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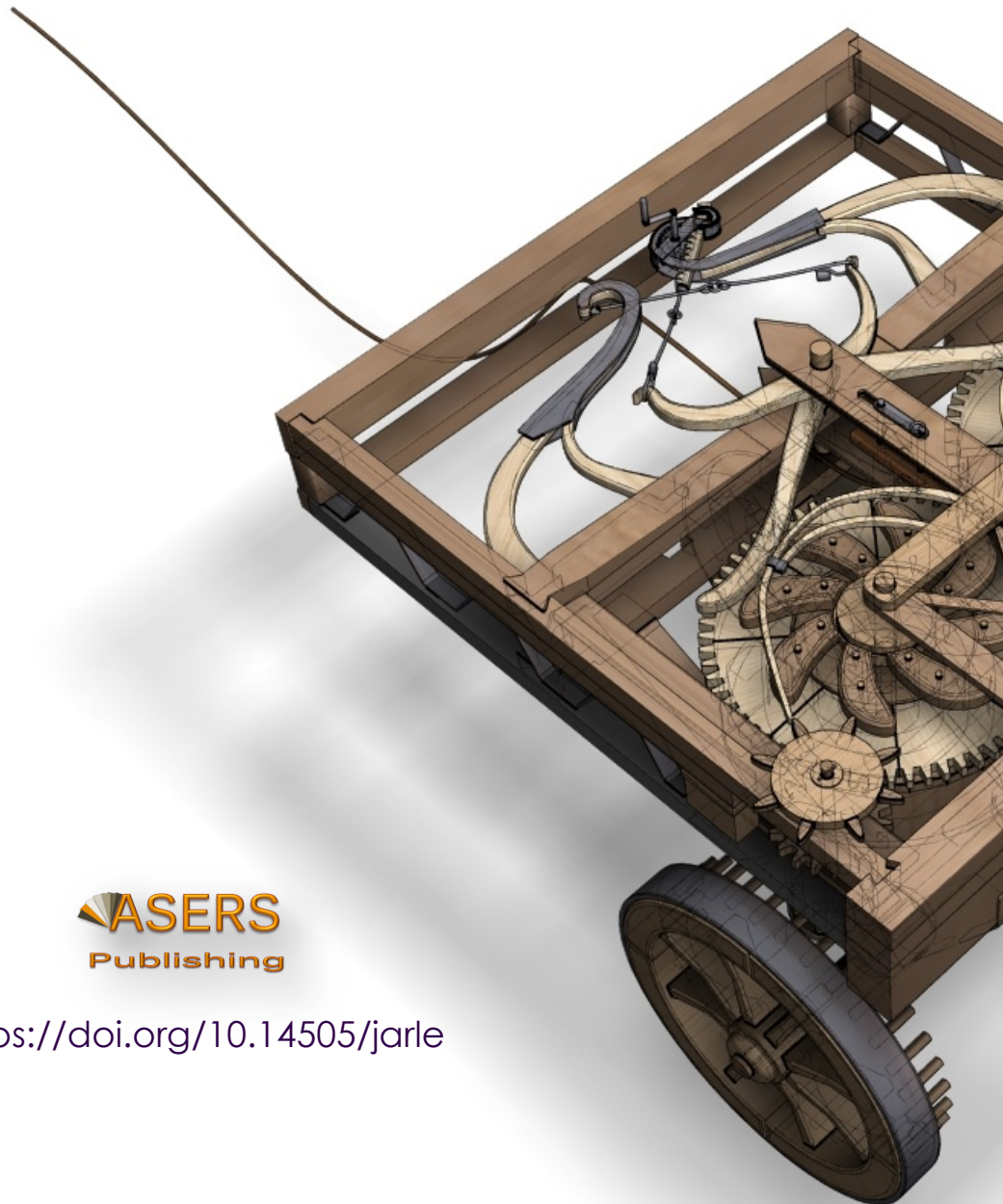
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Imperatives of Quality Insuring of the Production Cycle and Effective Functioning Process of the Enterprises of Agro-Product Subcomplex of Ukraine

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Abstract:

The article deals with the imperatives of quality insuring of the production cycle and the effective functioning process of the enterprises of agro-product subcomplex of Ukraine. An effective functional system has been built which, based on the quantitative and qualitative criteria of competitiveness of enterprises, determines the scale and effectiveness of their activity, provides opportunities to reproduce the resource potential of the agro-product subcomplex industries. The set of processes of relevant implication 'resources – structure – efficiency – development of the system' was singled out in order to improve the qualitative and quantitative properties of the production cycle as a creation of efficiency. An adaptive-renovation approach is proposed, which allows selecting from the system of indicators representative-effective indicators and factors of financial and resource load on the level of self-financing of the production cycle with 95% probability. The criterion of 'optimal maximum profit', which meets the requirements of a clear economic interpretation of the performance indicators, provides an increase in the value of cash flow to reduce the dependence of the entities of inter-economic relations on the slowdown in the self-financing of the production cycle. It is proved that the integration of agro-product industries with a long continuous cycle has specified functional changes in their efficiency. We have grouped the entities of inter-economic relations by the level of production cost and profitability of the sold products, which ensure the effective process of functioning of the enterprises of the agro-product

subcomplex. The parameters of financial and resource load on indicators of self-financing of the production cycle of enterprises of poultry agro-complex in the average for one region of Ukraine are determined. Alternative business projects for the production of poultry products are proposed while changing the cash flow discount rate.

Keywords: economic activity; consumer value; agricultural sector; production; integration of economic relations.

JEL Classification: P42; Q18; Q14; Q13.

Introduction

The agrarian sector of the economy of any country is a complex integrated system, containing a large number of spheres of economic relations, as well as subsystems of economic activity for the full and constructive functioning of enterprises of agro-product subcomplex, which provide a viable cycle of branches of agriculture. The creation of a competitive environment in the agricultural sector of the economy allows identifying the criteria of the optimal structure of resource costs, which change the quality of finished products and shape its additional consumer value, form the spatial functionality of the entities of inter-economic relations and their guaranteed economic status. However, the problems of increasing the efficiency of the development of these entities cannot be successfully solved without large-scale transformations in the development of agricultural sectors, which still lack real opportunities for enhanced reproduction and export-oriented production of raw materials and finished products. It should be noted that the use of imported raw materials, from the point of view of the national economy, is less significant, since efficiency reserves are sought not only within the specific production, but also at other stages of the reproduction process that would satisfy the economic interests of enterprises with the available resource potential of the agro-product subcomplex.

From the point of view of evaluating the efficiency of alternative costs (or costs of lost profit), the target resolution of the functionality of the agro-product subcomplex enterprises is associated with significant financial losses, which unfortunately have a disparity between the actual needs of production resources (i.e., associated costs) and the rates of their use, given the basic parameters of advanced reproduction of finished goods production.

The declared problems of agrarian-industrial relations were investigated by such scientists as: Cixanovska (2016); Czarenko (1998); Chernenkyj (2010); Chymshyt *et al.* (2011); Prutska and Yarova (2013); Sabluk and Kaletnik (2011); Shpykulyak (2010); Xudolej and Paryczka (2015); Yakymchuk (2011). Scientific achievements in the functioning and development of the product subcomplex of the agricultural sector of the economy as a system of economic relations aimed at providing the population with products of the processing industry have been studied by: Babu and Shishodia (2017); Buryennikova and Dmytrenko (2017); Luzan (2011); Mojsa (2004); Odinczov (2010); Sabluk and Mesel-Veselyak (2004); Shpychak (1995). Within the financial support plane of the production chain, research was carried out by such scientists as: Frolova *et al.* (2016); Grossman and Hart (1982); Harris and Raviv (1990); Onyshhenko (2005); Skalyuk (2010); Stulz (1990). In the context of the functioning of regional agro-industrial entities, from the point of view of financial and economic parameters of their production, the possibilities of integration into other subcomplexes and functional links of the agricultural sector of the economy were studied by: Barbier (1987); Demyanenko *et al.* (2011); Knight (2006); Lazebyk (2009); Martynyuk (2017); Turylo and Zinchenko (2009); Zinchenko (2010); Xudolij and Shevchenko (2015).

