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Managing the Potential of Agro-Industrial Enterprises in the Consumer Market

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Abstract. The article implements aspects of managing the potential of agro-industrial enterprises in the consumer market. A comprehensive methodological approach to diagnosing the model of assessing the management of the potential of agro-industrial enterprises is proposed, which on the basis of the mathematical apparatus of fuzzy theories allows to optimize its level in the chain of aggregate components, reduce the pressure of factors to limit the competitive position of businesses in the consumer market. It is proved that economic diagnostics allows to reveal causal relations in managerial dysfunctions and to pass to the model of sustainable development of the enterprise and effective use of its potential. A group (integrated) system of economic system diagnostics is proposed, which combines the properties of traditional "rigid" models and algorithms that assess the state of management of agro-industrial enterprises and the reasons for their dysfunction in many uncontrolled flows of resources, with the probability of failure. It is substantiated that the main component in managing the potential of the enterprise is the availability of potential resources, the totality and interaction of which opens up promising opportunities to achieve management goals. The directions of estimating the value of the potential of the agro-industrial enterprise are determined. An expert assessment of the integrated factor coefficient of economic stability of the potential of agricultural holdings of the meat-processing unit of Ukraine has been carried out. The graph-analytical levels of type manifestations of the potential and the profile of its components at the enterprises of agro-industrial production of meat processing unit are determined. Standardized coefficients for rating of agricultural holdings of the meat-processing unit of Ukraine according to their potential have been calculated. The forecast level of indicators and the integrated coefficient of effective management of the potential of agro-industrial enterprises are established

Keywords: land and resource potential, land relations, rent, yield, cost price, income, profitability

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INTRODUCTION

The challenges of globalization, vertical integration, the pandemic, and the intensification of market competition are becoming more and more tangible for agro-industrial enterprises and put them in a difficult economic situation. Modern economic events and processes carried out in the agro-industrial complex are not within the generally accepted theories, so they need other approaches to the formation of new areas of economic growth with emphasis on improving management efficiency and meeting the needs of the consumer market. In this case, the activities of agro-industrial enterprises will be effective in the case of the correct formation of the composition and structure of their potential, which, in turn, is the object of management, which depends not only on the amount of resources involved but also on their efficiency and interaction. Management decisions cannot be limited to the narrow framework of current production problems, as the activities of enterprises should anticipate changes that occur in the external environment to influence the implementation of goals.

Any enterprise is focused on successful operation in the long run. This creates the need to identify the potential, the direction of its use, adaptation to ever-changing environmental conditions, ensuring overall management efficiency. It is the requirements of the external environment that determine the direction of managing the potential of agro-industrial enterprises as a dynamic system consisting of local potentials: raw materials, production, financial, labor, organizational and managerial, investment, information, infrastructure, marketing, economic potential and domestic and non-production reserves [1]. The main component in managing the potential of the enterprise is the availability of potential resources, the totality and interaction of which opens up promising opportunities to achieve management goals. The resource component is able to contribute in the end to the implementation of the mission chosen by the enterprise and meet the ever-changing needs of potential consumers.

The potential in various aspects and hierarchical levels was studied by O. Hlon, V. Dubovoi [2], O. Moroz, A. Matviichuk [3], S. Ramazanov, V. Pripoten [4], V. Rudashevskiy [5], V. Timofeeva, K. Bushuiev [6], A. Uskov, A. Kuzmin [7], who connected it with the welfare of the society and with the productive potential of the nation. The foundations of the theory of economic potential have been formed by I. Azhaman, O. Zhydkov [8], O. Fedonin, I. Riepina, O. Oleksiuk [9], N. Krasnokutska [10], N. Vashchenko [11]. The structure, relationships of the potential of the enterprise, its competitiveness and management system were studied by I. Simenko, M. Romaniuk [12], R. Grant [13], R. Makadok [14], E. Penrose [15], R. Amit, P.J. Shoemaker [16], A. Voronkova [17]. Paying tribute to previous scientific achievements, there is a need for a systematic study of the potential of agro-industrial enterprises in the context of identifying its structure and components, creating an intelligent system of automated management of business tools given the need to use potential reserves and their ability to provide resource structure of the potential in the consumer market. The priority of study is to diagnose the model of assessing the management potential of agro-industrial enterprises, which based on the mathematical apparatus of fuzzy theories allows to optimize its level in the chain of aggregate components, reduce the pressure of factors limiting the competitive position of businesses in the consumer market.

MATERIALS AND METHODS

The potential of agro-industrial enterprises has a high ability to adapt to changing environmental conditions, due to: 1) constant monitoring of changing needs and demand for goods and services, promotion and implementation of competitive ideas that best meet these needs and demand; 2) adaptation of the production apparatus to the most effective performance of its functions by the enterprise. The extreme complexity is the assessment of the degree of adaptability of the potential of the enterprise, as it is determined not only by internal but also external influences. First, such influence arises from the demand on the production of the enterprise. The variability of demand parameters is due to a set of reasons of economic, political, demographic and socio-cultural nature. The adaptability of the potential of the enterprise is also influenced by the situation in the markets of material resources, financial markets, labor markets, information and services [18; 19]. This means that, like any system, the potential of the enterprise has the ultimate ability to adapt to ever-changing production conditions and requires minimization of the negative consequences of changes that occur, as well as factors of "uncertainty of the future" [20]. This determines the need to diagnose capacity as an economic system (ES), which begins with the analysis, including the external and internal environment of competitors, suppliers, customers, human resources, financial, labor and technical resources of the enterprise.

Economic diagnostics allows identifying causal links in management dysfunction and moving to a model of sustainable development of the enterprise and the effective use of its potential. Diagnosis is considered as a reflective management technology, which in the early stages of crisis development is the methodological basis of the model that connects modern management and the dynamic economic reality of the enterprise [21]. Diagnosis allows to determine the state of the functioning of the control object (evaluation function); identify possible changes in the state of the object (diagnostic function) and anticipate possible measures to improve or restore the state of the control entity (search function) [22]. The objects of agro-industrial production belong to the class of complex economic systems (ES), which in the process of their purposeful or given functioning are in dynamics

and prone to both controlled and uncontrolled actions. That is, the state of ES of enterprises over time undergoes certain changes.

The group (integrated) system (GIS) of the diagnostics of (ES) is offered, combining properties of the traditional "rigid" models and algorithms which estimate a condition of management of potential of the enterprises of agro-industrial production and the reasons of disturbance of their functioning in set of uncontrolled streams of resources with the probability of not obtaining an effective result of their action. However, the lack of sufficient statistics to establish objective relationships between the values of probabilistic diagnoses determines the heuristic description of these relationships. In general, the model of the diagnostic object and information transmission channels can be represented as the following equations [23; 24]:

$$F(x,u,a,t)=0,\ y(t)=G(x,u,\xi_0,v,b,t) \quad (1)$$

where $x \in R^n$ – is the state vector; $u \in R^r$ – control vector; $y \in R^m$ – vector of output variables; *w, v* – vectors of perturbations and obstacles (included in equations (2-4) both additively and multiplicatively); *a, b* – vectors of indeterminate parameters, and $a(t)=0$, $b(t)=0$; *F, G* – some given operators (differential, both ordinary and with partial derivatives, integral, integro-differential, matrix and the like).

