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FORMATION OF INDICATORS FOR MANAGING THE INNOVATIVE DEVELOPMENT OF AGRICULTURAL ENTERPRISES IN RURAL AREAS

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INTRODUCTION AND PURPOSE OF THE STUDY. The purpose of the study is to determine the process of forming indicators for the management of innovative development of agricultural enterprises in rural areas in the current conditions and the European integration vector of the state, taking into account the goals of sustainable development.

RESEARCH METHODS. During the study, the following scientific economic methods were used: the grouping and classification method, index-indicator method, structural-logical analysis method, graphic method, etc.

PRESENTATION OF THE MAIN MATERIAL. The need to transition to innovative development of agricultural enterprises in rural areas was analyzed and substantiated in order to balance and stabilize the latter. Criteria for innovative development of rural areas were developed: institutional (study of the state of regulatory and legal support for the application of innovations, innovative approaches, creation of innovative prerequisites and an appropriate environment in the agricultural sector of the country, etc.); index-indicator (comprehensive assessment of the development of the country's innovative potential, which includes sustainable development by studying specific indicators (indexes and indicators) of the implementation of innovations); innovative entrepreneurship; innovative infrastructure; innovative culture.

RESULTS. The index-indicator criterion is deepened by proposing separate and substantiated groups of indicators of innovative development of rural areas based on the Oslo Guidelines (by measuring scientific, technological and innovative activity in business): indicators of innovative potential of rural areas; indicators of knowledge flow management; indicators of assessment of the external environment of agricultural enterprises.

KEYWORDS: agricultural enterprises; European integration; innovative development; innovative activity; sustainability; sustainable development; rural areas; development.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
19	11	6

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ФОРМУВАННЯ ІНДИКАТОРІВ УПРАВЛІННЯ ІННОВАЦІЙНИМ РОЗВИТКОМ АГРАРНИХ ПІДПРИЄМСТВ СІЛЬСЬКИХ ТЕРИТОРІЙ

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ВСТУП І МЕТА ДОСЛІДЖЕННЯ. Метою дослідження визначено процес формування індикаторів управління інноваційним розвитком аграрних підприємств сільських територій в умовах сьогодення та євроінтеграційного вектора держави, враховуючи цілі сталого розвитку.

МЕТОДИ ДОСЛІДЖЕННЯ. Під час дослідження використано такі наукові економічні методи як: метод групування та класифікації, індексно-індикаторний, метод структурно-логічного аналізу, графічний метод та ін.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. Проаналізовано та обґрунтовано необхідність переходу до інноваційного розвитку аграрних підприємств сільських територій задля збалансування та стійкості останнього. Розроблено критерії інноваційного розвитку сільських територій: інституціональний (дослідження стану нормативно-правового забезпечення можливостей застосування інновацій, інноваційних підходів, створення інноваційних передумов та відповідного середовища в аграрному секторі країни тощо); індексно-індикаторний (комплексна оцінка розвитку інноваційного потенціалу країни, до якої належать сталий розвиток шляхом дослідження конкретних показників (індексів та індикаторів) впровадження інновацій); інноваційне підприємництво; інноваційна інфраструктура; інноваційна культура.

РЕЗУЛЬТАТИ. Індексно-індикаторний критерій поглиблено шляхом пропонування виокремлених та обґрунтованих груп показників інноваційного розвитку сільських територій на основі Керівництва Осло (шляхом вимірювання науково-технологічної та інноваційної діяльності у бізнесі): індикаторів інноваційного потенціалу сільських територій; індикаторів управління потоками знань; індикаторів оцінки зовнішнього середовища аграрних підприємств.

КЛЮЧОВІ СЛОВА: аграрні підприємства; євроінтеграція; інноваційний розвиток; інноваційна діяльність; стійкість; сталий розвиток; сільські території; розвиток.

Introduction. Management of the development of agricultural enterprises assumes the presence of potential in the enterprise, effective strategic management of its activities, which are the determining guidelines for forming the vision of the enterprise in the long term. The prospects for research in this direction are to substantiate methodological approaches and determine the main indicators of management of the development of agricultural enterprises in rural areas to assess their potential and further activities.

