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Development of micro-entrepreneurs in agriculture in wartime conditions

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► **Abstract.** Micro-entrepreneurial structures in the field of agricultural production generate employment, have adaptive potential for the formation of stable food systems and survival. **The purpose of this study** was to substantiate the theoretical and methodological foundations and socio-economic problems of micro-entrepreneurial activities in agriculture under martial law. **Research methodology**. The methodological framework of the present study included the provisions of system analysis. To generalize results, the study involved monographic, normative, graphic, abstract-logical methods and approaches. **Study results**. The place of micro-enterprises in the "production – distribution – exchange – consumption" system is determined. They can creatively contribute to the achievement of sustainable development criteria, form sustainable agri-food chains, guarantee self-sufficiency in food products, develop local niche exclusive productions, and ensure self-employment of the rural population. It is established that personal farms that have organized a family farm and registered as individual entrepreneurs also have the opportunity to implement their activities. It was found that the most adapted to the crisis conditions associated with military actions are family farms and household plots. However, the lack of stable sales channels for the products of micro-enterprises, the low level of purchase prices and a considerable increase in prices due to military operations for energy resources, machinery, fertilizers, and plant protection products make production inefficient. One of the priority areas of regional

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policy is still the development of family farming, small and micro businesses in rural areas. **Practical significance**. The results of the study can be considered when developing regional programs for the development of agricultural business entities

▸ **Keywords:** business entity; micro-entrepreneurial structures; family farm; private household plot; agricultural cooperative; private enterprises

▸ Introduction

The conditions of martial law have a considerable impact on socio-economic and political instability. Micro-entrepreneurial structures have managed to adapt faster to the extreme conditions of organizing the production, storage, and marketing of agricultural products. Microentrepreneurs are the most motivationally oriented, especially if the owner is the head of the family, the household is family property, and the family takes lessons in building up its capital. The organization and activities of microenterprises are implemented according to the "Economic Code of Ukraine" (Paragraph 2, Item 3). The Code states that the average number of employees in a micro-enterprise should not exceed 10 people during the reporting calendar year. According to the average annual exchange rate of the National Bank of Ukraine, the income of a microenterprise from any activity for the year should not exceed 2 million euros in equivalent (Commercial Code of Ukraine, 2003). Considering the positions reflected in the Law of Ukraine "On Accounting and Financial Reporting in Ukraine", the following economic features of the development of a microentrepreneur are substantiated as follows: a) up to 10 people – the average number of employees at the enterprise; b) up to 700,000 euros – net income from the sale of products (goods, works, services); c) up to 350,000 euros – the book value of assets (Law of Ukraine No. 996-XIV…, 2018). Microenterprise entities can take a decent position in the market. During the period of martial law (2023), conditions are needed that would ensure the increase in competitiveness of microentrepreneurs in agriculture and their strengthening.

O. Shpykuliak & I. Bilokinna (2019) proved that the rural population can ensure energy independence by selling produced fuel, reducing energy costs, and functioning of established "green" cooperatives. A. Burliai *et al.* (2021) grouped the risks of greening agriculture into four groups: logistics and sales, financial and economic, institutional risks, and industrial risks. Typification of the main risk reduction tools from the implementation of greening at the level of the business entity has been carried out.

Researcher V. Horovyi (2021) investigated the main aspects of the development of Ukrainian agricultural cooperation. J. Lopes & S. Gomes (2022) explored the potential of innovative and sustainable strategic management in the development mechanism of small and medium-sized enterprises to expand the competitive advantages of the enterprise. The processes of survival of the business entity are classified as mechanisms for the realization of social and environmental benefits for the enterprise.

Worthy of attention is the position of V. Kyfyak *et al.* (2022), who substantiated the influence of extreme and socio-economic conditions of activity on the processes of transformation of subjects of agrarian entrepreneurship. It was established that the lack of sources of financing is one of the principal issues of the functioning of agribusiness, and therefore integration and cooperation of agricultural producers will help business entities survive. A. Bitkowska *et al.* (2022) revealed the mechanism of business process management and proved that the implementation of Agile Business Process Management allows the business entity to respond more effectively to market changes and implement radical changes in the business environment. D. Dabrowski (2022) focused on market turbulence and its relationship to commercial enterprise performance, labour productivity, market infrastructure, suppliers, and buyers. It was substantiated that the introduction of innovative products has a dual impact on the commercial efficiency of production.

D. Shyian *et al.* (2021) determined that the quality of the food supply is a fundamental factor in social security according to established standards and scientific norms. However, some issues related to the functioning of microenterprises in wartime conditions are still understudied and require further consideration.

Considering the processes of functioning of microentrepreneurial structures in extreme conditions, most researchers addressed the expediency of their creation; capital formation of individuals-entrepreneurs, family farms, and private household plots, and their economic importance as business entities. Economists' attention is focused on the problems of infrastructure support for rural areas and the assessment of target parameters of the anti-crisis stability of enterprises. This paper substantiates the features of personnel management, where the owner and manager are one person; marketing development strategy; increasing the investment activity of households, and the impact of armed conflict on the functioning of microentrepreneurial structures.

The published studies on the problems of the development of farms primarily address the essence of the concepts, the need for state support, the assessment of the impact of the external environment, and the criteria for assessing the investment status of subjects. Insufficient attention is paid to the development of microenterprises under martial law. The question of the methodological principles of the assessment also did not find further development. This refers to indicators that ensure the identification

of parameters of the effectiveness of social development processes, considering the specific features of the legal form, which specifically concerns the subjects of microentrepreneurship, which are considered in this paper.

Scientific originality. Microentrepreneurial structures have advantages over large enterprises that have suffered large losses as a result of military operations. The present study substantiated the essence of the transformation of household plots into family farms in the conditions of martial law, which proved their effectiveness.

The purpose of this study was, from the standpoint of a systemic approach, to evaluate and substantiate the theoretical, methodical, and practical principles of the economy of microentrepreneurial structures of the agrarian sector of the economy in wartime conditions.

▸ Materials and Methods

The main provisions of institutional economic theory and system analysis served as the theoretical and methodological platforms of this study. The system method of cognition is based on the historical experience of the development of agricultural microenterprises. Abstract-logical methods were used to determine the essence of the processes of adaptation of microenterprises of the agricultural sector of the Ukrainian economy to functioning in wartime conditions. The monographic method was used to make empirical assessments and identify trends in changes and development of microenterprises. The method of analysis was used to reveal data on the functioning of microentrepreneurs in the agricultural sector of Ukraine. The graphical method was used to display conditional images of statistical data and the process of calculating certain parameters. The generalization method was used to formulate conclusions, research results, and recommendations, and establish cause-and-effect relationships in describing the development of individual groups of microentrepreneurs.

An equation that reflects the change in the average value of one feature (*Y*) depending on the second feature (*X*) is called the correlation equation. The rectilinear form of communication is determined by the straight-line equation:

$$y = a_0 + a_1 \times x, \quad (1)$$

where y are the theoretical values of the resulting feature; a_0 is the start of the countdown, provided that $x = 0$; a_1 is the regression coefficient; x is the value of the factor factor.

a_0; a_1 parameters are found according to the least squares method. The least squares method is reduced to composing and solving a system of normal equations:

$$\begin{cases} a \cdot \sum x^2 + b \cdot \sum x = \sum x \cdot y \\ a \cdot \sum x + b \cdot n = \sum y. \end{cases} \quad (2)$$

By solving it, we get the values of the coefficients a_0; a_1 and the analytical expression of the dependence: $y = a_0 + a_1 \times x$.

For the established density of the connection between the factor and result features, the Pearson correlation coefficient and determination coefficient were calculated according to the following formulas:

$$\sigma_x = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}; \sigma_y = \sqrt{\frac{\sum (y_i - \bar{y})^2}{n}}. \quad (3)$$

$$t_x = \frac{x_i - \bar{x}}{\sigma_x}; t_y = \frac{y_i - \bar{y}}{\sigma_y}. \quad (4)$$

$$r = \frac{\sum (t_{x_i} \times t_{y_i})}{n}. \quad (5)$$

$$d = r^2 \quad (6)$$

where r is the linear correlation coefficient; σ_x is the mean square deviation of the factor feature; σ_y is the mean square deviation of the resulting feature; t_x; t_y are intermediate indicators for calculating mean square deviations of features. The coefficient of determination (d), i.e., the square of the correlation coefficient, shows what proportion of the total variation of the resulting feature is determined by the factor feature.

The calculations were performed using modern computer technologies (Microsoft 365 for Business; web versions of Word, Excel, and PowerPoint) and analysis techniques. A trend analysis was used to construct a forecast for 2030 of annual changes in agricultural products and net profit realized by the microentrepreneurs. The optimistic scenario of the forecast for the development of microentrepreneurs in 2030 is based on the number of entities according to type of business.

▸ Results and Discussion

Microentrepreneurial structures, due to their mobile management system and compact production, are more adapted to activities in wartime conditions. Therefore, in the future, it is necessary to promote the development of microentrepreneurial structures, private household plots, and family farms, which are represented by niche products, to ensure the preservation of jobs and environmental protection. In the conditions of martial law, the perspective of the institution of self-sufficiency and the provision of food aid to other citizens increases, and the development of rural social capital also gains priority.

The number of employed employees of microenterprises in 2021 compared to 2016 increased by +6.66%, while individual entrepreneurs decreased by -7.78%. In 2021, agricultural microenterprises employed 129,640 employees. Until 2018, there was a tendency to increase their number. The level of profitability in 2021 was 35.3% (Table 1) (State Statistics Service…, 2023).

In 2021, microenterprises of agriculture ensured the sale of products in the amount of UAH 120,252.924 million with the highest level of profitability of all activities of 35.3% (Table 1).

Table 1. Main indicators of the functioning of the microentrepreneurs of the agricultural economy of Ukraine

Indicators	2016	2017	2018	2019	2020	2021	2021 in % to 2016
Number of active entities, units	36,096	40,943	41,271	40916	40503	**38,663**	**+7.11**
Number of employed workers, people	92,765	100,217	99,851	94,537	93,356	**129,640**	**+39.75**
share in the total number of microenterprises, %	3.30	3.49	3.29	2.98	3.01	**4.14**	**+0.84**
Volume of products sold, mln UAH	53,410.504	63,215.048	71,143.889	76,615.937	89,853.409	**120,252.924**	**+125.15**
share in the total number of microenterprises, %	6.58	6.01	5.50	5.35	5.43	**5.58**	**-1**
share in the total number of enterprises in the industry, %	c/s	14.13	13.78	c/s	c/s	**c/s**	**c/s**
Volume of goods produced, mln UAH	57,918.058	68,749.237	79,988.912	85,842.992	95,156.463	-	**+64,29****
share in the total number of microenterprises, %	10.95	9.73	9.13	7.71	7.09	-	**-3.86****
share in the total number of enterprises in the industry, %	c/s	13.66	13.53	c/s	c/s	**c/s**	**c/s****
Personnel costs, mln UAH	1,977.0773	2,284.022	3,912.1203	4,120.3941	4,513.6854	**4,891.088**	**+147.39**
Labour costs, mln UAH	1,542.6692	1,797.8872	3,072.554	3,241.6429	3,550.2032	**3,798.970**	**+146.26**
Net profit, mln UAH	10,084.756	4,026.056	4,881.165	5,807.906	10,678.756	**25,099.756**	**+148.88**
Equity at the end of the year, mln UAH	42,248.451	45,280.133	40,822.439	65,751.001	82,042.613	**97,282.378**	**+130.26**
Level of profitability of operating activities, *%	33.5	24.5	16.5	15.7	18.2	**38.2**	**+4.7**
Level of profitability of all activities, *%	26.9	7.8	7.9	9.0	15.3	**35.3**	**+8.4**

Note: * – agriculture, hunting, and provision of related services; ** – 2020 in % by 2016; c/s – data are not made public to ensure compliance with the requirements of the Law of Ukraine "On State Statistics" regarding the confidentiality of statistical information (primary and secondary blocking of vulnerable values). It is presented without considering the results of the activities of banks and budgetary institutions, 2016-2021

Source: State Statistics Service of Ukraine (2023)

It has been established that in recent years (2017-2021) there has been an increase in the sale of products by microentrepreneurs. In 2021, compared to 2020, the production of cereals, legumes, and oilseeds in crop production increased by +33.42%. In animal husbandry, animal breeding increased by +8.73%. In 2021, compared to 2020, the production of cereals, legumes, and oilseeds in crop production increased by +33.42%. In animal husbandry, animal breeding increased by +8.73% (Table 2).

Table 2. Volume of products sold by microenterprises in agriculture, mln UAH, in 2017-2021

Indicators	2017	2018	2019	2020	2021	deviation of 2021 in % to 2017
crop production, cultivation, incl.:						
annual and biennial crops	49,289.6	55,433.0	60,004.6	70,999.8	94,568.3	**+91.86**
cereals (eXcept rice), legumes and oilseeds, **incl.:**	48,487.2	54,723.6	59,117.9	69,890.7	93,248.0	**+92.31**
vegetables and melon crops, roots and tubers	617.5	591.4	669.8	875.4	1,042.3	**+68.79**
hemp crops	c/s	26.1	11.1	16.2	22.0	**-15.71***
other annual and biennial crops	115.9	74.1	120.6	173.3	237.9	**+105.26**
perennial crops	686.8	736.7	877.2	1,149.7	1,584.5	**+130.71**
grapes	92.2	95.5	47.8	34.1	105.6	**+14.53**
seed and stone fruits	348.7	443.1	363.9	546.9	763.5	**+118.96**
berries, nuts, and other fruit trees	203.1	159.2	399.9	460.5	621.4	**+205.96**
other perennial crops	19.7	18.3	11.9	25.4	20.2	**+2.54**
plant reproduction	88.5	134.6	135.1	129.2	242.3	**+173.79**
animal husbandry, breeding, incl.:	1,580.6	1,775.4	1,589.5	1,886.9	2,051.7	**+29.81**
Dairy cattle	406.3	582.7	446.6	490.9	558.3	**+37.41**

Table 2, Continued

Indicators	2017	2018	2019	2020	2021	deviation of 2021 in % to 2017
other cattle and buffaloes	201.2	129.9	104.8	119.9	117.1	**-41.80**
horses and other animals of the equine family	3.0	5.2	6.9	5.5	22.1	**+636.6**
sheep and goats	53.9	46.7	72.8	23.1	89.6	**+66.23**
pigs	358.9	476.7	472.0	544.5	446.1	**+24.29**
poultry	476.4	436.7	402.7	619.9	648.9	**+36.21**
other animals	80.7	97.5	83.6	82.9	169.5	**+110.0**
supporting activities, including in the following areas: agriculture and post-harvest activities	710.8	1,014.8	1,225.5	1,382.5	1,954.8	**+175.0**
crop production	767.4	1,066.6	1,090.5	1,169.3	1,675.5	**+118.3**
animal husbandry	52.10	42.7	41.9	39.5	50.1	**-3.84**
post-harvest activities	88.9	76.9	107.3	104.2	137.1	**+54.2**
mixed agriculture	914.2	752.6	838.0	988.2	1,422.2	**+55.56**
seed treatment for reproduction	106.4	39.4	56.7	69.5	92.1	**-13.44**

Source: State Statistics Service of Ukraine (2023)

During the study, a functional dependence was found between the volume of agricultural products sold by active microentrepreneurs and the net profit for 2016-2021 in mln UAH, at constant prices of 2016 (Table 3). To identify the dependence between agricultural products produced by microenterprises and net profit, we will calculate intermediate indicators (Table 4).

Table 3. Initial data for establishing the relationship between profit and product volume indicators

Indicators	2016	2017	2018	2019	2020	2021
Agricultural products, **Xi**	53,410.504	63,215.048	71,143.889	76,615.937	89,853.409	**120,252.924**
Net profit (loss), **Yi**	10,084.756	4,026.056	4,881.165	5,807.906	10,678.756	**25,099.756**

Source: State Statistics Service of Ukraine (2023)

Table 4. Calculated values of intermediate indicators for establishing a linear dependence function

	x_i^2	x	y	y^2	$x_i y_i$
2016	2,852,681,937.5	53,410.5	10,084.7	101,702,303.6	547,708,181.1
2017	3,996,142,293.6	63,215.0	4,026.1	16,209,126.9	254,507,323.3
2018	5,061,452,942.0	71,143.9	4,881.2	23,825,771.8	347,265,060.9
2019	5,870,001,802.4	76,615.9	5,807.9	33,731,772.1	444,978,160.2
2020	8,073,635,108.9	89,853.4	10,678.7	114,035,829.7	959,522,630.5
2021	14,460,765,730.5	120,252.9	25,099.8	629,997,751.3	3,018,319,050.7
Σ	**40,314,679,814.9**	**474,491.7**	**60,578.4**	**919,502,555.4**	**5,572,300,406.7**

Source: author's development using the Eqs. (1, 2)

The desired equation has the following form:

$$y = 0{,}2456 \times x - 9120{,}5 \quad (1)$$

$$a_1 = 0{,}2456;\ a_0 = -9120{,}5 \quad (2)$$

Consequently, with an increase in the volume of agricultural products sold by microentrepreneurs by UAH 1 million, net profit increases by UAH 0.2456 million. The parameter a_0 (in our example -9120.5) as a free member of the equation has only a calculated value and is not interpreted.

The following average values of agricultural products and net profit (loss) were established: $\bar{x} = 79081{,}9$; $\bar{y} = 10096{,}4$.

To find the density of the connection between the factor and result features, we will calculate the coefficient of correlation and determination (Table 5).

Calculation results using Eq. (3):

$$\sigma_x = \sqrt{\frac{2790948746{,}8}{6}} = 21567{,}52.$$

$$\sigma_y = \sqrt{\frac{307879307{,}1}{6}} = 7163{,}32.$$

The results of calculations using Eq. (5):

$$r = \frac{5}{6} = 0{,}8333.$$

The results of calculations using Eq. (6):

$$d = r^2 = 0{,}6944.$$

Table 5. Calculated values of intermediate indicators for determining Pearson's correlation coefficients and determination

	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$	t_x	t_y	$t_x t_y$
2016	-25,671.4	-11.7	659,020,777.9	136.9	-1.19	-0	0
2017	-15,866.9	-6,070.3	251,758,515.6	36,848,542.1	-0.73	-0.85	0.62
2018	-7,938	-5,215.2	63,011,844	27,198,311.0	-0.37	-0.73	0.27
2019	-2,466	-4,288.5	6,081,156	18,391,232.2	-0.11	-0.60	0.07
2020	10,771.5	582.3	116,025,212.3	339,073.2	0.50	0.08	0.04
2021	41,171	15,003.4	1,695,051,241	225,102,011.5	1.91	2.09	4
Σ			**2,790,948,746.8**	**307,879,307.1**			**5**

Source: author's development based on Eqs. (3,5,6)

Given that the value of the correlation index approaches 1, we can conclude that the influence of other factors in 2016-2021 on the analysed population is not very significant. In 2016-2021, among existing individual entrepreneurs: their number decreased by only -19.53%; the volume of products sold (goods, services) increased by +119.89%; the number of employees also increased by +27.25% (Table 6).

Table 6. Some key indicators of the functioning of e*X*isting individuals-entrepreneurs in microenterprises in agriculture

Indicators	2016	2017	2018	2019	2020	2021	2021 in % to 2016
Number of active entities, units	23,460	21,205	20,927	20,339	19,357	**18,879**	**-19.53**
Number of workers employed by individuals-entrepreneurs, people	31,351	30,070	c/s	30,436	29,046	**28,913**	**-7.78**
share in the total number of individuals-entrepreneurs, %	1.44	1.39	c/s	1.27	1.22	**1.23**	**-0.21**
share in the total number of individuals-entrepreneurs in micro enterprises of the industry, %	96.8	96.1	93.8	93.8	93.9	**94.9**	**-1.9**
Volume of products sold, mln UAH	8,380,886.2	9,640,485.3	11,057,041.0	11,875,273	13,317,137.6	**18,429,211.1**	**+119.89**
share in the total number of individuals-entrepreneurs, %	1.86	1.74	1.60	1.45	1.41	**1.43**	**-0.43**
share in the total number of individuals-entrepreneurs in micro enterprises of the industry, %	97.3	96.3	94.8	94.9	94.1	**95.9**	**-1.4**

Source: State Statistics Service of Ukraine (2023)

The largest financial losses were experienced by micro, small, and medium-sized business entities that are focused on the production of niche products. Almost half of the products are produced by private household plots (PHPs), micro and small producers. In 2020, retail and wholesale markets, public catering establishments that are the main sales channels for products, especially fruits and vegetables, greens,

and meat and dairy products, were shut down. Two components decreased – the gross accumulation of fixed capital and the change in stocks of tangible working capital. Due to the massive shutdown of markets, farmers suffered considerable losses.