If the potential of the ES consists of *N* resources (elements) and each element is associated with other (*N*-1) elements (integral potential of the ES), then the maximum possible number of connections between resources (elements) will look like [23; 24]:

$$M_{max}=N(N-1) \quad (2)$$

If the number of actual connections (M_f) is less than the maximum possible (not every element is connected with all other elements), then the degree of integrity (I_{ntg}) of the ES potential will be determined by the formula (3) [23; 24]:

$$I_{ntg}=M_f/M_{max} \quad (3)$$

Should note, when $M_f=M_{max}$, $I_{ntg}=1$, i.e., ES is integral; when $M_f=0$, $I_{ntg}=0$ – the potential of the ES is isolated.

The degree of isolation (I_{isol}) of the potential can be determined by the formula (4) [23; 24]:

$$I_{isol}=1-I_{ntg} \quad (4)$$

In this case, if $I_{ntg}=1$, then $I_{isol}=0$; if $I_{ntg}=0$, then $I_{isol}=1$. Thus, the potential of the ES combines the properties of integrity and isolation ($I_{ntg} \le 1.0$; $I_{isol} \le 1$). The rational combination of the properties of integrity and isolation determines the possibilities of developing the potential of the ES through its modernization. Increasing the integrity of the ES potential contributes to its efficiency, but increases the complexity of the system, which, in turn, increases the need for resources needed to create and operate the system. The more isolated the system, the more flexible and less complex it is. However, increasing the degree of isolation, as a rule, reduces the effectiveness of the potential of the ES. All elements that demonstrate a high enough closeness of communication with each other and provide a certain functioning combination with other elements can be attributed to the components of the potential of the ES, and all other elements – to the elements of its external environment. It is not necessary to reduce the formation and development of the potential of the enterprise's ES only to the formation and development of its elements.

The combined functioning of heterogeneous interdependent components of the potential generates qualitatively new functional properties of the whole, which has no analogues in the properties of its components.

In particular, stochastic differential equations (linear or nonlinear, continuous or discrete), partial derivative equations can be used as model (1), for example, for cases of accounting for the territorial location of production facilities. Models for processing and identification that can be practically implemented have the following form [23; 24]:

$$\dot{x}(t)=A(t,\theta)x+B(t,\theta)u+W(t),\ y(t)=C(t,\theta) \quad (5)$$

or, in the discrete case:

$$y(k+1)=H(k)x(k)+V(k) \quad (6)$$

$$x(k+1)=\hat{O}(k+1,k,\theta)x+\psi(k+1,k)u(k)+W(k) \quad (7)$$

The control condition (scheme) of diagnosis is usually a relationship of the type [25]:

$$\mu(E(t)) \le \delta \quad (8)$$

where $\mu(\cdot)$ – some given metric, for example, the Euclidean norm; $u \in R^r$ – control vector; δ – the allowable threshold value that is set; $E(t)$ – non-viscous (deviation) or deviation from the norm, or assessment of the state from the standard, or assessment of parameters from the nominal, or characteristics of estimates from the possible (for example, covariance of renewal processes in the Kalman filter). For example:

$$E(t)=\hat{O}(y^F,q^{-1}y^F,\dots,q^{-k}y^F,u^F,q^{-1}u^F,\dots,q^{-k}u^F) \quad (9)$$

where *F* – operator; *k* – the order of the control scheme to be determined (or assigned). Then, provided there is no error (flaws) $E(t)=0, t=0,1,2,\dots$ and equation (8) will look like this: $\|E(t)\| \le \delta$. We note that the problem can be solved both in the case of deterministic and in conditions of stochastic and multiple uncertainty.

To increase the efficiency and quality of diagnosing the complex ES, which include agro-industrial enterprises, it is necessary to use the subjective probability of diagnoses from a predetermined number of diagnoses $D_1,\dots,D_k$. Each of X_i, $i=\overline{1\dots,n}$, acquires a value from the set $X=\{x_{i1},\dots,x_{im,\dots,xip}\}$. At time *t*, the state of the object is described by a feature vector [26]:

$$X(t)=[X_1(t),\dots,X_n(t)X_i(t)=X_{im}]^F,\ m_i=\overline{1,p_i} \quad (10)$$

where $X_1(t)$ – is the realization of the sign X_i at the present moment t.

There is a need to determine the assessment of the probability (measure of possibility) of economic diagnosis $P_\sigma(j)$ [26]:

$$\forall j = \overline{1,k}: \hat{O}_{\hat{a}}(j) = \hat{O}_{\hat{a}}(D_j/X(t)) \quad (11)$$

where P_σ – is a symbol of subjective probability.

To solve this problem, the representation of expert knowledge in linguistic form is used. In this case, the expert operates fuzzy categories, such as: "If the value X_i is very large, the probability D_j – is small". Therefore, a linguistic approach based on fuzzy set theory can be applied to the modeling of fuzzy information [26]. In the fuzzy algorithm of diagnosing the sign and probability are represented by linguistic variables (*LV*), defined by formula (12-13) [26]:

$$(X_i, T_i, V_i, G_i, M_i), i = 1, n \quad (12)$$

$$(P_{\hat{a}}, P, U, S, Q) \quad (13)$$

where $P_{\hat{a}}$, X_i – the names of the corresponding *LV*, T_i, P – the term set of variables X_i and P_σ respectively, i.e., many of their linguistic meanings, which is the name of fuzzy variables (*FV*) [26]:

$$A_{if}(f_i = \overline{1, p_i}/p_i = cardT_i) \text{ and } B_r(r = \overline{1, m}/m = cardP) \quad (14)$$

with values from universal sets V_i and U; $_{\text{Gi}}$ and S – syntactic rules that generate names A_{if} and B_r of the values of variables X_i and P_σ; M_i, Q – semantic rules that allow to convert (*FV*) to each new meaning. Accordingly, the new value A_{if} and B_r has the form (formulas (15-16) [26]:

$$(A_{if}, V_i, \tilde{C}_{if}), i = \overline{1, n} \quad (15)$$

$$(B_r, U, \tilde{E}_r), r = \overline{1, m} \quad (16)$$

where A_{if}, B_r – names of *FV*; V_i, U – the same as above.

$$\tilde{C}_{if} = \cup_{v \in V_i} \mu_{\tilde{C}}(V)\ /V \text{ and } \tilde{E}_{if_i} = \cup_{v \in U} \mu_{\tilde{E}}(U)/U \quad (17)$$

Fuzzy subsets (*FV*) of sets V_i and U, describing restrictions on possible values A_{if} and B_r; $\mu_C(\cdot)$ and $\mu_{\tilde{E}}(\cdot)$ – are membership functions (*MF*) for $\tilde{C}_{if}$ and $\tilde{E}_r$. For example, for some block of ES of enterprises with a diagnostic feature $\{X_1, X_2, X_3, X_4, X_5\}$ the following values *LV* are matched [26]:

$$(X_1, T_1, [" - "], G_1, M_1) \quad (18)$$

$$(X_2, T_2, [" - "], G_2, M_2) \quad (19)$$

$$(X_2, T_5, [" - "], G_5, M_5) \quad (20)$$

where term-sets T_1=...T_5= {significantly increased, increased, slightly increased, slightly decreased, decreased, significantly decreased, not changed}.