Problem statement. Analysis of the development and further activities of agricultural enterprises consists in building a system of indicators with the help of which it is possible to judge individual aspects of development: environmental, social, economic types of activities of the enterprise.

Unresolved parts of the problem. The construction of integral, aggregated indices with the help of which it is possible to comprehensively judge the development of a business entity at the macro, meso and micro levels plays an important role in the study, analysis, modeling and forecasting of economic processes at various levels of management. The main difficulty in aggregating information into indices is determining the weight of the original indicators without losing significance and without excessive subjectivity.

Analysis of literary sources. Regarding the calculation of the integral coefficient of the ecological state of the land area, P.I. Korenyuk proposed a corresponding normative scale and a scale of gradation of the value of this coefficient (Table 1). Therefore, the integral index of the ecological state of the territory is a relative indicator that characterizes the complex state of the land area of the region, the country, in this study of agricultural enterprises of the Vinnytsia region. As previously noted, the gradation scale of the integral coefficient of the ecological state of the land area is presented in Table 1 (Koreniuk, 2003).

Table 1

Graduation scale of the integral coefficient of the ecological state of the land area

Coefficient value	Ecological safety
<0,33	Ecologically crisis
0,34-0,66	Ecologically pre-crisis
>0,66	Ecologically moderately safe
about 1	Ecologically safe

Source: (Koreniuk, 2003).

Presentation of the main material Usually aggregated indicators are divided into the following groups:

- socio-economic;
- ecological-economic;

- socio-ecological;
- ecological-socio-economic (uk.wikipedia.org).

We will begin the study of the management of the development of agricultural enterprises in rural areas of Vinnytsia region and its main indicators with the selection of research subjects. They selected six agricultural business entities of Vinnytsia region, which occupy leading positions in the rating among the twenty best agricultural enterprises in Vinnytsia region (kurkul.com).

Let's describe their activities:

- Archi LLC. Land bank: 5,270 hectares.
- Lypivka-Agro LLC. Land bank: 4,500 hectares. Areas of activity: grain, legume, oilseed, vegetable.
- Agro-Etalon LLC. Land bank: 4,428 hectares. Areas of activity: grain, legume, oilseed, vegetable, fish farming, beekeeping.
- Olgopil AF LLC. Land bank: 4,340 hectares.
- Dashkivtsi PJSC. Land bank: 4,300 hectares. Areas of activity: grain, oilseed, fruit.
- Peredovik LLC. Land bank: 4,190 hectares. Areas of activity: grain, legume, oilseed, vegetable, dairy and meat cattle breeding (kurkul.com).

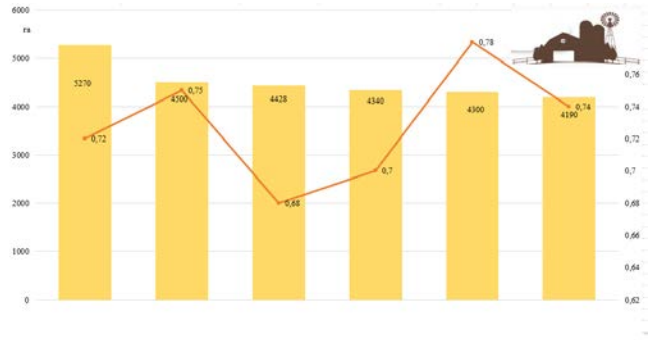
Analyzing the given economic entities, we note that the farms have a large land fund. That is, when conducting economic activity, economic entities face the issue of rational use of nature, ecological production, soil protection, which is expressed through ecological and economic indicators of management of the development of agricultural enterprises. The paradigm of the strategy of rational use of nature involves the formation of an adequate conceptual apparatus, improvement of the ecological and regulatory legal framework, coordination of the development of agricultural natural resource potential with the priorities of socio-economic policy (Laslo, Dychenko and Nahorna, 2018).