Despite the considerable interest of scientists in the process of stabilization of the results of the effective activity of agro-product entities, the issues of integration of economic ties in different segments of the agricultural market remain unresolved, taking into account the social and economic conditions of adaptability. The priority of our research is the development of a methodological approach and practical recommendations for ensuring the effective process of functioning of enterprises of agro-product subcomplex, taking into account the influence of the modified factors of financial and resource load on the parameters of self-financing of the production cycle in order to preserve the rates of economic growth of inter-economic entities.

1. Materials and Methods

The process of functioning of enterprises is identified by the resultant components that have a stochastic pace of development and a dynamic system of conditionally-qualitative provision of the production cycle. Moreover, the functionality of the system is determined by the resource, production, material, financial, social, economic, environmental, technological, logistical, institutional potentials with appropriate foreseeable risks (Teslenok *et al.* 2012), and the traditional evaluation of the effective process of functioning of enterprises (taking into account the influence of factors of the environment) is carried out on the monitoring platform of the 'performance pyramid' developed by world and international organizations (in particular, the UN, the OSCE, the EU Economic Commission) (Oleksyuk 2008).

When evaluating the results of functioning of enterprises of agro-product subcomplex, as a system, we distinguish two scientific approaches: the first approach involves taking into account the final results (effects) of the production subsystem, the second – the volumes of functioning of the economic process as a whole. In our opinion, the complexity of estimating the intensity of the final result obtained by the entities of inter-economic relations in the agricultural sector of the economy cannot be reflected without an increase in resource costs, since their volumes do not always make it possible to increase the high-quality functionality of the production subsystem at higher rates. Accordingly, there is a need to build an effective functional system, which on the basis of quantitative and qualitative criteria for the competitiveness of enterprises determines the scale and effectiveness of their activities, taking into account the intensity of financial and resource load on the parameters of self-financing of the production cycle (quantitative component) branches of the agro-product subcomplex of the national economy.

A methodological approach is proposed to ensure the effective process of functioning of enterprises of agro-product subcomplex by a single integrated indicator, which meets the requirements of a clear economic interpretation of productive indicators, taking into account the influence of the modified factors of financial and resource load on the parameters of the self-financing of the production cycle in order to preserve the economic growth rates of the entities of inter-economic relations. The set of processes in the relevant implication of 'resources – structure – efficiency – system development' for improving the qualitative and quantitative properties of the production cycle is defined as the creation of this efficiency. Accordingly, the creation of efficiency (as a whole) or efficiency (as part of the whole) of a functional system is the result of the implication of the added value of production resources (Buryennikova and Dmytrenko 2017), which are maximized when the rate of change of their use does not exceed the rate of change of efficiency (Table 1). That is, there is a need to evaluate both the structure of resources and the components of the productivity (efficiency) of the production cycle of enterprises.

Table 1. The Components of the Efficiency (as a Whole) of the Production Cycle and the Effective (as Part of the Whole) Functioning of the Enterprise of Agro-Product Subcomplex

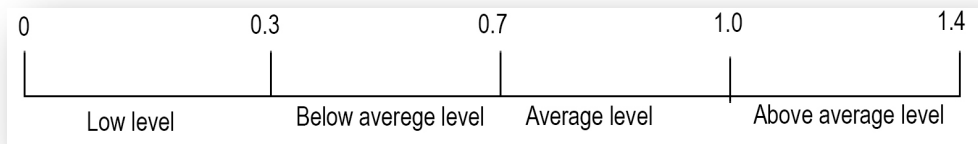
The name of the indicator	The algorithm of calculations
Aggregate cost of the production cycle	V_i
Costs of production cycle	Z_i
Profitability of production cycle	$G_i = V_i - Z_i$
Productivity of production cycle	$R_i = K_i \times E_i$
Production cycle performance index	$J_{R_i} = R_i/R_{i-1}$
Final production (scale) of production cycle	$K_i = G_i + Z_i \times G_i/V_i$
Required cost of production cycle	$K_{G_i} = K_i \times G_i/V_i$
Added cost of production cycle	$K_{Z_i} = K_i - K_{G_i}$
Index of production cycle	$J_{K_i} = K_i/K_{i-1}$
Production cycle efficiency	$E_i = V_i/Z_i = G_i/Z_i$
Quantitative component of production cycle performance	$E_{1_i} = E_i - 1$
Production cycle efficiency index	$J_{E_i} = E_i/E_{i-1}$
Qualitative component of production cycle	$E_{2_i} = V_i/G_i$
Index of the qualitative component of the production cycle	$J_{E_{2_i}} = E_{2_i}/E_{2(i-1)}$
Index of the quantitative component of the efficiency of the production cycle	$J_{E_{1_i}} = J_{E_i}/J_{E_{2_i}}$

Source: Developed by the authors according to data (Shapochka 2014).

It should be noted that the components of performance are separate effects of creation. In this case, the index of change in the value of the aggregate or individual types of production resources decreases under the influence of the change of the productivity index, i.e. there is a positive effect of creation, and vice versa (Figure 1, Table 2). The calculation of the effect of creation allows stimulating the functional system of the enterprise due to

the quantitative interrelation between individual indicators of self-financing of the production cycle and the general integrated indicator of the effective functioning of the entity. The absence of such a connection deprives the system of quality homogeneity and functionality of the productive resources involved in achieving the overall effect generated by the resource potential of the enterprise. Accordingly, in the integral indicator of the effective functioning of the enterprise, there is a need to isolate the part that determines the action of a specific factor, which allows the productive cycle as a system, through the component of its functioning E_i ; quantitative E_{1i} and qualitative E_{2i} components, as well as indices corresponding to the parameters $J_{E_{1i}}$ and $J_{E_{2i}}$.

Figure 1. The Scale of Assessing the Level of Performance of the Production Cycle



Source: Developed by the authors.

Table 2. Indices of Productivity and Condition of the Production Cycle, Providing an Efficient Process of Functioning of the Enterprise of Agro-Product Subcomplex

Index	The gap change	Production cycle condition	Actions of quality assurance
Performance $J_R = J_K \times J_E$	$J_R \geq 1$	Performance increase	Provide sufficient level
	$J_K \geq 1$	Increase in scale	Provide sufficient level
	$J_E \leq 1$	Decrease in efficiency	Provide efficiency increase
	$J_K \leq 1$	Decrease in scale	Provide efficiency increase
	$J_E \geq 1$	Increase in efficiency	Provide sufficient level
	$J_K \geq 1$	Increase in scale	Provide sufficient level
	$J_E \leq 1$	Increase in efficiency	Provide sufficient level
	$J_R \leq 1$	Performance decrease	Provide performance increase
	$J_K \leq 1$	Decrease in scale	Provide scale increase
	$J_E \leq 1$	Decrease in efficiency	Provide efficiency increase
	$J_K \leq 1$	Decrease in scale	Provide scale increase
	$J_E \geq 1$	Increase in efficiency	Provide sufficient level
	$J_K \geq 1$	Increase in scale	Provide sufficient level
	$J_E \leq 1$	Decrease in efficiency	Provide efficiency increase

Source: Developed by the authors according to data (Shapochka 2014).