The principal role in the preservation and development of local markets and food supply chains is played by farmers and private household plots. Private household plots function for the existence of the producer itself, and not just for profit and rent. The development of farmers and private farms will contribute to ensuring the adaptation of the agricultural structure of Ukraine to the EU (National Academy…, 2022).

In 2021, there were 3,921.5 thousand PHPs in Ukraine, using 6,120.0 thousand hectares of land, producing a significant share of gross agricultural production (32.0%). The largest share in the production of certain types of products is occupied by the production of potatoes (97.7%), vegetables (85.9%), fruit (79.2%), milk (68.2%), raising livestock (29.4%) (Table 7) (State Statistics Service…, 2023).

Table 7. General characteristics of private farms, 2017-2021

Indicators	2017	2018	2019	2020	2021	2021 in % to 2017
Number of households in rural areas, thous. units	4,900.1	4,873.6	4,844.2	4,782.1	**4,734.1**	**-3.39**
Number of PHPs, thous. units	4,031.7	3,996.5	3,975.1	3,954.8	**3,921.5**	**-2.73**
Land area owned by PHPs, thous. ha, incl.:	6,175.6	6,132.2	6,133.6	6,125.7	**6,120.0**	**-0.90**
for construction and maintenance of residential buildings, outbuildings and structures, thous. ha	793.3	791.0	788.3	787.0	**777.1**	**-2.04**
for private household farming, thous. ha	2,551.3	2,513.4	2,512.6	2,517.7	**2,544.2**	**-0.28**
for commercial agricultural production, thous. ha, of which:	2,799.3	2,777.1	2,781.8	2,772.6	**2,735.3**	**-2.29**
leased, thous. ha	338.5	345.0	348.2	350.9	**367.1**	**+8.45**
The average size of the land area of the household, ha	1.23	1.20	1.19	1.18	**1.24**	**+0.81**
The average land area of the PHP, ha	1.532	1.534	1.543	1.549	**1.561**	**+0.03**
Gross agricultural production, billion UAH	279.393	314.904	311.302	326.604	**437.539**	**+56.60**
The share of households in gross agricultural production, %	39.5	37.2	36.9	36.6	**32.0**	

Source: Socio-demographic characteristics… (2023)

Therewith, the main objective prerequisite for the dynamics of rural households is the demographic crisis in rural areas, which is expressed in a tendency to reduce the size of the rural population and its economically active part. Thus, from 2017 to 2021, the number of economically active people aged 15-70 years decreased from 5,602.2 thousand people to 5,414.9 thousand people (by -3.34%). During 2016-2021, the area of land used in terms of 1 PHP was 1.5387 ha. Analysis of PHP dynamics allows making a trend forecast for 2024-2030. According to the forecast, the number of PHPs in 2030 maybe 3,753.4 units (Fig. 1) (State Statistics Service…, 2023).

Considering the positions of local self-government, it is important to form a balanced socio-economic activity of rural communities, which is ensured if there is an optimal number of business entities in terms of types of business in agriculture. Therewith, it is important to have a different scale with priority support for farms and subsidiary farms, various forms of cooperation as integration structures for organizing joint activities (Table 8).

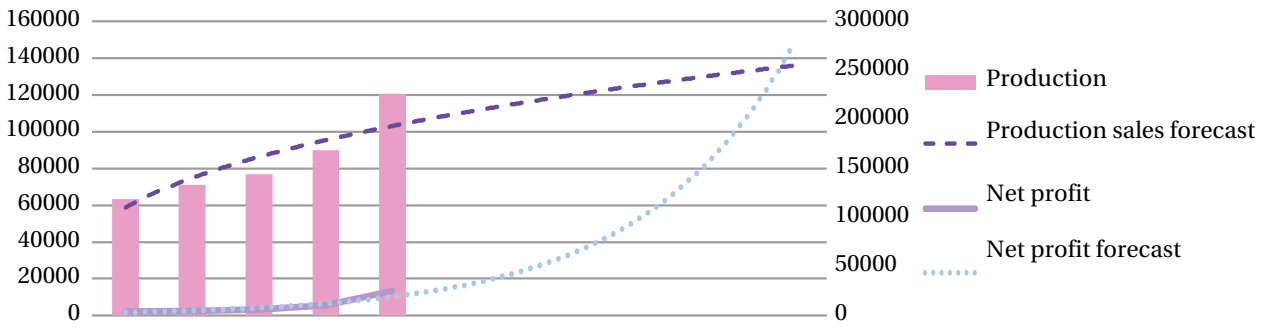

Figure 1. Forecast of changes in agricultural products sold by microentrepreneurs and net profit in 2030 (mln UAH; in constant prices of 2016)

Table 8. Dynamics of the number of entrepreneurs according to forms of management in agriculture for 2027, thous. units

Entrepreneurs	2016	2017	2018	2019	2020	2021	2030 forecast	2021 in % to 2016
Number of agricultural enterprises, as of 01.11 of the corresponding year, incl.:	47,697	45,558	49,208	48,504	47,523	45,661	**44,628**	**-4.27**
Family farms	-	-	-	64	48	151	**953**	
Household plots	4,075.2	4,031.7	3,996.5	3,975.1	3,954.8	3,921.5	**3,753.4**	**-3.77**
Individuals-entrepreneurs	23,458	21,201	20,922	20,337	19,354	18,876	**24,236**	**+3.59**

Source: State Statistics Service of Ukraine (2023)

As a result of the military operations, 1.5 million citizens need aid in resuming their activities in agriculture. The Food and Agricultural Organization of the United Nations (FAO) in 2023, to resume work in agriculture, plans to help restore its activities and directs USD 205 million for this. In 2022, 40,000 households in rural areas have already received the aid, but USD 100 million is still planned to be directed in 2023 to support households (FAO will allocate…, 2023; Small agricultural producers…, 2022).

As of January 2023, the Entrepreneurship Development Fund has already concluded cooperation agreements with banks regarding the implementation of the State Program "Affordable Loans 5-7-9%" (During the period…, 2023). Microentrepreneurs can receive a loan for investment purposes for the restoration of production facilities (destroyed or stolen partially or completely due to extreme operating conditions) in the amount of up to UAH 60 million (at 7% with the possibility of a reduction for investment loans to 5%;) for a term up to five years; state subsidy; technical support loan from state donors; targeted credit. In 2022, according to the State Program, "5-7-9% Affordable Loans", by Resolution of the CMU No. 916 of July 29, loans to business entities for seed companies (at 0%) in the amount of 95.5 billion were extended to 12 months UAH, with UAH 24.722 billion received under state guarantees (80%) (The government has…, 2022). In March 2023, according to the state program, banks (about two-thirds of them were state-owned) issued 511 preferential loans for a total amount of UAH 1.9 billion. The total number of loans issued since the beginning of large-scale military operations on the territory of Ukraine under the program exceeded 23 thousand, and their volume amounted to almost 92 billion UAH (The government has…, 2023).

There are no funds to support the development of entrepreneurs in agriculture in the country's budget for 2023. However, the state can provide compensation, grants, or loans if necessary. For instance, in August 2022, Switzerland allocated almost UAH 100 million for the affected 296 milk-producing farms in the Kharkiv, Sumy, Chernihiv, and Kyiv regions (FAO will allocate…, 2023).

To develop microentrepreneurship, among the existing grant programs from international donor organizations, the following should be noted.

1. Training in social entrepreneurship (the possibility of attracting a grant to scale the business).

2. Competition for female entrepreneurs "Created by women – 2023" (the possibility of attracting 100 000 UAH for the development of their business).

3. Science&Business – GIST Pitch Days (an opportunity for entrepreneurs to receive support for innovation development; 24 winning projects will receive assistance from GIST in the amount of USD 5,000).

4. Competitive advice from KSE Graduate Business School on adapting to war conditions for at least 100 entrepreneurs.

5. Express online incubator for the creation and development of social enterprises from SILab Ukraine and the Ukrainian social venture fund.

6. Compensation from the German MSME Government up to 30% of the investment value (in general, an initial amount of EUR 1.3 million is available for grants; the total program budget is EUR 2.4 million).

7. Leverist.de – a digital platform for finding business partners in EU countries (Grants for business…, 2022).

8. "Make your own – 2023" – a grant competition for microentrepreneurs, within the framework of which projects were financed for a total amount of UAH 6.2 million (The year of indomitability…, 2023).

9. "Own business – 2023" – support of 7,000 micro-businesses (1.8 billion UAH). The grant amount is from 50 to 250 thousand UAH for the purchase or leasing of equipment, purchase of raw materials, rental of premises (Grants for business…, 2022).

Within the framework of the "e-Robota" grant program, it is planned to create new jobs (632 permanent, 9,000 seasonal) in the development of greenhouses and gardens in 2023. The decision on the procedure for providing grants for the creation or development of viticulture, horticulture, and berry growing and the procedure for providing grants for the creation (development) of greenhouse farming is prescribed by Resolution of the CMU No. 39 of January 17, 2023 (IOM grant program…, 2023). The issue regarding the transfer of funds to recipients from the general fund of the state budget has been resolved.

The program of USAID-agro (US Agency for International Development) on agrarian and rural development is calculated until 2024. The implementation of the program allows supporting 3 thousand

producers from the regions of the country that suffered from the russian-Ukrainian war.

The total cost of the program is USD 35 million. In addition, the Agriculture Resilience Initiative (AGRI) project "Agricultural Resilience Initiative in Ukraine" is being prepared for implementation. Its total cost is USD 100 million. It was established that the purpose of implementing this project is to strengthen the mechanisms for exporting agricultural products. Furthermore, in 2023, it is planned to implement the USAID-agro project "Increasing the capacity of demonstration farms to ensure food security in Ukraine". The overall purpose of the project is to attract subgrants for the development of production for post-harvest preparation, processing of vegetables, fruits, and berries, meat, dairy products, poultry (except chicken), or aquaculture products (Agriculture Resilience Initiative – Ukraine, 2023).

The amount of the grant "Development of small and medium-sized enterprises: economic integration of internally displaced persons and business recovery" for micro-enterprises from the Government of Germany is up to EUR 20,000. Within the framework of this project, the amount of one-time grants is up to EUR 4,500. May 2022 was the first competition for microenterprises in the Zakarpattia, Lviv, Kyiv, Chernihiv, and Sumy regions. Support was provided to 62 microenterprises. October 2022 - second contest. Support was implemented for 188 microenterprises in these regions and from Ivano-Frankivsk, Ternopil, and Poltava regions. The third competition is to be held in spring 2023 (IOM grant program…, 2023).

Non-refundable grants for the creation of greenhouses and gardens. The total budget of the program is UAH 7 billion. In 2023, the Ministry of Agrarian Policy signed 98 orders on the allocation of grants for the development of gardens and greenhouses, totalling UAH 472.3 million. 86 grants were approved for UAH 388.4 million in gardens and 12 grants for UAH 83.9 million in greenhouses. Support for viticulture and berry growing is also provided. For the horticulture grant, the conditions for obtaining funds are the official and transparent purchase of seedlings, equipment, irrigation systems, fertilizers, etc.; garden area – from 1 to 25 ha; own land or land in use for at least 25 years. For the greenhouse grant, the maximum grant amounts are as follows: 1.6-2.4 ha – UAH 7 million; 0.8-1.2 ha – UAH 3.5 million; 0.4-0.6 ha – UAH 2 million (The Ministry of Agrarian…, 2023). The Keep Going project is a platform for helping micro and small businesses. Impulse monetary and informational support for micro-business owners is also planned. (National platform of small…, 2023).

It is also possible to receive non-refundable aid for microentrepreneurs registered in the State Agrarian Register in the amount of UAH 5,300 for each cow owned by the recipient (but not more than UAH 530,000); UAH 3,100 per hectare of cultivated agricultural land (but no more than UAH 372,000). The total amount of funding by the European Union is over UAH 2.5 billion (EUR 50 million) (Ukrinform, 2023).

The study of theoretical, methodological, and practical principles of adaptation of microenterprises of the agricultural sector of the economy to functioning in wartime conditions is a common issue. These issues are discussed in different interpretations in scientific publications.

It has been established that the imperfection of forms of social capital prevents the involvement of microenterprises in agriculture in integration processes (Yatsiv and Solovei, 2019). M. Odnorog *et al.* (2019) proved that business entities are most adapted to extreme operating conditions, and the functioning of inefficient institutions in the state reduces the standard of living of the villager and the protection of property rights.

It was found that the general strengthening of the material and technical condition, optimization of the size of land use, use of modern production technologies, increasing the capitalization of private household plots, and the activation of their transformation into family farms are one of the main areas of the development of microentrepreneurship. The approach of T. Ivanyuk *et al.* (2020) is noteworthy, who argued that the start-specialization mechanism should be implemented during the cooperation of farmers' associations as an opportunity for supplementary financing of development, considering the characteristics of resources and the territorial system of functioning.

V. Hrosul *et al.* (2021) developed the concept of the economic core of the development of a business entity; identified strategic components of the development of entrepreneurship; proved that the component of resource potential provides the size of the resources required for the subject; found that the component of the business model most increases the efficiency of the functioning of the subject of agricultural entrepreneurship. O. Semenenko *et al.* (2021) identified the basics of the military-economic importance of agriculture for the use of food resources for military purposes and developed recommendations regarding the importance of agricultural development indicators in the formation of the military-economic potential of the state. Semenenko analysed the impact of the armed conflict on the development of business entities and changes in the average prices of agricultural products; determined the relationship between the change in the sale price of products and financial costs for defence needs; established a connection between the change in the volume of military expenditures, the gross collection of grain and leguminous crops, the harvested and threshed area, and their productivity levels.

I. Vinichenko *et al.* (2021) revealed the criteria for evaluating the components of the efficiency of using the resource potential of business entities in agriculture; determined the integral indicator of efficiency (quantitative and qualitative characteristics of the involved resources, productivity, and efficiency) of the principal types of activity of business entities on agricultural land. E. Kharaishvili and M. Suknishvili (2021) identified and substantiated

the factors restraining the development of business entities in agriculture. They also emphasized that farms that are not united in cooperatives have a lower level of adaptation to extreme survival conditions. V. Roshylo (2023) proved that sustainable house-hold functioning expands the socio-economic po-tential for developing a country's economic security.

As for food security, J. Junaidi *et al.* (2022) found that its level in households growing food crops is high compared to households growing plantations. Half of such households are classified as food secure, while only about 20% of plantation crop households fall into this category.

O. Kyrylenko *et al.* (2022) identified certain approaches of Ukrainian scientists, the methodology of the State Statistics Service of Ukraine for estimating and determining household expenses. The Engel coefficient was chosen as an indicator for estimating the financial condition of a household with calculated values.

S. Maryam *et al.* (2022) proved that microenterprises in agriculture are the main platform for the country's national sustainable development. H. Molnar (2021) and Yu. Lupenko *et al.* (2022) revealed the priority areas of development of business entities in agriculture; which justified the need to increase Ukraine's investment potential. Subjects of agricultural entrepreneurship are quite sensitive to extreme states of the economic system, transformational shocks, and wartime states. When observing the main aspects of the market environment, the model of behaviour chosen by the business entity in the environment of functioning in wartime conditions is of great importance. For an individual business entity in the agricultural sector of the economy, adaptation processes are revealed at the level of response to external changes (Kravchenko *et al.* 2022).

When a business entity in the agricultural sector of the economy is faced with a new type of instability, its staff implements the process of adaptive change management. Under certain socio-economic and political circumstances, the problem of survival of a business entity is the loss of its market niche capacity. An adaptive approach to management in the languages of wartime is associated with the development and application of strategies for reflecting the effects of the consequences of the war by the business entity and its structures, the optimal management strategy options are chosen in the management decision-making system (Malik *et al.* 2022).

V. Rudenko *et al.* (2022) covered the impact of the fiscal mechanism on household investment activity. The tax burden on individual entrepreneurs was calculated and the need to improve the fiscal mechanism of their functioning was established. R. Skrynkovskyy *et al.* (2022), and S. Ierokhin *et al.* (2022) substantiated that to optimize the information and financial flows of the business entity, it is necessary to use the quality function. A multiplicative criterion of management effectiveness (about risk management, specifically innovation) for the task of maximizing the profit of a business entity is proposed, which contains methods for determining the level of quality of development of a business entity and managing the development of a business entity. It was determined that the level of quality of development of a business entity depends on the level of satisfaction of consumers' needs with finished products; defect-free production; and the level of rhythmicity.

M. Ilchuk *et al.* (2023) were the first to propose a mechanism of environmental taxation for agricultural enterprises that violate the scientifically sound structure of acreage, to suspend the adverse processes of soil degradation and stabilize the agroecological situation in the country. Proposals have been developed to introduce a tax on the consumption of energy resources by creating a model of the mechanism for taxation of carbon taxes on fossil fuels.

D. Nemish (2022) found that to solve the problems of regulating the Ukrainian agricultural sector, it is necessary to consider the main aspects of the development of small agricultural entrepreneurship during its implementation. V. Antoshchenkova *et al.* (2023) developed an economic-mathematical model that allows determining the optimal raw material zone of the procurement entity of the enterprise based on the criterion of the minimum transport expenses for the delivery of raw materials. The optimal structure of production is also determined according to the criterion of minimum technological costs for processing raw materials in the production of various types of products, considering the volume of consumer demand. The rational distance of producers from the business entity was determined at a distance of 46-56 km in the region. L. Kucher *et al.* (2023) were the first to assess the readiness of business entities to implement and manage innovative projects. The current state and industry features of readiness to implement innovative projects in general and in the context of large, medium, small, and microenterprises were identified. It was found that in crop production, small business entities were distinguished by a relatively high level of readiness for the implementation of innovative projects. It was proved that in general, in the industry and animal husbandry, large business entities have a higher integral indicator of readiness to implement innovative projects than medium and small enterprises. H. Sanikidze (2021) clarified the theoretical and legal aspects of the development of agricultural cooperatives, factoring in the introduction of new principles of their activity.

The conducted research showed that the transformation of the agricultural sector, the functioning of rural areas, as well as the lengthy period of their adaptation to market conditions, generally contributed to the development of cost-effective forms of entrepreneurial activity. Non-agricultural business entities have also become widespread in rural areas.

The effective development of entrepreneurship as the main driving force in the development of the country's economy depends on the state of

the entrepreneurial environment. The conditions of martial law have a considerable impact on socio-economic and political instability. Such conditions of activity of business entities set new requirements for the development of an effective system of adaptation of the organizational and economic mechanism of management to the conditions of martial law. The practice of economic structures in wartime conditions has shown certain advantages of the functioning of small and medium-sized business structures in comparison with larger ones, such as agricultural holdings. Microentrepreneurial structures have managed to adapt faster to the extreme conditions of organizing the production, storage, and marketing of agricultural products.

Substantial obstacles to the development of microentrepreneurial structures in the countryside are still the orientation of most state programs in the field of agriculture and rural development towards the support of large producers; certain risks associated with starting a business, a low level of identification and liquidity of property objects, which practically exhausts their value with the costs of compulsory charges; the inadequate level of development of systems of informational and advisory support for entrepreneurship in rural areas. Agricultural advisory services do not receive sufficient state support.

▸ Conclusions

The conducted assessments of trends in the development of microentrepreneurial structures confirmed their special socio-economic importance as quickly responding to changes in the business environment under martial law. The effectiveness of their economic activities was covered. The implementation of the marketing strategy of microenterprises in the face of the complexity of logistics components caused by military operations, along with financial support, is the key element of management of microenterprises.

