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SMART FINANCIAL AND PERSONNEL DESIGN OF ACCOUNTING OF INNOVATIVE AGRIBUSINESS IN THE CONDITIONS OF MANAGING CHANGES IN THE DIGITAL ECONOMY

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Abstract

In modern conditions, when the world society is faced with a food crisis, the growth of efficiency of the agrarian sector becomes the key not only to ensuring national security, but also to a condition for overcoming the global food shortage. However, the national agricultural sector of the economy is functioning under unprecedentedly difficult conditions, primarily related to military aggression on the part of the Russian Federation. Therefore, ensuring the effective functioning of agribusiness under current conditions is an important but complex task that needs to be addressed immediately. The management's special attention is drawn to the problem of financial support and accounting of the functioning of an agrarian enterprise in the conditions of managing the changes faced by the economy of Ukraine. The systems of financial support of an agricultural enterprise is largely determined by its priority economic interests, which are formed under the influence of both endogenous and exogenous factors. The purpose of the article is the design of an integral indicator for accounting for the effectiveness of personnel and financial support in the conditions of managing changes in the digital economy.

The information base of the scientific research is the reporting information from thirteen national enterprises of the agricultural sector characterizing the activity of national enterprises of the agrarian

sector. The analysis of the data of thirteen enterprises in the agrarian sector made it possible to determine the risk factors related financial support of agrarian enterprises. SWOT analysis and comparative analysis were used to assess the state of agrarian enterprises.

As a result of the research, an integral indicator was developed, which allows effective accounting of the implementation of the financial and personnel potential of enterprises in the conditions of managing changes in the digital economy. The integral indicator was used to survey 13 innovative agricultural enterprises. Based on the data obtained, it was determined that among others seven enterprises are in the risk zone, because they have a negative dynamics of the integral index, which indicates a low adequacy of the chosen strategy, or low efficiency of the measures envisaged.

It has been proven that in the context of designing the design of agribusiness accounting, management systems of key factors of production are of great importance. For example, in the process of management system design, most attention is usually given to modelling the financial and personnel resource subsystems of enterprise management.

Key words: *Finance support, Personnel support, Digital economy, Security, Integral indicator, Agricultural sector, Change management.*

1. Introduction

The last decade has seen an increase in the role of the agro-industrial sector in the structure of the national economy, in particular as an exporter of competitive products. This is largely facilitated by the growing demand for agricultural products against the backdrop of the global food crisis. Therefore, increasing the efficiency of national agricultural enterprises is the key to increasing foreign exchange earnings for the country, sustainable development of the national economy, ensuring national security and helping to solve the global food crisis.

Improving the efficiency of agricultural enterprise management is a reserve for improving the efficiency of the agricultural sector as a whole. An important component of the accounting system of an innovative agrarian enterprise is resource management, in particular, personnel and financial support. After all, personnel resources and finances of the enterprise are the key resources of innovative agrarian entrepreneurship.

Many scientists have studied various aspects of accounting for financial and personnel support, in particular in the agricultural sector. Scientists emphasize the need for innovative changes in this sector of the economy, especially under the influence of digitalization [1 - 6]. Berde and Piros [7], analyzed the problem of the declining number of people employed in the agricultural sector, and they also pay much attention to the qualification level of workers in the agricultural enterprise. They point out that those employed in the agricultural sector have a rather low level of qualification and emphasized the importance of higher education for productivity growth. Rivera and Alex [8], also discussed the problems of human resource development in their work. Noting the impact of globalization and innovative change, Rivera and Alex, pointed to the need for human resource development and suggest a reform of agricultural education.

Urbancová and Vrabcová [9], investigated the problems of personnel support in the agricultural sector. The authors analyzed the problem of an ageing workforce, which creates barriers to generational change in agricultural enterprises. An analysis of empirical data showed that less than 25% of companies use age management. The reason for this is a shortage of human resources, but the management of enterprises tries to compensate for this deficiency, in particular by improving motivation, improving the organizational climate, etc. Urbancova [10], also investigated the specifics of working time organization in agricultural enterprises. Taking into account the demographic problem of staffing, the author noted three factors that affect the organization of working time of employees,

namely: productivity of work, usage of flexible forms of employment and the attraction of skilled workers. According to the author, this allows to improve the cooperation of human resources.

Sajbidorová *et al.*, [3], looked at the specifics of human resource management in agricultural enterprises using the example of agricultural enterprises in Slovakia. The study emphasized the importance of worker co-operation and presents several strategies to ensure worker co-operation. Vnouchkova *et al.*, [4], explored another aspect of personnel support in their article. The authors analyzed strategic talent management in agricultural enterprises. The results of the study indicate that most managers of agricultural enterprises have an understanding of the principles of talent management, but less than half are aware of the importance of introducing these principles into enterprise management practices. Vnuchkova *et al.*, [4], focused on the importance of applying talent management as part of agribusiness personnel support. Bitsch and Yakura [11], analyzed the role and power of human resource management of middle managers in agricultural enterprises. They pointed out the important role in the training of personnel to the needs of the agricultural enterprise. Also in work of Bitsch *et al.*, [12], analyzed the risks of human resource management and propose the adaptation of farmer education programmes with recommendations for risk reduction. The problems of financial support of agribusiness are also one of the key topics of scientific research into the problems of efficiency of the agricultural sector. For example, Barry and Robison [13], analyzed current financial concepts and sources of agribusiness finance, in particular the definition of sound lending. A key issue in financial support is limited access to finance, and this is the problem that Bharti [14], explored. In his article, Bharti analysed the retrospective of policy interventions in agribusiness finance in India and emphasized the important role of microfinance in achieving an effective financial support system.