Probability estimation is represented by the eponymous P_σ, and the term set P consists of the following linguistic values of the variable: B_1 – excluded, B_2 – almost unbelievable, B_3 – very unlikely, B_4 – unlikely ..., B_m – absolutely accurate. Based on a set of rules, a matrix of fuzzy relations is built [26]:

$$X_j, RD_j, \text{ or } R = \cup_{x \in X \in D} \mu_R(x, d)/(x, d) \quad (21)$$

RESULTS

The management of the potential of agro-industrial enterprises is dominated by the cost approach, which is associated with the development of long-term and current operational solutions aimed at generating revenue and maximizing the value of the potential of agro-industrial entities [27]. The growth of the value of the potential of the enterprise is an indicator of evaluating the effectiveness of management staff and serves as a generalizing indicator of management, shows the vector of its future development in the system of modern evaluation coordinates. From the methodological point of view, there are two interrelated, but not identical areas of assessing the value of the potential of agro-industrial enterprises (Fig. 1). The first direction is formed in order to establish the balance and market value of competitive potential using standards for valuation of property and business. The assessment is based on three approaches: property (cost), comparison (market) and income (performance).

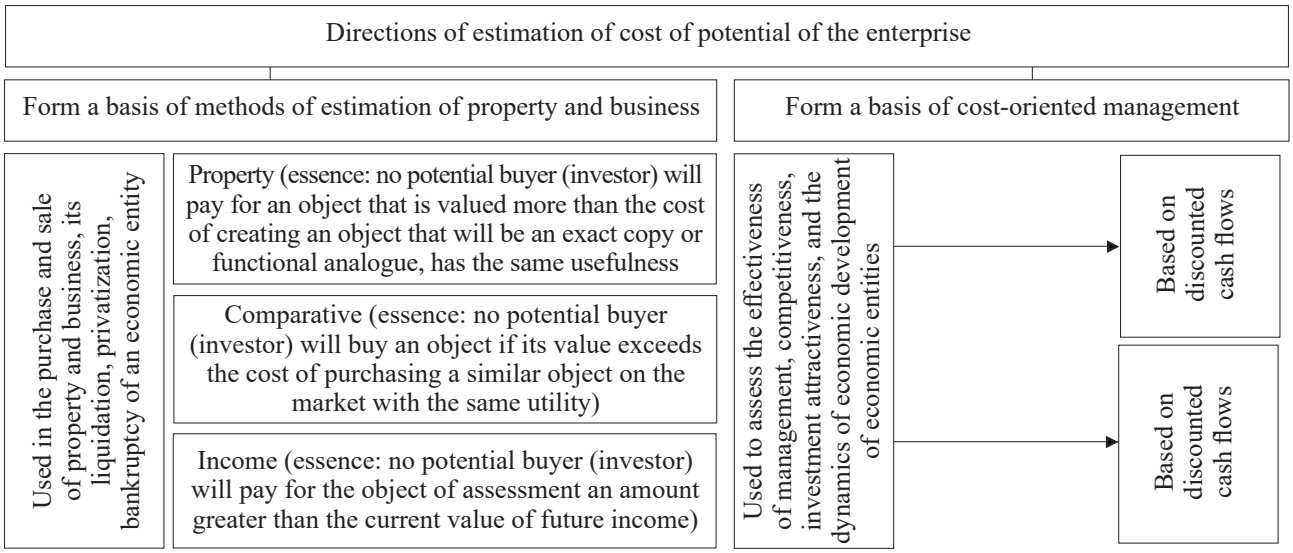

Figure 1. *Directions of assessing the value of the potential of agro-industrial enterprises*

Source: *compiled by the authors based on [27]*

We describe in more detail the use of performance (income) approach, which is characterized by two methods: a) direct capitalization of income; b) discounting cash flows (not direct capitalization). The direct capitalization method is used in the case of forecasting a constant value and equal in time intervals net operating income [27; 28]. The sequence of using the method of direct capitalization of income for the valuation of movable and immovable property has successive stages of determining the value (Fig. 2).

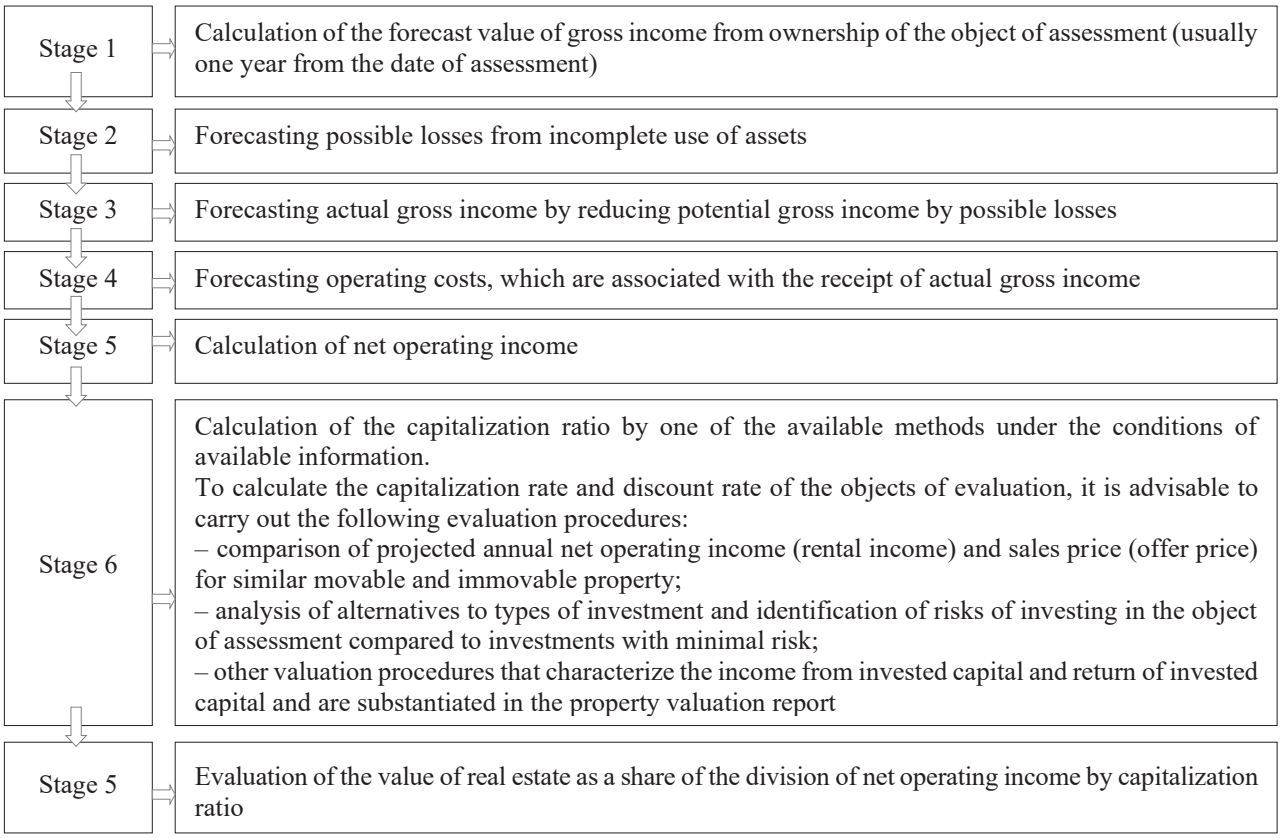

***Figure 2**. The sequence of using the method of direct capitalization of income for the valuation of movable and immovable property*

***Source**: improved by the authors based on data [28; 29]*

Projected net operating income that generates potential is different in value, volatile in revenue over a given forecasting period over time. In this case, the cost of reversion (income from resale – C_{rev}) implies that the potential in the forecast period is able to generate income, i.e., to have a stable growth rate, or uniform cash income. The cost of reversion is determined by formula (22) [28; 29]:

$$C_{rev} = \frac{NCF(t+1)}{(i - l_t)} \quad (22)$$

where C_{rev} – the cost of reversion; $NCF(t+1)$ – net cash flow of income for the first year of the post-forecast period; i – discount rate; l_t – long-term growth rate of cash flow.