The study results indicate that the activity of microentrepreneurial structures in wartime conditions ensures the performance of their functions. Microentrepreneurial structures, due to their mobile management system and compact production, are more adapted to activities in wartime conditions. In the system of ensuring food security, the importance of niche products is growing, the activation of production of which requires inclusion in the priority areas of regional and national policy.

It was established that the purpose of the strategy for the development of private farms and family farms in the post-war period is to increase the efficiency of management that can ensure income growth. It was substantiated that the development of private farms and family farms provides a substantial increase in added value through the processing of agricultural raw materials, innovative renewal of production, and infrastructure. In further research, there is a need to clarify the strategic areas and principles of microenterprise development. Furthermore, they require support to accelerate the integration of the Ukrainian agricultural sector into the global economy. Such research may include the development of content and terms for enhancing the involvement of microentrepreneurial structures in the restoration and acceleration of the post-war development of the Ukrainian economy. Attention should be paid to the increased involvement of local self-government bodies in the processes of supporting the activities of private farms and family farms. For this, it is necessary to develop state and regional programs for the development of private household plots and family farms for the period up to 2030, under the determination of the priority vectors of their development in Ukraine.

The reasons that hinder the development of microenterprises are the low level of technical and technological support; insufficient awareness of the population about the opportunities and benefits of creating family farms. Furthermore, there is an insufficient level of opportunities to attract financial resources and investments for the functioning and development of microentrepreneurs. The lack of a holistic and consistent policy aimed at the integrated development of rural areas, which is based on the needs of territorial communities of the village and settlement, and the support of microenterprises, has a negative impact.

A key factor in the further development of microentrepreneurs is national support for starting one's own business, protecting property rights, and employment, spreading financial literacy, and increasing export potential.

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None.

▸ Conflict of Interest

None.

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Розвиток суб'єктів мікропідприємництва у сільському господарстві в умовах воєнного часу

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▸ **Анотація.** Мікропідприємницькі структури в сфері виробнитцва сільськогосподарської продукції створюють нові робочі місця, володіють адаптивним потенціалом для формування стабільних продовольчих систем та виживання. **Мета статті** – обґрунтувати теоретико-методологічні засади та соціально-економічні проблеми діяльності суб'єктів мікропідприємництва у сільському господарстві в умовах воєнного стану. **Методика дослідження**. За методологічну основу дослідження слугували положення системного аналізу. Використано монографічний, нормативний, графічний, абстрактно-логічні методи та підходи узагальнення результатів. **Результати дослідження**. Визначено місце мікропідприємств у системі "виробництво – розподіл – обмін – споживання". Вони здатні креативно сприяти досягненню критеріїв сталого розвитку, формувати сталі агропродовольчі ланцюги, гарантувати самозабезпечення харчовими продуктами, розвивати локальні нішеві ексклюзивні виробнитцва, забезпечити самозайнятість сільського населення. Встановлено, що мають можливість реалізувати свою діяльність і особисті селянські господарства, які організували сімейне фермерське господарство і зареєструвалися як фізичні особи-підприємці. Виявлено, що найбільш адаптованими до кризових умов, пов'язаними з воєнними діями, є сімейні фермерські і особисті селянські господарства. Проте відсутність стабільних каналів збуту продукції мікропідприємств, низький рівень закупівельних цін та значне підвищеня цін в зв'язку з воєнними діями на енергоресурси, техніку, добрива, засоби захисту рослин робить виробництво малоефективним. Одним з пріоритетних напрямів регіональної політики залишається розвиток сімейного фермерства, малого та мікробізнесу на селі. **Практична значущість**. Результати дослідження можуть бути враховані при розроблені регіональних програм розвитку суб'єктів аграрного підприємництва

▸ **Ключові слова:** суб'єкт підприємництва; мікропідприємницькі структури; сімейне фермерське господарство; особисте селянське господарство; сільськогосподарський кооператив; приватні підприємства

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Monitoring of the aggregate level of economic efficiency of agricultural enterprises in Ukraine: Factors of influence and growth prospects

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▸ **Abstract.** The efficiency of agricultural enterprises is determined by the synergistic influence of an entire set of various factors. Improvement and testing of methodological support for factor-complementary diagnostics of the level of economic efficiency of business entities in modern conditions is still an urgent issue. The purpose of this study was to comprehensively monitor the level of economic efficiency of agricultural enterprises in Ukraine and measure the degree of influence of priority factors on the aggregate efficiency indicator. The study involved several methods: abstract-logical, comparative analysis, tabular, statistical, matrix-coordinate method, calculation-constructive, monographic, factor analysis. It was established that during 2015 and 2021, this aggregate indicator increased by 47% – from 15.07 to 22.13 points. Among the factors that had a positive effect on the established growth of the overall indicator of economic efficiency, the largest rating coefficients have: an increase in labour productivity (1.5852), a more than two-fold increase in the amount of net profit of agricultural enterprises (1.0931), a 2.2-fold increase in the coefficient financing (0.905), a 1.9-fold increase in the loan capital turnover ratio (0.8754) and an almost 3-fold increase in its profitability (0.8587), an increase in the receivables turnover index (0.7899) and a two-fold increase in the absolute liquidity index (0.7500). The following influencing factors had the most negative effect on the level of the overall efficiency indicator: a 23% decrease in the fund return indicator (-0.6005), a 17% decrease in the quick liquidity ratio (-0.4944), a 26% deterioration in the profitability of fixed assets (-0. 4642), a decrease in turnover and profitability of the equity capital of agricultural enterprises (-0.4653 and -0.4426, respectively). The practical significance of this study is determined by the improvement of methodological tools for measuring and diagnosing the aggregate level of economic efficiency of business entities, which can be useful in the management practice of organizing monitoring and developing areas for improving the economic efficiency of agricultural enterprises

▸ **Keywords:** economic efficiency; dynamics; additive model; profitability; financial stability

▸ Introduction

The economic mechanism of efficiency of agricultural enterprises is formed, on the one hand, based on the versatility and variety of forms of its manifestation, and on the other hand – through variable combinations of various priority factors of influence. Efficiency assessment should factor in the various manifestations of practice and results of economic activity of agricultural enterprises as comprehensively as possible. The variety and specificity of measurement forms when comparing the effect

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with the resources spent on obtaining it require improvement of methodological tools for comprehensive assessment and dynamic diagnostics of the level of economic efficiency of agricultural enterprises.

The essence and versatility of the manifestation of efficiency is conditioned upon the existence of many types of effect and the variety of costs (resources) that cause their occurrence. Its measurement requires having a quantitatively expressed effect (result) and resources (costs). When proving economic problems that are solved in conditions of possible sufficient provision of economic activity with appropriate resources, the maximum effect is achieved with a focus on the marginal cost of the resource and the cost of the marginal product. According to their comparison, a decision should be made on the appropriate limit of resource consumption, at which such an economic effect is achieved.

Each enterprise operates under an entire system of factors. Assessment and consideration of this impact during business planning, development strategy formation and substantiation of the national policy in the field of agriculture is a necessary condition for achieving success in business activities.

Among foreign scientists, E. Gunes, & H. Guldal (2019) made a significant contribution to the study of the problems of increasing the economic efficiency of agricultural enterprises, who carried out a thorough investigation aimed at determining the efficiency of agricultural enterprises in Turkey due to the variable use of capital and credit resources. The authors measured and established a close relationship between the indicators of credit resource use and the level of overall economic efficiency of farmers.

N. Bachev (2022) conducted a quantitative assessment of the effectiveness of farm management, identified the main factors that reduce the efficiency of farms in Bulgaria. Among the most influential authors, the author highlights the lack of material, technical and innovative support for agricultural labour, the imperfection of the policy of minimizing transaction costs, and the need to increase the level of national support for small-scale farming.

A. Gaviglio *et al.* (2021) evaluated the technical efficiency and productivity of suburban farms specializing in crop and livestock production. Differentiation of the levels of economic efficiency of farms is determined precisely by their industry specifics. The results of the study show that crop farms are more efficient than livestock farms, but have less productive technology. Attention is focused on the need to develop a policy to improve the level of education of farmers and national support for farm efficiency.

H. Alem *et al.* (2018) investigated the economic efficiency of Norwegian crop farms using stochastic frontier analysis. The results of the analysis indicate that the average efficiency was approximately 78-81%. The authors proved that the level of farm efficiency is determined by the practice of crop rotation and land use management, national support, and the level of non-agricultural activities. All this has a positive impact on the dynamics of production costs on crop farms.

Analysis of economic results and evaluation of production efficiency in farms specializing in field crops and classified by economic size is presented in the study by A. Skarzhinskaya (2019).

The functioning of agricultural enterprises is characterized by instability, a considerable degree of risk, as well as the adverse impact of a changing external environment. This has become especially acute with the outbreak of a full-scale war and adversely affects the performance indicators of economic activity.

In the conditions of constant changes in the external environment, the problems of formalized assessment of factors affecting the overall level of economic efficiency of agricultural enterprises and forming the microenvironment of their development become relevant.

At the same time, the study of methodological aspects of determining the economic efficiency of agricultural enterprises in the context of highlighting the impact of priority factors is represented by individual studies, where attention is focused mainly on individual factors without consideration of their complex impact. Factoring this in, the available developments require additional substantiation, clarification, and adaptation to modern business conditions.

The purpose of this study was a comprehensive assessment of the level of economic efficiency of agricultural enterprises in Ukraine, and a retrospective measurement of the priority impact of factors. To achieve the purpose set, the tasks of the study were defined as follows:

– to estimate the dynamics of the level of economic efficiency of agricultural enterprises using the methodology for calculating the aggregate indicator;

– to substantiate the model and calculate the degree of influence of factors on the aggregate performance indicator using deterministic factor analysis techniques.

The scientific originality of the obtained results lies in the fact that a methodological approach to complementary assessment of efficiency as a phenomenon and process of economic activity and various forms and levels of economic efficiency has been further developed, which is based on the determination of an integral indicator using the matrix-coordinate method and modelling the factor influence on the dynamics of its level.

▸ Literature Review

L. Rohatina (2018), R. Sodoma & T. Shmatkovska (2021) and many other researchers investigated the influence of factors of the internal and external environment on the functioning of agricultural enterprises in the context of their economic efficiency.

V. Nesterenko & A. Moroz (2022) investigated the indirect effect of innovative factors on the functioning and pace of economic development of agricultural enterprises. M. Humeniuk & D. Nemish (2022) analysed the dynamics of the level of economic efficiency of small agricultural enterprises.

The authors found that the set of indicators used to assess the efficiency of small agricultural enterprises should be graded by types of efficiency and defined groups of indicators that should be used to assess economic, technological, social, and environmental efficiency.

L. Vdovenko (2018), V. Otenko *et al.* (2023) analysed and evaluated the factors of the national support influence on the results of agricultural enterprises.

O. Anisenko & K. Vakar (2018), V. Holian & A. Hordiichuk (2019) investigated the modern problems of the development of the agrarian sector of the economy of Ukraine in the conditions of institutional changes, the determination of prospects for the development of the agrarian economy, considering the existing risks and possible options for the influence of national policy.

Comprehensive research on the problems of improving the economic efficiency of farms in Bulgaria was conducted by N. Koteva (2019). M. Asfaw et al. (2019) solved the problems of technical, distributional, and economic efficiency of farms in Ethiopia.

Z. Naglova *et al.* (2017) investigated the presence of considerable differences in economic indicators between enterprises of the Czech dairy industry, which are differentiated by size, form of ownership, and receipt of subsidies. The authors proved that large companies with foreign ownership can be considered as a potential threat and affect the level of competitiveness of other enterprises.

V. Masuku & A. Belete (2015) investigated and analysed the economic efficiency of small dairy farmers in Swaziland. The authors described socio-economic characteristics, evaluated the economic efficiency of small dairy farms, identified, and analysed factors affecting its level. Monitoring of the dynamics of profitability of small dairy enterprises revealed a trend of its stability and gradual growth.

E. Rosochatecká (2018) singles out the quality of the database and the substantiation of the methodological assessment tools as priority components of the measurement and analysis of the performance of agricultural enterprises. The author suggests using the method of financial analysis indices, the economic rate of profit and tools for forecasting indicators of the financial condition of the enterprise for a comprehensive assessment of the level of economic efficiency of agricultural enterprises.

Bulgarian scientists M. Georgiev & A. Roycheva (2017) focused on investigating the institutional impact of individual factors operating in agricultural enterprises and proposed a comprehensive methodological approach to measuring this impact.

M. Guth & K. Smedzik-Ambrozy (2020) studied the impact of factor security on the level of economic efficiency of agricultural production in EU countries. The authors showed that there is a variety of availability of factors of production in agriculture between groups of EU regions, which leads to differences in the technical efficiency of agricultural holdings of different types of production.

▸ Research Methodology

During the study, several methods were used: abstract-logical – to formulate conclusions; comparative analysis – to compare indicators of agricultural production, assess the profitability and return of enterprises and identify trends in their changes; tabular – to visually represent the results of the study. The statistical method was used to determine the variation in indicators of liquidity and solvency, financial stability, business activity and efficiency of agricultural enterprises. Using the matrix-coordinate method, the aggregate indicator of the efficiency of the functioning of agricultural enterprises was calculated. The calculation-constructive method was used to analyse and determine the type of financial stability of agricultural enterprises of Ukraine in dynamics; monographic method was used to detail the current level of efficiency of agricultural enterprises of Ukraine; deterministic factor analysis - to determine the factors influencing the aggregate efficiency indicator.

The methodology of the conducted study is presented in the form of the following sequence of stages:

– assessment of the dynamics of natural indicators of agricultural production in Ukraine during 2000-2021;

– assessment of the dynamics of agricultural production in Ukraine at constant prices in 2016 for 2000-2021;

– measurement, monitoring, and evaluation of the dynamics of indicators of profitability and return of agricultural enterprises in 2015-2021;

– assessment of liquidity, solvency, diagnostics of the level and type of financial stability of agricultural enterprises for 2015-2021;

– assessment and monitoring of the dynamics of business activity indicators of agricultural enterprises for 2015-2021;

– construction of matrices of priority indicators, calculation, and evaluation of the dynamics of an integral indicator of the efficiency of agricultural enterprises in Ukraine;

– building a model and calculating the influence of factors on the aggregate performance indicator using deterministic factor analysis techniques;

– assessment of the rating of factors that positively and negatively affected the change in the overall performance indicator of agricultural enterprises in Ukraine.

To form and calculate the overall indicator of the efficiency of the functioning of agricultural enterprises, the coordinate matrix method was employed, which is used to reduce the set of indicators to a single generalized indicator, considering their importance.

The sequence of implementation of this method was as follows:

1. Substantiated choice of a set of indicators that characterize the results of economic activity of agricultural enterprises;

2. For each indicator, the maximum value is selected, and the first matrix is formed by dividing all indicators by the selected maximum values in rows (the matrix has the following form):

X_1	$X_{1\,2015}/X_{1max}$	$X_{1\,2016}/X_{1max}$	$X_{1\,2017}/X_{1max}$	$X_{1\,2018}/X_{1max}$	$X_{1\,2019}/X_{1max}$	$X_{1\,2020}/X_{1max}$	$X_{1\,2021}/X_{1max}$
X_2	$X_{2\,2015}/X_{2max}$	$X_{2\,2016}/X_{2max}$	$X_{2\,2017}/X_{2max}$	$X_{2\,2018}/X_{2max}$	$X_{2\,2019}/X_{2max}$	$X_{2\,2020}/X_{2max}$	$X_{2\,2021}/X_{2max}$
X_3	$X_{3\,2015}/X_{3max}$	$X_{3\,2016}/X_{3max}$	$X_{3\,2017}/X_{3max}$	$X_{3\,2018}/X_{3max}$	$X_{3\,2019}/X_{3max}$	$X_{3\,2020}/X_{3max}$	$X_{3\,2021}/X_{3max}$
X_4	$X_{4\,2015}/X_{4max}$	$X_{4\,2016}/X_{4max}$	$X_{4\,2017}/X_{4max}$	$X_{4\,2018}/X_{4max}$	$X_{4\,2019}/X_{4max}$	$X_{4\,2020}/X_{4max}$	$X_{4\,2021}/X_{4max}$
X_5	$X_{5\,2015}/X_{5max}$	$X_{5\,2016}/X_{5max}$	X_{152017}/X_{5max}	$X_{5\,2018}/X_{5max}$	$X_{5\,2019}/X_{5max}$	$X_{5\,2020}/X_{5max}$	$X_{5\,2021}/X_{5max}$
X_6	$X_{6\,2015}/X_{6max}$	$X_{6\,2016}/X_{6max}$	$X_{6\,2017}/X_{6max}$	$X_{6\,2018}/X_{6max}$	$X_{6\,2019}/X_{6max}$	$X_{6\,2020}/X_{6max}$	$X_{6\,2021}/X_{6max}$
X_7	$X_{7\,2015}/X_{7max}$	$X_{7\,2016}/X_{7max}$	$X_{7\,2017}/X_{7max}$	$X_{7\,2018}/X_{7max}$	$X_{7\,2019}/X_{7max}$	$X_{7\,2020}/X_{7max}$	$X_{7\,2021}/X_{7max}$
X_8	$X_{8\,2015}/X_{8max}$	$X_{8\,2016}/X_{8max}$	$X_{8\,2017}/X_{8max}$	$X_{8\,2018}/X_{8max}$	$X_{8\,2019}/X_{8max}$	$X_{8\,2020}/X_{8max}$	$X_{8\,2021}/X_{8max}$
X_9	$X_{9\,2015}/X_{9max}$	$X_{9\,2016}/X_{9max}$	$X_{9\,2017}/X_{9max}$	$X_{9\,2018}/X_{9max}$	$X_{9\,2019}/X_{9max}$	$X_{9\,2020}/X_{9max}$	$X_{9\,2021}/X_{9max}$
X_{10}	$X_{10\,2015}/X_{10max}$	$X_{10\,2016}/X_{10max}$	$X_{10\,2017}/X_{10max}$	$X_{10\,2018}/X_{10max}$	$X_{10\,2019}/X_{10max}$	$X_{10\,2020}/X_{10max}$	$X_{10\,2021}/X_{10max}$
X_{11}	$X_{11\,2015}/X_{11max}$	$X_{11\,2016}/X_{11max}$	$X_{11\,2017}/X_{11max}$	$X_{11\,2018}/X_{11max}$	$X_{11\,2019}/X_{11max}$	$X_{11\,2020}/X_{11max}$	$X_{11\,2021}/X_{11max}$
X_{12}	$X_{12\,2015}/X_{12max}$	$X_{12\,2016}/X_{12max}$	$X_{12\,2017}/X_{12max}$	$X_{12\,2018}/X_{12max}$	$X_{12\,2019}/X_{12max}$	$X_{12\,2020}/X_{12max}$	$X_{12\,2021}/X_{12max}$
X_{13}	$X_{13\,2015}/X_{13max}$	$X_{13\,2016}/X_{13max}$	X_{132017}/X_{13max}	$X_{13\,2018}/X_{13max}$	$X_{13\,2019}/X_{13max}$	$X_{13\,2020}/X_{13max}$	$X_{13\,2021}/X_{13max}$
X_{14}	$X_{14\,2015}/X_{14max}$	$X_{14\,2016}/X_{14max}$	$X_{14\,2017}/X_{14max}$	$X_{14\,2018}/X_{14max}$	$X_{14\,2019}/X_{14max}$	$X_{14\,2020}/X_{14max}$	$X_{14\,2021}/X_{14max}$
X_{15}	$X_{15\,2015}/X_{15max}$	$X_{15\,2016}/X_{15max}$	$X_{15\,2017}/X_{15max}$	$X_{15\,2018}/X_{15max}$	$X_{15\,2019}/X_{15max}$	$X_{15\,2020}/X_{15max}$	$X_{15\,2021}/X_{15max}$
X_{16}	$X_{16\,2015}/X_{16max}$	$X_{16\,2016}/X_{16max}$	$X_{16\,2017}/X_{16max}$	$X_{16\,2018}/X_{16max}$	$X_{16\,2019}/X_{16max}$	$X_{16\,2020}/X_{16max}$	$X_{16\,2021}/X_{16max}$
X_{17}	$X_{17\,2015}/X_{17max}$	$X_{17\,2016}/X_{17max}$	$X_{17\,2017}/X_{17max}$	$X_{17\,2018}/X_{17max}$	$X_{17\,2019}/X_{17max}$	$X_{17\,2020}/X_{17max}$	$X_{17\,2021}/X_{17max}$
X_{18}	$X_{18\,2015}/X_{18max}$	$X_{18\,2016}/X_{18max}$	$X_{18\,2017}/X_{18max}$	$X_{18\,2018}/X_{18max}$	$X_{18\,2019}/X_{18max}$	$X_{18\,2020}/X_{18max}$	$X_{18\,2021}/X_{18max}$
X_{19}	$X_{19\,2015}/X_{19max}$	$X_{19\,2016}/X_{19max}$	$X_{19\,2017}/X_{19max}$	$X_{19\,2018}/X_{19max}$	$X_{19\,2019}/X_{19max}$	$X_{19\,2020}/X_{19max}$	$X_{19\,2021}/X_{19max}$
X_{20}	$X_{20\,2015}/X_{20max}$	$X_{20\,2016}/X_{20max}$	$X_{20\,2017}/X_{20max}$	$X_{20\,2018}/X_{20max}$	$X_{20\,2019}/X_{20max}$	$X_{20\,2020}/X_{20max}$	$X_{20\,2021}/X_{20max}$
X_{21}	$X_{21\,2015}/X_{21max}$	$X_{21\,2016}/X_{20max}$	$X_{21\,2017}/X_{20max}$	$X_{21\,2018}/X_{20max}$	$X_{21\,2019}/X_{20max}$	$X_{21\,2020}/X_{20max}$	$X_{21\,2021}/X_{20max}$
X_{22}	$X_{22\,2015}/X_{22max}$	$X_{22\,2016}/X_{22max}$	$X_{22\,2017}/X_{22max}$	$X_{22\,2018}/X_{22max}$	$X_{22\,2019}/X_{22max}$	$X_{22\,2020}/X_{22max}$	$X_{22\,2021}/X_{22max}$
X_{23}	$X_{23\,2015}/X_{23max}$	$X_{23\,2016}/X_{23max}$	$X_{23\,2017}/X_{23max}$	$X_{23\,2018}/X_{23max}$	$X_{23\,2019}/X_{23max}$	$X_{23\,2020}/X_{23max}$	$X_{23\,2021}/X_{23max}$
X_{24}	$X_{24\,2015}/X_{24max}$	$X_{24\,2016}/X_{24max}$	$X_{24\,2017}/X_{24max}$	$X_{24\,2018}/X_{24max}$	$X_{24\,2019}/X_{24max}$	$X_{24\,2020}/X_{24max}$	$X_{24\,2021}/X_{24max}$
X_{25}	$X_{25\,2015}/X_{25max}$	$X_{25\,2016}/X_{25max}$	$X_{25\,2017}/X_{25max}$	$X_{25\,2018}/X_{25max}$	$X_{25\,2019}/X_{25max}$	$X_{25\,2020}/X_{25max}$	$X_{25\,2021}/X_{25max}$