Indicator (Eq. 1):

$$E_i = G/Z \tag{1}$$

as a quantitative component of the efficiency indicator (the amount of net output per unit of cost), characterizes the process of reproduction of the production cycle and indicates the degree of rationality and efficiency of obtaining an economic effect in terms of utility (justifies the profit process) of its implementation at the enterprise. The expanded form of calculating the indicator (Eq. 2):

$$E_{2i} = V_i/G_i = (G_i + Z_i)/G_i = 1 + Z_i/G_i = 1 + 1/E_1, \tag{2}$$

as a qualitative component of the efficiency indicator (the amount of resource costs for each unit of net production), characterizes the cost process of production of the entity of inter-economic relations (Shapochka 2014). That is (Eq. 3):

$$E_i = V_i/Z_i = (G_i/Z_i) \times (V_i/G_i) = (G_i/Z_i) \times (1 + Z_i/G_i), \tag{3}$$

If the value of the quantitative component of the performance indicator increases as net income grows, then the value of the qualitative component increases, as its volume decreases. This is quite natural in terms of the mathematically existing contradiction. The extended index form of the performance indicator has the following expression (Eq. 4) (Shapochka 2014):

$$J_{E_i} = J_{V_i/Z_i} = J_{V_i}/J_{Z_i} = J_{G_i/Z_i} \times J_{V_i/G_i} = J_{G_i/Z_i} \times J_{E_{1_i+Z_i/G_i}}, \tag{4}$$

where, $J_{E_i}, J_{V_i/Z_i}, J_{V_i}, J_{Z_i}, J_{G_i/Z_i}, J_{V_i/G_i}, J_{E_{1_i+Z_i/G_i}}$ – are the indices of change of indicators according to the basic level of the production cycle. It should be noted that self-financing is a qualitative functional criterion for the development of enterprises of agro-product subcomplex. It is characterized by the simultaneous focus of cash flows on attracting funds and leveling credit, as well as the absence of a cost mechanism during the mobilization of funds to increase financial independence, solvency and creditworthiness of enterprises. In this regard, efficiency, adequacy, in formativeness of methodological tools that form a universal model of self-financing of the production cycle and a cost platform of resource potential for growth of current economic activity of subjects of inter-economic relations are of great importance. To establish the priority of indicators of ensuring the effective process of functioning of enterprises, it is proposed to use an adaptive-renovation approach, which allows selecting from the system of indicators representative-effective indicators and factors of financial and resource load on the level of self-financing of the production cycle with a probability of 95% (Eq. 5) (Shapochka 2014; Tikhomirova and Matrosova 2016):

$$N \left(\frac{3}{p} + 0.5 \right)_{min}, \tag{5}$$

where, N_{min} – the minimum required number of factors of financial and resource load on the parameters of self-financing of the production cycle; p – a valid probable error accepted at the level 0.05 (5%). The parameters of the self-financing matrix of the production cycle have the form (Eq. 6) (Shapochka 2014; Tikhomirova and Matrosova 2016):

$$e_{ij} = \begin{vmatrix} - & e_{12} & e_{13} & e_{14} & \dots & e_{1j} \\ e_{21} & - & e_{23} & e_{24} & \dots & e_{2j} \\ e_{31} & e_{32} & - & e_{34} & \dots & e_{3j} \\ \dots & \dots & \dots & \dots & \dots & - & \dots \\ e_{i1} & e_{i2} & e_{i3} & e_{i4} & \dots & - & \dots \end{vmatrix}, \tag{6}$$

$$\begin{cases} 1, & \text{if } i - \text{th factor is included in the self - financing parameters of the } j \\ & \text{-th production cycle} \\ 0, & \text{if } i - \text{th factor is not included in the self - financing parameters of the } j \\ & \text{-th production cycle} \end{cases} \tag{7}$$

The level of self-financing of the j -th production cycle is determined by the formula (Eq. 8) (Shapochka 2014; Tikhomirova and Matrosova 2016):

$$S_f = \frac{\sum_{i=1}^m e_{ij}}{m}, \tag{8}$$

where, S_f – the level of self-financing of the j -th production cycle; e_{ij} – the volume of loading of the i -th factor than provides the conditions of self-financing of the resource potential in the j -th production cycle; m – the total number of factors that provide the parameters of the self-financing of the production cycle for the formation of the added consumption value of production resources. The self-financing ratio is measured in the range $[0.1]$. The higher the value of the coefficient, the higher the likelihood of using the net result to cover the costs that form the

added consumer value of production resources. Accordingly, there is a need to include the i -th parameter in the group's own provision of the production cycle in the current activities of the enterprises of the agro-product subcomplex. In Figure 1, the stages of estimation of conditionally qualitative parameters of financial and resource load, quantitative and effective indicators of self-financing of the production cycle and the integrated indicator of the effective functioning of enterprises of agro-product subcomplex are presented (Figure 2).

In order to build a model of efficient functioning of the agro-product subcomplex, it is proposed to introduce the criterion of 'optimal profit maximum', which meets the requirements of a clear economic interpretation of productive indicators, provides an increase in the value of cash flow to reduce the dependence of the entities of intergovernmental relations on the slowdown of the scale of production (Eq. 9):

$$X_i = \sum_{q=1}^3 x_{iq}, \quad i=1, \dots, 4, \quad (9)$$

We denote x_{iq} – the amount of primary cash flow to purchase raw materials of the q -th category, for the i -th variant of the production cycle, and $x_{iq} \geq 0, \quad i=1, \dots, 4, \quad q=1, 2$ (for the first and second categories), $x_{13} = 0, \quad x_{23} = 0, \quad x_{33} \geq 0, \quad x_{43} \geq 0$ (for non-standard category). Let R_q characterize the stock of production resources as the primary raw material of the q -th category, $q=1, \dots, 3$. Then, the restriction on the flow of money on their spending describes the inequalities (Eq. 10) (Shapochka 2014):

$$\sum_{i=1}^4 x_{iq} \leq R_q, \quad q=1, \dots, 3, \quad (10)$$

The economic requirement for the total amount of cash flow (S) spent on production is given in the form (Eq. 11) (Shapochka 2014):

$$\sum_{i=1}^4 e_i X_i \leq S, \quad (11)$$

where, e_i – the rate of total costs of primary raw materials in the structure of inventories in the i -th version of the production cycle. It should be noted that the production cycle has some limitations regarding the availability of manpower (b_1) and equipment (b_2). If a_{ij} – the rate of cash flow refers to the j -th production resource in the i -th version of the production cycle, then we get the ratio (Eq. 12) (Shapochka 2014):

$$\sum_{i=1}^4 a_{ij} X_i \leq b_j, \quad j=1, 2. \quad (12)$$

If we denote by u_{iq} the rhythmic coefficient of spending money for the production of k -type products in the i -th variant of the production cycle, then the total amount of cash flow outflow for the manufacture of products of the k -type of the i -th category will be (Eq. 13) (Shapochka 2014):

$$Y_{kd} = \sum_{i=1}^4 u_{ki} \times x_{iq}, \quad k=1, \dots, 15, \quad q=1, \dots, 3. \quad (13)$$

The total volume of cash flow for the production of k -type products will be (Eq. 14) (Tikhomirova and Matrosova 2016):

$$Y_k = \sum_{q=1}^3 Y_{kd}, \quad k=1, \dots, 15, \quad (14)$$

and should be consistent with the added consumer value of the finished product and guarantee coverage of the financial and resource load in the total financing of the production cycle at the expense of own funds, and the demand for production S_k products – a quality supply of consumer needs, that is (Eq. 15) (Shapochka 2014):

$$Y_k \geq S_k, \quad k=1, \dots, 15, \quad (15)$$

Provided that the profit of production activity will be determined as the difference between the net income from the sale of manufactured goods (B) and the costs (C), then the indicator p_k will correspond to the base value (price) for k -type products, $k=1, \dots, 15$. Accordingly, the price correction factor depending on the category q will correspond to $w_q, \quad q=1, \dots, 3$ (Shapochka 2014). In accordance (Eq. 16):