Another important aspect of financial support is the assessment of the current state of a company's finances. Obst *et al.*, [15], analyzed the problems of applying traditional financial decision-making tools, in particular the evaluation of agricultural enterprises' activity. They proposed the usage of multi-criteria analysis (PROMETHEE II). Morgan *et al.*, [16], in their research analyzed risk measurement methods and propose the usage of extreme value theory to model tail returns.

The problem of using different indicators that allow diagnosing the state of financial health of the enterprise was investigated by Valaskova *et al.*, [17], in their research.

The researchers tested the predictive efficiency of bankruptcy models and concluded that the highest predictive ability is achieved when the model is used under identical conditions to those in which the model was developed. Other authors emphasized the need to review the system of accounting, management and functioning of innovative enterprises during institutional changes [18 - 23]. In spite of the large number of scientific researches that have investigated various aspects of staffing and financial support, aspects of security remain underreported and require research that is more detailed.

In the context of modeling accounting of the personnel support subsystem, it is necessary to take into account the specifics of the functioning of the agrarian sector. In particular, the peculiarity of enterprise location, both in the context of human resource formation and the functioning of the agrarian enterprise. The seasonality of work has a significant impact on the design of personnel support, which leads to an uneven workload. Another factor affecting the personnel support pattern is the rapid process of urbanization. It is the movement of human resources from rural areas to cities and abroad that complicates the process of personnel support of innovative agricultural enterprises.

Education is also an important factor in the personnel support of innovative agricultural enterprises. In the context of innovative activity of an agricultural enterprise, there is a demand for highly qualified specialists, who are not only carriers of certain knowledge and experience but are able to constantly raise awareness of innovative technologies and methods of their application in practice. Therefore, one of the objectives of the human resources strategy of the enterprise is the formation of an "innovative" consciousness of employees.

Another peculiarity of staffing an innovative agricultural enterprise is that the same labor input brings different results due to differences in climatic conditions, seed quality, soil fertility, etc. In securing financial resources for an enterprise, it is necessary to generate the necessary amount of resource from various sources that meets the following conditions: minimizing cost of resource and minimizing risk. Sources of financial support include self-financing, budget funding, corporate funding, crowdfunding and earmarked grants. Self-financing is the most popular source of resource formation, realized through founders' contributions, net profit, and depreciation. Budget financing, which is implemented through earmarked expenditures of state or local budgets, is important. Also, a significant impact on the formation of financial resources occurs through the implementation of tax policy instruments, e.g. through VAT refunds.

Corporate finance also plays a significant role in generating financial resources. The most prominent role is played by the banking sector through lending, including to innovative projects. One of the peculiarities is that in conditions of high levels of uncertainty, loan funds lose their availability. Also, agricultural enterprises can attract agricultural insurance and stock market instruments, in particular through the issuance of securities.

Recently, alternative sources of financing, such as crowdfunding, have become popular. However, the usage of alternative financing faces some obstacles, namely: a low level of awareness of farmers about the possibilities of alternative sources of financing; lack of legal regulation; and a low level of investor confidence. The search for optimal human and financial resource solutions directs the efforts of the management of agricultural enterprises towards the design of staffing and financial support systems that provide the necessary solutions at the lowest cost and low risk. Modelling the accounting system of staffing and financial support system implies a certain algorithm that allows to effectively solve the problems of enterprise resource management, in particular, to ensure a certain level of security of the agricultural enterprise's functioning. The general algorithm of staffing and financial support includes the following stages: assessment of the current state of the functional environment, in which the economic activity of the agricultural enterprise is carried out, in particular, the definition of risks; determination of the adequacy of the existing personnel and financial strategy or development of financial and personnel strategy, that defining the objectives of the enterprise, a set of activities and resource base for their implementation; developing indicators to determine the effectiveness of the implemented strategies; Analyzing the values of the proposed indicators to assess the effectiveness of staffing and financial support; Making changes to the set of staffing and financial support measures as necessary. The general algorithm is shown in Figure 1.

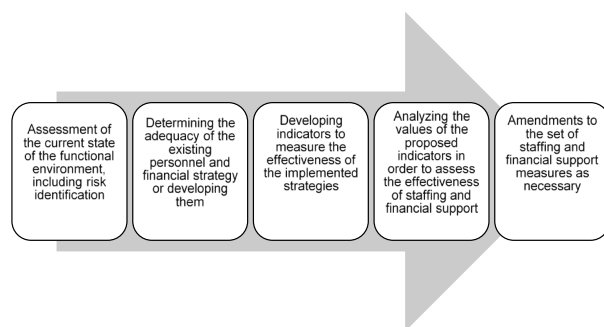


Figure 1. Design algorithm of staffing and financial support accounting
 Source: author's development

The purpose of the article is the design of an integral indicator for accounting for the effectiveness of personnel and financial support in the conditions of managing changes in the digital economy.