(1)

where X_1 is net profit, UAH billion; X_2 – labour productivity, thous. UAH; X_3 is the return on fiXed assets, %; X_4 is the return on working capital, %; X_5 is the return on capital, %; X_6 is the return on equity, %; X_7 is the return on loan capital, %; X_8 is the return on products (gross), %; X_9 is the return on sales, %; X_{10} is the return on activities, %; X_{11} is the fund return, billion UAH; X_{12} is the asset turnover ratio; X_{13} is the accounts receivable turnover ratio; X_{14} is the accounts payable turnover ratio; X_{15} is the equity turnover ratio; X_{16} is the coverage ratio; X_{17} is the quick liquidity ratio; X_{18} is the absolute liquidity ratio; X_{19} is the loan capital turnover ratio; X_{20} is the coefficient of autonomy (independence); X_{21} is the funding ratio; X_{22} is the financial stability coefficient; X_{23} is the equity manoeuvrability ratio; X_{24} is the ratio of provision of own working capital; X_{25} is the ratio of provision of stocks with own working capital.

3. The results of calculations of the first matrix are squared, and the second matrix is formed;

4. The sum of the results obtained by year for the analysed period is a cumulative indicator of the efficiency of the functioning of agricultural enterprises of Ukraine, which is calculated using the following formula:

$$Y_{(j)} = \sum_1^n \left(\frac{x_{ij}}{x_{imax}}\right)^2, \quad (2)$$

where $Y(j)$ is a cumulative indicator of the efficiency of the functioning of agricultural enterprises of Ukraine in the j^{th} year; x_{ij} is the value of the i^{th} indicator (factor) that forms the aggregate efficiency indicator in the j^{th} period; x_{imax} is the maximum value of the i^{th} indicator (factor) for the analysed research period; n is the number of indicators (factors).

The model of factor influence on the aggregate performance indicator is recognized as additive, and the formulas for calculating the influence of factors in retrospect by year of study have the following form:

$$\Delta y_{(i+1)j} = (x_{1j} + x_{2j} + x_{3j} + x_{(i+1)j} + \ldots x_{nj}) - (x_{1j} + x_{2j} + x_{3j\text{-}1} + x_{(i+1)j\text{-}1} + \ldots + x_{nj\text{-}1}), \quad (3)$$

where Δy_{ij} is the impact of the i^{th} indicator (factor) on the total performance indicator in the jth year.

The rating of factors that positively and negatively affected the change in the overall efficiency indicator of the functioning of agricultural enterprises of Ukraine was formed and assessed by calculating the ratio of the influence of each factor on the change in the overall efficiency indicator.

Research Results

Over the past two decades, Ukraine has substantially increased the volume of agricultural production, especially export-oriented types. Thus, from 2000 to 2021, wheat production increased 3.2 times (from 10.2 to 32.2 million tonnes), barley – 1.4 times (from 6.9 to 9.4 million tonnes). The continued growth of global demand for Ukrainian corn contributed to an 11-fold increase in its production (from 3.8 million tonnes in 2000 to 42.1 million tonnes in 2021). If in 2000 Ukraine grew 24.4 million tonnes of grain crops, then 20 years later this figure exceeded the mark of 86 million.

The production of soybeans, rapeseed, sunflower, and poultry meat also increased considerably – by 54, 22, 4.7, and 6.9 times, respectively. During the analysed period, the volume of agricultural production in monetary terms increased by 52.4% – from UAH 467.5 billion in 2010 to UAH 712.6 billion in 2021 (Table 1).

Table 1. Dynamics of agricultural production in Ukraine, mln UAH (in constant prices of 2016)

Product type	2010	2015	2018	2019	2020	2021	2021 to 2000, %
agricultural products	467.5	596.8	671.3	681.0	612.1	712.6	152.4
crop production	329.6	453.0	529.3	538.7	473.4	580.3	176.1
grain and leguminous crops	126.8	193.4	225.6	239.7	207.8	274.3	216.3
technical cultures	98.2	149.3	190.6	194.8	162.4	199.8	203.5
potatoes, vegetable, and melon food crops	67.7	77.3	80.9	77.8	78.9	80.7	119.2
fruit and berry crops, grapes	12.8	14.8	17.1	14.6	13.4	14.4	112.5
products animal husbandry	137.8	143.8	141.9	142.3	138.7	132.3	96.0
farm animals (rearing)	64.7	70.2	72.6	74.2	73.4	71.7	110.8
milk	50.1	47.3	44.8	43.0	41.2	38.8	77.4
eggs	19.8	19.5	18.7	19.4	18.8	16.3	82.3
other livestock products	3.1	6.8	5.8	5.7	5.3	5.5	177.4

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

Crop production experienced the highest growth rates during the analysed period. Thus, during 2010-2021, the production of crop products in Ukraine increased by 76.1% (from UAH 329.6 billion to UAH 580.3 billion). For groups of agricultural products, the dynamics of production is uneven. Thus, the production of export-oriented types of grain crops at constant prices in 2016 for the analysed period increased 2.2 times, industrial crops – 2 times, vegetables – by 19.2%. At the same time, the total production of livestock products decreased by 4% compared to 2010.

The net income from the sale of products in agricultural enterprises of Ukraine for 2015-2021 increased by 2.5 times (from 372 to 918.7 billion UAH); however, the total costs of production and sale of products also increased by 2.5 times – from 270 billion UAH in 2015 to 680.2 billion UAH in 2021 (Table 2).

Table 2. Dynamics of profitability of agricultural enterprises of Ukraine, billion UAH

Indicators	2015	2016	2017	2018	2019	2020	2021	2021 to 2015
Net income from sales of products	372	414.8	467.6	540.5	572.7	624.1	918.7	247.0
Production and sales costs	270	324.7	399	469.7	481.9	542.5	680.2	251.9
Financial result before taxation, billion UAH	102.0	90.1	68.6	70.8	90.8	81.6	238.5	233.8
Enterprises that made a profit before taxation								
as a percentage of the total number	89.0	88.4	86.8	86.8	83.5	83.2	88.7	99.7
financial result	127.6	102.8	89.0	93.5	115.3	108.1	246.6	193.3
Enterprises that received a pre-tax loss								
as a percentage of the total number	11.0	11.6	13.2	13.2	16.5	16.8	11.3	102.7
financial result, mln UAH	25.6	12.7	20.4	22.8	24.5	26.5	8.2	32.0
Net profit, billion UAH	101.9	89.9	68.3	70.5	90.2	81.0	237.6	233.2
Enterprises that made a net profit								
as a percentage of the total number	88.9	88.4	86.7	86.7	83.4	83.1	88.7	99.8
financial result, mln UAH	127.5	102.5	88.7	93.2	114.7	107.5	245.8	192.8
Enterprises that received a net loss								
as a percentage of the total number	11.1	11.6	13.3	13.3	16.6	16.9	11.3	101.8
financial result, mln UAH	25.6	12.7	20.4	22.8	24.5	26.5	8.2	32.0
Number of employees, thous. people	500.9	513.2	489.2	479.8	461.5	443.7	460.0	91.8

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

The aggregate net profit after taxation for the analysed period increased by 2.3 times (from UAH 101.9 to UAH 237.6 billion). Therewith, the percentage of profitable enterprises in the country's agriculture stayed almost unchanged – 88.7%. The calculation of the factor influence on the positive dynamics of the net profit revealed the most priority influence of the growth of the sales revenue indicator, which amounted to UAH 546.7 billion for the analysed period. In turn, the corresponding increase in the cost of production reduced net profit by UAH 410.2 billion.

Comprehensive monitoring of the dynamics of consolidated indicators of agricultural enterprises' balance sheets for 2015-2021 revealed the following trends:

– total capital growth of 94.2% (or UAH 646.2 billion);
– increase in the value of non-current assets by almost 3 times (or by UAH 290 billion);
– growth in working capital volumes by 69.2% (or UAH 356.2 billion);
– positive transformation of the structure of assets of enterprises (the ratio between non-current and current assets increased from 0.33 to 0.53.

A retrospective analysis of sources of financing for agricultural enterprises found a positive trend of almost 3-fold increase in the cost of their equity, from UAH 275.3 billion in 2015 to UAH 791.1 billion in 2021) (Table 3). In comparison, loan capital in the form of long- and short-term bank loans increased by merely 31.7% (from UAH 410.5 billion to UAH 540.8 billion). Accordingly, the share of equity for the analysed period increased by 19.3 percentage points – from 40.1% to 59.4%.

Table 3. Analysis of sources of financing for agricultural enterprises of Ukraine, billion UAH

Indicators	2015	2016	2017	2018	2019	2020	2021	2021 in % to 2015.
Equity	275.3	369.4	436.3	483	522.8	612.3	791.1	287.4
Loan capital	410.5	1,167.9	475.2	500.6	507.6	518	540.8	131.7
Specific weight of equity, %	40.1	24.0	47.9	49.1	50.7	54.2	59.4	19.3
Specific weight of loan capital, %	59.9	76.0	52.1	50.9	49.3	45.8	40.6	-19.3
Total capital	685.8	1,537.3	911.5	983.6	1,030.4	1,130.3	1,331.9	194.2

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

Agricultural production in Ukraine is still consistently profitable, and a considerable increase in net profit in 2021 could not but affect the dynamics of profitability indicators of agricultural enterprises. The return on loan capital experienced the greatest growth (from 16.5% to 43.9%), the return on current assets increased by 7.5% and reached 27.3% in 2021. Profitability of operations reached 34.9%, return on equity – 30.0%, return on sales – 25.9%. The greatest drop was experienced by the return on fixed assets of enterprises (from 95.9% in 2015 to 70.2% in 2021) (Table 4).

Table 4. Dynamics of performance indicators of agricultural enterprises of Ukraine, %

Indicator	2015	2016	2017	2018	2019	2020	2021	2021 to 2015, %
Return on fixed assets	95.9	61.4	37.1	30.3	31.2	26.1	70.2	-25.7
Return on working capital	19.8	6.8	10.7	10.8	14.1	11.4	27.3	7.5
Return on capital	14.9	5.8	7.5	7.2	8.8	7.2	17.8	2.9
Return on equity	37.0	24.3	15.7	14.6	17.3	13.2	30.0	-7.0
Return on loan capital	16.5	6.1	8.0	7.8	9.6	7.7	43.9	27.4
Product profitability (gross)	38.1	28.2	18.1	16.3	19.8	15.8	36.2	-1.9
Return on sales	27.4	21.7	14.6	13.0	15.7	13.0	25.9	-1.5
Return on activity	37.7	27.7	17.1	15.0	18.7	14.9	34.9	-2.8
Capital return, billion UAH	3.50	2.83	2.54	2.33	1.98	2.01	2.71	77.4
Capital capacity, billion UAH	0.29	0.35	0.39	0.43	0.51	0.50	0.37	127.6
Labour productivity, thous. UAH per employee	624.0	765.0	755.4	867.7	928.6	857.2	968.9	155.3
including crop production	660.0	804.0	777.4	900.1	954.4	853.7	1016.0	153.9
animal husbandry	503.9	614.0	664.8	730.4	815.2	872.8	808.3	160.4

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

Labour productivity indicators for the analysed period increased in crop production by 53.9%, and in animal husbandry – by 60.4%

It was established that the dynamics of indicators of profitability and return of agricultural enterprises affects their liquidity and solvency. During 2015-2021, the coverage ratio had fairly stable values within the regulatory limits and increased by 27.5% (from 1.5 to 1.92). The absolute liquidity ratio has low values, but there is a steady trend of its growth. Net working capital increased 2.4 times over the analysed period (from UAH 172.2 billion to UAH 416.2 billion) (Table 5). A set of indicators of financial stability characterize the stability of the financial condition of enterprises in retrospect and allow predicting possible crisis phenomena in the future, assessing dependence on creditors and investors. The analysis of the financial stability of agricultural enterprises in Ukraine helped identify it during 2015-2017 as sufficient, but in the following 2018-2020 period, the

type of financial stability was recognized as insufficient. A profitable and productive 2021 contributed to improving the financial stability of agricultural enterprises. There is a tendency to improve almost all indicators of financial stability: the coefficient of autonomy (independence) increased by 0.19 points, financial dependence decreased from 0.60 to 0.41, which is within the optimal values.

Table 5. Indicators of liquidity and solvency of agricultural enterprises in Ukraine

Indicators	2015	2016	2017	2018	2019	2020	2021	2021 in % to 2015
Coverage ratio	1.50	1.19	1.54	1.56	1.55	1.61	1.92	127.5
Coefficient quick liquidity	1.00	0.99	0.88	0.78	0.72	0.75	0.84	83.4
Absolute liquidity ratio	0.05	0.02	0.05	0.05	0.06	0.09	0.10	205.7
Net working capital, UAH billion	172.2	212.7	223	236	226.6	269.9	416.2	241.7

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

An increase in the financial stability coefficient from 0.50 to 0.66 indicates a decrease in the level of dependence of agricultural enterprises on borrowed funds and a relative increase in their solvency on their obligations at the expense of equity. Nevertheless, the indicators of equity working capital availability, despite the relative growth trend, are still low (Table 6).

Table 6. Analysis of the financial stability of agricultural enterprises of Ukraine in dynamics, billion UAH

Indicator	2015	2016	2017	2018	2019	2020	2021	2021 in % to 2015
Current assets	514.6	1318.7	639.1	654.3	641.2	711.1	870.8	169.2
Current liabilities	342.4	1106	416.1	418.3	414.6	441.2	454.6	132.8
Availability of own working capital	104.1	150.8	163.8	153.7	133.6	193.1	330.2	317.2
Long-term loan sources	68.1	61.9	59.1	82.3	93	76.8	86.2	126.6
Availability of own and long-term sources of working capital formation	172.2	212.7	222.9	236	226.6	269.9	416.4	241.8
Short-term loan sources	27.85	29.06	46.85	54.85	52.43	56.34	55.2	198.2
Total value of the main sources of working capital formation	200.05	241.76	269.75	290.85	279.03	326.24	471.6	235.7
Reserves and expenses	114.9	160.3	203.4	256	270.7	289.1	388.8	338.4
Surplus or lack of own working capital	-10.8	-9.5	-39.6	-102.3	-137.1	-96	-58.6	-542.6
Surplus or shortage of own and long-term sources of working capital formation	57.3	52.4	19.5	-20	-44.1	-19.2	27.6	48.2
Surplus or shortage of the main sources of formation of reserves and expenses	85.15	81.46	66.35	34.85	8.33	37.14	82.8	97.2
Type of financial stability	S	S	S	L*	L*	L*	S	
Indicators of financial stability of enterprises								
Coefficient of autonomy (independence)	0.40	0.24	0.48	0.49	0.51	0.54	0.59	148.0
Financial dependency ratio	0.60	0.76	0.52	0.51	0.49	0.46	0.41	67.8
Funding ratio	0.45	0.25	0.51	0.54	0.56	0.58	1.46	218.1
Financial stability ratio	0.50	0.28	0.54	0.57	0.60	0.61	0.66	131.5
Equity manoeuvrability coefficient	0.38	0.41	0.38	0.32	0.26	0.32	0.42	110.4
Ratio of provision with own working capital	0.20	0.11	0.26	0.23	0.21	0.27	0.38	187.4
Ratio of provision of stocks with own working capital	0.91	0.94	0.81	0.60	0.49	0.67	0.85	93.7

Note: A – absolute; S – sufficient; L – low

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

Notably, the dynamics of the level and ultimately the type of financial stability of enterprises is largely determined by the set of indicators of their business activity. Research has established a considerable improvement in the turnover of assets of agricultural enterprises – the total turnover ratio for the analysed period increased by 45.9% (from 0.7 to 1.1), and the turnover period decreased by 159 days (Table 7).

Table 7. Analysis of business activity of agricultural enterprises of Ukraine in dynamics

Indicator	2015	2016	2017	2018	2019	2020	2021	2021 to 2015, %
Asset turnover ratio	0.7	0.3	0.7	0.8	0.9	0.9	1.1	145.9
Turnover period, days	504.9	1,160.4	498.9	441.8	408.7	415.9	346.0	68.5
Accounts receivable turnover ratio	1.1	0.4	1.3	1.7	1.9	1.9	2.4	223.0
Accounts payable turnover ratio	1.1	0.4	1.1	1.3	1.4	1.4	2.0	186.0
Repayment period of receivables, days	336.3	961.0	285.5	220.1	189.7	192.8	150.8	44.8
Payable debt repayment period, days	336.0	973.2	324.8	282.5	264.2	258.0	180.6	53.8
Inventory turnover ratio	3.2	2.6	2.3	2.1	2.1	2.2	2.4	73.0
Turnover period, days	112.7	141.1	158.8	172.9	172.5	169.1	154.5	137.0
Turnover ratio of fixed assets	3.5	2.8	2.5	2.3	2.0	2.0	2.7	77.5
Turnover period, days	104.3	128.8	143.7	156.9	184.5	181.6	134.6	129.0
Equity turnover ratio	1.4	1.1	1.1	1.1	1.1	1.0	1.2	85.9
Turnover period, days	270.1	325.1	340.6	326.2	333.2	358.1	314.3	116.4
Loan capital turnover ratio	0.6	0.3	0.5	0.6	0.6	0.6	1.7	187.5
Turnover period, days	606.1	1298.3	665.4	608.6	597.4	616.1	214.9	53.3
Operating cycle, days	449.1	1102.0	444.2	393.0	362.3	361.8	305.3	68.0
Financial cycle, days	113.1	128.8	119.4	110.5	98.0	103.8	124.7	110.2

Source: calculated according to the data of the State Statistics Service of Ukraine (2022)

A positive trend in the management practice of agricultural enterprises is a significant increase in the ratio of receivables from 1.1 to 2.4 and a corresponding reduction in the term of its repayment by almost half - from 336 to 151 days. Despite the established increase in the amount of resources borrowed by the enterprise and a considerable increase in the amount of short-term bank loans, this did not affect the deterioration of the turnover of the company's accounts payable – the turnover ratio increased from 1.1 to 2.0 points, and the repayment period decreased from 336 to 181 days. The indicators of turnover of material stocks and fixed assets of enterprises decreased by 27.0% and 22.5%, respectively. Equity turnover declined by almost 14%. In the presence of a positive trend of increasing the efficiency of receivables management, the operational cycle of agricultural enterprises between the purchase of stocks and the receipt of funds from the sale of products during the analysed period decreased by almost 144 days. The relatively insignificant increase in the duration of the financial cycle indicates that, due to the seasonality of agricultural production, enterprises receive money from customers 3.8 months later on average than they make payments to their creditors.