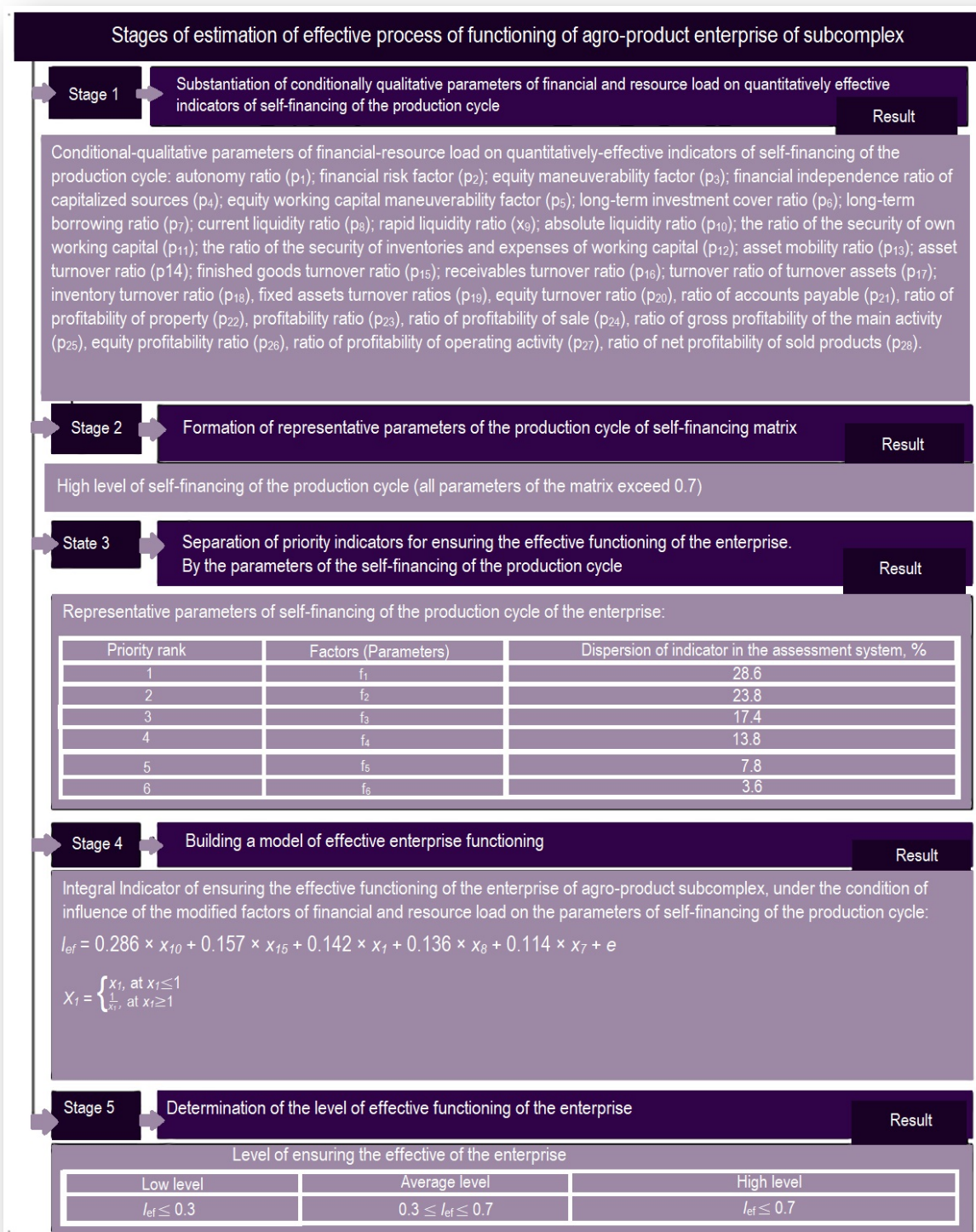
$$B = \sum_{k=1}^{15} p_k \sum_{q=1}^3 w_q Y_{kq}, \quad (16)$$

The costs which depends on the cost of the resources used and the raw materials used, will look like (Eq. 17) (Shapochka 2014):

$$C = \sum_{q=1}^3 c_q \sum_{i=1}^4 x_{iq} + \sum_{j=1}^2 d_j \sum_{i=1}^4 a_{ij} X_i, \tag{17}$$

where, c_q – the cost of the raw material of the q -th category, $q=1, \dots, 3$; d_j – the cost of one unit of the j -th production resource, $j=1, 2$. The model obtained requires the search for unknown $x_{iq} \geq 0, i=1, \dots, 4, q=1, 2, x_{13} = 0, x_{23} = 0, x_{33} \geq 0, x_{43} \geq 0$, that satisfy the constraints (Eq. 18) (Shapochka 2014):

Figure 2. A Methodological Approach to Ensuring an Efficient Process of Functioning of Enterprises of Agro-Product Subcomplex



Source: Authors' own research and calculations.

$$\begin{cases} \sum_{i=1}^4 x_{iq} \leq R_q, & q = 1, \dots, 3 \\ X_i = \sum_{q=1}^3 x_{iq}, & i = 1, \dots, 4 \\ \sum_{i=1}^4 e_i X_i \leq S \\ \sum_{i=1}^4 a_{ij} X_i \leq b_j, & j = 1, 2 \\ Y_k = \sum_{q=1}^3 Y_{kq}, & k = 1, \dots, 15 \\ Y_k \geq S_k, & k = 1, \dots, 15 \end{cases} \quad (18)$$

and optimize the performance criterion for maximum revenue (Eq. 19) (Shapochka 2014):

$$\Pi = \sum_{k=1}^{15} p_k \sum_{q=1}^3 w_q Y_{kq} - (\sum_{q=1}^3 c_q \sum_{i=1}^4 x_{iq} + \sum_{j=1}^2 d_j \sum_{i=1}^4 a_{ij} X_i) \rightarrow \max \quad (19)$$

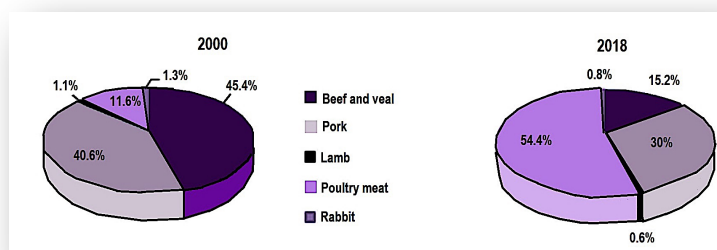
The integral indicator of the effective functioning of the enterprise on the criterion of ‘optimal maximum profit’ meets the economic requirements for quantitative homogeneity of alternative business projects, which can be mutually exclusive in the absence of a positive assessment of their quality realization and lack of funds (Bath 2012; Mamotenko 2008). We should note that the homogeneity of performance indicators for alternative business projects for enterprises of agro-product subcomplex are based on appropriate conditions, which provide that the cash proceeds will be reinvested at the rate *IRR*, and *NPV* and *PI* – at operating costs of the production process. Accordingly, conflicts may arise between *NPV*, *IRR* and *PI* due to the discrepancy in the time of cash inflows generated as a result of the implementation of business projects and the amount of cash outflows required to realize the business projects (Basil 2004; Orlyk 2005).

It should be understood that the assessment of the effective functionality of business projects in the calculation *NPV*, without taking into account the financial and resource load on the parameters of the self-financing of the production cycle meets the criteria of valuation of the enterprise, and, conversely, – taking into account the financial and resource load, meets the criteria of the evaluation of the cost of capital (Xudolej and Paryczka 2015). This condition requires adequate clarity in the synchronization of cash flows and the choice of discount rate. Meanwhile, the integrated indicator of business project effectiveness is dependent on the basic principles of the cost concept of the production process and the optimum-maximum effect of functionality of the entities of inter-economic relations, as well as the sectoral or regional peculiarities of development of enterprises of agro-product subcomplex.

2. Results and Discussion

The effective functioning of the enterprises of the agro-product subcomplex of Ukraine depends on the interaction of production processes, distribution and exchange of products. In turn, the rational course of these processes depends on the accumulation of capital in the sphere of circulation, the monopolization of the structural components of the market and the increase in the level of national agricultural production. From the standpoint of ensuring the self-financing of the production cycle, the qualitative component of the effective functioning of the agricultural market enterprises depends not only on the guarantee of increasing the volume of profit, but also on the ability of the entities of inter-economic relations to accumulate trade capital (capital as a resource, which takes the form of trade capital when it provides movement of the product from producer to consumer of products) into the sphere of production. The integration of industries with a continuous cycle has specified functional changes in their performance. Thus, in 2008, more than 50% of the structure of the agro-product subcomplex was formed by poultry production, 1/3– of the pig industry (Figure 3).

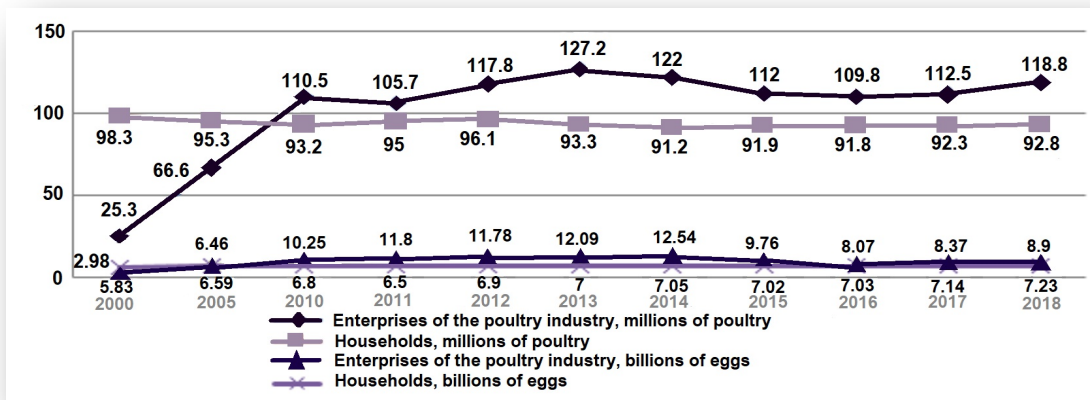
Figure 3. The Structure of Meat Production in Ukraine



Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018).