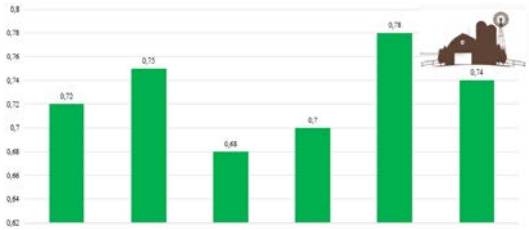
In this regard, domestic scientists conducted research, practical application of the level of environmental friendliness of a land area using the integral coefficient of the ecological state of the land area (Holovchenko, 2015).

Graphically, the land bank of agricultural enterprises and the integral coefficient of the ecological state of the land territory of Vinnytsia region, as of 01.01.2024, and the indicator of the integral coefficient of the ecological state of the land territory of the leading agricultural enterprises of Vinnytsia region are presented in Fig. 1 and Fig. 2.

Analyzing the dynamics of agricultural land and the load of agricultural land on the 1st average employee of the leading agricultural enterprises of Vinnytsia region over the last five years, it should be noted that the land fund of business entities has grown by an average of 313 hectares or 7.47%, as for the load of agricultural land on the 1st average employee, there is also an increase of

1.10 hectares or 5.62% – a positive trend in the activities of agricultural enterprises of the Vinnytsia region.





Source: based on (kurkul.com; Laslo, Dychenko and Nahorna, 2018; Koreniuk, 2003; Holovchenko, 2015).

Fig. 1. **Land bank of agricultural enterprises and the integral coefficient of the ecological state of the land territory of Vinnytsia region, as of 01.01.2024**

Fig. 2. **Indicator of the integral coefficient of the ecological condition of the land territory of the leading agricultural enterprises of Vinnytsia region, as of 01.01.2024**

Over the last studied period, there has been a fluctuation in the average number of employees of the leading agricultural enterprises of Vinnytsia region, which is influenced by many factors of both external and internal nature. On average, this indicator fluctuated by 4 people or 1.9%.

To further characterize the state and efficiency of the leading agricultural enterprises of Vinnytsia region, we will analyze the provision of fixed assets of business entities, both in absolute and relative terms and coefficients, which are shares of the main indicators of management of the development of agricultural enterprises in rural areas. Analyzing the dynamic processes of the average annual cost of fixed assets of the leading agricultural enterprises of Vinnytsia region, we see some fluctuation in their value.

Labor capitalization is an indicator that characterizes the ratio of the average annual cost of the enterprise's fixed assets to the average annual number of employees.

Fund availability – fund availability characterizes the provision of the area of agricultural land with fixed assets and is calculated as the ratio of the average annual cost of fixed assets to the area of agricultural land.

Capital intensity is an indicator, the inverse of capital return, which shows the value of the cost of fixed assets per unit of output produced by the enterprise. This indicator serves to determine the efficiency of using the organization's fixed assets.

Return on assets is the ratio of the value of output in monetary terms to the average annual value of fixed assets (www.google.com).

The working capital of an enterprise is characterized by working capital and current assets that are at the disposal of the enterprise and can be converted into cash within one production cycle or year.

The turnover ratio (number of turnovers) is calculated as the ratio of the cost of products sold at current wholesale prices for a certain period to the average balance of working capital for the same period (Kobyletskyi, analizua.com).

The average annual cost of working capital and the dynamics of the turnover ratio of working capital of leading agricultural enterprises in Vinnytsia region over the past five years are presented in Table 2.

Table 2

Average annual cost of working capital and average value of the turnover ratio of working capital of leading agricultural enterprises of Vinnytsia region, 2019–2023

Agricultural enterprise	Average annual cost of working capital 2019–2023, thousand UAH	Average annual cost of working capital 2019–2023, thousand UAH
Archi LLC	5768,00	2,138
Lypivka-Agro LLC	7180,00	0,796
Agro-Etalon LLC	5760,20	1,513
Olgopil AF LLC	5181,13	1,036
Dashkivtsi PJSC	5221,48	2,032
Peredovik LLC	5089,61	1,048

Over the last studied period, the amount of material costs for the production of leading agricultural enterprises of Vinnytsia region increased on average by 95.11 thousand UAH or 5.63%, this trend is understandable and explained by the state of the domestic economy.

Next, we turn to the analysis of the financial results of leading agricultural enterprises of Vinnytsia region over the past five years, which are represented by economic indicators of development management and enterprise activities.