The aggregate integral (generalizing) performance indicator of agricultural enterprises of Ukraine was retrospectively monitored using the matrix-coordinate method based on the structuring of a set of priority indicators of economic efficiency, liquidity, and solvency, financial stability and business activity (Table 8).

Table 8. Calculation of the total efficiency indicator of agricultural enterprises in Ukraine

Indicators	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
	Coordinate matrix one							Coordinate matrix two						
Net profit	0.43	0.38	0.29	0.30	0.38	0.34	1.00	0.18	0.14	0.08	0.09	0.14	0.12	1.00
Labour productivity	0.64	0.78	0.90	0.96	0.88	0.64	1.00	0.41	0.61	0.80	0.92	0.78	0.41	1.00
Return on fixed assets	1.00	0.64	0.39	0.32	0.33	0.27	0.73	1.00	0.41	0.15	0.10	0.11	0.07	0.54
Return on working capital	0.73	0.25	0.39	0.40	0.52	0.42	1.00	0.53	0.06	0.15	0.16	0.27	0.17	1.00
Return on capital	0.84	0.33	0.42	0.40	0.49	0.40	1.00	0.70	0.11	0.18	0.16	0.24	0.16	1.00
Return on equity	1.00	0.66	0.42	0.39	0.47	0.36	0.81	1.00	0.43	0.18	0.16	0.22	0.13	0.66
Return on loan capital	0.38	0.14	0.18	0.18	0.22	0.18	1.00	0.14	0.02	0.03	0.03	0.05	0.03	1.00

Table 8, Continued

Indicators	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
Product profitability (gross)	1.00	0.74	0.48	0.43	0.52	0.41	0.95	1.00	0.55	0.23	0.18	0.27	0.17	0.90
Return on sales	1.00	0.79	0.53	0.47	0.57	0.47	0.95	1.00	0.63	0.28	0.23	0.33	0.23	0.89
Return on activity	1.00	0.73	0.45	0.40	0.50	0.40	0.93	1.00	0.54	0.21	0.16	0.25	0.16	0.86
Fund return	1.00	0.81	0.73	0.67	0.57	0.57	0.77	1.00	0.65	0.53	0.44	0.32	0.33	0.60
Asset turnover ratio	0.64	0.27	0.64	0.73	0.82	0.82	1.00	0.40	0.07	0.40	0.53	0.67	0.67	1.00
Accounts receivable turnover ratio	0.46	0.17	0.54	0.71	0.79	0.79	1.00	0.21	0.03	0.29	0.50	0.63	0.63	1.00
Accounts payable turnover ratio	0.55	0.20	0.55	0.65	0.70	0.70	1.00	0.30	0.04	0.30	0.42	0.49	0.49	1.00
Equity turnover ratio	1.00	0.79	0.79	0.79	0.79	0.71	0.86	1.00	0.62	0.62	0.62	0.62	0.51	0.73
Coverage ratio	0.78	0.62	0.80	0.81	0.81	0.84	1.00	0.61	0.38	0.64	0.66	0.65	0.70	1.00
Coefficient quick liquidity	1.00	0.99	0.88	0.78	0.72	0.75	0.84	1.00	0.98	0.77	0.61	0.52	0.56	0.71
Absolute liquidity ratio	0.50	0.20	0.50	0.50	0.60	0.90	1.00	0.25	0.04	0.25	0.25	0.36	0.81	1.00
Loan capital turnover ratio	0.35	0.18	0.29	0.35	0.35	0.35	1.00	0.12	0.03	0.09	0.12	0.12	0.12	1.00
Coefficient of autonomy (independence)	0.68	0.41	0.81	0.83	0.86	0.92	1.00	0.46	0.17	0.66	0.69	0.75	0.84	1.00
Funding ratio	0.31	0.17	0.35	0.37	0.38	0.40	1.00	0.09	0.03	0.12	0.14	0.15	0.16	1.00
Financial stability ratio	0.74	0.44	0.89	0.91	0.94	1.00	0.61	0.55	0.20	0.79	0.82	0.87	1.00	0.37
Equity manoeuvrability coefficient	0.90	0.98	0.90	0.76	0.62	0.76	1.00	0.82	0.95	0.82	0.58	0.38	0.58	1.00
Ratio of provision with own working capital	0.53	0.29	0.68	0.61	0.55	0.71	1.00	0.28	0.08	0.47	0.37	0.31	0.50	1.00
Ratio of provision of stocks with own working capital	1.00	1.03	0.89	0.66	0.54	0.74	0.93	1.00	1.07	0.79	0.43	0.29	0.54	0.87
Aggregate indicator of the efficiency of the functioning of agricultural enterprises	-	-	-	-	-	-	-	**15.07**	**8.84**	**9.85**	**9.37**	**9.78**	**10.10**	**22.13**

Source: the result of the authors' research

The highest efficiency of agricultural enterprises of Ukraine was achieved in pre-war 2021, the lowest in 2016. During the analysed period, this aggregate indicator increased by 47% – from 15.07 to 22.13 points.

The matrix-indicative toolkit of the final stage of determining the aggregate indicator of the efficiency of the functioning of agricultural enterprises is recognized as an additive model.

The algorithm for calculating the influence of factors on the performance indicator is based on the use of the chain substitution technique. This mathematical tool helps determine the influence of individual factors on the change in the value of the performance indicator by gradually replacing the base value of each factor indicator with the factual value in the next period.

The practical implementation of this methodological technique allowed establishing the following dynamics and rating assessment of the factor impact (Table 9).

Thus, in 2021, compared to 2015, the overall efficiency indicator increased by 7.06 points. The following factors had the greatest positive impact on the established growth: an increase in labour productivity (the impact was estimated at 22.5%), a considerable increase in the amount of net profit of agricultural enterprises (15.5%), an increase in the financing ratio (12.8%), an increase in the turnover

ratio loan capital (12.4%) and an increase in its profitability (12.2%), an increase in the turnover ratio of receivables (11.2%) and a substantial increase in the absolute liquidity ratio (10.6%).

Table 9. The result of deterministic factor analysis of the impact on the aggregate performance indicator of agricultural enterprises

Indicators	2016 compared to 2015	2017 compared to 2016	2018 compared to 2017	2019 compared to 2018	2020 compared to 2019	2021 compared to 2020	2021 compared to 2015
Net profit, billion UAH	0.2362	0.0232	0.4235	0.3224	0.2775	1.3886	1.0931
Labour productivity, thous. UAH	1.1931	1.2412	0.8088	0.1989	-0.078	1.1273	1.5852
Return on fixed assets	-0.5901	-0.2602	-0.1499	0.006	-0.1317	0.4617	-0.4642
Return on working capital	-0.864	0.0916	0.0029	0.1103	-0.1924	0.7256	0.474
Return on capital	-0.6945	0.0713	-0.0139	0.0608	-0.0808	0.7364	0.2993
Return on equity	-0.5687	-0.4512	-0.1244	0.0429	-0.0913	0.5301	-0.4426
Return on loan capital	-0.122	0.0139	-0.0916	0.0162	-0.017	0.8692	0.8587
Product profitability (gross)	-0.4522	-0.5221	-0.0427	0.0871	-0.0981	0.7307	-0.0973
Return on sales	-0.4728	-0.5433	-0.1588	0.1032	-0.1032	0.5684	-0.2065
Return on activity	-0.4601	-0.3342	-0.1474	0.0877	-0.0898	0.6008	-0.243
Capital return, billion UAH	-0.3462	-0.1271	-0.0835	-0.1632	0.0098	0.2697	-0.6005
Asset turnover ratio	-0.3306	0.2306	0.1239	0.1405	-0.1405	0.3306	0.595
Accounts receivable turnover ratio	-0.1823	0.2656	0.2083	0.125	-0.1402	0.3733	0.7899
Accounts payable turnover ratio	-0.2625	0.2625	0.12	0.0675	-0.0729	0.51	0.6975
Equity turnover ratio	-0.5827	0.0004	-0.165	0.0031	-0.1071	0.2245	-0.4653
Coverage ratio	-0.4262	0.2592	0.0169	-0.0685	0.0515	0.2468	0.3896
Coefficient quick liquidity	-0.0899	-0.4057	-0.166	-0.09	0.0441	0.1431	-0.4944
Absolute liquidity ratio	-0.21	0.21	-0.125	0.11	0.45	0.19	0.75
Loan capital turnover ratio	-0.0934	0.0554	0.0381	0.0032	-0.0281	0.7754	0.8754
Coefficient of autonomy (independence)	-0.2942	0.4364	0.0278	0.0575	0.0905	0.1623	0.5404
Funding ratio	-0.2657	0.0727	0.0148	0.0103	0.0107	0.8422	0.905
Financial stability ratio	-0.3612	0.5426	0.0333	0.0512	0.1254	-0.6265	-0.3752
Equity manoeuvrability coefficient	0.2344	-0.2343	-0.2381	-0.3973	0.1973	0.3195	0.1814
Ratio of provision with own working capital	-0.3932	0.3843	-0.3018	-0.1709	0.1994	0.4952	0.723
Ratio of provision of stocks with own working capital	0.167	-0.2747	-0.4576	-0.2848	0.2522	0.3304	-0.3275
Changes in the overall indicator of financial stability and efficiency of agricultural enterprises	-6.23	1.01	-0.48	0.41	0.32	12.03	7.06

Source: the result of the authors' research

At the same time, a decrease in the return on capital, profitability of fixed assets, quick liquidity ratio, indicators of turnover and profitability of equity capital of agricultural enterprises had a negative impact on the level of the overall efficiency indicator.

Conducting deterministic factor analysis in retrospective dynamics revealed the following trends. The largest decrease in the total efficiency of agricultural enterprises occurred in 2016 (compared to the previous 2015, the indicator almost halved – from 15.0 to 8.84). The greatest negative impact was caused by the following factors: a decrease in the profitability of working capital of enterprises (13.9%), the profitability of the entire capital of enterprises (11.1%), the profitability of fixed assets (9.5%), the turnover ratio of own capital (9.4%). Since 2017, there has been a gradual increase in this indicator. Thus, the growth of the aggregate efficiency indicator by 1.01 points in 2017 was facilitated by the increase in labour productivity, improvement of financial stability coefficients, provision of own working capital, turnover of receivables and turnover of payables.

In the following year, 2018, the level of economic efficiency of agricultural enterprises decreased by 0.48 points, mainly due to the deterioration of indicators of availability of their own working capital.

In 2019, the increase in the aggregate efficiency index by 0.41 points was contributed by the growth of the net profit of enterprises, the further growth of labour productivity, the improvement of indicators of business activity, and the increase in the level of absolute liquidity of assets. The growth of the efficiency indicator in 2020 was also most affected by the positive dynamics of net profit and a substantial improvement in the financial stability of agricultural enterprises.

In 2021, the cumulative performance indicator more than doubled from 2020 (from 10.1 to 22.13) and experienced the largest absolute value for 2015-2021. This rapid growth was facilitated by the improvement of almost all indicators of factor impact on the total performance of agricultural enterprises.

Thus, the indicators of profitability of assets and return on invested capital, which are indirectly related to the amount of net profit, as well as indicators of turnover of receivables and indicators of financial stability, of which the provision ratio is recognized as the priority, have the greatest indicative influence on the dynamics of the aggregate indicator of the efficiency of agricultural enterprises own working capital.

Comparing the obtained results with the results of other researchers, we note that the factor studies of L. Rogatina (2018) focus on the analysis of economic factors of the macro-environment and determining their impact on the development of the agricultural sector of Ukraine. Direct foreign and capital investments, the level of population income, the income tax rate and the dynamics of the exchange rate were selected as relevant factors, while the set of internal effective factors of agricultural enterprises were not included in the analysis. V. Nesterenko and A. Moroz (2022) investigated the impact of a set of innovative factors, and the level of competitiveness of agricultural enterprises was chosen as an effective indicator of efficiency.

M. Humeniuk & D. Nemish (2022) consider profitability as a general indicator of the development of small agrarian entrepreneurship and the economic efficiency of its production and focus their research only on small forms of agricultural entrepreneurship. H. Pruntseva (2020) revealed the dependence of the performance of agricultural enterprises on the expenditures of the state budget of Ukraine on the agricultural sector. In contrast to the present study, which was aimed at determining the overall integral indicator of economic efficiency, the dynamics of the net profit indicator were chosen as the results of the activities of agricultural enterprises.

L. Vdovenko's research (2018) is also aimed at determining the impact of state support on the efficiency of agricultural enterprises, but the author also tried to provide a comparative description with other European countries. In turn, O. Anysenko & K. Vakar (2018) generally determined the prospects for the development of agriculture in Ukraine, considering the existing risks and possible options for the national agrarian policy.

V. Holian *et al.* (2019) investigated the factorial influence of the institutional environment on the efficiency of the agricultural sector of the economy and the real possibilities of its further development. The authors found a positive influence of institutional factors on the results of functioning of large agricultural enterprises and a braking effect on the work of medium and small agricultural businesses. The need to ensure comprehensive development of the agrarian sector of the economy focuses on overcoming the raw material orientation of export supplies of agricultural and food products and increasing the specific weight in the structure of production of products with high added value.

The methodology for assessing the economic efficiency of Norwegian researchers H. Alem *et al.* (2018) is based on the methodological tools of stochastic marginal analysis, the implementation of which helped determine the level of average efficiency and prove that management methods and a set of socio-economic factors considerably affect economic indicators of farms in the crop industry.

M. Asfaw *et al.* (2019) emphasized the influencing factors in the production of wheat, and the authors proposed to evaluate the overall efficiency differently from the standpoint of the levels of technical, distributional, and economic efficiency using the example of small wheat producers.

The methodological toolkit of the statistical analysis of factors affecting the results and efficiency of activities carried out by Czech researchers (Naglova *et al.*, 2017) is more focused on the specifics of dairy enterprises. In turn, the use of the cluster analysis methodology allowed assessing the factor impact of foreign capital on the efficiency and competitiveness of medium and small producers of dairy products.

We agree with the conclusions of the research results of V. Masuku and A. Belete (2015), who used a universal approach to analyse and evaluate the economic efficiency of small, medium, and large dairy farms. The integrated use of three methods of data analysis, namely descriptive statistics, econometric analysis (stochastic marginal function of profit) and

gross profit analysis allowed the authors to measure the average level of their economic efficiency.

Authors fully agree with the conclusions that the quality of the database and the evaluation method used affect the objectivity of the evaluation of the results of the management of agricultural enterprises. In contrast to the applied toolkit, E. Rosochatecká (2018) used the index method, the method of calculating the economic rate of profit, and indicators of forecasting the financial state of enterprises to determine the overall indicator of the efficiency of agricultural enterprises.

N. Koteva (2019) found a significant relationship between the size and economic efficiency of farms. The author identifies aggregate economic efficiency with such indicators as productivity and profitability of farms, and the applied methodological tools combine methods of comparative analysis, statistical groupings, and expert evaluation.

One cannot help but agree with the results of research by M. Guth & K. Smedzik-Ambrozy (2020), which revealed the priority influence of the available resource potential of the country on the level of economic efficiency of its agricultural enterprises. The level of provision of land resources, capital, and labour is recognized as the main factors that create the economic efficiency of the agrarian sector of the country's economy.

Thus, in contrast to other researchers, a complex algorithmized methodical approach to assessing the level of economic efficiency of agricultural enterprises of Ukraine based on the definition and analysis of the aggregate indicator and the construction of a model of factor influence on its dynamics has been substantiated and tested.

▸ Conclusions

A substantiated and tested methodical approach to the complementary evaluation of efficiency as a phenomenon and process of economic activity, which is based on a step-by-step algorithm for calculating integral indicators and subsequent modelling of factor influence, allows for a comprehensive assessment of the dynamics of the level of economic efficiency of agricultural enterprises of Ukraine and to carry out retrospective monitoring based on rating coefficients.

Notably, the analysis is based on statistical data before the full-scale russian invasion of Ukraine. The performance indicators of agricultural enterprises in the past 2022 will be incomparably worse.

Since 2015, there has been a steady trend of a gradual increase in the volume of production of the vast majority of agricultural products, an increase and strengthening of the export potential of Ukrainian agricultural enterprises; however, the beginning of russia's full-scale armed aggression has had a devastating effect on the functioning and prospects of their further development.

Prospective ways from the topic for the following scientific works focus on observing the stabilization and gradual recovery of agricultural enterprises of Ukraine, namely the following endogenous factors:

– further development of military events on the territory of Ukraine;

– the pace of liberation of the occupied territories;

– state of damage and destruction of agricultural enterprises and agricultural infrastructure;

– the degree of mining of a considerable part of the territories, including farmland;

– real opportunities for setting up logistics;

– aggravation of the shortage of working capital at agricultural enterprises;

– limited number of resources;

– terms and scope of solving the problem of unblocking Ukrainian ports and operation of export corridors for further export of Ukrainian agricultural products;

– the current state and level of realization of the capacity potential of processing enterprises according to the current military situation;

– providing state support to agricultural enterprises.

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▸ Conflict of Interest

None.