In general, the estimate of the value of potential is determined by the sum of the current value of cash flow and the current value of reversal according to formula (23) [28; 29]:

$$C_{cp} = \sum_{i=1}^{n} \frac{Inc_i}{(1+i)} + \frac{CV_{rev}}{i} \quad (23)$$

where C_{cp} – the cost of competitive potential; Inc_i – the expected income from the possession of competitive potential for the i-th year; CV_{rev} – the current cost of reversion.

A methodical approach to establishing the value and usefulness of the potential based on the net present value (*NPV*) is proposed. It reflects the increase in the value of the enterprise as a result of the use of potential and is the difference between the amount of cash flows (revenues) arising from the economic system (ES), discounted to their present value and the sum of the discounted value of all cash outflows [28; 29]. To calculate this indicator, formula (24) is used [29]:

$$NPV = \sum_{r=1}^{n} \frac{Pr_i - C_i}{(1+i)^t} \quad (24)$$

where Pr_1 – full benefits for the year t; C_i – full costs for the year t; t – the corresponding year of the project (1, 2, 3, … n); n – the term of use of the potential, the depth of the horizon in years; i – discount rate (interest).

$$NPV = \frac{Pr_1 - C_1}{(1+i)^1} + \frac{Pr_2 - C_2}{(1+i)^2} + \ldots + \frac{Pr_n - C_n}{(1+i)^n} \quad (25)$$

$$NPV = \sum_{r=1}^{n} \frac{Pr_1}{(1+i)^t} - \sum_{r=1}^{n} \frac{C_t}{(1+i)^t} \quad (26)$$

In cases where the option of the potential growth involves significant initial investment I_o in resources, the calculation NPV is carried out according to formula (27) [29]:

$$NPV = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \ldots + \frac{CF_n}{(1+i)^n} - I_0 = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t} \quad (27)$$

where CF_t (cash flow) – cash flow at the end of period t.

The criterion of selection at net present value means that the usefulness and value of the potential are approved in the case of a positive value NPV, (i.e., due to the realization of the potential, the value of the enterprise will increase). When choosing options to increase the magnitude of the potential, preference is given to those of them who have higher values of net present value.

The spread of the method of valuation of the degree of increase in the value of potential is due to the ability to directly determine the effect. In addition, it allows to estimate the total net benefits from several potential options (the property of additively is given only to the indicator of net present value). However, this indicator does not reflect the relative degree of value increase, the general criterion that can be used in the practice of management decisions is the coefficient of benefit – cost (benefit cost – B/C). It is defined as the amount of discounted benefits divided by the amount of discounted costs, and is calculated by formula (28) [29]:

$$B/C = \frac{\sum_{t=1}^{n} B_t/(1+i)^t}{\sum_{t=1}^{n} C_t/(1+i)^t} \quad (28)$$

The criterion for selecting a variant using the cost-benefit ratio may be its value greater than or equal to one. That is, such a potential is appropriate for use. But if the coefficients of benefit – the costs that meet the established requirements of two or more, then there are difficulties in reasoning the ranking of options. Next, because the relative values of the cost-benefit ratios are compared, they do not reflect the value of the net benefits of using the potential. Thus, the cost-benefit ratio may be higher in an enterprise with a smaller absolute potential. Therefore, it is proposed to use additional calculations of the criterion NPV so as not to make the wrong decision of the choice in choosing the best option.

Given that the enterprise has limited capital, it is necessary to correlate the net benefit with the cost of available capital (formula (29)) [29]:

$$B/C = \frac{\sum_{t=1}^{n} (B_t - PC_t)/(1+i)^t}{\sum_{t=1}^{n} Cc/(1+i)^t} \quad (29)$$

where PC – production and operating costs; Cc – capital costs.

In the presence of such a coefficient, the ranking of variants is carried out according to the largest value of the coefficient (B/C) relative to the value (PC). In addition, when there is a shortage of resources, the cost-benefit ratio is also modified and calculated by formula (30) [29]:

$$B/C = \frac{\sum_{t=1}^{n} (B_t - C_t)/(1+i)^t}{\sum_{t=1}^{n} R_t/(1+i)^t} \quad (30)$$

where R_t – the cost of the scarce resource.

Comparing the value of net benefits with the cost of scarce resources, you can select the option of using the potential for which unique resources are significant. Thus, for enterprises of agro-industrial production the scarce resources include foreign currency, which is a stimulating factor of development. In this case, the calculation of the ratio is equal to the ratio of net discounted costs to foreign currency costs. Discounted cash flow takes into account the long-term prospects of the enterprise and the use of its potential. However, sometimes there is a loss of usefulness for the current assessment of activities, i.e., tactical management. Therefore, preference is given to models of "economic Value Added" (EVA), which allows to assess the effectiveness of management decisions. The indicator is an alternative to the traditional EVA analysis. This means that only a management decision that provides a greater return on potential will be effective. Comparing the rate of return on invested capital with the weighted average cost of capital allows to get the value (pre-yield), which measures the level of economic profit, while EVA reflects the absolute value of economic profit. The positive absolute value of the indicator EVA and its positive dynamics indicates an increase in the value of the enterprise, i.e., the value of the potential.

In modern market conditions, an important condition for the functioning of the enterprise is to ensure economic stability and efficiency of its economic system, which is characterized by the orderliness of technical, economic, environmental, social and scientific resources. The economic stability of the potential of agro-industrial enterprises primarily depends on: the stability of production and marketing activities – the optimal range in terms of compliance with market demands, advertising, flexibility of partnerships, reliability of supply logistics; financial activity – profitability of products, absolute liquidity ratio, receivables, net profit (loss); labor activity – the number of staff, labor productivity, labor capital, staff qualifications; innovation activity – use of modern technologies, level of readiness of personnel for changes at the enterprise, level of conformity of organizational culture to innovative development of the enterprise, environmental friendliness of technologies and equipment; management activities – business qualities of employees in the field of management, the effectiveness of the organizational structure of management, the creativity of management staff.