2. Materials and Methods

In order to account of the human and financial potential for innovative agribusiness in the conditions of managing changes in the digital economy, it is advisable to use an integral indicator. To calculate the integral indicator, you can use the following formula (1):

$$I = \alpha \cdot L + \beta \cdot F \quad (1)$$

Where: I - is an integral indicator that characterizes the efficiency of realization of the human and financial potential of an agricultural enterprise; L - the coefficient of the realisation of an agribusiness's personnel potential; F - coefficient of realisation of the financial potential of an agricultural enterprise; α - weighting coefficient of the personnel component of the management system; β - weighting coefficient of the financial component of the management system.

To calculate the integral Indicator we need to find the coefficient of realization of monetary potential of an agricultural enterprise. This indicator allows estimating the current financial state of the enterprise and making conclusions about the effectiveness of the chosen financial strategy. The coefficient of realization of financial potential F is calculated by the formula (2):

$$F = \sum_{i=1}^m \varphi_i \cdot f_i, \quad (2)$$

Where: f_i - is a separate indicator describing the financial state of the innovative agricultural enterprise; φ_i - weighting coefficient of the i financial indicator; m - the number of individual financial indicators selected to analyse the financial state of the enterprise.

The selection of financial indicators is based on the strategic objectives set for the management of the company. The weighting coefficient of financial indicators are determined based on the ranking of indicators by the level of importance. The coefficients can be determined using formula (3):

$$\varphi_i = r_i \cdot (\sum_{i=1}^m r_i)^{-1}, \quad (3)$$

Where: φ_i - weighting factor of i financial indicator; m - the number of separate financial indicators selected to analyse the financial state of the enterprise; r_i - rank of i financial indicator, which corresponds to the condition $\{\max(P_{r_i})\} \rightarrow \{\max(r_i)\}$, where P_{r_i} - priority of i financial indicator.

In the context of the study of financial security of economic activity of an innovative agricultural enterprise, five financial indicators have been selected, namely: autonomy coefficient, current liquidity coefficient, quick liquidity coefficient, absolute liquidity coefficient, sales profitability coefficient. The selected financial indicators and their ranks are presented in Table 1.

Table 1. Financial indicators and ranking results

Designation	Indicator	Rank
f_1	Coefficient of autonomy	5
f_2	Current liquidity ratio	1
f_3	Quick liquidity ratio	2
f_4	Absolute liquidity ratio	3
f_5	Sales profitability	4

Source: author's elaboration.

The second component of the integral indicator is the enterprise's human resources realization coefficient L . This coefficient helps to determine the current state and level of implementation of human resources potential of an innovative enterprise in the agrarian sector. In order to construct this coefficient, a set of indicators is formed to evaluate various aspects of the implementation of personnel strategy. In particular, the following indicators were selected for the current study: the coefficient of compliance of the available personnel with the staffing establishment, the coefficient of compliance of the average grade of workers with the average grade of work, the coefficient of investment of the enterprise in training and professional development of personnel, the coefficient of labour productivity, the share of remuneration in production costs. Selected indicators characterizing the personnel subsystem and their ranks are given in Table 2.

Table 2. Indicators describing the personnel subsystem of an enterprise and the results of the ranking

Designation	Indicator	Rank
l_1	The coefficient of compliance of the available staff with the staffing establishment	2
l_2	Coefficient of correspondence of the average grade of workers to the average grade of work	3
l_3	Ratio of the company's investments in training and professional development	1
l_4	Labour productivity ratio	5
l_5	Share of labour costs in production costs	4

Source: author's research.

To calculate the coefficient L is necessary to determine the weighting coefficients for the indicators included in the structure L and defined by formula (4):

$$y_j = k_j \cdot (\sum_{j=1}^n k_j)^{-1}, \quad (4)$$

Where: y_j - weighting factor of the j - personnel indicator; n - the number of separate indicators selected to analyse the personnel status of the enterprise; k_j - rank of j - human resources potential indicator, which corresponds to the condition $\{\max(P_j)\} \rightarrow \{\max(k_j)\}$ where P_j - priority of the j human resources potential indicator of the enterprise.

The coefficient of the realisation of the enterprise's human resources potential L can then be calculated according to the following formula (5):

$$L = \sum_{j=1}^n \gamma_j \cdot l_j \quad (5)$$

Where: l_j is a separate indicator describing the state of the personnel subsystem of an innovative agricultural enterprise; γ_j - weighting factor of the j human resource potential indicator; n - the number of separate indicators selected to analyse the state of an enterprise's human resource potential.

The resulting coefficients L and F are used for the calculation of the integral coefficient I . The analysis of the coefficient I allows clustering the inspected enterprises by this indicator. Also in the context of organisational and management design of staffing and financial support, analysis of coefficient I dynamics is important as it allows to estimate efficiency of strategic measures on prevention of realisation of risks connected with staffing and financial support.