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Моніторинг сукупного рівня економічної ефективності сільськогосподарських підприємств України: фактори впливу та перспективи зростання

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► **Анотація.** Ефективність діяльності сільськогосподарських підприємств визначається синергетичним впливом цілої сукупності різноманітних факторів. Удосконалення та апробація методичного забезпечення факторно-компліментарної діагностики рівня економічної ефективності суб'єктів господарювання у сучасних умовах залишається актуальною проблемою. Метою дослідження був комплексний моніторинг рівня економічної ефективності сільськогосподарських підприємств України та вимірювання ступеня впливу пріоритетних факторів на сукупний показник ефективності. У процесі дослідження використано ряд методів: абстрактно-логічний, порівняльного аналізу, табличний, статистичний, метод матриці-координат, розрахунково-конструктивний, монографічний, факторного аналізу. Встановлено, що протягом 2015 та 2021 рр. даний сукупний показник збільшився на 47% – від 15,07 до 22,13 пункти. Серед факторів, які позитивно вплинули на встановлене зростання сукупного показника економічної ефективності, найбільші рейтингові коефіцієнти мають: збільшення продуктивності праці (1,5852), більш, ніж дворазове зростання обсягу чистого прибутку сільськогосподарських підприємств (1,0931), збільшення у 2,2 рази коефіцієнта фінансування (0,905), зростання у 1,9 разів коефіцієнта оборотності позикового капіталу (0,8754) та збільшення майже у 3 рази його рентабельності (0,8587), зростання показника оборотності дебіторської заборгованості (0,7899) та дворазове збільшення показника абсолютної ліквідності (0,7500). Найбільш негативно на рівні сукупного показника ефективності позначилися наступні фактори впливу: зниження на 23% показника фондовіддачі (-0,6005), зменшення на 17% коефіцієнта швидкої ліквідності (-0,4944), погіршення на 26% рентабельності основних засобів (-0,4642), зниження оборотності та рентабельності власного капіталу сільськогосподарських підприємств (-0,4653 та -0,4426 відповідно). Практична значущість проведеного дослідження визначається удосконаленням методичного інструментарію вимірювання та діагностики сукупного рівня економічної ефективності суб'єктів господарювання, що може бути корисним в управлінській практиці організації моніторингу та розробки напрямів підвищення економічної ефективності сільськогосподарських підприємств

► **Ключові слова:** економічна ефективність; динаміка; адитивна модель; рентабельність; фінансова стійкість

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Architecture of corporate reporting on the sustainable development of business entities in the agrarian sector as a tool of sustainable agri-management

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▸ **Abstract.** Increasing the level of competitiveness of the agricultural sector and solving important tasks for rural areas requires the consideration of the priorities of sustainable development. The implementation of this task requires new concepts of agricultural management, the justification of which is impossible without improving corporate reporting. The purpose of this study was to supplement the scientific and methodological framework for the development of a reporting architecture for the sustainable development of agricultural companies. This study involved the following methods: monographic, graphic, method of systematization and logical concretization, synthesis, induction and deduction, questionnaires, generalization, method of structural and genetic analysis and synthesis. The study found that in modern management, corporate financial and non-financial reporting is a strategic management tool that signals investors about the long-term nature and public priorities of business development. It was discovered that reporting on sustainable development is becoming widespread in the practice of foreign companies. The attitude of the management of Ukrainian agricultural companies towards the issue of the expediency of adding sustainable development indicators to management reporting was clarified. The corporate reporting of Ukrainian agricultural enterprises was analysed, which allowed identifying the key guidelines for reporting on sustainable development in the future. The set of qualitative characteristics of reporting on the sustainable development of Ukrainian agricultural companies was substantiated. Based on the mathematical model, an attempt was made to estimate the impact of corporate reporting on sustainable development on the profitability of agricultural companies. The results showed a connection between these factors in large agricultural holdings and uncertainty in medium and small agricultural companies. The results can be used by agricultural enterprises that are focused on achieving the sustainable development goals of agricultural production and rural areas

▸ **Keywords:** reporting; agricultural companies; management; agriculture; sustainable development; social responsibility; efficiency

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Introduction

In the context of increasing requirements and risks for socially responsible business activities, certain information contained in the financial statements of companies is insufficient to make effective management and investment decisions. Reporting on sustainable development has become the information and analytical basis of modern corporate management, based on the principles of social responsibility and the creation of socially necessary value. Today, reporting on sustainable development forms the potential of trust in the company, the commitment of customers and consumers, and the margin of safety for increasing the value indicators of the brand and the business as a whole.

Exacerbations of global social, environmental, and economic problems of humanity today form new prerequisites for determining business performance criteria. High profits are no longer the most important indicator of business success. Indicators of social significance and value of goods, works, services, types, and results of companies' activities are increasingly coming to the fore. Many international corporations today confidently demonstrate that future success is guaranteed to businesses that are not indifferent to socially significant problems of humanity (climate, ecology, poverty, social justice, etc.) and publish their corporate reports on solving these important tasks of society.

Starting from 2023, the Corporate Sustainability Reporting Directive (CSRD), adopted by the European Parliament (Directive EU, 2022), entered into force within the European space. The main issues regulated by the Directive on non-financial corporate reporting are environmental aspects, aspects of business-staff relations, respect for human rights, fight against corruption, gender equality of staff. As noted by J. Krasodomska & P. Zieniuk (2023), today the international community is undergoing a critical period in the implementation of the ambitious sustainable development goals, which are scheduled to be implemented by 2030. The solution of these issues appears not only in the context of the responsibility of states and governments of countries; the leading role is assigned to business and its socially responsible part. In this regard, financial and non-financial corporate reporting becomes of strategic and priority importance, which should disclose the goals, indicators, and effectiveness of sustainable development of companies for society.

F. Rosati & L. Faria (2019) call sustainability reporting "…the practice of publicly reporting on how an organization achieves its sustainability goals". A. Elalfy *et al.* (2021) determine that the largest part of sustainable development reporting today falls on the countries of South America and Europe. According to O. Makarenko (2023), an expert of the auditing company KPMG in Ukraine, the most active regions in the practice of reporting on sustainable development are the countries of the Asia-Pacific region (89%), the EU countries (82%), the Middle East and Africa (56%).

O. Budko (2020) considers sustainable development reporting to be a strategic tool that concretizes sustainable development issues, which facilitates further assessment and monitoring of their achievements in the company. According to the study results of S. Pizzi *et al.* (2020), the systems and standards of sustainable development, as well as the practices of compiling and publishing financial statements compiled based on their use, have a positive impact on the activities of companies and business development. Orientation of enterprise management towards the use of sustainable development standards in business and the display of the results of such activities in corporate reporting T. Tsalis *et al.* (2020) send a powerful signal to investors on the presence of long-term competitive advantages. A. Haji *et al.* (2022) determine that the decision to prepare and publish reports on the sustainable development of companies is considerably influenced by the industry affiliation and sensitivity of the business.

The scientific originality of the present study lies in complementing the methodological foundations of corporate reporting on sustainable development for business entities in the agricultural sector of the economy, factoring in the specifics of their functioning within the Ukrainian agro-industrial complex.

The purpose of this study was the scientific and applied substantiation of the conceptual foundations of the reporting architecture for sustainable development of Ukrainian agricultural companies and determination of its key qualitative characteristics to meet the information needs of sustainable agricultural management.

Literature Review

The issue of reporting on sustainable development has gained considerable popularity and relevance among Ukrainian and foreign researchers in recent years. Well-known agricultural scientists of Ukraine have made a powerful contribution to the development of the scientific, theoretical, and methodological framework of sustainable development as a strategic tool for the development of the national agrarian business. Y. Bezdushna *et al.* (2022) investigated the impact of companies' financial statements on the capitalization of their assets. Yu. Lupenko *et al.* (2020) indicate that the implementation of systemic structural transformations in the further development of the country's agricultural sector requires new approaches to management and new management decisions, the information and analytical basis of which is corporate reporting. V. Mesel-Veseliak (2016), upon substantiating the strategic development vectors of the agricultural sector in rural areas of Ukraine, pointed out the need to solve acute socio-economic and environmental issues that form the framework of sustainable agricultural development goals. M. Puhachov (2020) expands the scope of the tasks of sustainable development of rural areas, identifying the improvement of management of sustainable development of rural areas as the first

and priority task in their overall list. The thorough results of their research reflect strategic guidelines, opportunities, and prospects for the development of the agricultural sector and rural areas of Ukraine in the context of the transition to a global concept of sustainable existence. Strategies, vectors, and trends in the development of agricultural business clearly defined by these scientists require their further detail, search for effective tools for their implementation in economic practice and testing the results obtained.

C. Ngwakwe (2008) states that coverage of financial and non-financial performance of companies, specifically in the field of environmental, social, and managerial components, contributes to the improvement of financial results, return on investment and asset growth of the company.

In the world, out of the 250 largest companies in terms of size and scale of activity, 93% prepare and publish sustainability reports. According to T. Mohin (2018), a quarter of them use the Global Reporting Initiative (GRI) standards. In Europe, 96% of companies in major European indices publish sustainability reports.

According to D. Partridge (2018), large companies clearly demonstrate the connection between their sustainability activities and the development of individual business value and social value. Today, it is important to demonstrate this dependence to buyers, employees, investors, shareholders, and all interested public groups, to demonstrate that such dependence has a commercial effect and solves the most important environmental and social issues. This connection is a means of increasing the level of profitability and increasing value for investors. A. Ferrell *et al.* (2016) prove that on stock exchanges, financial instruments of companies that demonstrate corporate sustainability reporting are in greater demand.

According to the results of research conducted by A. McWilliams & D. Siegel (2000) in American companies, it was found that sustainability reporting has a positive and considerable effect on return on equity, return on assets, and profitability in the forecast period. P. Whetman (2017) adds that corporate sustainability reporting has a particularly significant impact on the profitability of companies with low levels of institutional ownership.

As R. Stammers (2017) points out, the lack of information and reporting of companies on sustainable development is increasingly viewed by potential investors as value risks. P. Wright *et al.* (1997) and S. Teoh *et al.* (1999) agree that, as a management factor, sustainability reporting forms a powerful information and analytical basis, the scope of which is much broader than conventional reporting, which contains mainly financial data on business. Y. Nakao *et al.* (2007), A. King & M. Lenox (2001) proved that the degree of relevance of sustainability reporting is considerably higher, which increases the effectiveness of management and investment decisions and reduces potential management risks.

▸ Materials and Methods

The materials for this study included data obtained based on generalizations of Ukrainian and foreign scientific literature on issues of corporate reporting of business entities. Specialized data on the global reporting initiative's system of standards and requirements were also added to the information base of this study. As additional information and analytical materials, the author of this study used data from international organizations (13 largest agricultural…, 2021), annual financial and non-financial reporting of individual large agricultural holdings of Ukraine (Non-financial reporting…, 2021), published on the official websites of companies, results of surveys of managers and specialists of agricultural enterprises.

A set of general scientific and specific methods of economic research was used in the study, which were based on a dialectical methodological approach to the knowledge of socio-economic phenomena and processes. The analysis method was used to identify key trends in the development of corporate reporting of companies and investigate the procedures for its regulation in international practice. Based on the method of systematization and specification, a review of the scientific literature was conducted and the author's vision of the need to supplement the conventional financial statements of agricultural companies with a set of non-financial indicators was formed. The method of synthesis, induction and deduction, as well as systematization of the results of scientific research, formed the methodological framework for substantiating the author's concept of corporate reporting architecture for the sustainable development of agricultural companies in Ukraine. Methods of systematic approach, systematization and logical structuring were used to substantiate the qualitative characteristics of corporate reporting of agricultural business entities. The methods of observation and comparison underlie the description of the professional discourse concerning the discussion of the obtained results and opinions of other scientists on the problem of improving the information and analytical basis of modern management in the field of corporate reporting on sustainable development.

Part of the material for conducting the study was collected by the method of a selective survey of the target audience, which was conducted based on a survey using a sample questionnaire developed by the authors. The face-to-face form of conducting the survey was chosen (involving higher education graduates who underwent practical training at agricultural enterprises). The condition for participation in the voluntary survey was to indicate the name of the agricultural enterprise, position, and surname of the defendant. The respondents of the survey were heads and chief specialists of agricultural business structures of the Odesa region. The total number of respondents who answered the questionnaire was 53. The questionnaire contained six main questions with suggested possible answers in the context of the

importance of indicators of sustainable agribusiness development for the needs of future management and a separate point of appreciation for taking part in the survey (Table 1).

Table 1. Survey questions that were used in the study

Company name Question	*Respondent's full name and details* Answer options
Do you consider it important for management to reflect information on sustainable development in the company's financial statements?	– yes – rather "yes" than "no" – "no"
Do you consider the amount of information on sustainable development available in the company's annual financial statements sufficient?	– yes – rather "yes" than "no" – "no"
Do you consider it appropriate to supplement management reporting with sustainable development indicators?	– yes – rather "yes" than "no" – "no"
Do you consider it appropriate to supplement the company's financial statements with information about risks associated with sustainable development?	– yes – rather "yes" than "no" – "no"
Does your company take part in the implementation of sustainable development programs and projects?	– yes – "no"
Do you consider it appropriate to take further participation of the company in the implementation of sustainable development programs?	– yes – "no"

Source: compiled by the authors

The results of the survey were processed using the statistical method. Based on the economic and statistical method, the impact of corporate reporting on the financial result of agricultural formations was estimated. As a particular methodological technique of the economic and statistical method, a three-factor mathematical model of multiple linear regression was used, which showed a high level of reliability at 96%:

$$Y_i = b_0 + b_{1j} + b_2 x_{2j} + b_3 x_{3j}, \quad (1)$$

where x_1 is the cost per 1 ha of arable land; x_2 is the amount of investments in social development per 1 ha of arable land; x_3 is the coefficient of disclosure of information about sustainable development by the company in reporting.

The conclusions to the study were formulated using methods of concretization, generalization, structural and genetic analysis and synthesis of the obtained results. Some of the results of the conducted research, author's developments and recommendations were presented using the graphical visualization method.

▸ Results and Discussion

In modern conditions, reporting on sustainable development is an important indicator of business reliability and stability, a marker of its long-term goals and intentions, and a guarantor of business corporate responsibility to customers, society, and the environment. Reporting on sustainable development is a necessary tool that allows determining the strategic investment priorities of a company, forming a comparative picture of its attractiveness in its industry sector, and providing information to society about the unity of goals and objectives of business development with socially significant and important tasks of the present and future.

The corporate strategy of ensuring and protecting the interests of investors and shareholders is no longer limited to the cost framework of net profit, which is an indicator of the present and does not guarantee an increase in efficiency in the future period. A more promising indicator and source of satisfaction of investors' economic interests is the value of the business, which generates the potential for productivity and increasing the income of its owners in the future. Sustainability reporting acts as a tool for forming and increasing business value at the same time as increasing the level of its social responsibility in solving the key tasks of society's existence.

The EU directive from 2014 (A matter of principles…, 2021) established that large companies in the European Union (companies with over 500 employees) must disclose non-financial information. In 2021, the Corporate Sustainability Reporting Directive (CSRD) was adopted, which applies to all companies operating on regular markets, includes reporting on the green course of economic development and requires a mandatory audit regarding its reliability (Directive EU, 2022). According to the International Federation of Accountants, today in the world about 91% of companies provide reporting on sustainable development. Of these, about 51% of companies provide relative confidence in the accuracy of such reporting, about 9% of companies provide guarantees of sustainability reporting, which are confirmed by professional auditors or specialists affiliated with audit firms (IFAC state of play…, 2022).

The corporate reporting architecture model today is based on the system of international standards for sustainable development: GRI, a set of accounting standards for sustainable development developed by SASB (Sustainability Accounting Standards Board), standards of the Task Force on Climate-

related Financial Disclosures (TCFD), a set of tasks in the field of sustainable development goals based on the UN, the EU Sustainable Finance Disclosure Regulation, SFDR, the Directive on non-financial reporting (NFRD - EU), etc. The developed project of the International Standard, which defines the key principles for disclosure of information about sustainable development in financial reporting, is "General Requirements for Disclosure of Sustainability-related Financial Information" (2021). All these standards are not mandatory for practical application, although they are required by financial and stock exchanges in most countries of the world (Villiers & Tsagas, 2020).

In modern practice, the value of a business based on sustainable development is determined in several ways. One of them is based on the actual sustainability ratings and indices (DJSI, FTSE4 Good, Euronext Vigeo Eiris, STOXX ESG-X, Sustainalytics), which are considered by investors for making investment decisions (Buchholz *et al.*, 2020). Accounting concepts have made a considerable contribution to the development of sustainable development standards, namely the Value Balancing Alliance initiative, which is actively supported by the Big Four accounting firms (Value balancing alliance…, 2020), Sustainable Business Value (SBV) (Hayatun & Wiwin, 2012). There is a close connection between the value of a brand that demonstrates respect for the needs of the environment, society, its staff and consumers and added opportunities to generate dividends and maximize future profits for shareholders by increasing the company's reputation capital (Loh & Tan, 2020).

The study analysed the reporting of companies in the agrarian sector of the economy of Ukraine and assessed its content and quality. 98.5% of owners and managers of agricultural companies identified the importance of corporate reporting in terms of disclosing indicators and data on the achieved level of sustainable development of the company. 81.2% of respondents consider information on sustainable development to be incomplete and insufficiently informative. 83.6% of respondents expressed their desire to supplement the corporate reporting of companies with quantitative indicators of sustainable development. Over 96% of respondents expressed their desire to provide more thorough analytical information and explanations about trends and prospects for sustainable development of the company and a detailed assessment of the risks associated with the implementation of particular business programs.

Studies have shown that the financial and corporate reporting of Ukrainian companies is rather limited in terms of quantifying the value of objects of future investments in sustainable development programs. Analytical information on assessing the relationship and results between investment in sustainable development programs and future business growth opportunities and prospects is also limited. Considerable difficulties in reporting on sustainable development in Ukraine are explained by the fact that financial statements, their structure, content, forms, and set of indicators are strictly governed at the state regulatory level and reporting cannot be supplemented according to the requirements of its principal users (owners, investors, stakeholders, etc.). Under these conditions of drafting full corporate sustainability reporting, Ukrainian companies still use international accounting standards. Or another option: financial reporting and the formation of additional internal management reporting that is not regulated by national frameworks and standards.

Corporate reporting on the sustainable development of Ukrainian agricultural companies should form an element of the unified reporting architecture of the agro-industrial complex, as part of the nationwide concept of formation, use, and publication of the results of activities in the field of sustainable development of the national economy. Therewith, the preparation of a conceptual framework for corporate reporting on sustainable development should consider the specifics and features of the functioning of agrarian production. It is also necessary to indicate the development of rural areas, the system of interrelations with other areas of the agro-industrial complex to ensure the implementation of common sustainable development goals at the level of the country's agro-industrial complex (Fig. 1).

Presently, corporate sustainability reporting of Ukrainian agricultural companies is characterized by the following disadvantages: lack of consistency and clear criteria for its drafting and provision; lack of a single reporting period, structure and forms for such reporting; a free set of indicators and reporting items that do not always fully disclose information about sustainable development, program implementation costs and results obtained. In addition, the problem is the predominance of financial reporting indicators over non-financial ones, which are key in sustainable development issues, and the lack of a qualitative assessment of strategic prospects for agribusiness development. Specifically, due to the advance in ensuring sustainable development, the number of indicators for assessing future risks and the results of the impact of sustainable development on the further development of the company is limited. The lack of clear guidelines for the requests of the main users, first of all, investors, staff, public groups, and the predominant orientation of corporate reporting of medium and small enterprises to the state management sector may be the main drawback of reporting by Ukrainian agricultural companies.