Analyzing the main financial results of leading agricultural enterprises of Vinnytsia region over the past five years, which are represented by economic indicators of development management and enterprise activities: net income (revenue) from the sale of products (goods, works, services) and gross profit (loss), we note an increase in net income (revenue) from the sale of products (goods, works, services) on average by farms by 254.90 thousand UAH or 5.63%, and gross profit (loss) increased on average by 31.96 thousand UAH or 5.36%.

Next, we move on to detailing the production, sales, and marketability of agricultural products of the leading agricultural enterprises of the Vinnytsia region, its structure, and specialization coefficient.

Specialization of agriculture is a complex process that develops in various forms. Specialization of agricultural enterprises is the predominant production in them of the corresponding type (types) of products for which there are the most favorable natural and economic conditions. The efficiency of production in agricultural enterprises depends not only on the size of the industries that are leading in them, but also on how developed other industries that have a commodity nature are. The more such industries in the economy, the smaller their size and lower the concentration of production, as a rule. The specialization of an agricultural enterprise is determined using the specialization coefficient. Using the indicator of the structure of commodity products, one can conclude about the level of development of individual industries and the degree of specialization of the economy in the production of the main (leading) of them, then the coefficient of commodity concentration of industries is used to judge the level of specialization of an agricultural enterprise, taking into account all its commodity industries. It is customary to consider that an enterprise is multi-industry when this coefficient does not exceed 0.20, with an average – 0.21–0.40, above average – 0.41–0.50, high – 0.51–0.60 and with a deep – over 0.60. Other things being equal, the efficiency of the functioning of agricultural enterprises increases with an increase in the absolute value of the coefficient of commodity concentration of industries, but at the same time the risk of loss of financial stability increases due to a possible deterioration in the market conditions for products of specialization industries (buklib.net).

Also, to analyze the production, marketing and sales activities of an agricultural enterprise, the level of marketability is determined. The marketability coefficient characterizes the share of products ready for sale in the total volume of products produced (buklib.net).

As a result of the calculation, the specialization coefficients of six leading agricultural enterprises of Vinnytsia region were obtained, the coefficient indicators are qualitative, mediocre, and LLC "Lypivka-Agro" has a high specialization coefficient, which indicates the in-depth specialization of the agricultural enterprise. The structure of the commodity products of the studied enterp Judging by the structure of marketable products, the studied agricultural enterprises have a developed crop production sector, and some also have a livestock sector, which was noted at the beginning of the study of the topic of managing the development of agricultural enterprises in rural areas. The level of marketability of agricultural products of the leading agricultural enterprises of the Vinnytsia region was determined (Table 3).

Archie LLC
Coefficient of specialization
K = 0.226, average

Source: based on
(opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

LLC "Lypivka-Agro"
Coefficient of specialization
K = 0.427, high

Source: based on
(opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Agro-Etalon LLC
Coefficient of specialization
K = 0.269, average

Source: based on
(opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

STOV AF "Olgopil"
Coefficient of specialization
K = 0.384, average

Source: based on
(opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

PJSC "Dashkivtsi"
Coefficient of specialization
K = 0.301, average

Source: based on
(opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

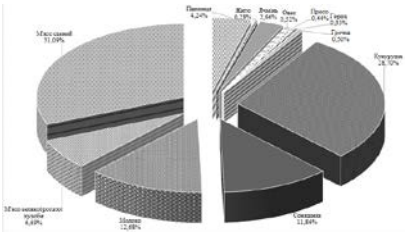


Fig. 3. **Structure of commercial products of Archi LLC of Vinnytsia region**

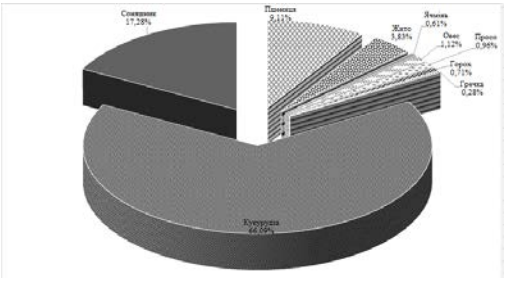


Fig. 4. **Structure of marketable products of LLC "Lypivka-Agro" of Vinnytsia region**