3. Results and Discussion

To achieve the objectives of the study, in particular to identify the risks associated with staffing and financial support for the functioning of agricultural enterprises,

a SWOT analysis was conducted. The analysis based on the functioning of thirteen agricultural enterprises ($N_{1r}, N_{2r}, N_{3r}, N_{4r}, N_{5r}, N_{6r}, N_{7r}, N_{8r}, N_{9r}, N_{10r}, N_{11r}, N_{12r}, N_{13r}$). The SWOT-analysis aggregated data about the strengths and weaknesses of national innovative enterprises in the agricultural sector was obtained. The strengths are as follows: it should be noted that the military aggression by the Russian Federation against Ukraine significantly affects both the opportunities and threats faced by national agrarian enterprises.

The results of the first stage of the SWOT analysis are shown in Table 3.

The next step is the distribution of threats and opportunities according to their probability of realisation and the degree of impact on the functioning of agricultural enterprises. Thus, the most likely threats are loss of human resources potential, an increase in the tax burden, and an increase in energy prices. The results of the distribution are shown in Tables 4 and 5.

Several threats have the most critical impact on the functioning of agricultural enterprises, in particular in the context of financial and personnel security: loss

Table 3. Results of the analysis of strengths, weaknesses, opportunities and threats

Strengths	Weaknesses
1. Usage of innovative technologies in economic activity 2. Updated production assets 3. Availability of qualified personnel 4. Availability of a developed export infrastructure 5. Availability of state financial support programs for agricultural enterprises 6. Availability of favorable agro-climatic conditions 7. A significant amount of black soil with a high level of fertility	1. Low level of foreign investment inflows 2. Very limited access to credit resources 3. Loss of some sales markets due to military aggression 4. Low level of efficiency of communication between the enterprise and the state at the regional level 5. Deterioration of the logistics infrastructure in the combat zones 6. Low productivity of industrial processing of agricultural products 7. Significant fluctuations in energy markets
Opportunities	Threats
1. Increased sales volumes, in particular of processed agricultural products 2. Increase in labour productivity 3. Entering new sales markets 4. Improving the system of formation and development of human resources potential 5. Intensify the introduction of innovative technologies 6. Development of cooperation among agricultural enterprises	1. Loss of land and other assets in the areas of hostilities and temporary occupation 2. Destruction of agricultural infrastructure 3. Destruction of logistics infrastructure 4. Loss of human resources potential 5. Adverse changes in exchange rate dynamics 6. Increased tax burden 7. Rising energy prices

Source: author's research.

Table 4. Threats are distributed in terms of likelihood of occurrence and degree of impact

Probability of realization	Degree of influence		
	Critical	Medium	Insignificant
High	Loss of human resources potential	Increased tax burden; Increased energy prices	
Medium	Loss of land and other assets in the areas of hostilities and temporary occupation; Destruction of logistics infrastructure		Adverse changes in exchange rate dynamics
Low	Destruction of agricultural infrastructure		

Source: author's research.

of human resources potential, wastage of land and other assets in war and temporary occupation zones, destruction of logistics infrastructure, and destruction of agricultural infrastructure.

Among the opportunities, the most probable are the acquisition of new markets, the increase in sales volumes, in particular of processed agricultural products. The most influential ones are the acquisition of new markets, increasing labour productivity, improving the system of formation and development of human resources, and implementing innovative technologies.

The next step is the formation of a summary matrix reflecting the above strategies. A summary matrix is shown in Table 6.

The analysis indicates that the most difficult strategy to implement is the one envisaged for "Weaknesses - Threats". This strategy is envisaged in case of realization of external environment threats, e.g. destruction of the agricultural infrastructure, and manifestation of weaknesses of the agricultural enterprise, e.g. difficult access to credit resources. The following measures should be included in this strategy: the development of cooperation among agricultural enterprises and, at the regional level, the establishment of relations between regional authorities and agricultural enterprises. The most positive strategy is envisaged for the direction "Strengths - Opportunities", applied when realising the opportunities of the external environment by exploiting the strengths of the agricultural enterprise,

e.g. increasing production volumes through additional financing from the state support programme.

In the security aspect SWOT-analysis allows to evaluate the current state of financial and economic security of agro-enterprise, in particular the personnel and financial component. In conditions of rapid changes it is advisable to conduct SWOT-analysis regularly, it will provide a better information resource for making balanced management decisions.

Within the framework of staffing and financial support, the implementation of any strategy requires monitoring the financial and personnel state of an agro-enterprise. To this end, it is advisable to use an integral indicator that characterizes the financial and personnel state of the enterprise, which allows us to assess the effectiveness of implementation of the strategy of human resources and financial potential of an innovative agrarian enterprise. As part of the current study, an integral indicator was calculated for thirteen agricultural enterprises ($N_1, N_2, N_3, N_4, N_5, N_6, N_7, N_8, N_9, N_{10}, N_{11}, N_{12},$ and N_{13}).

To calculate the integral indicator I formula (1) was used, for which the weighting coefficients α and β are equal to 0.5, i.e. financial and personnel components of the integral indicator have the same weight.