It should be noted that in 2000 beef and veal production accounted for a stable share of 45.4%, but in 2018 there was a dynamic reduction of this segment of the market almost three times. In addition, during the period 2008-2018, the share of pork production decreased from 40.6% to 30% respectively. At the same time, the proportion of poultry of all species increased from 11.6% to 53.4%. The rapid return on investment in poultry production is driven by the creation of powerful vertically-integrated enterprises that provide rapid rates of expanded reproduction of the production process and guarantee increased consumer demand for products. The largest share of poultry production in 2018 was in vertically integrated enterprises – 56.2%, in households it was 43.8%. In 2000, the distribution of livestock was in the opposite direction: the share of poultry agro-complexes was – 20.5%, households – 79.5%, in which the number of livestock reached 98.3 million heads (Figure 4).

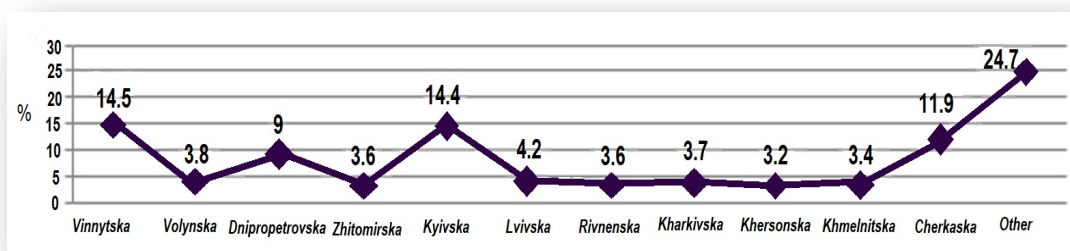
Figure 4. Dynamics of Poultry Production and Egg Production by Enterprises of Agro-Product Subcomplex of Ukraine



Source: calculated by the authors according to data (Animals in Ukraine... 2019; Statistical publication... 2018)

The use of high-performance and resource-saving technologies, optimized poultry feeding ratios, as well as modern zoo-veterinary measures allow Ukrainian agro-complexes to obtain high egg production. In the period 2000-2018, the total egg production in Ukraine has almost doubled and in 2018 amounted to 16.13 billion units. But it should be noted that the number of enterprises engaged in egg production is decreasing every year. This tendency is mainly due to the entities of inter-economic relations with the production volume up to 500 thousand pieces for a year. At the same time, the share of poultry agro-industry enterprises engaged in egg production increased from 33.8% to 55.1% during the study period. The positive trend was reflected in the increase in consumer demand for this product per person in the country, by an average of 2.2times (from 179 to 394eggs).The leaders in poultry breeding, where 50% of the retained livestock of all species are concentrated, are Vinnytska (29.6 million heads), Kyivska (29.5 million heads), Cherkaska (24.3 million heads) and Dnipropetrovska (18.5 million heads) regions (Figure 5).

Figure 5. Distribution of Poultry Breeding by Region of Ukraine in 2018, %

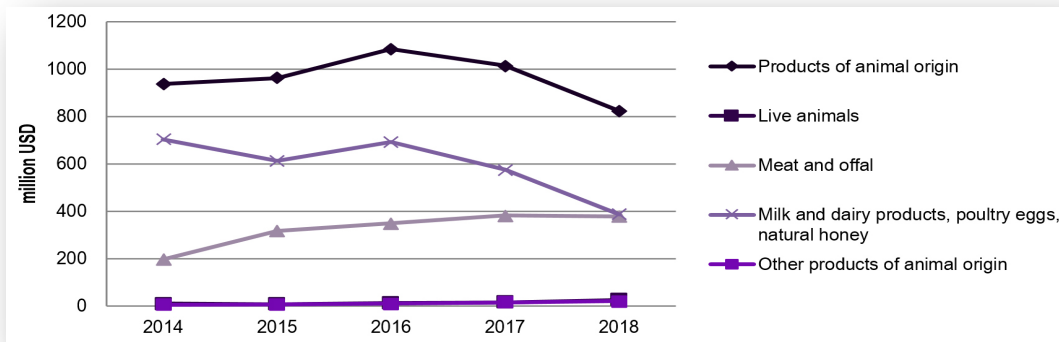


Source: Calculated by the authors according to data (Animals in Ukraine... 2019; Statistical publication... 2018).

The poultry sub-complex in the poultry industry is engaged in foreign economic activity, which by 2018 is among the eight largest exporters of chicken meat to EU countries. At the same time, there is a growing demand

for Ukrainian cattle in the Middle East and North Africa. However, the quotas granted by the European Union for the export of pork, beef, lamb and dairy products in Ukraine are not fully used (Figure 6).

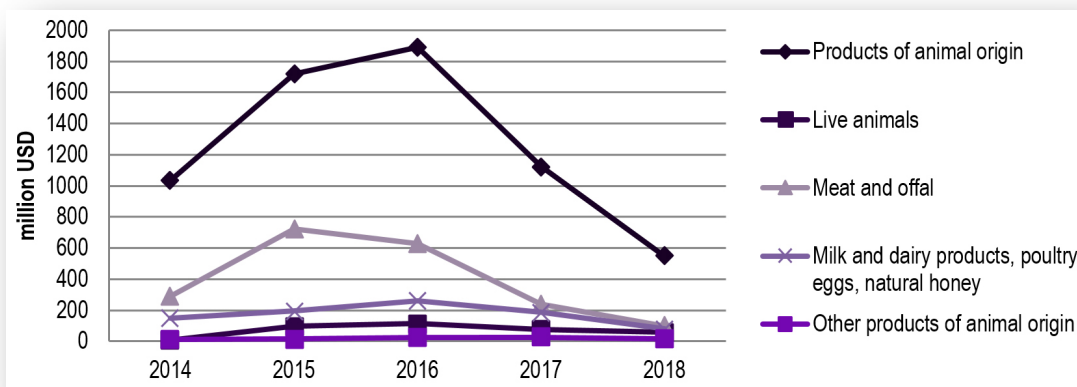
Figure 6. Dynamics of Export of Products by Enterprises of Agricultural Subcomplex of Ukraine, Million USD



Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018)

The relative volume of exports of Ukrainian livestock products in 2018 amounted to 2.2% of the total export structure of the country, which compared to the level of 2014 had a slight dynamic upward trend of 0.8%. However, the export value of the industry relative to 2014 decreased by 12.1% or on 113.2 million USD. Imports of livestock products in 2018 amounted to 548.2 million USD or 1.5% of the total imports into Ukraine, which is 0.2% more than in 2014 (Figure 7).

Figure 7. Dynamics of import of products by enterprises of the agro-product subcomplex of Ukraine, million USD



Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018).

It should be noted that in 2018, compared to 2014, the largest decline occurred in the import of meat and by-products due to the increase in production and consumption of the domestic product, mainly chicken meat. Over the past five years, total imports of meat and offal have decreased by 66% (or 192.8 million USD); imports of milk and dairy products, poultry eggs and natural honey decreased by 70.6 million USD, (or 46.9%); imports of live animals decreased by 16.9million USD (or 22.1%); imports of other animal products increased by 69.7%.The distribution of costs and revenues in the chain ‘production-processing-sales’ of the main products of the enterprises of the agro-product subcomplex of Ukraine is shown in Table 3, which demonstrates a breach of the principle of equivalence of equal benefit in inter-economic relations between the participants of the said chain.