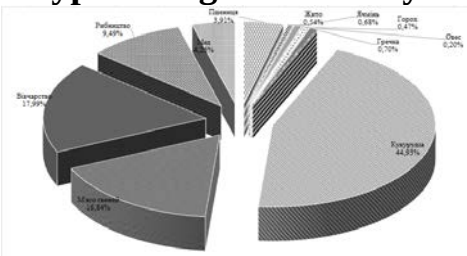


Fig. 5. **Structure of marketable products of Agro-Etalon LLC of Vinnytsia region**

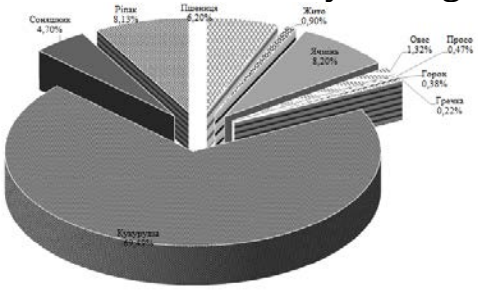


Fig. 6. **Structure of marketable products of STOV AF "Olgopil" Vinnytsia region**

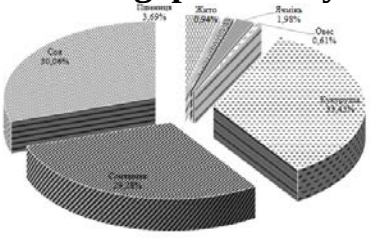


Fig. 7. **Structure of marketable products of PJSC "Dashkivtsi" Vinnytsia region**

LLC "Peredovik"
Coefficient of specialization
K = 0.399, average

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

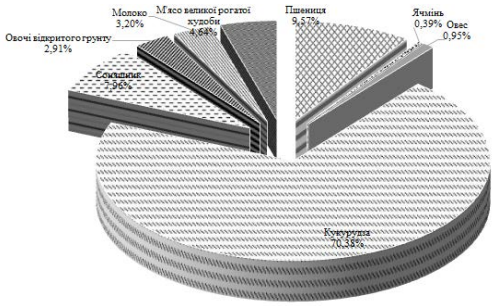


Fig. 8. **Structure of marketable products of LTD "Peredovik" of Vinnytsia region**

Table 3

Level of marketability of agricultural products of leading agricultural enterprises of Vinnytsia region

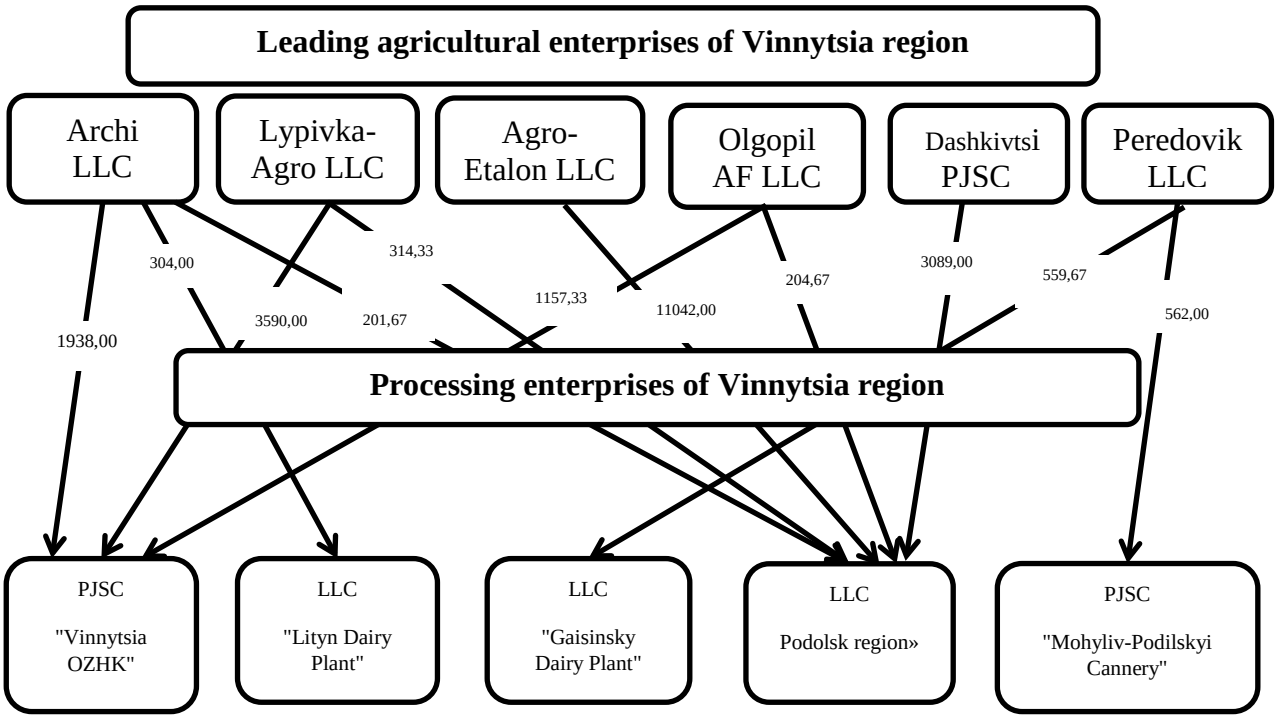
Agricultural enterprise	Marketability level, %
Archi LLC	91,00%
Lypivka-Agro LLC	88,00%
Agro-Etalon LLC	89,00%
Olgopil AF LLC	78,00%
Dashkivtsi PJSC	86,00%
Peredovik LLC	92,00%