The weights for the individual human resources and financial indicators were determined by formulae (3) and (4) respectively. Thus, for the financial indicators the weights coefficients are equal to:

Table 5. Opportunities are distributed in terms of likelihood of realisation and degree of impact

	Critical	Medium	Insignificant
High	Entering new sales markets	Increased sales volumes, in particular of processed agricultural products	
Medium	Increasing labour productivity; Improving the system of formation and development of human resources potential	Development of cooperation among agricultural enterprises	
Low	Intensify the introduction of innovative technologies		

Source: author's research

Table 6. Results summary of the analysis of strengths, weaknesses, opportunities and threats

	Opportunities	Threats
Strength	Increasing the volume of production and processing of agricultural products, diversification of products, including the production of eco-products	Implementation of resource-saving technologies, participation in government programs to support agricultural producers
Weaknesses	Search for new customers in foreign markets, participation in government programs to support agricultural producers	Development of cooperation among agricultural enterprises in order to offset the negative manifestations of the functional environment, establishing relations "state - region - enterprise"

Source: author's research.

$$\begin{aligned} \varphi_1 &= r_1 \cdot (\sum_{i=1}^5 r_i)^{-1} = 5 \cdot (5 + 1 + 2 + 3 + 4)^{-1} = 0,333, \\ \varphi_2 &= 1 \cdot (15)^{-1} = 0,067, \\ \varphi_3 &= 2 \cdot (15)^{-1} = 0,133, \\ \varphi_4 &= 3 \cdot (15)^{-1} = 0,2, \\ \varphi_5 &= 4 \cdot (15)^{-1} = 0,267. \end{aligned}$$

And for the personnel indicators, the weighting factors are defined as follows:

$$\begin{aligned} \gamma_1 &= k_1 \cdot (\sum_{j=1}^5 k_j)^{-1} = 2 \cdot (2 + 3 + 1 + 5 + 4)^{-1} = 0,133, \\ \gamma_2 &= 3 \cdot (15)^{-1} = 0,2, \\ \gamma_3 &= 1 \cdot (15)^{-1} = 0,067, \\ \gamma_4 &= 5 \cdot (15)^{-1} = 0,333, \\ \gamma_5 &= 4 \cdot (15)^{-1} = 0,267. \end{aligned}$$

The values of personnel and financial indicators that characterise the financial and economic state of individual agricultural enterprises selected for the calculation of the integral indicator are shown in Table 7.

The next step in calculating the integral indicator is to determine the coefficients that characterise the state of staffing and financial support separately. Thus, the indicator characterizing the personnel component is determined by the formula (5). For enterprise N1 for period t, it has the form:

$$L_{N1} = \sum_{j=1}^5 \gamma_j \cdot l_j = 0,133 \cdot 0,97 + 0,2 \cdot 0,68 + 0,067 \cdot 0,07 + 0,333 \cdot 1,11 + 0,267 \cdot 0,21 = 0,7,$$

and for enterprises N2 - N13, respectively, is equal:

$$\begin{aligned} L_{N2} &= 0,133 \cdot 0,85 + 0,2 \cdot 0,54 + 0,067 \cdot 0,04 + 0,333 \cdot 1,98 + 0,267 \cdot 0,15 = 0,92, \\ L_{N3} &= 0,133 \cdot 0,93 + 0,2 \cdot 0,62 + 0,067 \cdot 0,08 + 0,333 \cdot 0,63 + 0,267 \cdot 0,28 = 0,54, \\ L_{N4} &= 0,133 \cdot 0,89 + 0,2 \cdot 0,71 + 0,067 \cdot 0,03 + 0,333 \cdot 7,09 + 0,267 \cdot 0,04 = 2,64, \\ L_{N5} &= 0,133 \cdot 0,78 + 0,2 \cdot 0,67 + 0,067 \cdot 0,02 + 0,333 \cdot 1,19 + 0,267 \cdot 0,21 = 0,1, \end{aligned}$$

$$\begin{aligned} - N_6 &= 0,133 \cdot 0,92 + 0,2 \cdot 0,53 + 0,067 \cdot 0,01 + 0,333 \cdot 2,38 + 0,267 \cdot 0,19 = 1, \\ - L_{N7} &= 0,133 \cdot 0,87 + 0,2 \cdot 0,86 + 0,067 \cdot 0,02 + 0,333 \cdot 1,98 + 0,267 \cdot 0,09 = 0,97, \\ - L_{N8} &= 0,133 \cdot 0,83 + 0,2 \cdot 0,83 + 0,067 \cdot 0,04 + 0,333 \cdot 0,45 + 0,267 \cdot 0,45 = 0,8, \\ - L_{N9} &= 0,133 \cdot 0,94 + 0,2 \cdot 0,81 + 0,067 \cdot 0,08 + 0,333 \cdot 3,19 + 0,267 \cdot 0,53 = 1, \\ - L_{N10} &= 0,133 \cdot 0,79 + 0,2 \cdot 0,79 + 0,067 \cdot 0,12 + 0,333 \cdot 0,08 + 0,267 \cdot 0,7 = 0,4, \\ - L_{N11} &= 0,133 \cdot 0,86 + 0,2 \cdot 0,82 + 0,067 \cdot 0,04 + 0,333 \cdot 1,92 + 0,267 \cdot 0,12 = 0,95, \\ - N_{12} &= 0,133 \cdot 0,91 + 0,2 \cdot 0,67 + 0,067 \cdot 0,01 + 0,333 \cdot 0,41 + 0,267 \cdot 0,26 = 0,4, \\ - L_{N13} &= 0,133 \cdot 0,82 + 0,2 \cdot 0,84 + 0,067 \cdot 0,23 + 0,333 \cdot 0,38 + 0,267 \cdot 0,34 = 0,51. \end{aligned}$$

Analysis of the calculated indicator indicates that the best level of implementation of human resources potential and, consequently, of staffing is observed at enterprise N4, for which $L_{N4} = 2,64$. While the worst situation with staffing is recorded at enterprises N12 and N10, for which the indicator is 0.46 and 0.49 respectively.