Table 3. Distribution of Costs and Revenues in the Chain 'Production-Processing-Sales' of the Main Types of Products of Enterprises of Agro-Product Subcomplex of Ukraine in 2018, USD / ton

Indicators	Beef	Pork	Poultry meat
Costs	978.3	933.3	783.2
Profit (+), loss (-)	-182.9	-36.8	27.6
Purchase price (in slaughter weight)	795.3	896.5	810.8
Profitability level (purchase), %	-23.0	-4.1	3.4
Share of value added in the structure of retail price, %	30.9	35.5	52.1
Costs (excluding cost of raw materials)	811.6	698.6	259.4
Total Cost (recycling)	1606.9	1595.1	1070.2
Profit (+), loss (-)	274.1	189.8	149.5
Wholesale and selling price	1881.1	1784.9	1219.7
Profitability level (recycling), %	17.1	11.9	14.0
The share of value added of processors in the structure of retail price (processing), %	42.2	35.2	26.3
Costs (excluding the wholesale selling price)	487.4	483.1	172.3
Costs (including the wholesale selling price)	2368.5	2267.9	1391.9
Profit (+), loss (-)	205.9	255.2	164.0
Retail price	2574.4	2523.2	1555.9
Profitability level (realization), %	8.7	11.3	11.8
The share of value added of processors in the structure of retail price (sales), %	26.9	29.3	21.6

Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018).

The restraining factors of the functioning of the agro-product subcomplex in the country are: deterioration of the material and resource base, lack of cattle for meat, its low efficiency, and therefore producers have lost interest in this development, limiting the possibilities of using the latest resources technologies. These factors have influenced the level of competitiveness of products in the domestic and world markets, including both in terms of consumption of natural and production resources, as well as in terms of quality of products and prices for it. The industry needs advanced equipment for primary processing and processing of raw materials, packaging and packaging equipment, refrigeration equipment, etc. This requires the development of systematic, integrated measures and strategies aimed at improving the situation in the industry.

To identify the factors of financial and resource load on the parameters of the self-financing of the production cycle, we will group the entities of inter-economic relations by the level of production cost and profitability of sold products of the poultry industry, which provide an effective process of functioning of enterprises of agro-product subcomplex in regions (Tables 4-5). The calculations showed that on average, about 31 poultry agro-complexes are operating in one region. Among them, 14 entities are unprofitable, due to the disproportion between the production cost per 1 centner of chicken meat (\$ 120.2) and the selling price of this type of production (\$107.09/1centner). At the same time, the structure of resource costs for the feed base occupies on average 75.6%, wages - 4.4%, petroleum products - 1.5% of the total production costs (Table 4). In addition, more than 29% of poultry agro-enterprises from the aggregate, which produce 5.4% of total chicken meat, do not ensure the efficiency of the production cycle (Table 5). The reasons for the loss of production process are the low level of poultry productivity (the average weight of 1 chicken was 1.4 kg), with rather high production costs, in which resource requirements for feed occupy an average of 66.0%, wages - 7.5%, petroleum products - 2.6%. At the same time, 71% of enterprises (group II-IV) are profitable at the level of 11.7% to 57.2%. Thus, enterprises that had a level of profitability of production of more than 50% (group IV) provided the lowest level of production costs by 1 bird.

Table 4. Grouping of Enterprises of Poultry Agro-Complex on Average in the Region of Ukraine by the Level of Production Cost of Chicken Meat, 2018

Indicators	Groups of enterprises by the level of production cost of 1centner poultry products, USD				Total
	under 2000	2000-2500	2500-3000	more 3000	
Number of enterprises	4	7	6	14	31
Poultry, thousand heads	7333.2	1209.4	3787.3	220.3	12550.2
The number of poultry per enterprise, thousand heads	1566.1	172.8	631.2	15.7	404.8
Average weight of 1 bird, kg	1.5	1.8	1.8	2.3	1.6
Annual production of cultivation by 1bird, kg	15.3	8.0	18.9	2.4	16.4
Production cost of 1 bird, USD	7.11	8.31	8.42	10.11	8.16
Production cost of 1c of meat, USD	69.87	83.06	95.88	120.2	80.46
The total cost of 1c of meat, USD	78.73	90.32	103.86	123.72	88.83
Cost of selling 1c of meat, USD	94.05	81.08	111.58	107.09	98.78
Profit (loss) total, million USD	15.58	-2.00	5.31	-0.08	19.42
The level of profitability (loss level), %	19.5	-10.6	7.4	-13.4	11.1

Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018).

Table 5. Grouping of Enterprises of Poultry Agro-Complex on Average in the Region of Ukraine by the Level of Profitability of Sold Products, 2018

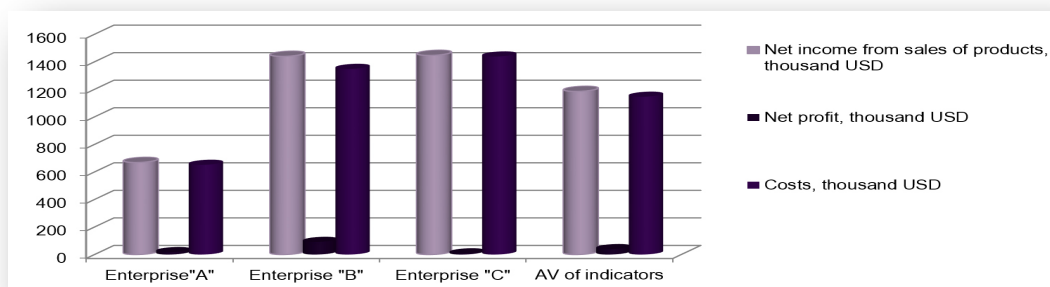
Indicators	Groups of enterprises by the level of profitability of poultry products sold, %				Total
	unprofitable	0-25	25-50	more 50	
Number of enterprises	9	13	6	3	31
Poultry, thousand heads	794.6	6962.7	2655.4	2137.5	12550.2
The number of poultry per enterprise, thousand heads	88.3	535.6	442.6	712.5	404.8
Average weight of 1 bird, kg	1.4	1.5	1.7	1.9	1.7
Production cost of 1c of meat, USD	122.16	73.53	80.35	71.34	75.15
Production cost of 1 bird, USD:	12.25	7.53	8.33	7.02	7.91
including: feed	8.14	4.96	5.35	4.30	5.13
petroleum products	0.33	0.18	0.17	0.14	0.18
payment for services	0.50	0.32	0.37	0.40	0.35
other material costs	1.15	0.96	1.20	0.67	0.98
direct labor costs	0.92	0.41	0.27	0.22	0.33
amortization of fixed assets	0.55	0.44	0.39	0.57	0.46
contributions to social events	0.34	0.10	0.11	0.08	0.11
other direct and overhead costs	0.34	0.18	0.49	0.65	0.34
The total cost of 1c of meat, USD	127.73	75.68	86.30	74.54	80.99

Indicators	Groups of enterprises by the level of profitability of poultry products sold, %				Total
	unprofitable	0-25	25-50	more 50	
Cost of selling 1c of meat, USD	109.24	84.58	108.86	117.15	97.64
Profit (loss) total, million USD	-2.06	9.15	10.45	11.63	31.88
Profitability level (loss level), %	-14.5	11.7	26.1	57.2	19.9

Source: Calculated by the authors according to data (Animals in Ukraine 2019; Statistical publication 2018).

It should be noted that the introduction of rational functionality of production processes at these enterprises positively affected their performance. Thus, in the structure of expenditures of the subjects of inter-economic relations of the poultry industry, which had a level of profitability of more than 50% (group IV), oil products occupy only 1.9% against 2.6% of enterprises of group I. At the same time, in the 1st group of entities, the cost of remuneration was 7.5%, and in the enterprises of the 4th group – 3.1%. The need to simulate the economic growth rate of poultry agro-enterprises, which have a profitability of more than 50% due to the innovation and investment orientation of their development, financing which is mainly carried out at the expense of own funds (net profit, depreciation, funds from the sale of fixed assets, excess current assets). Figure 8 presents the performance indicators of these enterprises for the period 2016 – 2018, as well as their average value (AV), which is calculated as the arithmetic mean of the performance indicators.

Figure 8. Production Activity of the Enterprises of Poultry Agro-Complex of 2016-2018 on the Level of Profitability Over 50% on Average per a Region of Ukraine, Thousand USD



Source: Calculated by the authors.

According to the SEE analysis (Yarmolenko and Buryennikova 2014) the components of ensuring a net profit are identified (Table 6).