The key guidelines for compiling corporate sustainability reporting of national agricultural companies should be as follows: 1) creation and increase in value and its parts in the industry chain; 2) increasing the amount of incoming investment flows and the value of business as a whole; 3) satisfying the economic interests of owners and investors; 4) implementation of programs of social responsibility to society and the company's personnel; 5) unification with world standards, requirements, and indicators of sustainable development; 6) clear reflection of strategic development goals; 7) transparency, prominent level of trust and social nature of presentation

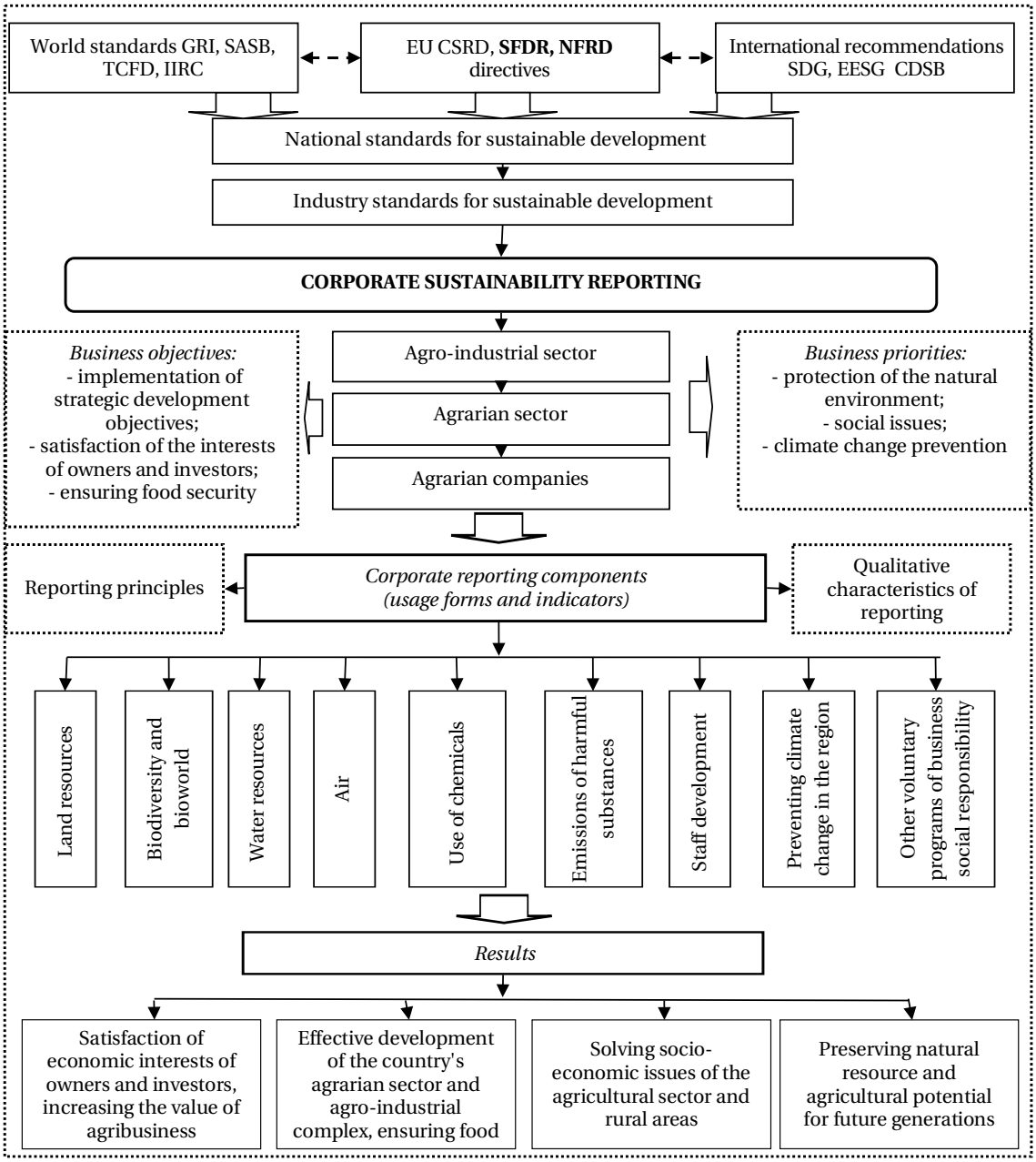

Figure 1. Architecture of corporate sustainability reporting of agricultural companies in Ukraine
Source: developed by the author of this study

According to the conceptual framework of financial statements, their key qualitative characteristics are relevance, materiality, truthful presentation, comparability, verification capability, timeliness, and clarity. Experts of the International Federation of Accountants (IFA) in the context of the formation of a new generation of non-financial sustainability reporting focus on the need to ensure its compliance with the following parameters: meaningfulness, objectivity, reflection of ecosystem indicators, reliability, proportionality to issuers, compliance with modern technologies, timeliness (Companies, investors, and professionals…, 2022). Fully agreeing with these qualitative parameters, we consider it appropriate to supplement them in terms of forming corporate sustainability reporting for agricultural companies in Ukraine, factoring in the specific features of the current level of development of theory, national methodology and practice (Fig. 2).

Corporate sustainability reporting today should include indicators and analytical explanations regarding information on economic activity and its results, technical standards and their implementation in the field of social development of personnel, environmental development, climate change, anti-bribery, the results of investing in social responsibility business programs, social activity of agricultural companies and involvement in solving important tasks for Ukrainian society.

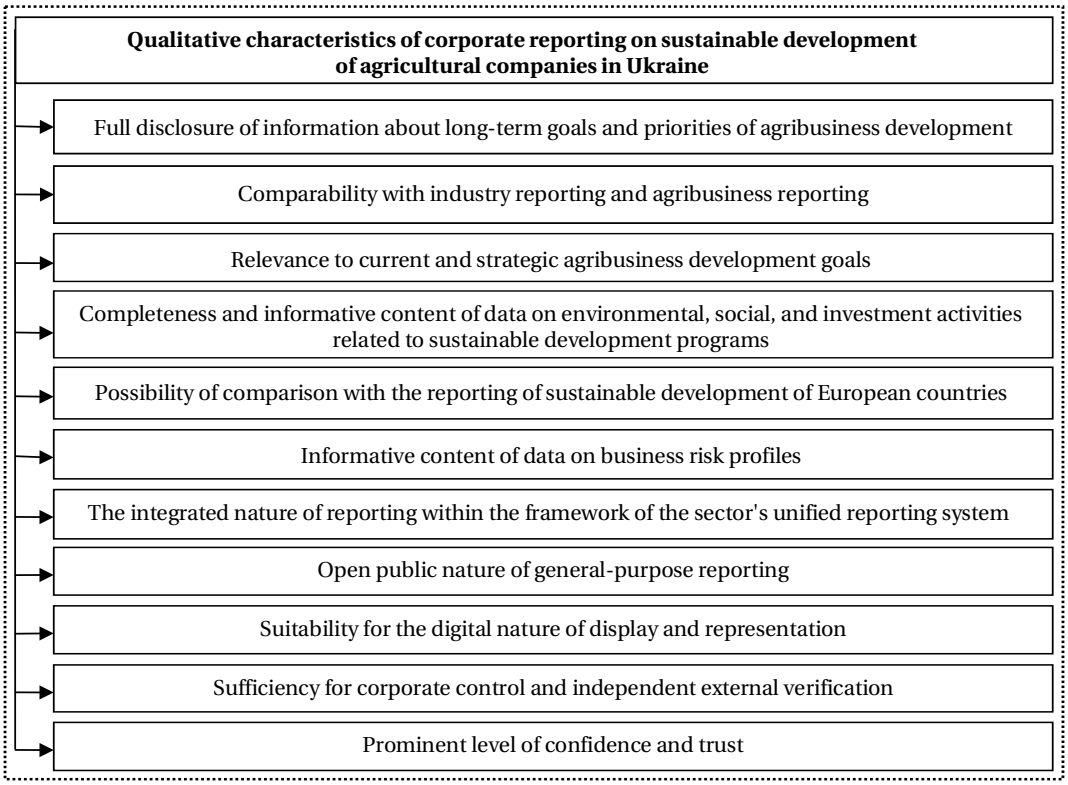

Figure 2. Qualitative characteristics of corporate reporting on sustainable development of agricultural companies in Ukraine

Source: developed by the author of this study

In 2020, according to Forbes lists, the largest agricultural companies (in terms of annual revenue) of Ukraine were Kernel ($4.4 billion), MHP ($1.9 billion), Nybulon ($0.9 billion). Eridon ($786 million), Suntrade ($853 million), Cargill ($682 million), ADM "Ukraine" ($856 million), Delta Wilmar ($241 million) (13 largest agricultural…, 2021).

These agricultural companies are the largest in Ukraine, they prepare their financial statements according to both national and international standards, form and publish non-financial statements that contain indicators of sustainable development. Corporate reporting on sustainability of these agricultural companies has many common features. It is compiled within the framework of social responsibility programs for agricultural businesses, is the result of a voluntary contribution of companies to the social, economic and environmental spheres, and meets the strategic goals and guidelines of their activities. The main areas of the sustainable agricultural development policy of these companies are as follows: preserving the environment, saving resources, programs, and projects of social protection of personnel, a prominent level of quality and responsibility for products, support for local territorial, specifically, rural communities.

The main vectors of sustainable development activities of the largest agricultural companies of Ukraine are as follows: 1) achievement of environmental and social goals of sustainable development through management of the company's value chains; 2) transition to the use of bioenergy (biomass TPP); 3) development and implementation of corporate climate strategies; 4) further certification of environmental management systems, personnel health and product safety and quality; 5) personnel development. However, this practice of implementing sustainable development programs and corporate reporting is now mainly inherent in large agricultural holdings and is less common in medium-and small-sized agricultural formations.

Due to the prominent level of social responsibility, participation in programs and preparation of corporate reports on sustainable development, large agricultural companies were excluded from the statistical sample when forming a mathematical model of the dependence of reporting on sustainable development and the cost of business of medium and small agricultural enterprises in Ukraine.

The mathematical model showed a fairly high level of reliability ($R^2 = 0.96$), which confirmed a close relationship between the selected factors and the business value (total assets) of Ukrainian agricultural companies. Based on economic and statistical indicators of the activity of agricultural companies, the mathematical model has the following form:

$$Y_i = 734.3 + 0.48x_{1j} + 0.84x_{2j} + 45.4x_{3j} \quad (2)$$

The conducted research identified the main weaknesses of medium-sized and small agricultural companies in terms of managing agricultural activities based on sustainable development: lack of

systematicity in planning and ignoring the modern practice of investing in sustainable development programs; weak (or non-existent) communication systems, lack of intangible assets, predominant focus on achieving short-term development goals (profit maximization), low level of corporate culture and reporting. Small agricultural enterprises are characterized by a cost-based approach to agricultural management.

The results obtained indicate the successful development of methods and forms of responsible management based on the principles of sustainable development in large agricultural companies in Ukraine. Compilation and publication of corporate reporting on sustainability by representatives of large agrarian businesses of Ukraine on official websites is also an effective practice. Therewith, the study demonstrates the need for further research towards substantiation and search for effective tools for attracting medium and small agricultural companies to take part in sustainable agricultural development programs in Ukraine. A problematic aspect for small agricultural formations is the system of implementing motives and incentives for long-term sustainable development in practical activities.

The key issues of agriculture and rural areas of the national economy today are as follows: a considerable percentage of agricultural land degradation, a small share of the area under organic farming, an increase in the level of use of chemical soil treatments, and a prominent level of energy-intensive production. Furthermore, Ukrainian agribusiness is characterized by a considerable reduction in the biodiversity of farm animals, insufficient financial state support for the industry and rural areas, low degree of intersectoral integration and low share of agricultural products in the added value of the public national product, low level of income and well-being of rural residents, indifference to environmental problems in the context of temporary maximization of farmers' profits.

Effective communication with stakeholders is currently based on a socially responsible or sustainable reputation, reputation capital, and strategy aimed at achieving sustainable development, which must be recorded and properly disclosed in relevant non-financial reporting documents. The use of these parameters creates an opportunity for stakeholders to obtain data that provides the value and effectiveness of integrated information on the innovative development of agricultural enterprises (Zamlynskyi *et al.* 2023).

The authors agree with the conclusions of scientific studies by Y. Bezdushna *et al.* (2022), who determine that financial reporting is a tool for capitalizing Ukraine's national wealth and capitalizing business assets. Therewith, the authors do not specify exactly how reporting should be integrated to perform capitalization functions at different levels of economic management. The proposed concept of corporate reporting architecture of agricultural companies in Ukraine makes provision for a structural combination of management levels and reporting on sustainable development: from agricultural business to the agro-industrial complex as a whole. Only an integrated methodical approach allows creating systematic information and an analytical base necessary for sustainable management of all spheres of agriculture.

In C. Ngwakwe's (2008) impact assessment model, indicators of the firm's environmental responsibility (personnel health and safety, waste and community development) were chosen as the basis and factors of the multiple regression model. Therewith, we consider it more correct to attribute indicators of personnel safety and community development to the social component of sustainable development. Fully agreeing that these factors are actively involved in the achievement of the sustainable development goals and influence the financial results of the company, we consider it appropriate to choose more comprehensive relative indicators, e.g., the amount of social development costs per 1 ha.

D. Partridge (2018) has proven that the value factor and sustainability of entrepreneurship are gaining increasingly more trust from business owners and users of financial statements. Partridge notes that the integration of elements of sustainable development into the business strategy and reporting can cause initial inconsistencies and the need to supplement it with certain principles and characteristics. However, in his further studies, such characteristics are not detailed. The authors of the study believe that the definition of new qualitative parameters of corporate reporting of business entities is one of the defining aspects, and therefore a set of such characteristics for reporting of agricultural companies was presented.

Part of the authors, including A. Ferrell *et al.* (2016), Y. Nakao *et al.* (2007), T. Mohin (2018), A. King *et al.* (2001), investigate the financial and non-financial reporting from the standpoint of the social responsibility of firms, which manifests itself mainly in the form of social or environmental forms. We believe that the study of corporate reporting from the standpoint of the impact of the concept of sustainable development on it is a more universal methodological approach, since sustainable development is a systematic category that covers, among other things, aspects of social responsibility of business.

A. Hayatun & B. Wiwin (2012) present two models of corporate reporting: the first model - the model of sustainability reporting, the second model – reporting based on the disclosure of information about the economic, social, and environmental components of the company's activities. Agreeing with the importance of reflecting all these aspects in the corporate reporting of business entities, the authors attempted to combine these components in a single architecture. The integration of corporate reporting of agricultural companies into a single system of information and analytical support, which today is necessary for solving the urgent tasks of the further functioning of the agrarian sector and rural areas of the country, appears as a methodological principle different from all previous models of building sustainability reporting.

Conclusions

The conducted study has proved the exceptional importance, relevance, and global scale of using standards and requirements of sustainable development in the practice of corporate reporting of companies. Reporting based on the principles of sustainable development includes three main groups of indicators: environmental, social, and economic activity. The results of the studies have proved that owners and investors of Ukrainian agricultural companies consider corporate reporting, which is compiled and published, incomplete and insufficiently informative in terms of indicators of sustainable development. A considerable difference between the national practice of preparing corporate reports of Ukrainian companies is the predominant focus on the public management sector and strict regulation of the composition, forms, and content of financial statements of enterprises.

During systemic analysis, it was concluded that corporate reporting becomes the dominant feature of the unified architecture of sustainable development of the agricultural sector and should create prerequisites for motivating business entities to achieve its goals and objectives. Considering this principle, the model of corporate reporting architecture for sustainable development of Ukrainian agricultural companies was substantiated. As an addition to the conceptual framework for the preparation of non-financial reporting, it was found that the key qualitative characteristics of corporate reporting on the sustainable development of Ukrainian agricultural companies should be comparability with the reporting of the agricultural sector and long-term orientation, comparison with practice, openness, transparency, and informative content, a prominent level of trust and suitability for digitalization.

The assessment of the current level of sustainable development of the country's agriculture over the past two decades indicated a sharp trend of deterioration of key indicators of environmental activity of Ukrainian agricultural companies, the disappearance of biodiversity, low income of rural residents, the presence of considerable issues in the conservation of natural resources, specifically, land resources.

The assessment of the level of influence of corporate reporting on the value of agrarian business revealed the presence of considerable differences in the obtained results depending on the size of agrarian companies. In large agricultural holdings of Ukraine, a close direct relationship was revealed between financial indicators (revenue size) and business value. In medium and small enterprises, the existence of such a link was ambiguous and indicated the need for further investigation. The research revealed the existence of a certain issue of motivating the management of medium and small agricultural companies in Ukraine to prepare corporate reports on sustainable development. In the near future, it is also necessary to develop a mechanism for involving medium and small agricultural companies in the sustainable development reporting system. The substantiation for such a mechanism should be based on the principles of combining sustainable development management at all levels of institutional regulation: at the level of the country's agro-industrial complex, agriculture, and agricultural management of companies.

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None.

Conflict of Interest

None.

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Архітектура корпоративної звітності зі сталого розвитку бізнес-суб'єктів агарного сектору як інструмент сталого агроменеджменту

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▸ **Анотація.** Підвищення рівня конкурентоспроможності аграрного сектору та вирішення важливих для сільських територій завдань потребує врахування пріоритетів сталого розвитку. Реалізація даного завдання потребує нових концепцій агроменеджменту, обґрунтування яких неможливо без удосконалення корпоративної звітності. Метою статті було доповнення науково-методичного базису формування архітектури звітності зі сталого розвитку аграрних компаній. При написанні статті було використано наступні методи: монографічний, метод абстрактної систематизації і логічної конкретизації, методи синтезу, індукції і дедукції, метод анкетування, методи абстрактної конкретизації, узагальнення, структурно-генетичного аналізу і синтезу, графічний метод. В процесі проведення дослідження було визначено, що у сучасному управлінні корпоративна фінансова та нефінансова звітність є стратегічним інструментом управління, який сигналізує інвесторам про довгостроковий характер і суспільні пріоритети розвитку бізнесу. Виявлено, що звітність зі сталого розвитку набуває значного поширення у практиці діяльності зарубіжних компаній. Було з'ясовано ставлення менеджменту українських агрокомпаній до питання доцільності доповнення управлінської звітності показниками сталого розвитку. Проведено аналіз корпоративної звітності українських аграрних підприємств, що дозволило виділити ключові орієнтири складання звітності зі сталого розвитку у перспективі. Обґрунтовано сукупність якісних характеристик звітності зі сталого розвитку вітчизняних агрокомпаній. На основі математичної моделі здійснена спроба оцінити вплив корпоративної звітності зі сталого розвитку на доходність аграрних компаній. Результати показали наявність зв'язку даних факторів у великих агрохолдингах та невизначеність у середніх та малих агрокомпаніях. Результати можуть бути використані аграрними підприємствами, які орієнтовані на досягнення цілей сталого розвитку сільськогосподарського виробництва і сільських територій

▸ **Ключові слова:** звітність; аграрні компанії; управління; сільське господарство; сталий розвиток; соціальна відповідальність; ефективність

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Integration of Agile methods into the management system as a tool for increasing the effectiveness of strategic management in the agri-food sector

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▸ **Abstract.** Within the framework of modern world conditions faced by the Ukrainian business subjects of the agri-food sector, conducting research on the possibility of using new methodologies in management can be an added advantage to optimizing and increasing the effectiveness of their performance. The purpose of this study was to highlight and summarize the work on the principles of introducing modern methodologies into general management systems as tools for increasing the effectiveness of strategic management in the agri-food sector, considering the modern world conditions. The study used general scientific and special research methods: monographic; theoretical generalization, analysis, synthesis, induction, and deduction; structural and logical analysis; grouping and classification. The author substantiated the expediency of using flexible management methods in agri-food enterprises. The priority of using Agile management methods was identified, the advantages and disadvantages of using Kanban and Scrum methodologies in the management of an agri-food enterprise were investigated, and their main elements were determined (classification of roles in the team, key concepts, principles). Features of the functioning of business entities in the conditions of SPOD, VUCA, and BANI worlds were provided. It was noted that the flexible methods under study are aimed at the evolutionary development of organizations, i.e., gradual improvements that, in the end, ensure the effectiveness of management at a prominent level. This paper expands practical approaches to the application of flexible management methods in agri-food enterprises, which lays the foundation for further research on strategic management in the agri-food sector under the conditions of the need for their constant reorientation and adaptation to the BANI world. The practical significance of the study lies in the development and implementation of proposals and practical recommendations for the use of Agile management methods in the management system of an agri-food enterprise as a means of improving the effectiveness of strategic management

▸ **Keywords:** management; flexible management methods; management; strategic management; business processes; strategy

▸ Introduction

Considering the global trend of finding advanced and innovative solutions to increase labour productivity, improve quality, reduce costs, and use available resources, it is proposed to implement the methodology as an effective solution to the existing problems of agri-food enterprises. By structuring information about providing and analysing the advantages and disadvantages of flexible management methods, it is possible to form an effective system that can help enterprises function in modern conditions.

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The relevance of this study is conditioned upon the level of management of an agri-food enterprise that plays a dominant role in the effectiveness of its management. It is the need for rapid adaptation to dynamic market conditions and consumer needs that makes the introduction of flexible management methodologies urgent. World practice proves that the level of management is substantially increased with the introduction of modern, flexible methodologies.

The purpose of flexible management methods is not to level the existing management system, but the ability to consider its essence, flexibility, and the ability to apply existing advantages of enterprises. Accordingly, the claim that the existing management model does not function or function inefficiently is not true.

Today, the business environment is unpredictable, so managers must adhere to a systematic analysis of the external competitive and internal environment, and based on this, ensure the organization's strategy. In many ways, the effectiveness of strategic management depends on the synergistic effect of the management goals of an economic entity and the goals of employees, internal and external motivations for development, the availability of highly qualified, competent employees, etc.

At the same time, aspects of adaptation, and introduction of new methodologies in the management of agri-food entities as a tool for improving the effectiveness of strategic management, have not yet gained considerable popularity among the Ukrainian scientific community, which determines the relevance of this study.

Notably, agri-food enterprises are looking for a new management system that would be more adaptive and efficient, despite the challenges and risks of the external environment. D.M. Wiechmann *et al.* (2022) state the need for transformations of a modern enterprise, ensuring its market stability and the possibility of applying flexible management methods.