The indicator that describes the financial component is determined by formula (2). For enterprise N1 in period t it looks like:

$$F_{N1} = \sum_{i=1}^5 \varphi_i \cdot f_i = 0,333 \cdot 0,768 + 0,067 \cdot 6,34 + 0,133 \cdot 4,078 + 0,2 \cdot 0,157 + 0,267 \cdot 0,189 = 1,3,$$

and for enterprises N2 - N13, respectively, is equal:

$$\begin{aligned} - F_{N2} &= 0,333 \cdot 0,714 + 0,067 \cdot 2,718 + 0,133 \cdot 0,823 + 0,2 \cdot 0,014 + 0,267 \cdot 0,226 = 0,59, \\ - F_{N3} &= 0,333 \cdot 0,911 + 0,067 \cdot 6,42 + 0,133 \cdot 2,629 + 0,2 \cdot 0,183 + 0,267 \cdot 0,149 = 1,16, \\ - F_{N4} &= 0,333 \cdot 0,585 + 0,067 \cdot 1,894 + 0,133 \cdot 1,551 + 0,2 \cdot 0,001 + 0,267 \cdot 0,22 = 0,59, \\ - F_{N5} &= 0,333 \cdot 0,877 + 0,067 \cdot 7,092 + 0,133 \cdot 4,142 + 0,2 \cdot 3,513 + 0,267 \cdot 0,201 = 2,07, \\ - F_{N6} &= 0,333 \cdot 0,717 + 0,067 \cdot 2,242 + 0,133 \cdot 1,405 + 0,2 \cdot 0,703 + 0,267 \cdot 0,315 = 0,8, \\ - F_{N7} &= 0,333 \cdot 0,877 + 0,067 \cdot 15,252 + 0,133 \cdot 9,314 + 0,2 \cdot 0,069 + 0,267 \cdot 0,152 = 2,61, \\ - F_{N8} &= 0,333 \cdot 0,751 + 0,067 \cdot 1,081 + 0,133 \cdot 0,462 + 0,2 \cdot 0,007 + 0,267 \cdot 0,167 = 0,43, \\ - F_{N9} &= 0,333 \cdot 0,894 + 0,067 \cdot 2,8 + 0,133 \cdot 0,510 + 0,2 \cdot 0,085 + 0,267 \cdot 0,628 = 0,74, \\ - F_{N10} &= 0,333 \cdot 0,027 + 0,067 \cdot 0,291 + 0,133 \cdot 0,256 + 0,2 \cdot 0,118 + 0,267 \cdot 0,054 = 0,1, \\ - F_{N11} &= 0,333 \cdot 0,365 + 0,067 \cdot 0,861 + 0,133 \cdot 0,337 + 0,2 \cdot 0,001 + 0,267 \cdot 0,188 = 0,27, \\ - F_{N12} &= 0,333 \cdot 0,854 + 0,067 \cdot 4,188 + 0,133 \cdot 2,191 + 0,2 \cdot 0,195 + 0,267 \cdot 0,097 = 0,92, \\ - F_{N13} &= 0,333 \cdot 0,529 + 0,067 \cdot 1,279 + 0,133 \cdot 0,061 + 0,2 \cdot 0,0001 + 0,267 \cdot 0,114 = 0,3. \end{aligned}$$

Table 7. Value of personnel and financial indicators characterising the financial and economic state of selected agribusinesses (t = 2021)