While diagnosing the potential of agro-industrial enterprises, it should be noted that one of the directions

of its evaluation is expertising. Eight agricultural holdings of Ukraine are included in the objects of assessment of the potential of the sample of meat processing enterprises. An integrated (group) factor indicator of enterprises has been formed, which is calculated as the product of a parametric unit assessment and the rank of the analyzed synthesizing factor of a meat processing enterprise (agroholding). The total assessment consists of integrated (group) factor components of the potential for each of the analyzed enterprises. The coefficient of economic stability potential (FP_s) is taken as a unit for the enterprise that has the highest total score for all components of the potential. For the rest of the enterprises, it is calculated by the ratio to the highest level of the total score of the leading enterprise [30]. Indicators of the integrated factor, which includes production, marketing, management, labor, financial and innovation potential have been selected. The graphic representation of the potentials is divided into two groups of agricultural holdings: those that are only meat processing with the purchase of raw materials and those that are agro-industrial enterprises with their own raw materials. Each agricultural holding corresponds to a polygon with the corresponding calculation of its area S_i by formula (31) [30]:

$$SS_i = \sum_{i=1}^{10} \frac{1}{2} sin\,\Delta \times a_i \times a_i + 1 \qquad (31)$$

where a_i – is the value of the i-th integrated factor indicator at each of the eight meat products enterprises of agro-industrial production (agroholdings), with i=8 (eight integrated factors of the enterprise potential). The area of the polygon of agro-industrial enterprises (agroholdings) is calculated as follows:

$$SS_{ag1} = 1/2 \times 0.71 \times (0.67 \times 0.4 + 0.4 \times 0.58 + 0.58 \times 0.52 + 0.52 \times 0.45 + 0.45 \times 0.4 + 0.46 \times 0.67) = 0.55$$
$$SS_{ag2} = 1/2 \times 0.71 \times (0.68 \times 0.42 + 0.42 \times 0.5 + 0.5 \times 0.53 + 0.53 \times 0.52 + 0.52 \times 0.48 + 0.48 \times 0.68) = 0.57$$
$$SS_{ag3} = 1/2 \times 0.71 \times (0.61 \times 0.36 + 0.36 \times 0.53 + 0.53 \times 0.52 + 0.52 \times 0.46 + 0.46 \times 0.43 + 0.43 \times 0.61) = 0.49$$
$$SS_{ag4} = 1/2 \times 0.71 \times (0.68 \times 0.37 + 0.37 \times 0.48 + 0.48 \times 0.55 + 0.55 \times 0.44 + 0.44 \times 0.49 + 0.49 \times 0.68) = 0.53$$
$$SS_{ag5} = 1/2 \times 0.71 \times (0.65 \times 0.38 + 0.38 \times 0.56 + 0.56 \times 0.56 + 0.56 \times 0.43 + 0.43 \times 0.42 + 0.42 \times 0.65) = 0.52$$
$$SS_{ag6} = 1/2 \times 0.71 \times (0.67 \times 0.37 + 0.37 \times 0.51 + 0.51 \times 0.55 + 0.55 \times 0.46 + 0.46 \times 0.42 + 0.42 \times 0.67) = 0.51$$
$$SS_{ag7} = 1/2 \times 0.71 \times (0.63 \times 0.39 + 0.39 \times 0.56 + 0.56 \times 0.53 + 0.53 \times 0.44 + 0.44 \times 0.46 + 0.46 \times 0.63) = 0.53$$
$$SS_{ag8} = 1/2 \times 0.71 \times (0.65 \times 0.41 + 0.41 \times 0.51 + 0.51 \times 0.56 + 0.56 \times 0.5 + 0.5 \times 0.46 + 0.46 \times 0.65) = 0.55$$

Parametric results of expert assessment of the integrated factor indicator of economic stability of the potential of agricultural holdings of the meat-processing unit are presented in Figure 3.

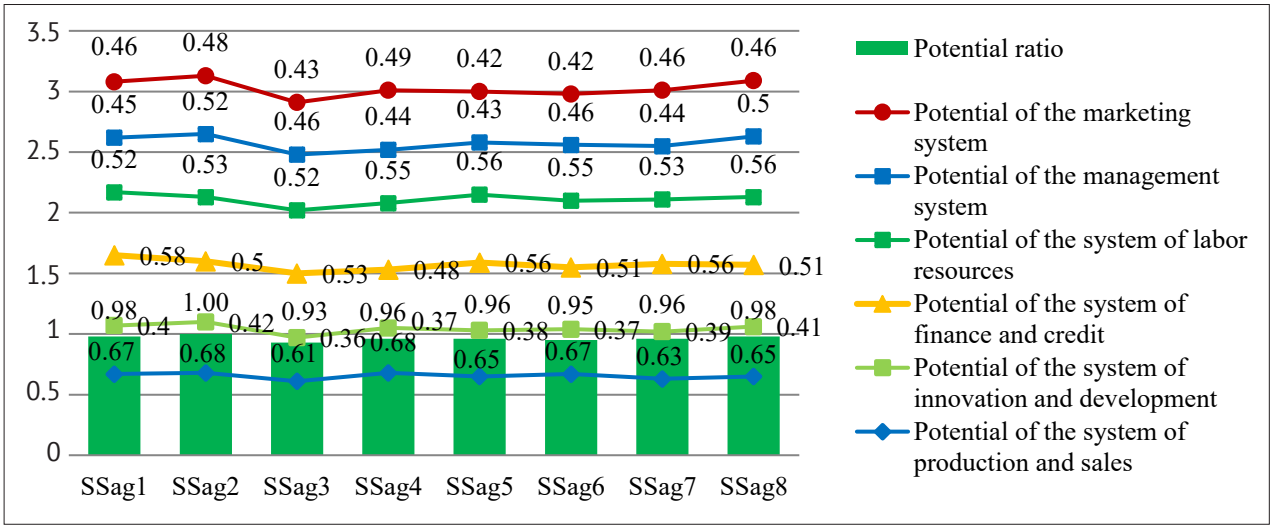

Figure 3. *Integral factor coefficient of economic stability of the potential of agricultural holdings of the meat-processing unit, 2020*

Source: *calculated by the authors*

Inaccuracies that arise because of calculations by this method are compensated by the ability to compare graph-analytical and analytical assessment of the economic stability of the potential of the studied enterprises and identify their place in the level of economic stability of the ES (Table 1).

***Table 1**. Comparison of levels of economic stability of the potential of agricultural holdings of meat-processing unit by different methods of determination*

Agroholdings (meat-processing unit)	Assessment methods			
	Area of potential polygon		Normalized integral coefficient	
	Rank correlation coefficient	Rang	Value	Rang
Agroholding No. 1	0.546	3	0.980	3
Agroholding No. 2	0.520	6	0.958	6
Agroholding No. 3	0.572	1	1.0	1
Agroholding No. 4	0.554	2	0.985	2
Agroholding No. 5	0.512	7	0.951	7
Agroholding No. 6	0.527	5	0.961	5
Agroholding No. 7	0.528	4	0.963	4
Agroholding No. 8	0.492	8	0.931	8

***Source**: calculated by the authors*

The rank correlation coefficient allowed establishing the relationship between the ranked distribution of potentials of the studied agroholdings, which indicates their functionality in the market environment and the high level of economic stability of the potential of the economic system as a whole. Agroholdings are divided into three groups: the first group – enterprises that have the highest level of economic stability (these are agroholdings No. 3, No. 4, No. 1); the second group – enterprises with an average level of economic stability of potential (these are agroholdings No. 2, No. 7, No. 6); the third is enterprises that have a low level of economic stability of potential (these are agroholdings No. 5, No. 8). Monitoring the current capabilities of the components of the potential of agroholdings involves a systematic analysis of the level and effectiveness of the factors that shape them. One of such directions of monitoring is the graph analytical method of object profile formation. The profile is defined as a graphical representation of selected indicators according to certain principles. The enterprise profile is used to assess the level of potential development by comparing the profiles of competing enterprises built on one evaluation field [31].