Table 6. Components of Ensuring the net Profit of Poultry Enterprises of Agro-Complex at the Level of Profitability Over 50%, on Average per a Region of Ukraine, 2016-2018

Objects	Providing a common process		Providing a costs process		Providing a sheer process	
	V	J_V	Z	J_Z	G	J_G
AV of indicators	1185.1	1	1145.9	1	39.2	1
Enterprise 'A'	668.9	0.5644	651.4	0.5685	17.5	0.4464
Enterprise 'B'	1439.8	1.2149	1348.1	1.1765	91.7	2.3393
Enterprise 'C'	1446.7	1.2207	1438.2	1.2551	8.5	0.2168
Objects	Qualitative component of providing a large-scale process		Providing a large-scale cost process		Providing an effective process	
	$1+Z/V$	$J_{1+Z/V}$	K	J_K	E	J_E
AV of indicators	1.9669	1	5.1303	1	1.0342	1
Enterprise 'A'	1.9739	1.0036	17.4999	0.4448	1.0269	0.5684

Objects	Providing a common process		Providing a costs process		Providing a sheer process	
	V	J _V	Z	J _Z	G	J _G
Enterprise 'B'	1.9363	0.9844	91.6999	2.3764	1.0680	1.1763
Enterprise 'C'	1.9941	1.0138	8.4999	0.2198	1.0059	1.2550
Objects	Quantitative component of an effective process		Qualitative component of an effective process		Process efficiency	
	J _{G/E}		J _{V/G}		R	J _R
AV of indicators	1		1		4.9606	1
Enterprise 'A'	0.4496		1.2643		17.0415	0.2528
Enterprise 'B'	2.2652		0.5193		85.8613	2.7954
Enterprise 'C'	0.2229		5.6305		8.4500	0.2758

Note: Cost indicators are presented on average per year per employee in 2018 prices, in thousands of USD; V – indicator of net income from sales of products; G – net profit indicator; Z = (V – G) – a cost indicator. Indices – in coefficients as the ratio of enterprise AV of indicators of these enterprises ($J_K = J_G \times J_{1+Z/V}$, $J_E = J_{G/Z} \times J_{V/G}$, $J_R = J_K \times J_E$)

Source: calculated by the authors according to data (Yarmolenko and Buryennikova 2014).

The growth rates of the indices of these components for poultry agro-complex enterprises, which have a profitability of more than 50%, are identified by the scale indicators – K, efficiency – E, performance – R (Table 7). The elements of SEE analysis are its F-impulses (factors) that influence the process of ensuring net profit ($F = V, Z, G, 1 + Z/V, K, E, G/Z, V/G, R$).

The calculations made it possible to systematize the factors of financial and resource load of the production cycle of the studied sample of enterprises of poultry agro-complex on the average in one region of Ukraine (31 objects). We will use the method of principal components of multivariate analysis to determine a representative set of indicators of an effective process of functioning of the entities of the industry, which must exceed the values [1.0] (Boush *et al.* 2012; Halafyan 2010). In view of this, 6 factors were used to describe the quantitatively effective indicators of self-financing of the production cycle, the composition of which was determined according to the conditional-qualitative parameters of financial and resource load exceeding the level of value [0.7] (Table 8). It should be noted that the main source of self-financing at the enterprises of poultry agro-complex is profit, which is reinvested through the parameters of the following factors: availability of own funds (26.3% of the variance), effective distribution of sources of financing (23.8%), profit activity of the entity (17.4%), efficient use of capital (13.8%), liquidity (7.8%) and maneuverability of own funds (3.6%).

Table 7. Matrix of Growth Rates of Indices of Ensuring Net Profit of Poultry Agro-Complex Enterprises by the Level of Profitability More than 50% on Average per a Region of Ukraine, 2016 – 2018

Objects	$J_R = J_G \times J_{1+Z/V} = J_G \times J_{1+Z/V} \times J_{G/Z} \times J_{1+Z/G}; J_{G/Z} = J_G/J_Z; J_{V/G} = J_V/J_G$ $J_R = J_K \times J_E; J_K = J_G \times J_{1+Z/V}; J_E = J_{G/Z} \times J_{V/G}$									
	ΔJ_R	ΔJ_K	ΔJ_E	ΔJ_G	$\Delta J_{1+Z/V}$	$\Delta J_{G/Z}$	$\Delta J_{V/G}$	ΔJ_V	ΔJ_Z	
	-74.7	-55.5	-43.2	-55.4	0.4	-55.04	26.4	-57.95	-43.2	
Enterprise 'A'	Impact of F-impulses on the process of ensuring net profit									
	negative	negative	negative	negative	positive	negative	positive	negative	negative	
	179.5	137.6	17.6	33.9	-1.6	126.5	-48.1	21.5	17.7	
Enterprise 'B'	Impact of F-impulses on the process of ensuring net profit									
	positive	positive	positive	positive	negative	positive	negative	positive	positive	
	-72.4	-78.02	25.5	-78.3	1.4	-77.7	463.1	22.1	25.5	
Enterprise 'C'	Impact of F-impulses on the process of ensuring net profit									
	negative	negative	positive	negative	positive	negative	positive	positive	positive	

Note: Growth rates are in percentages (indices of components of ensuring the net profit of enterprises 'A', 'B', 'C' in comparison with the AV of indicators).

Source: Calculated by the authors according to data (Yarmolenko and Buryennikova 2014).

Table 8. Systematization of Conditionally Qualitative Parameters of Financial and Resource Load on Quantitatively Effective Indicators of Self-Financing of the Production Cycle of Enterprises of Poultry Agro-Complex on Average in One Region of Ukraine

Factors (Parameters)	Parameters of financial and resource load	Dispersion of indicator in the assessment system, %
Factor 1. 'Securing own funds'		
Autonomy ratio (p_1)	0.92	28.6
Financial risk factor (p_2)	-0.78	
Financial independence ratio of capitalized sources (p_4)	0.85	
Long-term investment cover ratio (p_6)	-0.77	
Long-term borrowing ratio (p_7)	-0.73	
The ratio of the security of own working capital (p_{11})	0.92	
The ratio of the security of inventories and expenses of working capital (p_{12})	0.84	
Factor 2. 'Efficiency of allocation of funding sources'		
Asset mobility ratio (p_{13})	0.74	23.8
Asset turnover ratio (p_{14})	0.89	
Finished goods turnover ratio (p_{15})	0.82	
Receivables turnover ratio (p_{16})	0.88	
Turnover ratio of turnover assets (p_{17})	0.93	
Inventory turnover ratio (p_{18})	0.95	
Fixed assets turnover ratios (p_{19})	0.87	
Factor 3. 'Profitability of the enterprise activity'		
Ratio of profitability of property (p_{22})	0.93	17.4
Ratio of profitability of sale (p_{24})	0.86	
Ratio of gross profitability of the main activity (p_{25})	0.81	
Ratio of profitability of operating activity (p_{27})	0.80	
Ratio of net profitability of sold products (p_{28})	0.88	
Factor 4. 'Capital usage efficiency'		
Equity turnover ratio (p_{20})	0.79	13.8
Equity profitability ratio (p_{26})	0.98	
Profitability ratio (p_{23})	0.87	
Ratio of accounts payable (p_{21})	0.78	
Factor 5. 'Liquidity of an enterprise'		
Current liquidity ratio (p_8)	0.87	7.8
Rapid liquidity ratio (p_9)	0.84	

Factors (Parameters)	Parameters of financial and resource load	Dispersion of indicator in the assessment system, %
Absolute liquidity ratio (p ₁₀)	0.95	3.6
Factor 6. 'Own funds maneuverability'		
Equity maneuverability factor (p ₃)	0.87	
Equity working capital maneuverability factor (p ₅)	0.93	

Source: Authors' own calculations.

