 1 ha, which is quite explicable. The effect of the other variables for the two enterprises varies considerably. Especially, it relates to the impact of the factor x_3 (the share of costs for fertilizers in the structure of production costs) on the final results. This factor has notable negative influence on the agricultural production cooperative "Ch". The difference in the direction of the correlation shows that increasing costs for fertilizers as the most important component of intensive production at the cluster #1 enterprises can cause the opposite effect in the circumstances of lack of other production factors, violation of the proportionality between them.

For enterprises oriented to the cost minimization strategy and increasing the production costs primarily due to inflation processes, it is more relevant to find ways of increasing returns on investment by attracting domestic resources, detecting bottlenecks, improving management effectiveness, and finding innovative ways of development.

4. Conclusion

In the circumstances of the insufficient application of modern management methods and tools, the study of latent strategies, which the executives of the agricultural enterprises adhere to, is of particular interest. Their study allows understanding better the regularities of the agribusiness operation, identifying strategies typical of agricultural production, preparing recommendations for managerial decisions by the business managers, applying the method of reflexion in the process of mastering the strategic management.

Therefore, identification of latent strategies can be seen as a stage of formation of the strategic management in agriculture in those countries, where no sufficient experience of application of formalized procedures of agribusiness development lines elaboration has been accumulated.

Implementation of the methodology of identification of strategic alternatives allowed to reveal latent entrepreneurial strategies related to the nature of expenditures in grain production. The study of performance indicators of model enterprises representing the strategies of costs minimization and intensification showed that both strategies could be successful in terms of profitability of the production. Thus, the overall picture of development at implementation of the strategy of costs minimization differs by the greater dynamism and lesser stability.

In the case of implementation of the strategy of intensification, the correlation of factors with the effective indexes is stronger, but the rate of return of costs with products is lower, as this enterprise has approached the exhaustion of the production growth reserves at the current level of technology.

Further research studying the latent strategies can be directed to a more detailed analysis of a wide range of indicators of model enterprises that are not limited to statistical indexes represented in the official reporting. This may become the basis for formation of a system of diagnostic and benchmarking for agricultural enterprises.

References

Brenes, E. R., Montoya, D., & Ciravegna, L. (2014). Differentiation strategies in emerging markets: The case of Latin American agribusinesses. *Journal of Business Research, 67*(5), 847-855. http://dx.doi.org/10.1016/j.jbusres.2013.07.003

Bühl, A., & Zöfel, P. (2005). *SPSS: the art of information processing. Analysis of statistical data and restore hidden patterns* (pp. 608). St. Petersburg: DiaSoftYuP. ISBN 5-93772-032-6, 3-8273-1673-1

Darmansyah, A., Rochana, S. H., Sutardi, A., & Zuraida, U. (2014). The New Growth Centres and Strategy for Building and Accelerating Agribusiness Development in Cirebon Regency, Indonesia. *Procedia – Social and Behavioral Sciences, 115,* 296-304. http://dx.doi.org/10.1016/j.sbspro.2014.02.437

Ferguson, R., & Hansson, H. (2013). Expand or exit? Strategic decisions in milk production. *Livestock Science, 155*(2-3), 415-423. http://dx.doi.org/10.1016/j.livsci.2013.05.019

Garcia-Fuentes, P. A., Ferreira, G. F. C., & Kennedy, P. L. (2013). Economic Performance of U.S. Multinational Agribusinesses: Foreign Direct Investment and Firm Strategy. *Agribusiness, 29*(2), 242-255. http://dx.doi.org/10.1002/agr.21316

Greco, M., Cricelli, L., & Grimald, M. (2013). A strategic management framework of tangible and intangible assets. *European Management Journal, 31*(1), 55-66. http://dx.doi.org/10.1016/j.emj.2012.10.005

Guerras-Martín, L. Á., Madhok, A., & Montoro-Sánchez, Á. (2014). The evolution of strategic management research: Recent trends and current directions. *BRQ Business Research Quarterly*, *17(2),* 69-76. http://dx.doi.org/10.1016/j.brq.2014.03.001

Hazell, P. B. R. (2013). Options for African agriculture in an era of high food and energy prices. *Agricultural Economics (United Kingdom), 44(SUPPL1),* 19-27. http://dx.doi.org/10.1111/agec.12047