Thus, the meat-processing unit of the studied agroholdings may worsen the economic sustainability of economic results not only due to the shortage of certain resources, but also due to their nominal potential. Graph analytical study of the level of use of the components of the potential of meat-processing enterprises showed that for each unit of use of production potential, they spend much more resources and opportunities for management, marketing and innovation potential and small amounts of financial and labor resources Figure 4.

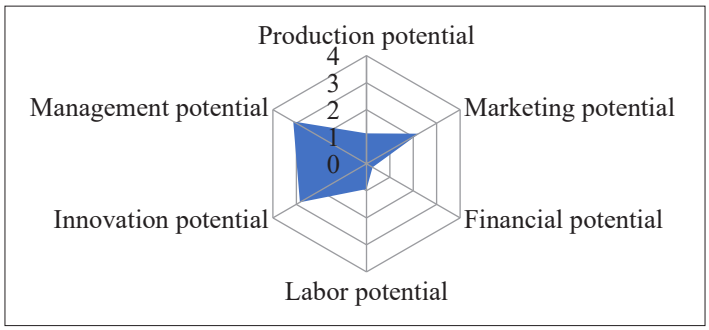

***Figure 4**. Graph analytical levels of type manifestations of the potential of agroholdings of the meat-processing unit, 2020*

***Source**: calculated by the authors*

The selected agroholdings of the meat-processing unit meet the following criteria: the as-sortment structure of trade turnover, the breadth and depth of the product range are identical; the life cycle phase of the entity and the main strategic development goals; use of one-way channels of distribution and sale of products; availability of equal opportunities for resource potential formation. It should be noted that the return on equity is an important indicator of investment potential of enterprises, which regulates the redistribution of cash

flows between production and financial potentials, given the profitability of the economic system as a whole. So, the coefficient of stability of economic growth, which remains with the business entity for its development and creation of a reserve, according to Figure. 3 had the largest amount of equity in 2020 (almost 44%) in the agroholding No. 8 and No. 1 – almost 34%, the smallest one is in the agroholding No. 6 – 0.5%. Meat-processing enterprises No. 2, No. 3, No. 5 did not direct their own capital at all to increase their potential, which reduced their competitive position in the con-summer market. The financial component of the potential of agroholdings of the meat-processing unit of Ukraine is presented in Figure 5.

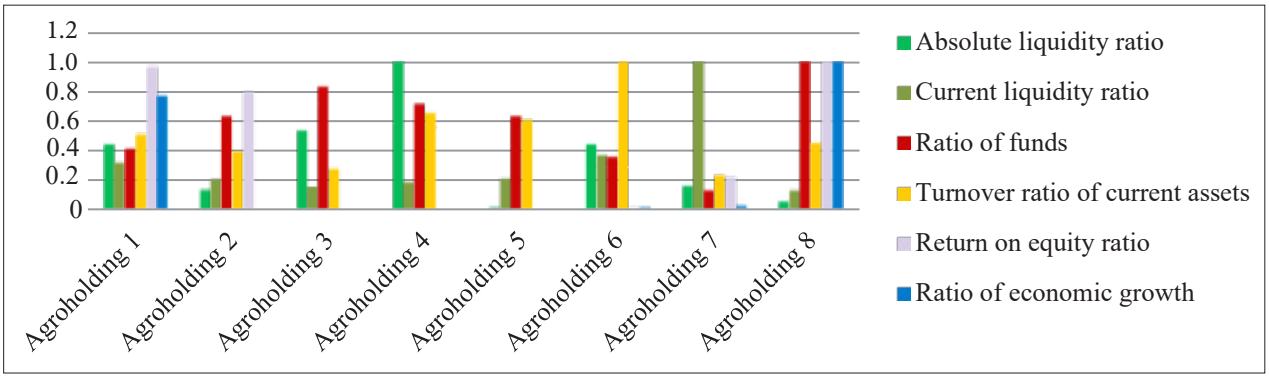

***Figure 5**. Standardized coefficients for rating of agroholdings of meat-processing unit of Ukraine according to their potential, 2020*

***Source**: calculated by the authors according to data State Statistics Service of Ukraine, 2021 [32]*

All elements of standardized coefficients are squared. The obtained results are added in rows, the square root is determined from the obtained sum. Meat-processing enterprises, which had negative coefficients of return on assets and of stable economic growth were not taken into account, i.e., had zero value. Ratings of potential competitiveness according to the indicators of stable financial condition of agroholdings of meat-processing units are placed in ascending order, due to their economic content Figure 6.

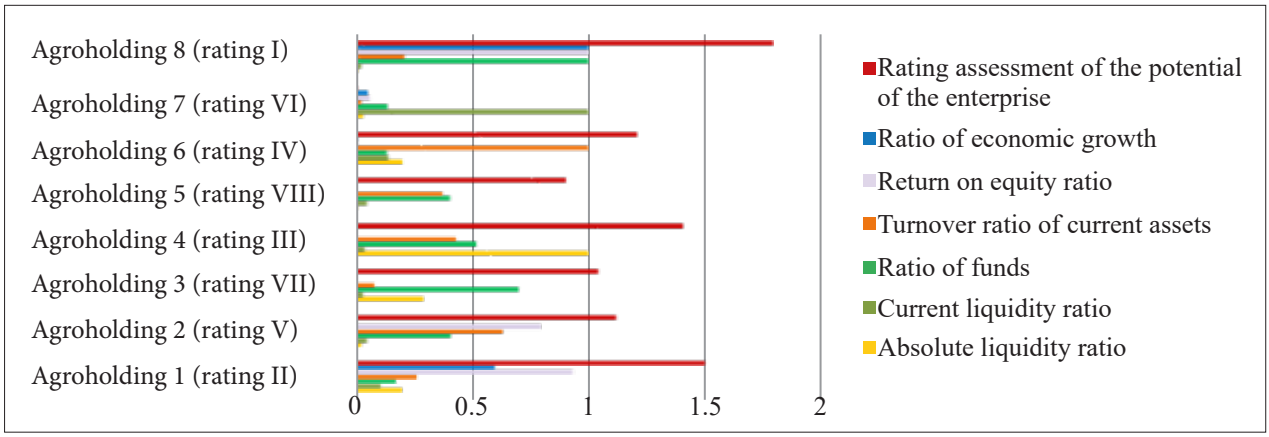

***Figure 6**. Rating assessment of the competitiveness of the potential of agroholdings of the meat-processing unit of Ukraine, 2020*

***Source**: calculated by the authors according to data State Statistics Service of Ukraine, 2021 [32]*

Thus, according to the indicators of competitiveness assessment of the potential of agroholdings of the meat-processing unit, the enterprise No. 1, has the highest rating, the second and third place belong to – No. 1 and No. 4, the agroholding No. 5 has the lowest level of rating. In order to increase the competitive potential and strengthen its position in the consumer market of agro-food enterprises in the meat-processing industry, it is necessary to develop effective management decisions in the long run.