In order to ensure uniformity of the sample to avoid leveling the reliability of the results of enterprise clustering, the values of the indicators are checked according to the Dickson criterion, according to which the maximum (Equation 20) and minimum (Equation 21) values are calculated, after which they are compared with the table values (Ma *et al.* 2019; Radkevich 2006). To ensure sampling uniformity, the tabular value of the criterion must exceed the calculated one (Eqs. 20-21):

$$r_{ij} = \frac{x_n - x_{n-i}}{x_n - x_{j+1}}, \tag{20}$$

$$r_{ij} = \frac{x_{1+i} - x_1}{x_{n-j} - x_1}, \tag{21}$$

where, $x_1, x_n, x_{n-i}, x_{j+1}, x_{1+i}, x_{n-j}$ – members of the variation series $x_1 \leq x_2 \leq x_3 \dots \leq x_i \dots \leq x_n$. The range of values of self-financing indicators of the production cycle are presented in Table 9. The maximum set error for enterprise clustering by self-financing indicators is 0.038 with 100% recognition. This means that it is 100% probable that the results obtained are relevant and adequate.

Table 9. Parameters of Financial and Resource Load on Indicators of Self-Financing of the Production Cycle of Enterprises of Poultry Agro-Complex on Average in One Region of Ukraine

Indicators	Self-financing level			
	Critical	Low	Average	High
Autonomy ratio (p ₁)	(-∞; 0.30]	(0.30; 0.42]	(0.42; 0.73]	(0.73; 1]
Asset turnover ratio (p ₂)	[0; 0.50]	(0.50; 1.23]	(1.23; 1.87]	(1.87; +∞)
Profitability ratio (p ₃)	(-∞; -0.01]	(-0.01; 0.08]	(0.08; 0.29]	(0.29; +∞)
Equity profitability ratio (p ₄)	(-∞; -0.31]	(-0.31; 0.29]	(0.29; 1.09]	(1.09; +∞)
Absolute liquidity ratio (p ₅)	[0; 0.09]	(0.09; 0.13]	(0.13; 0.34]	(0.34; +∞)
Equity turnover ratio (p ₆)	(-∞; -1.83]	(-1.83; 0.12]	(0.12; 0.69]	(0.69; +∞)

Source: Authors' own calculations.

The self-financing of poultry agro-enterprises is largely determined by the extent to which different types of cash flows are synchronized in volume and in time. The high level of such synchronization ensures the financial equilibrium of enterprises in the process of their investment development. This is facilitated by the reduction in the duration of production and financial cycles that is achieved in the process of effective use of cash flows, as well as in the reduction of capital requirements that serve the economic activity of enterprises. Accelerating capital flows through the efficient use of cash flow, the company provides growth in the amount of time generated profit, which allows the implementation of alternative business projects in the poultry industry.

In order to evaluate the effectiveness of the implementation of alternative business projects for egg production by poultry agro-complex enterprises and to substantiate options for resolving conflicts between them, the dependence on the discount rate is determined. In such calculations, opposite estimates of individual business projects are possible (Alikaeva and Shovgenov 2002; Peresada *et al.* 2003; Stehnei *et al.* 2017). We evaluate the

effectiveness of the implementation of an alternative business project for the production of eggs for poultry agro-enterprises (Table 10). We calculate the net present value NPV (Eq. 22):

$$NPV = \frac{1366.86}{1.20} + \frac{1612.74}{1.44} + \frac{1601.19}{1.73} + \frac{1663.66}{2.07} + \frac{1688.97}{2.49} - \frac{85.8}{1.0} = 4583.75 \text{ m ln. USD} \quad (22)$$

The profitability index (Eq. 23):

$$PI = \sum_{t=1}^n \frac{D_t - O_t}{(1+d)^t} : \sum_{t=1}^n \frac{K_t}{(1+d)^t} = \frac{4666.55}{85.8} = 54.39. \quad (23)$$

Including in the income net sales revenue and depreciation, and in the cost – income tax we calculate the coefficient of income (expenses) (BCR), which is – 1.50 (Eq. 24):

$$BCR = \sum_{t=1}^n \frac{D_t}{(1+d)^t} : \sum_{t=1}^n \frac{C_t}{(1+d)^t} = \left[\frac{5204.97 + 114.8}{1.2} + \frac{5618.52 + 114.8}{1.44} + \frac{5618.52 + 114.8}{1.73} + \frac{5618.52 + 114.8}{2.07} + \frac{5618.52 + 114.8}{2.49} \right] : \left[\frac{85.8}{1.0} + \frac{3678.06}{1.2} + \frac{3791.76}{1.44} + \frac{3760.52}{1.73} + \frac{3729.66}{2.07} + \frac{3698.8}{2.49} \right] = 16800.9 : 11241.95 = 1.50 \quad (24)$$

Table 10. Change NPV of an Investment Business Project for Egg Production for the Enterprises of Poultry Agro-Complex, when Cash Flow Discount Rate Changes, Million USD

Indicators	Year of implementation of the investment business project					
	0	1	2	3	4	5
Investment loan	82.8					
Interest (discount) rate, %	20	20	20	20	20	20
Sales volume of eggs, mln.		47200	50950	50950	50950	50950
Sales price of 1 thousand eggs (excluding VAT)		110.28	110.28	110.28	110.28	110.28
Net sales revenue		5204.97	5618.52	5618.52	5618.52	5618.52
Variable cost - total		3027.55	3120.14	3120.14	3120.14	3120.14
Fixed costs		650.51	671.63	640.39	609.53	578.66
including: depreciation		114.80	114.80	114.80	114.80	114.80
interest on the loan		16.56	13.25	9.94	6.63	3.32
Total expenses, mln.		3678.06	3791.76	3760.52	3728.53	3698.80
Profit before tax		1526.91	1826.76	1858.0	1888.86	1919.73
Income tax, %		18	18	18	18	18
Income tax		274.85	328.82	371.60	340.0	345.56
Net profit		1252.06	1497.95	150.31	1548.87	1574.17
Net cash flow	-85.8	1366.86	1612.74	1601.19	1663.66	1688.97

Source: Authors' own calculations.

Internal rate of return (IRR), for convenience, is summarized in Table 11.

$$IRR = 20 + \frac{4583.75}{4583.75} = 21\% \quad (25)$$

The payback period of an investment business project (PBP) is calculated in such a way as to gradually balance the amount of real investment and discounted net cash flows for the period from the beginning of the project implementation:

$$PBP = 85.8 - \frac{1366.86}{1,20 \times 12} \approx 0 \quad (26)$$

Table 11. Internal Rate of Return (IRR) of an Investment Business Project for Egg Production of Poultry Agro-Enterprises

Year	Net cash flow, million USD	$(1 + d)^t$ at a discount rate			Discounted cash flow at a discount rate, million USD		
		50%	60%	63%	50%	60%	63%
0	-85.8	1.0	1.0	1.0	-85.8	-85.8	-85.8
1	1366.86	1.50	1.60	1.63	2050.29	2186.97	2227.98
2	1612.74	2.250	2.56	2.66	3628.65	4128.60	4289.87
3	1601.19	3.375	4.096	4.33	5404.02	6558.48	6933.16
4	1663.66	5.063	6.554	7.06	8423.09	10903.59	11745.40
5	1688.97	7.594	10.486	11.5	12825.98	17710.45	19423.06
<i>NPV</i>	x	x	x	x	32249.21	41405.28	44536.66

Source: Authors' own calculations.

The expression $(1366.86 : 1.2 \times 12)$ is the average monthly discounted cash flow of the first year, so the payback period of real investment in poultry (egg) production will be 9 months. The investment business project is quite effective, with a positive value *NPV*, the latter exceeds the amount of real investment, the high level *PI* and *IRR* indicates that it is sufficiently protected from various risk factors, and the project will not enter the field of unprofitable production at a cost increase of at least 8%.

Conclusions

Thus, strategic directions of functioning and development of enterprises of agro-product subcomplex, based on the components of efficiency, and as a complex of concrete measures, and as a result of calculating the relevant indicators of efficiency, can ensure the realization of economic interests of entities of inter-economic relations in the market of agricultural products. Their effective functioning and development on an investment basis should be geared towards increasing economic returns and increasing economic growth.

These processes are interrelated, but the impact of economic development on economic returns should increase the economic interest in the agro-product subcomplex in the case of high economic and investment level of their functional components. That is why the correlation between the factors of financial and resource load and the parameters of self-financing of the production cycle of enterprises make the response of indicators of economic return to invested capital, which ensures the growth of economic growth. The optimum combination of all factors must ensure the optimum maximum of profits, which guarantees the most efficient use of resources and resilience against internal and external crises.

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