D. Larson & V. Chang (2016) investigated the benefits of using Agile management methods in business practices. Features of the application of Agile principles in project management were considered by N. Kaleshovska *et al.* (2015), in public management – by M. Maksimova (2021), etc. Among the benefits of Agile, C.Y. Hsieh & C.T. Chen (2015) note reduced time to complete tasks, higher quality, increased flexibility, and higher overall level of stakeholder satisfaction, etc. The study focuses on the effectiveness of Agile management methods, which occurs due to the productivity of employees, their high qualifications and work experience, the use of modern information technologies, a flexible management structure, etc. (Rudnicki, 2011).

F. Karaesmen & Y. Dallery (2000) defined the characteristics of Kanban work methods; in turn, T. Murino *et al.* (2010) substantiated the main functions of team members' joint work, their roles, and tasks that must be performed during its provision. In the study G.N. Krieg & H. Kuhn (2008) discuss the details of Kanban, which embodies the idea of flow as a specific production process, the absence of downtime and unfinished tasks. The study by M. Senapathi & M.L. Drury-Grogan (2021) focuses on practical recommendations for improving the productivity of teams, and the quality of their tasks in today's rapidly changing business environment.

This means that multiple experts can perform the same task sequentially. In this case, the diagnosis of previous errors and their processing is accelerated. This allows for avoiding unnecessary costs, improves the quality of development, and reduces its implementation time (Kirichek *et al.*, 2020).

Proceeding from the relevance of this study, most researchers and analysts support the idea of recommending managers systematically assess the external environment of the organization and compare the advantages and disadvantages of many alternatives before formulating a strategy.

The purpose of this study was to introduce and provide Agile management methods in the management system of an agri-food enterprise as a way to increase the effectiveness of strategic management, considering the concept of modern world conditions.

▸ Characteristics of concepts

Presently, domestic enterprises, regardless of their forms of ownership and management, have to adapt to the new conditions of martial law: most logistics routes have changed, and production and processing have been suspended or destroyed. That is why there is a need for high-quality management, the main task of which is to ensure the sustainability of the enterprise's functioning, and create new and maintain existing competitive advantages. It is this way of managing the organization in a dynamic environment and fierce competition that is an important factor in strengthening competitiveness. The emphasis on the strengths of an economic entity is not an accident, but the result of systematic efforts to create and strengthen the opportunities necessary for the development of the organization – this is the main task in strategic management.

To characterize the concept of world conditions before considerable globalization, scientists note the expediency of using the SPOD world (steady, predictable, ordinary, definite).

In the early 1990s, the US military proposed the concept of the world in the VUCA format (volatility, uncertainty, complexity, ambiguity). This concept focused on issues of behaviour in unstable, uncertain, complex, and ambiguous situations that arose after the end of the Cold War. Gradually, the VUCA concept spread to the business environment.

VUCA is a world where circumstances change quickly and unpredictably; devastating changes occur, and a retrospective cannot predict the future; facts that are difficult to understand (black swans), causes and factors that cause problems; difficulty answering the questions “Who, What, When, Why”.

Whereas in the SPOD world, business entities have progressed through the implementation of appropriate strategies, the results of which are somewhat predictable and achievable, with the advent of

the VUCA world, corporate strategies must be mobile and adaptive so that enterprises can effectively respond to fundamental changes in the external environment.

Since the beginning of the pandemic, the world has become BANI (brittle, anxious, nonlinear, incomprehensible), since 2020. The term was proposed by James Kashio, lead researcher at the Institute for the Future (USA) (Horney, 2015).

Accordingly, for business entities, the BANI world declares a high probability of destruction of all the usual methods and actions of management, the absence, and unavailability of providing long-term plans and actions. Anxiety has become a disease of the 21st century.

Rapidly changing conditions make it impossible to form long-term strategies for the development and life support of enterprises due to the inability to factor in all changes that occur simultaneously, there is an acute lack of initial data, furthermore, all knowledge becomes incomplete and superficial. Accordingly, management decisions are made in conditions of uncertainty, often intuitively. Therefore, the priority competitive advantages for modern organizations are the processes of constant reorientation and adaptation.

Consequently, there is a further change in the management paradigm all over the world (Khodakivska & Kononenko, 2020). Presently, it is common practice for managing agri-food enterprises to distinguish two main types of strategic management. The first is regular management, which includes several systems that complement each other. Within the framework of this type of strategic management, the process of managing the main functions of the enterprise takes place. At the same time, the second type of strategic management is carried out in real-time and is associated with solving problems and force majeure situations. It is important to note that in this type, it is important to refine and improve the existing strategy.

The essence of flexible thinking includes operational flexibility (improving an existing business) and strategic flexibility (creating new products and services, as a result – attracting new consumers (customers). Agile management technology, first of all, should be considered not as a methodology, but rather as a certain philosophy, way of thinking, culture, and a set of management methods (tools).

All forms of Agile methodologies used by organizations are based on team activities and have certain features based on the scope of their activities.

The lack of sufficient research in the field of Agile methodologies necessitates a systematic and interdisciplinary understanding of processes at the enterprise level.

▸ Strategic management of SWOT analysis

The main stages of strategic management are as follows:

1. Strategic diagnosis – analysis of the external and internal environment of the enterprise;
2. Determination of strategic goals, mission, vision, goals of the enterprise.
3. Strategic planning.
4. Strategic control.

SWOT analysis is a method of analysis in strategic management that organizations use to develop and validate their business strategies. SWOT analysis identifies and compares an organization's strengths and capabilities with external opportunities and threats in its environment. SWOT analysis clarifies internal, external, and other factors that may influence an organization's goals and objectives (MBA, 2019).

The SWOT analysis process helps managers determine whether the resources and capabilities of an organization are effective in a given competitive environment in which it operates, and, if necessary, improve the strategies necessary to maintain success in this environment.

Domestic agri-food enterprises are increasingly mastering European sales markets, which is why the main task for them is to create a sustainable competitive advantage. This is precisely what the strategy of functioning of economic entities should be aimed at.

Apart from the financial benefits, strategic management can increase employee motivation in the workplace. Setting effective goals for employees and engaging them in organizational work can improve overall productivity. Research shows that when goals are aligned, employee and business productivity increases dramatically (Peha, 2001).

Agile management methods developed within the framework of lean manufacturing were implemented in software after the “Manifesto for Agile” in 2001 and have since spread to all types of management tasks in all sectors of the economy (Manifesto for Agile…, 2001). Therewith, the purpose of flexible methods is not to level the existing management system, but the ability to consider its essence, flexibility, and the ability to apply existing capabilities of enterprises.

As a result, aspects related to the conditions for the formation, functioning, and development of groups, phenomena, and management processes that ensure the achievement of business goals are updated. Teams are characterized by open discussion of problems, pooling resources, and synergy.

The study of foreign practices (The Latest Reports…, 2019) highlighted certain advantages of Agile, among which it is worth noting that the method entirely changes the way the business entity works, as it introduces a new way of thinking. Unlike the main methods, Agile is aimed at flexible development, which includes, first of all, teamwork (Abrahamsson *et al.*, 2017). Therewith, labour productivity increases by changing conditions and setting tasks (they are changed by a certain sequence of phases – “iterations”, after which the results are summarized and the team's work is evaluated; the results of work are recorded in the form of weekly reports, which allows managers to indicate and correct incorrect decisions, improving the quality of project work

processes. Furthermore, there is a constant development of new techniques, exchange of knowledge and experience in the team, as there is an opportunity to learn and discover new things while working. Agile helps organizations increase revenue through the synergistic effect of communication, collaboration, feedback, and sharing accumulated knowledge, etc. However, the main advantage of using Agile is its main purpose – to create a qualitative value for the consumer.

▸ The essence of practical management methods

Kanban and Scrum, which have practical significance, should be highlighted among flexible management methods. Experts say that the information that is presented visually contributes to the best communication of the strategy to the employees of the enterprise. This allows all members of the team to visualize the scope and progress of their work. Kanban is a convenient tool for assessing the current status of tasks, the work performed, and the future scope of work to deliver the strategy (Zhmai & Badera, 2022).

Kanban is about limiting the number of unrealized tasks and maximizing efficiency and (or) speed. In the practice of management, there are situations of non-compliance with the deadlines for the implementation of tasks and projects (which is unacceptable under the conditions of using Kanban). It is important to pay attention to the creation of a single informational and categorical basis in which different units and employees can communicate effectively.

Kanban is a concept that maximizes the efficiency of employees and teams to support continuous work flow and efficient execution. When applied, Kanban is based on fundamental principles such as task visualization and limiting the number of tasks "in progress".

▸ Advantages and disadvantages of using management methods

Among the advantages of Kanban, it is worth noting the most important ones, specifically the improvement of work efficiency. No downtime and waiting for employees to complete tasks immediately after completing the previous one.

Thus, better interaction and communication in the team are formed. Responsible employees are always clearly defined by individual areas of responsibility. Constant communication, and prompt meetings of employees, contribute to the fastest solution to problems that may arise during work processes and allow the team to find the best solution.

Furthermore, Kanban is a flexible methodology that allows adding and cancelling tasks as a person works. Accordingly, this methodology can be easily adapted to existing work processes in the enterprise. There are no official roles, which is why it is easy to apply it to the specific features of an individual business entity's activities, and quickly change it at any time if necessary. Optimizing communication, discussion, and meeting time is an advantage of Kanban, as employees have a continuous flow of tasks, so less time is spent on planning.

At the same time, it is possible to highlight certain disadvantages of Kanban. Specifically, the results of practical application may have low efficiency. The reasons for this are as follows: low motivation of employees, unsatisfactory level of incentives from the management of the enterprise, the unfavourable microclimate of the team, lack of well-established business processes, effective communication within the team, duplication or lack of those responsible for certain areas of work, etc. In addition, the requirements for the constant availability of tasks – the "conveyor principle" can be recognized as a disadvantage, provided that the task or project has periods of uneven work.

The lack of time limits is considered a disadvantage since Kanban does not have deadlines, i.e., the task is given as much time as necessary to complete, which creates problems with task implementation deadlines. In application practice, there is a chance to "lose" tasks with a high priority for the organization. Since employees take tasks to work on their own, they can choose low-priority tasks for the business. Therefore, the tasks must be thoroughly checked and ranked by priority by the management of the enterprise.

The need to use Kanban is determined by the variety and multi-vector nature of business processes in the operational and strategic periods of the enterprise's functioning, as well as in conditions of a dynamic external environment. Another condition for using this methodology is flexible obligations to complete a certain task, project implementation, or an unlimited schedule (or rather long deadlines).

The expediency of using Kanban on the part of the company's management is the fact of avoiding overloading employees, since they independently choose areas of activity, without expecting a task from the management. This avoids the accumulation of unfinished tasks or the assignment of more tasks than can be completed.

In turn, the Scrum methodology is designed to improve project management in the field of computer software product development, the Scrum methodology is used in many types of production, commercial and financial activities. As an organizational form, Scrum is capable of structuring the content of processes and collective activities (Peha, 2001; Professional Scrum…, 2022).

Scrum is a project management methodology that is popular among programmers and is becoming increasingly widespread in other areas and industries, among managers in modern business conditions (Professional Scrum…, 2022).

The essence of this management tool is the ability to distribute a certain task or project into time intervals, so-called sprints. A considerable number of organizations use a two-week time interval for sprints, but it is possible to set other periods: one week or three-week. The essence is to break down a large task into the smallest sub-items that can be

completed during a given period. For this, it is useful to prepare the structure of future work.

As with Kanban, cards are used for each task and a common board is created, divided into periods. The difference is that Scrum has more planning elements.

The use of Scrum is determined by the need for a prominent level of control over the results of work, and activities in the "just in time" format, ensuring the loyalty of consumers, stakeholders, etc.

Scrum also allows for improving business processes quickly. To ensure its activity, small teams and collectives are created, the members of which must cooperate effectively as a certain cohesive unit. However, this is only possible if everyone has the opportunity to express their opinion. Accordingly, the optimal size of a Scrum team is five to nine people. If necessary, it is possible to create several such teams and combine them (Schwaber & Sutherland, 2020) (Table 1).

Table 1. Advantages and disadvantages of using Kanban and Scrum methodologies in managing an agri-food enterprise

Methods	Workflow	Roles in a team (group)	Communication	Possibility of making changes	Time interval	Performance results
Kanban	Current	None	Permanent	At any time	None	Current
Scrum	Specific implementation time intervals	Defined	Planning, review, retrospective, daily meetings	Impossibility of making changes	Defined	At the end of each time interval

Source: developed by the author based on research by K. Schwaber & J. Sutherland (2020)

Therefore, the business entity's choice of a way to implement certain tasks depends on its needs. Scrum is suitable for long-term projects where all the requirements are known and there is a work plan that can be divided into parts to fulfil the purpose in smaller steps. Kanban is suitable for small projects, tasks without detailed plans, or long-term projects where tasks are formed during the workflow. It is advisable to implement Kanban to provide more flexible and adapted business processes to changes in the external environment.

Notably, by investigating the practical and scientific aspects of implementing flexible management of agri-food enterprises, one can conclude that the methodology for forming and managing Agile teams is mediated.

Currently, opinions about the need for collaboration experience among team members are debatable. On the one hand, the success of team activity depends on the maturity of the team, in which a common mental model should be formed. At the same time, by giving priority to newly created teams, the activities of existing teams lead to dysfunction and inefficient decision-making (Mkoba & Marnewick, 2017).

The fulfilment of the possibilities of the process-based approach in the strategic management of modern organizations requires the solution of several important methodological issues, specifically target indicators, indices, and methods of choosing alternatives, considering the life cycle of organizations, forms of ownership, key success factors in the industry and other factors.

Considering the mission and goals of analysing the strengths and weaknesses of the enterprise, as well as the opportunities and threats of the external environment, the manager should start developing possible alternative strategies. This requires evaluating strategic alternatives based on specific criteria such as suitability, probability of implementation, and resource availability (McGee & Sammut-Bonnici, 2015).

Organizations that continuously identify and analyse the results of their strategic approaches are more likely to succeed and improve their financial performance (Gartner top…, 2021).

It is important to conduct an external audit of strategic processes as a basis for clarifying further areas of functioning, adaptation, and development of the organization.

Globalization processes, martial law, the need for economic recovery, and business support in modern conditions emphasized the need to supplement financial indicators with other parameters. It can be assumed that the application of strategic management, the formation, and the provision of the strategy of the business entity in the agri-food sector have certain benefits.

▸ Financial benefits

Empirical research and analysis have proved that the growth in the performance of enterprises with progressive strategic management systems, which have a significant impact on both the planning and implementation of the strategy, is directly proportional to the increase in financial indicators of management.

Increasing opportunities for preventing and levelling force majeure circumstances. Strategic management motivates managers to encourage the work of those subordinates who are aware of the need for systematic monitoring, forecasting, and ensuring operation strategies.

Improving the quality of strategic decision-making through collective interaction. The process of group interaction for decision-making contributes to the creation of alternative strategies and the choice of the best option by exchanging opinions and competencies of team members (a separate group).

▸ Employee motivation

Engaging employees in strategy development can provide a better insight into the priorities and functioning of an existing reward system. This also better

evaluates the relationship between employee performance and productivity rewards inherent in strategic planning.

Reducing the duplication of job duties and (or) the absence of those responsible for certain areas of work. When formulating a strategy, there is a more profound understanding of individual and collective responsibilities, and individual areas of responsibility. Role differentiation, which exists by definition, should reduce disparities and duplications in the activities of groups and individual employees (The new organization…, 2021).

▸ Reducing resistance to change

The benefits of understanding the need for change with minimal resistance are also more likely to follow the process of developing an engagement strategy for the entire team, as there is a better awareness of the choices for particular options and available alternatives. In turn, the uncertainty associated with change is also eliminated from the process, and resistance to change becomes less harmful.

It is worth emphasizing once again that maximum efficiency can be achieved only through an integrated approach – strategic design, organization, and implementation of various management methods (specifically, Agile methods), strategic control, and analysis of all results. Exceptionally comprehensive and systematic actions will be the key to success in today's dynamic environment.

Strategic management plays a key role in achieving success and maintaining competitiveness in today's business environment. Strategic management is a set of decisions and actions that lead to the development of effective strategies that help achieve the organization's goals. Apart from making operational and effective decisions, using opportunities, and coordinating actions, strategic management contributes to cost reduction, better motivation and stimulation of employees, the response of the organization's management to threats or their levelling, transformation into opportunities, and timely reaction and adaptation to possible market trends, growth of overall productivity in the business entity's activity. Effective strategic management continuously plans, monitors, and verifies the organization's operations to improve operational efficiency, market share, and profitability.

▸ Conclusions

Considering the need to find promising innovative solutions to improve the main aspects and needs of agri-food enterprises, the most effective solution to modern problems is the introduction of methodology. The implementation of the formation of an effective system that can help enterprises function in modern conditions has become possible due to the introduction and analysis of the advantages and disadvantages of practical management methods.

The present study found that the modern market economy confirms the expediency of considering strategic management as a special management technology that ensures the optimal organization of business processes in a dynamic environment. It is known that the effectiveness of strategic management depends on the synergistic effect of the management purpose of a business entity, as well as the availability of competent employees, and internal and external motivations for development. Considering the above, as well as global trends in finding solutions to increase labour productivity, reduce costs, and use real resources, it is the introduction of flexible management methods that are appropriate for agri-food enterprises. Accordingly, using a variety of flexible management methods, it is possible to coordinate the successful and productive work of agri-food enterprises.

The idea of using Agile management methods in the activities of enterprises is to strive to transform existing management models into more adaptive ones to external challenges, promote the improvement of information exchange, optimize processes and configure interaction within employee teams, establish a communication process with feedback, etc. Accordingly, the use of flexible management methods is a reliable support for ensuring the effectiveness of strategic management of enterprises in the agri-food sector.

This paper provides an area for new research related to the processes of implementing Agile management methods in the activities of agri-food enterprises, namely Kanban and Scrum, and will help in the initiation of the development of analogous approaches for other flexible management methods that involve dynamism, the mode of the greatest contribution to the implementation of interests, opportunities, and requests of buyers.

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▸ Conflict of Interest

None.

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Інтеграція Agile-методів у систему менеджменту як інструмент підвищення ефективності стратегічного управління в агропродовольчій сфері

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Анотація. У межах концепції сучасних світових умов, з якими зіштовхнулися вітчизняні господарюючі суб'єкти агропродовольчої сфери проведення досліджень щодо можливості використання нових методологій у сфері менеджменту може стати додатковою перевагою до оптимізації та збільшення результативності їх функціонування. Метою статті було висвітлення та узагальнення напрацювань щодо засад впровадження сучасних методологій у загальні системи управління як інструментів підвищення результативності стратегічного управління в агропродовольчому секторі з урахуванням концепцій сучасних світових умов. У дослідженні використано загальнонаукові та спеціальні методи дослідження: монографічний; теоретичного узагальнення, аналізу, синтезу, індукції та дедукції; структурно-логічного аналізу; групування й класифікації. Обґрунтовано доцільність застосування гнучких методів управління в підприємствах агропродовольчої сфери. Виділено пріоритетність застосування Agile-методів управління, досліджено переваги та недоліки застосування методологій Kanban і Scrum в управлінні підприємством агропродовольчої сфери, визначено їх основні елементи (класифікацію ролей у команді, ключові поняття, принципи). Наведено особливості функціонування суб'єктів господарювання в умовах SPOD, VUCA BANI-світів. Відзначено, що досліджувані гнучкі методи спрямовані на еволюційний розвиток організацій, тобто поступові вдосконалення, які, у кінцевому результаті, забезпечують результативність господарювання на високому рівні. У статті поглиблені практичні підходи щодо застосування гнучких методів управління в підприємствах агропродовольчої сфери, що закладає основу для подальших досліджень щодо стратегічного управління в агропродовольчій сфері за умов необхідності їх постійної переорієнтації та адаптації BANI-світу. Практична значущість досліджень полягає у розробці та впровадженні пропозицій й практичних рекомендацій щодо використання Agile-методів управління у системі менеджменту підприємства агропродовольчої сфери у якості засобу підвищення ефективності стратегічного управління

Ключові слова: управління; гнучкі методи управління; менеджмент; стратегічне управління; бізнес-процеси; стратегія

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