DISCUSSION

Management of the competitive potential of agro-industrial enterprises (agroholdings) is a general economic factor of rational consumption of resources and efficient functioning of the economic system. It is known that even those agroholdings that have similar potentials often differ in the results of their activities. Under these conditions, the difference in results can be explained only by the unequal degree of accuracy of the target orientation of the system. That is, other things being

equal, the value of the result will be greater, if the system of managing the competitive potential of agroholdings of the meat-processing unit is successful.

The integration of economic processes, which ensures the rationality of the potential management system of agroholdings of meat-processing complexes, reflects the ability to streamline its components through the internal laws of economic activity, and to reproduce its functionality it is necessary to model the optimization potential of the enterprise of agro-industrial production and identify alternative ways to use it. Using a system approach to the effectiveness of potential management is appropriate for assessing its components. It covers six blocks: financial, business activity, market, labor, business process management, and innovation potential. Each block of potential is proposed to be evaluated based on selected indicators taking into account the weights set by the expert. According to the adopted method [33] the calculation of the assessment of the effectiveness of potential management is carried out according to the algorithm:

1. Financial potential (C_{fp}) [34]:

$$C_{fp} = C_{fi} \times 0.2 + C_{cl} \times 0.3 + C_{scg} \times 0.2 + C_{wct} \times 0.3 \quad (32)$$

where C_{fi} – the coefficient of financial independence (autonomy); C_{cl} – current liquidity ratio; C_{scg} – the coefficient of sustainable economic growth; C_{wct} – turnover ratio of current assets.

2. Potential of business activity (C_{pba}) [34]:

$$C_{pba} = R_{ta} \times 0.15 + R_{ag} \times 0.25 + R_s \times 0.3 + R_c \times 0.3 \quad (33)$$

where R_{ta} – the ratio of total return on total assets; R_{ag} – return on equity ratio; R_s – the coefficient of profitability of sales; R_c – cost-effectiveness ratio.

3. Market potential (C_{mp}) [34]:

$$C_{mp} = D_{vep} \times 0.1 + D_v \times 0.3 + Dveg \times 0.25 + C_{mv} \times 0.1 + C_z \times 0.15 \quad (34)$$

where D_{vep} – the share of export revenue of the enterprise in its total revenue; D_v – the enterprise's share in the domestic market; D_{veg} – the share of export revenue of the enterprise in total export revenue by industry; C_{mv} – the coefficient of the share of material costs in the cost of production; C_z – the ratio of stocks of finished products to the average monthly volume of marketable products.

4. Labor potential (C_{pp}) [34]:

$$C_{pp} = C_{lp} \times 0.55 + C_{mms} \times 0.3 + C_{he} \times 0.15 \quad (35)$$

where C_{lp} – labor productivity ratio; C_{mms} – the coefficient of material motivation of staff; C_{he} – the ratio of industrial production personnel with higher education to the total number of industrial production personnel.

5. Business process management potential (C_{pbpm}) [34]:

$$C_{pbpm} = C_{rc} \times 0.3 + C_{suya} \times 0.7 \quad (36)$$

where C_{rc} – the coefficient that reflects the level of computerization of production and management processes; C_{suya} – the coefficient that reflects the presence of a quality management system (evaluated by experts on a scale from 0 to 1).

6. Innovation potential (C_{pi}) [34]:

$$C_{pi} = C_{np} \times 0.3 + C_{ia} \times 0.2 + C_{wme} \times 0.25 + C_{rfa} \times 0.25 \quad (37)$$

where C_{np} – the ratio of new products in the total volume of marketable products; C_{ia} – the ratio that reflects the share of intangible assets in the balance sheet currency; C_{wme} – the coefficient of wear of machines and equipment; C_{rfa} – the coefficient of renewal of fixed assets.

The integrated indicator of efficiency of potential management is calculated by formula (38) [34]:

$$CP = C_{fp} \times 0.1 + C_{pba} \times 0.2 + C_{mp} \times 0.3 + C_{pp+0.1+} \times 0.15 + C_{pbpm} \times 0.1 + C_{pi} \times 0.15 \quad (38)$$

Thus, the efficiency of managing the potential of agroholdings in the meat-processing industry is a complex indicator that is calculated on the basis of a number of individual criteria. In this case, the assessment of the effectiveness of potential management using weights leads the individual indicators to a comparable form, which allows calculating the consolidated indicator.

The forecast indicators of the efficiency of potential management of the investigated enterprises of meat-processing unit are established Figure 7.

Thus, the highest efficiency of managing the potential of the meat-processing industry is in the agroholdings No. 7 and No. 2, but the latter has less management efficiency 9%. In the agroholding No. 6 the indicator of management efficiency is only 46.1% of the level of the reference according to the rating of the enterprise (agroholding No. 7). The practice of innovation processes in processing enterprises shows that most of the economic benefits of the new technology is brought by improvements made after this technology has found commercial application. That is, the priority is the development of innovations in the processing industry, which in turn require the introduction of new machinery and technology in agriculture. Further supporting innovations aimed at meeting the needs of the consumer market, will attract investment. Therefore, the innovative development of processing enterprises as part of agroholdings is a strategic tool to increase the efficiency of enterprise development in both domestic and foreign markets. More clearly, the general level of evaluation of the effectiveness of potential management is presented in Figure 8.

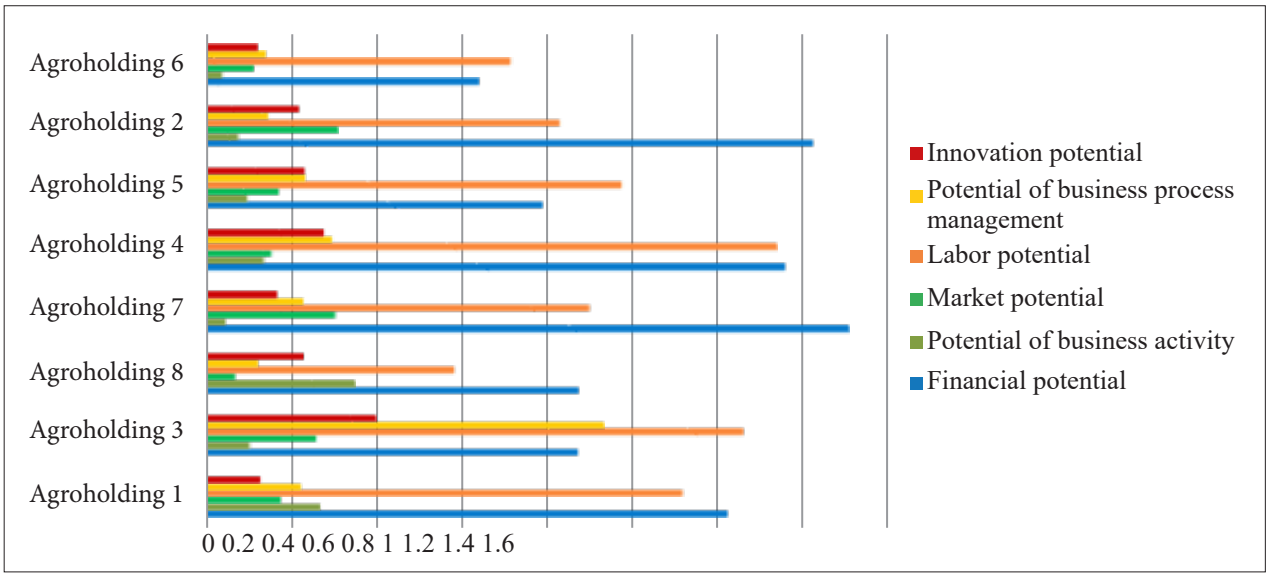

Figure 7. *Forecast level of indicators of effective management of the potential of agroholdings of the meat-processing unit of Ukraine*