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Having sufficiently high marketability levels, the studied agricultural enterprises are permanent sellers of their products to processing enterprises of the Vinnytsia region. The logistics chain of agricultural product sales by one of the main processing enterprises is schematically presented, although the full cycle of sales and logistics is broader and covers other processing enterprises of the region and enterprises of neighboring regions of various levels.

The next stage in defining and describing the main indicators of managing the development of agricultural enterprises is the indicators and coefficients of personnel turnover. One of the important ones in managing the activities of an agricultural enterprise is the coefficient of personnel turnover and the coefficient of personnel stability. The coefficient of personnel turnover is an indicator that indicates the percentage ratio of the number of dismissed employees to the average annual number of people at the enterprise calculated for a certain period.

The coefficient of personnel stability is the ratio of the number of employees with work experience at the enterprise for more than one year (for a certain period) to the average number of employees for the corresponding period (Balabaniuk, 2011).



Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Fig. 9. **Schematic presentation of the plan for transportation of agricultural products of leading agricultural enterprises of Vinnytsia region, 2023**

We observe fluctuations in the staff turnover rate of the studied agricultural enterprises of Vinnytsia region, the average value of this coefficient is 2.31%, which is a relatively low value – positive, as for the personnel stability coefficient, its average value over the past five years is 61.09%, which is also a positive phenomenon, indicating the relative stability of the personnel of agricultural enterprises.

Next, we will define the next step of the study – determining the state of innovation of agricultural enterprises of Vinnytsia region. The main indicator of innovative activity is the integral indicator of the implementation of innovative potential.

To determine the integral indicator of the realization of innovative potential, the formula is used:

$$П_{ін} = \frac{П_1 + П_2 + П_3 + П_4 + П_5 + П_6}{t}, \quad (1)$$

where $П_{iн}$ – the average value of the *i*-th indicator for *t* years; *t* is the analyzed.

The components of the integral indicator of the implementation of innovative potential are the factors of resource potential: labor resources, fixed assets, material and intangible resources, investment costs in innovative

activities, intellectual property and other components. The normative value of the integral indicator of the implementation of innovative potential is more than 0.5, which indicates that the economic entities of the region involve 50% of their resource potential in innovative activities: labor resources, fixed assets, material and intangible resources, carry out investment activities (attract investment funds) and are provided with intellectual property (Voinarenko and Skaliuk, 2008).

As a result of the calculation, a dynamic series of the integral indicator of the implementation of the innovative potential of leading agricultural enterprises of the Vinnytsia region over the last five years and its characteristics were obtained (Table 4).