	I ₁		I ₂		I ₃		I ₄		I ₅		f ₁		f ₂		f ₃		f ₄			
	t-1	t	t-1	t	t-1	t	t-1	t	t-1	t	t-1	t	t-1	t	t-1	t	t-1	t		
N1	0,96	0,97	0,65	0,68	0,05	0,07	1,17	1,11	0,20	0,21	0,564	0,768	1,737	6,340	0,587	4,078	0,010	0,157	0,189	0,189
N2	0,81	0,85	0,52	0,54	0,03	0,04	2,03	1,98	0,15	0,15	0,686	0,714	3,345	2,718	1,037	0,823	0,024	0,014z	0,234	0,226
N3	0,91	0,93	0,59	0,62	0,04	0,08	0,66	0,63	0,27	0,28	0,923	0,911	7,474	6,420	2,814	2,629	0,304	0,183	0,152	0,149
N4	0,83	0,89	0,67	0,71	0,01	0,03	6,72	7,09	0,04	0,04	0,674	0,585	2,284	1,894	1,740	1,551	0,008	0,001	0,220	0,220
N5	0,79	0,78	0,54	0,67	0,03	0,02	1,20	1,19	0,22	0,21	0,851	0,877	5,876	7,092	2,982	4,142	2,388	3,513	0,209	0,201
N6	0,91	0,92	0,49	0,53	0,01	0,01	2,50	2,38	0,20	0,19	0,620	0,717	1,540	2,242	0,760	1,405	0,292	0,703	0,331	0,315
N7	0,79	0,87	0,91	0,86	0,03	0,02	2,10	1,98	0,09	0,09	0,543	0,877	0,618	15,252	0,456	9,314	0,012	0,069	0,164	0,152
N8	0,84	0,83	0,81	0,83	0,04	0,04	0,45	0,45	0,42	0,45	0,709	0,751	0,841	1,081	0,255	0,462	0,012	0,007	0,158	0,167
N9	0,96	0,94	0,79	0,81	0,07	0,08	5,37	3,19	0,28	0,53	0,936	0,894	3,907	2,800	0,721	0,510	0,011	0,085	0,601	0,628
N10	0,81	0,79	0,84	0,79	0,09	0,12	0,10	0,08	0,58	0,70	0,160	0,027	0,258	0,291	0,220	0,256	0,087	0,118	0,056	0,054
N11	0,87	0,86	0,85	0,82	0,02	0,04	1,93	1,92	0,12	0,12	0,402	0,365	0,992	0,861	0,370	0,337	0,038	0,001	0,184	0,188
N12	0,93	0,91	0,64	0,67	0,02	0,01	0,40	0,41	0,29	0,26	0,923	0,854	7,447	4,188	2,805	2,191	0,389	0,195	0,103	0,097
N13	0,79	0,82	0,83	0,84	0,26	0,23	0,31	0,38	0,37	0,34	0,568	0,529	1,837	1,279	0,067	0,061	0,003	0,0001	0,103	0,114

Source: author's research.

That is, the best level of financial security is in enterprises N7 and N5, which have an indicator of $F_{N7} = 2,61$ and $F_{N5} = 2,07$ respectively. However, enterprises N10 and N11 have the worst level of financial security, because $F_{N10} = 0,1$ and $F_{N11} = 0,27$ respectively.

It is worth noting the need to analyse the indicators over time. The final step is to calculate and analyse the integral indicator itself using formula (1). In the current study, the weighting coefficients $\alpha = 0,5$ and $\beta = 0,5$, i.e., the financial and personnel components are equally important in the context of the organizational and managerial design of staffing and financial support for innovative agribusiness. For the enterprise N1 for the period t, it has the form:

$$I_{N1} = \alpha \cdot L + \beta \cdot F = 0,5 \cdot 0,7 + 0,5 \cdot 1,3 = 1,$$

and for enterprises N2 - N13, respectively, is equal:

$$I_{N2} = 0,5 \cdot 0,92 + 0,5 \cdot 0,59 = 0,76,$$

$$I_{N3} = 0,5 \cdot 0,54 + 0,5 \cdot 1,16 = 0,85,$$

$$I_{N4} = 0,5 \cdot 2,64 + 0,5 \cdot 0,59 = 1,61,$$

$$I_{N5} = 0,5 \cdot 0,69 + 0,5 \cdot 2,07 = 1,38,$$

$$I_{N6} = 0,5 \cdot 1,07 + 0,5 \cdot 0,8 = 0,94,$$

$$I_{N7} = 0,5 \cdot 0,97 + 0,5 \cdot 2,61 = 1,79,$$

$$I_{N8} = 0,5 \cdot 0,55 + 0,5 \cdot 0,43 = 0,49,$$

$$I_{N9} = 0,5 \cdot 1,5 + 0,5 \cdot 0,74 = 1,12,$$

$$I_{N10} = 0,5 \cdot 0,49 + 0,5 \cdot 0,1 = 0,29,$$

$$I_{N11} = 0,5 \cdot 0,95 + 0,5 \cdot 0,27 = 0,61,$$

$$I_{N12} = 0,5 \cdot 0,46 + 0,5 \cdot 0,92 = 0,69,$$

$$I_{N13} = 0,5 \cdot 0,51 + 0,5 \cdot 0,3 = 0,41.$$

The results of the calculation of the integral indicator and its components for enterprises N 1 to N 13 in period t and t-1 are presented in Table 8.

Table 8. Value of the integral indicator and its components for enterprises N 1 - N 13

Indicators Enterprise	L		F		I	
	t-1	t	t-1	t	t-1	t
N1	0,703	0,696	0,435	1,304	0,569	1,000
N2	0,931	0,923	0,657	0,592	0,794	0,757
N3	0,533	0,537	1,282	1,159	0,908	0,848
N4	2,496	2,636	0,669	0,587	1,582	1,612
N5	0,673	0,691	1,606	2,073	1,140	1,382
N6	1,106	1,073	0,557	0,800	0,832	0,937
N7	1,013	0,972	0,329	2,605	0,671	1,789
N8	0,537	0,548	0,371	0,430	0,454	0,489
N9	2,154	1,497	0,831	0,737	1,493	1,117
N10	0,470	0,485	0,132	0,101	0,301	0,293
N11	0,963	0,953	0,306	0,274	0,634	0,614
N12	0,463	0,464	1,284	0,921	0,873	0,692
N13	0,490	0,510	0,349	0,300	0,419	0,405

Source: calculated by the author.