Source: *calculated by the authors*

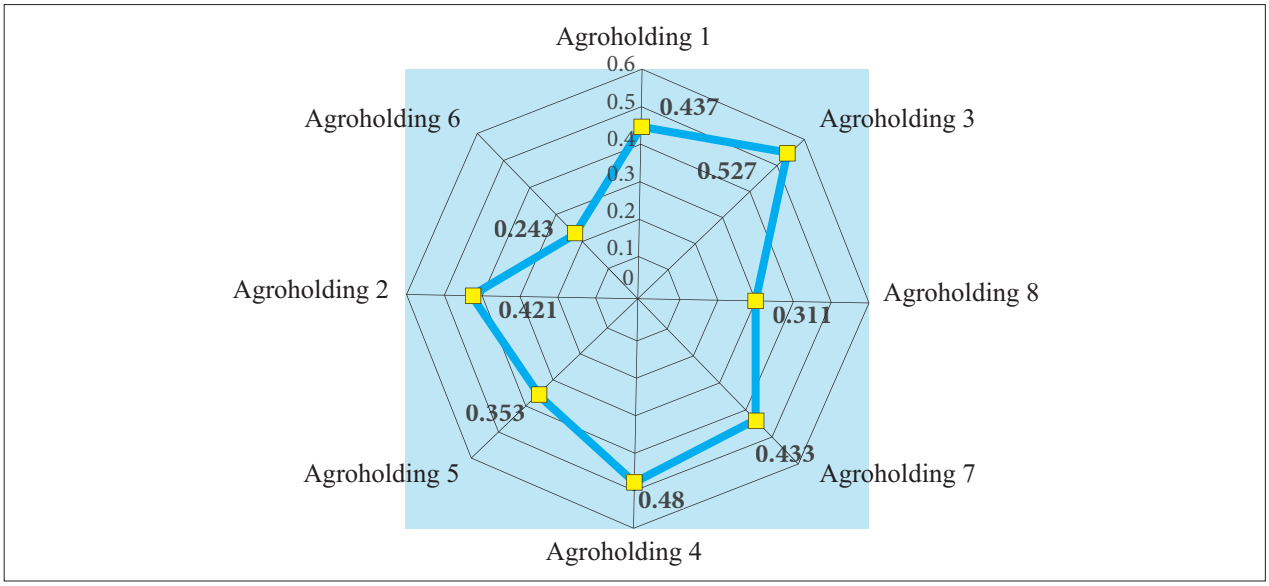

Figure 8. *Forecast integrated coefficient of effective management of the potential of agroholdings of the meat-processing unit of Ukraine, 2020*

Source: *calculated by the authors*

Calculations show that the competitiveness of the potential in most of the studied agroholdings of the meat-processing unit is average.

Thus, the constant development of competitive potential is the main condition for the effective operation of agro-industrial enterprises in a dynamic environment of the consumer market. At the same time, approaches to the development of competitive potential reflect different levels of its implementation. Most agro-industrial enterprises in Ukraine, seeking to increase competitive advantages and maintain market positions, traditionally use the strategy of two different trends: specialization and diversification. It is obvious that both of them help on the one hand to concentrate the potential of resources in the economic system, on the other – to expand the sphere of production due to uncertainty in the prospects of the main business. It should be noted that diversification and specialization have a single nature – a form of enterprise response to changes in the environment, which aims to identify those unique properties of the potential on the basis of which through the "value chain" they can develop in the long run and ensure their own success in creating consumer value. Therefore, the value chain for a set of activities creates additional consumer value of the enterprise product. That is, as the product moves along the production line to the final consumer, each participant in the production process brings additional value to its value, which reflects a set of interrelated activities and functions in the enterprise.

CONCLUSIONS

While assessing the enterprise's position in a competitive environment we should pay attention to the problems of physical and moral wear of basic and ancillary equipment, partial or complete lack of sources of capital investment, the duration of the introduction of innovative technologies, insufficient automation of manufacturing processes, continuous growth of costs of raw materials and also efforts at the enterprise level to carry out all production processes. In addition, it is necessary to determine the effectiveness of the main functions and processes in the value chain, namely: the use of procurement of materials, settlements with suppliers, inventory management, human resources and payroll, the control of the quality of processes and products and the execution of customer orders, how quickly the company innovates, launches new products to the market. This practice allows setting the minimum cost for the implementation of certain processes of production and sale of certain products.

Under conditions of high competition, the consumer market requires agro-food production entities, especially meat-processing units, to concentrate their efforts on the stages of reproducing the components of the potential of enterprises. Meanwhile, for the normal functioning of the market it is necessary to implement a rational distribution of time and resources between the main and non-core units, or activities. Outsourcing is a strategic alternative to deepening the specialization of enterprises. It is a special, highly efficient form of organization of business relations between enterprises, which creates a network system of production on strong long-term ties of independent market participants.

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Управління потенціалом агропромислових підприємств на споживчому ринку

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Анотація. У статті реалізовано аспекти управління потенціалом агропромислових підприємств на споживчому ринку. Запропоновано комплексний методологічний підхід до діагностики моделі оцінки управління потенціалом агропромислових підприємств, що на основі математичного апарату нечітких теорій дозволяє оптимізувати її рівень у ланцюжку сукупних компонентів, зменшити тиск чинників та обмежити конкурентні позиції бізнесу на споживчому ринку. Доведено, що економічна діагностика дозволяє виявити причинно-наслідкові зв'язки в управлінських дисфункціях та перейти до моделі сталого розвитку підприємства та ефективного використання його потенціалу. Запропоновано групову (інтегровану) систему діагностики економічних систем, яка поєднує в собі властивості традиційних «жорстких» моделей та алгоритмів, що оцінюють стан управління агропромисловими підприємствами та причини їх дисфункції у багатьох неконтрольованих потоках ресурсів, з ймовірністю збою. Обґрунтовано, що основною складовою управління потенціалом підприємства є наявність потенційних ресурсів, сукупність та взаємодія яких відкриває перспективні можливості для досягнення цілей управління. Визначено напрями оцінки вартості потенціалу агропромислового підприємства. Проведено експертну оцінку інтегрального коефіцієнта економічної стабільності потенціалу агрохолдингів м'ясопереробних підприємств України. Визначено графічно-аналітичні рівні типових проявів потенціалу та профілю його складових на підприємствах агропромислового виробництва м'ясопереробної галузі. Розраховано стандартизовані коефіцієнти рейтингування сільськогосподарських господарств м'ясопереробних підприємств України за їх потенціалом. Встановлено прогнозний рівень показників та інтегральний коефіцієнт ефективного управління потенціалом підприємств агропромислового комплексу

Ключові слова: земельний та ресурсний потенціал, земельні відносини, рента, врожайність, собівартість, дохід, рентабельністьтрація