Table 4

Dynamics of the integral indicator of the implementation of the innovative potential of leading agricultural enterprises of Vinnytsia region, 2019–2023

Agricultural enterprise	Years					Deviation 2023 from 2019		Average level of the integrated indicator of innovation potential realization, 2019, 2023
	2019	2020	2021	2022	2023	absolute, +, -	relative, v.p.	
	1	2	3	4	5	6	7	8
Archi LLC has a high value of the integral indicator of the realization of innovative potential	0,938	0,940	0,943	0,901	0,986	0,048	105,12	0,942
LLC "Lypivka-Agro" high value of the integral indicator of the implementation of innovative potential	0,894	0,801	0,788	0,722	0,869	-0,025	97,17	0,815
Agro-Etalon LLC high value of the integral indicator of the implementation of innovative potential	0,850	0,862	0,833	0,831	0,853	0,003	100,33	0,846
STOV AF "Olgopil" high value of the integral indicator of the implementation of innovative potential	0,806	0,790	0,845	0,818	0,838	0,032	103,93	0,819

End of Table 4

	1	2	3	4	5	6	7	8
PJSC "Dashkivtsi" has a high value of the integral indicator of the implementation of innovative potential	0,862	0,751	0,890	0,783	0,871	0,009	101,05	0,831
LLC "Peredovik" high value of the integral indicator of the implementation of innovative potential	0,798	0,812	0,845	0,831	0,854	0,056	107,03	0,828

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Analyzing the calculated dynamic series of the integral indicator of the implementation of the innovative potential of the leading agricultural enterprises of Vinnytsia region over the last five years, it should be recognized that the studied agricultural enterprises have a high value of the integral indicator of the implementation of the innovative potential. Its average value is 0.847 p.p., an increase over the last period of 0.020 p.p., which determines the active innovation process in agricultural enterprises of the region.

The final stage of the study of the topic of management of the development of agricultural enterprises in rural areas of Vinnytsia region and its main indicators is the measurement of efficiency in the performance system and the methodology for assessing the activities of enterprises based on the integrated total productivity of factors of production of competitive agricultural products of the studied enterprises of Vinnytsia region.

The main indicators that determine the level of competition in industry markets and may indicate the need to change the institutional conditions of entrepreneurial activity are the concentration index and the Herfindahl-Hirschman index.

Concentration index – calculated as the sum of the squares of the shares of enterprises in the market, which is previously defined as the object of regulation:

$$C_n = \sum_{i=1}^{n} d_i \,, \tag{2}$$

where d_i – is the enterprise's share in the product (means of production) market; n – is the number of enterprises for which the indicator is calculated.

The Herfindahl-Hirschman index is calculated as the sum of the squares of the shares of all enterprises operating in the market defined as the object of regulation:

$$HHI = \sum_{i=1}^{n} d_i^2 . \quad (3)$$

Ranging from 0 (competition) to 1 (monopoly of the seller or buyer), the index reflects market concentration and is often the main indicator in implementing policies aimed at ensuring economic competition. It effectively reflects the redistribution of shares between enterprises operating in the market, responding both to the growth of the leader's share and to changes in the number of market players (Vitvitskyi and Shvets, 2019).

Taking into account the previous economic indicators and calculations of the coefficients of the six leading agricultural enterprises of Vinnytsia region, we will calculate the production concentration index among the studied enterprises as the primary indicator of the agricultural market analysis. The advantages of the production concentration index are relatively little information, and the disadvantage is that all other enterprises on the market are not taken into account.

The dynamic series of the production concentration index among the leading agricultural enterprises of Vinnytsia region for the last five years is presented in Table 5.

Table 5

Dynamics of the production concentration index among leading agricultural enterprises of Vinnytsia region, 2019–2023, %

Agricultural enterprise	Years					Average concentration index, 2019, 2023
	2019	2020	2021	2022	2023	
Archi LLC	12,33	12,99	13,01	13,46	15,17	13,39
Lypivka-Agro LLC	11,22	11,54	11,86	12,18	14,67	12,29
Agro-Etalon LLC	10,11	10,09	10,71	10,90	14,83	11,33
Olgopil AF LLC	11,20	11,22	12,20	12,54	13,00	12,03
Dashkivtsi PJSC	10,09	11,07	12,05	13,03	14,33	12,11
Peredovik LLC	11,34	11,23	12,88	13,36	15,33	12,83

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

We note the average value of the production concentration index among the leading agricultural enterprises of Vinnytsia region is 12.33%, in the dynamics among the studied agricultural enterprises this index is growing, that is, the main production of agricultural products is concentrated among these business entities and this is evidenced by the previously determined specialization coefficient of each of these agricultural enterprises.