The results can be used for further comparative analysis and analysis of the dynamics of the indicators. The

dynamics of the personnel and financial components of the integral indicator are shown in Figure 2 and Figure 3, respectively. And the dynamics of the integral indicator is shown in Figure 4.

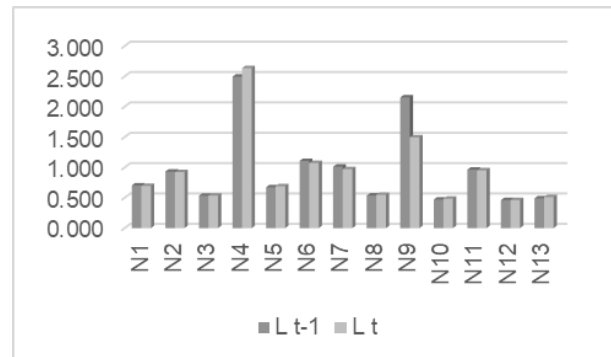


Figure 2. Dynamics of the personnel component of the integral indicator
Source: calculated by the author

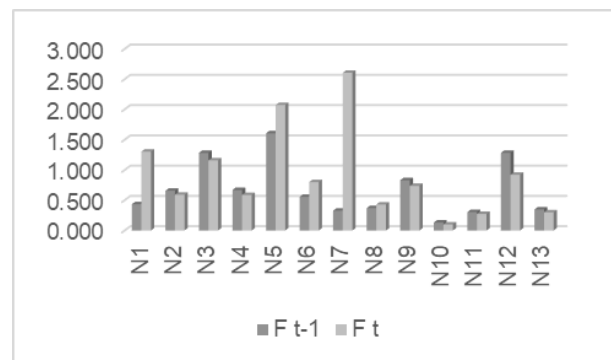


Figure 3. Dynamics of the financial component of the integral indicator
Source: calculated by the author

Enterprises with a high value of the integral indicator include N7, N4 and N5. Moreover, N7 achieved this result due to the improved efficiency of its financial support.

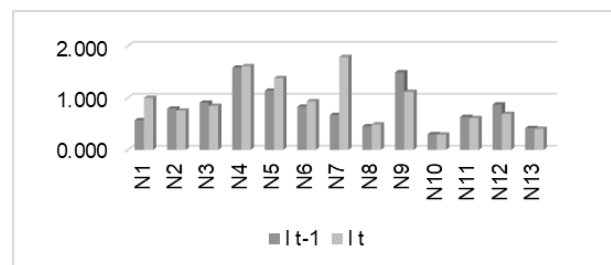


Figure 4. Dynamics of the integral indicator of accounting for financial and personnel support of agricultural enterprises
Source: author's research

However, in the context of the security aspect, enterprises with a low level of integral indicator attract more attention. Analysis of the integral index allows us to conclude that the lowest level of security efficiency

has enterprise N10, for which the integral index equals 0.301 for period $t-1$ and 0.293 for period t . That is, overall, the dynamics is negative. Paying attention to the dynamics of the personnel and financial components for this period, we can conclude that the system of financial support of enterprise N10 requires intervention, because the value of the financial component of the integral index decreased by 23.5%.

In addition, enterprises with negative dynamics of the integral indicator need to look at staffing and finance support in order to make changes in personnel or financial strategy. These enterprises include the following: N2, N3, N9, N10, N11, N12 and N13. Enterprises N2, N9, N11 have a decrease in both share indicators, which reflects a decrease in the efficiency of both staffing and financial support. Special attention is drawn to the result of enterprise N9, because in the previous period, the enterprise had a rather high value of the integral index, but during t period there was a decrease of 25.2% in the index. This drop was due to both a 30.5% decrease in staffing efficiency and an 11.3% drop in financial security efficiency. That is, enterprise N9 should first pay attention to staffing, in particular to increase labour productivity. Thus, in order to increase labour productivity, it may be recommended to make changes to the system of staff motivation and improve the level of training.

4. Conclusions

- The current conditions for the functioning of national agricultural enterprises are extremely difficult, primarily due to military aggression by the Russian Federation. Under such conditions, the management of agricultural enterprises has the critically important task of effectively attracting and using resources, in particular financial and human resources. In the context of innovation, staffing and financial support are key elements of the enterprise management system, and in today's environment, the security aspect is being mainstreamed. In order to implement effective staffing and financial support in the process of their modelling it is advisable to take into account the threats that may be faced by innovative enterprise of the agrarian sector.

- It is also proposed to accounting an integral indicator with two components - personnel and financial - in order to assess the current state of staffing and financial support. The integral indicator was used to survey 13 innovative agricultural enterprises. Based on the data obtained, it was determined that among others seven enterprises are in the risk zone, because they have a negative dynamics of the integral index, which indicates a low adequacy of the chosen strategy, or low efficiency of the measures envisaged. Therefore, the enterprises need to pay attention to staffing and

financial support. Finding the optimal structure for the indicators used in the construction of the integral indicator may be a subject for further researches.

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