Kalkan, A., & Bozkurt Ö. Ç. (2013). The choice and use of strategic planning tools and techniques in Turkish SMEs according to attitudes of executives. *Procedia – Social and Behavioral Sciences, 99,* 1016-1025. http://dx.doi.org/10.1016/j.sbspro.2013.10.575

Kovalev, V. V., & Kovalev, V. V. (2006). *Accounting, analysis, and financial management* (pp: 688). Moscow: Finance and Statistics. ISBN: 5-279-02862-2

Kuzmitskaya, A. A., & Ozerova, L. V. (2014). Contemporary aspects of the organization of strategic planning in APK. *Management of economic systems*, *63*(3). Retrieved from http://uecs.ru/uecs63-632014/item/2795-2014-03-05-09-08-04

Lansink, A. M., van den Berg, M., & Huirne, R. (2003). Analysis of strategic planning of Dutch pig farmers using a multivariate probit model. *Agricultural Systems, 78*(1), 73-84. http://dx.doi.org/10.1016/S0308-521X(03)00034-9

Le Gal, P. Y., Dugué, P., Faure, G., & Novak, S. (2011). How does research address the design of innovative agricultural production systems at the farm level? *Agricultural Systems, 104*(9), 714-728. http://dx.doi.org/10.1016/j.agsy.2011.07.007

Lopes, M. V., & Ross, R. B. (2012). A comparative analysis of strategic planning practices in Michigan agribusiness firms: 1992 vs. *International Food and Agribusiness Management Review, 16*(3), 123-152. http://dx.doi.org/10.1016/j.jcom.2013.06.004

Mintzberg, H., & Waters, J. A. (1985). Of Strategies, Deliberate and Emergent. *Strategic Management Journal, 6,* 257-272. http://dx.doi.org/10.1002/smj.4250060306

Njegovan, Z., & Jeločnik, M. (2013). *Reindustrialization of Serbian agriculture: toward a more balanced and knowledge based rural development,* 780-797. In the Proceedings of International Scientific Conference, Topola, Belgrade: Institute of Agricultural Economics. Retrieved from http://www.iep.bg.ac.rs/images/stories/dokumenti/IAE_Thematic_Proceedings_Topola_Serbia_2013.pdf

Ondersteijn, C., Giesen, G., & Huirne, R. (2006). Perceived environmental uncertainty in Dutch dairy farming: The effect of external farm context on strategic choice. *Agricultural Systems, 88*(2-3), 205-226. http://dx.doi.org/10.1016/j.agsy.2005.03.012

Phillips, J. C., Peterson, H. C., & Porter, S. S. (2014). Inventorying resources: An application to product-oriented agriculture. *International Journal of Agricultural Resources, Governance and Ecology*, *10*(1), 1-14. http://dx.doi.org/10.1504/IJARGE.2014.061037

Silva, D. A., Alves, G. I., De Mattos Neto, P. S. G., & Ferreira, T. A. E. (2014). Measurement of fitness function efficiency using data envelopment analysis. *Expert Systems with Applications, 41*(16), 7147-7160. http://dx.doi.org/10.1016/j.eswa.2014.06.001

Steigenberger, N. (2014). Only a matter of chance? How firm performance measurement impacts study results. *European Management Journal, 32*(1), 46-65. http://dx.doi.org/10.1016/j.emj.2013.09.003

Tanure, S., Nabinger, C., & Becker, J. L. (2013). Bioeconomic model of decision support system for farm management. Part I: Systemic conceptual modeling. *Agricultural Systems, 115,* 104-116. http://dx.doi.org/10.1016/j.agsy.2012.08.008

Tinsley, H. E. A., & Brown, S. D. (2000). *Handbook of Applied Multivariate Statistics and Mathematical*

Modeling (pp. 721). Academic Press. http://dx.doi.org/10.1016/B978-012691360-6/50002-1

Zahradníčková, L., & Vacík, E. (2014). Scenarios as a Strong Support for Strategic Planning. *Procedia Engineering, 69,* 665-669. http://dx.doi.org/10.1016/j.proeng.2014.03.040

Zorom, M., Barbier, B., Mertz, O., & Servat, E. (2013). Diversification and adaptation strategies to climate variability: A farm typology for the Sahel. *Agricultural Systems, 116,* 7-15. http://dx.doi.org/10.1016/j.agsy.2012.11.004