Next, we determine the Herfindahl-Hirschman index. Its advantages are the ability to determine the level of market monopolization, and the disadvantages are the difficulty in accessing information about the fate of all enterprises in the market and the calculation in the case of a large number of enterprises (Kyryliuk, 2016). Therefore, in our study, we operate on the initial statistical information of the studied agricultural enterprises and determine this index among them. The dynamics of the Herfindahl-Hirschman index of the leading agricultural enterprises of Vinnytsia region over the recent period is presented in Table 6.

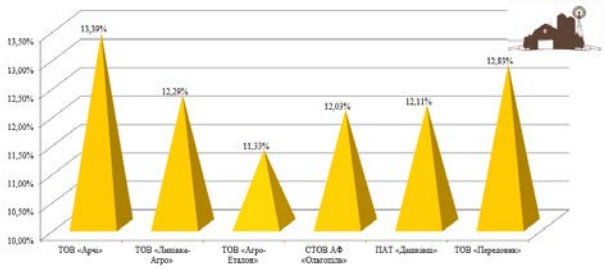
Table 6

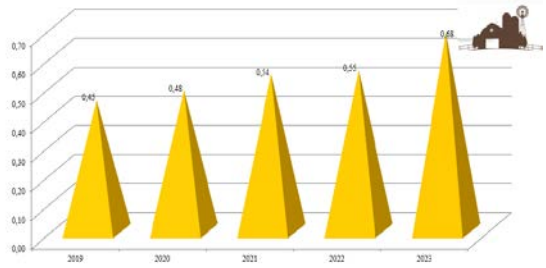
Dynamics of the Herfindahl-Hirschman index of leading agricultural enterprises in Vinnytsia region, 2019–2023

Agricultural enterprise	Роки					Average value of the Herfindahl-Hirschman index, 2019, 2023
	2019	2020	2021	2022	2023	
Archi LLC	12,30%	12,70%	13,03%	13,44%	15,07%	13,31%
Lypivka-Agro LLC	11,27%	11,55%	11,89%	12,08%	13,67%	12,09%
Agro-Etalon LLC	10,12%	11,09%	11,71%	10,80%	13,83%	11,51%
Olgopil AF LLC	11,25%	11,23%	12,02%	12,55%	13,01%	12,01%
Dashkivtsi PJSC	11,09%	11,80%	12,06%	12,54%	13,33%	12,16%
Peredovik LLC	11,34%	11,23%	12,84%	13,06%	13,77%	12,45%
Only six leading agricultural enterprises for determining the Herfindahl-Hirschman index	0,45	0,48	0,54	0,55	0,68	0,54

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

Referring to the normative scale of the Herfindahl-Hirschman index, as the main indicator in the implementation of a policy aimed at ensuring economic competition and one that reflects market concentration, we note that the studied business entities are competitive in the agricultural market of the region. The dynamics of the production concentration index among the leading agricultural enterprises of Vinnytsia region and the Herfindahl-Hirschman index are graphically presented in Fig. 10 and Fig. 11.





Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

Fig. 10. **Dynamics of the production concentration index among leading agricultural enterprises of Vinnytsia region, 2019–2023**

Fig. 11. **Dynamics of the Herfindahl-Hirschman index of leading agricultural enterprises of Vinnytsia region, 2019–2023**

Conclusions and prospects of the study So, finalizing the study of the main indicators of management of innovative development of agricultural enterprises in rural areas of Vinnytsia region, it should be noted that only the main part of them was studied, for a more detailed study, research, analysis, comparison, modeling and forecasting of these values, a wider range of economic, statistical, financial information of business entities is necessary, which can become a process of ensuring their high adaptability to the external environment.

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