Lesia Zaburanna,
Doctor of Economics, Professor,
Professor of the Department of Management named after prof. Zavadskyi J.S.,
National University of Life and Environmental Sciences of Ukraine (Kyiv, Ukraine);
Tetiana Lutska,
Candidate of Economic Sciences, Associate Professor,
Associate Professor of the Economics and Law Department,
National University of Food Technologies (Kyiv, Ukraine)

ASSESSMENT OF MANAGEMENT EFFECTIVENESS OF INNOVATION AND INVESTMENT ACTIVITY OF ENTERPRISES

In the article by the usage of multivariate analysis was developed the model of assessment of management effectiveness of innovation and investment activity of agricultural enterprises based on determining maximum values of both innovation and investment and economic effects. According to the suggested procedure for selection of strategic alternatives of innovation and investment development of enterprises, project packages of effective management of innovation and investment activity of agricultural enterprises were developed for each cluster.
Keywords: typology of enterprises, agricultural enterprises, efficiency of innovation and investment, cluster analysis, evaluation of effectiveness, methodological approach, innovation and investment activities management.
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Introduction. The European Union continues to establish an innovative economy ("the knowledge economy"), which stresses the importance of science and knowledge for the development of technologies that affect economic growth. The Europe 2020 Strategy, which outlines the expected future for the European Union, is a continuation of the Treaty of Lisbon, which states that resolving current crisis should mark the beginning of a new sustainable social market economy that will be more rational and more environmentally oriented. Such green economy will be based on innovations and efficient use of available resources; therefore, knowledge will represent its key component [9; 10]. It is obvious that agricultural enterprises are in dire need of innovation that will lead to the increase of economic efficiency and ensure competitive advantages of these enterprises [23]. At the same time, to enhance the innovation imperative is its financial security. The need to attract investment resources in agriculture conditional dire need of upgrading logistical and technological base of agricultural enterprises, which will enable producers to produce innovative products, increase output, reduce the cost, improve working conditions, to produce competitive products, increasing productivity, become active market participants. Thus, activation of innovation and investment in the agricultural sector is an urgent problem today, which will help to solve agricultural output of the crisis and revival of the village. A decision on the feasibility of innovative investment projects necessitates assessing the impact of innovation and investment activities of agricultural enterprises, which determines the relevance of the research topic.

Literature review. The term "innovation" means change or novelty [24]. In the early twentieth century, Schumpeter [20] stated that economic development fully depends on innovation. According to his definition, innovation is a "new combination", which means different quality of production means and is achieved not through minor improvements of old equipment or existing organizational structure, but through simultaneous and discrete introduction of new means of production and reorganization of its structure. In order to explain business cycles, Schumpeter uses the concept of "innovation", specifying it as "a new feature of production - creative destruction" and offers differentiation by the embodiment objects. The Organisation for Economic Co-operation and Development (OECD) defines innovation

activity as a complex of scientific, technological, organizational, financial and commercial steps that will lead to the implementation of innovations [17]. Famous scientist Z. Cygan believes that enterprises should not only adapt to current changes through innovation, but to outstrip them by taking measures to form the market in the most effective way to maintain competitiveness [6].

Although there is a general agreement that innovation is extremely important for the successful development of food production [22; 16], there is no common point of view regarding the effectiveness of innovation activity of agricultural enterprises. Modern research suggests several approaches to monitoring innovation effectiveness. Separate indicators are used in assessment of innovation effectiveness, including factors that influence the innovation process (e.g., resources invested in research and development, the number of days per year devoted to training of employees) [5; 10; 12]. However, the main problem of such indicators is their inability to solve complex issues of innovation implementation and management. One of the fundamental studies has focused on the development of indicators that would describe the features of investing in innovation activity, its implementation and results [9]. Nevertheless, the range of indicators was not wide enough to accumulate all peculiarities of each stage – investment in innovation, innovation process itself and the results of innovation activity.

A number of scientific studies found a positive correlation between the ability to successfully launch an innovative product (service) and lasting economic results. Despite the fact that business performance depends on a wide range of factors, it can be asserted that innovation plays a crucial role in the long-term development of enterprises [1; 11; 15; 19; 21].

It should be noted that the widespread implementation of achievements of modern science and technology in agricultural production without proper resource support, i.e. without investment, is impossible. At the same time, investment will not have a significant effect without innovation. International experience indicates that the lion's share of investment is aimed at innovation. Consequently, investment is a dominant constitutive feature of innovation, the main condition of normal course and development of innovation processes. If agricultural enterprises do not make investments, practical implementation of innovations is not possible. This allows us to analyse and research investment and innovation in interconnection and interdependence as a single innovative-investment process.

Problems of innovation and investment activity of agricultural enterprises in Ukraine have been investigated by scientists I. Blank [2] and Yu. Pravyk [18]. However, these authors did not pay close attention to the practical implementation of the assessment of effectiveness of innovative-investment activity of enterprises.

The lack of theoretical and methodological study of this topic, its relevance for economic and social development with innovation- investment tendency helped us to define the research topic.

Stimulation of the innovative-investment activity in the agricultural sector is a topical issue, the solution of which will facilitate crisis resolution and cause the revival of the village. The feasibility of innovative and investment projects necessitates the assessment of the effectiveness of innovation and investment activity of agricultural enterprises, which determines the topicality of the research theme.

The aim and methodology of the research. The research aims to determine the theoretical, methodological and practical foundation of assessment of the management effectiveness of innovation and investment activity of agricultural enterprises and develop strategic alternatives for innovation and investment growth of the enterprises under research.

Having conducted the study of the existing scientific views on the assessment of the effectiveness of innovation and investment activity of agricultural enterprises, we suggest to consider the choice of a rational strategy for the management of innovation and investment activity as a function of the parameters of its estimated resistance and as an aggregate relative value of the amount of risks under

necessity to introduce product, technological and managerial innovations based on attracting foreign investments given the exogenous factors of the foreign innovation market.

This correlation can be represented in the following form:

$$
St = f \overbrace{\underbrace{\left\{ \frac{\partial G}{\partial t}, \frac{\partial R}{\partial t}, \frac{\partial NPV}{\partial t} \right\}}_{f(exo)}}^{f(innov)},
\tag{1}
$$

where $\dfrac{\partial G}{\partial t}$ stands for the investment attractiveness of the company; $\dfrac{\partial R}{\partial t}$ stands for the aggregate value of the exogenous factors of the innovation market; *f*(innov) stands for the investment attractiveness of the company; *f* (exo) stands for the aggregate value of the exogenous factors of the innovation market; $\dfrac{\partial NPV}{\partial t}$ stands for the change in net worth of the company.

In order to assess the management effectiveness of innovation and investment activity of agricultural enterprises in Ukraine, it is necessary to analyse the homogeneity (typology) of the studied companies using cluster analysis based on the results of the innovation and investment activity. The algorithm of the typological classification of agricultural enterprises according to the management effectiveness of innovation and investment activity is successfully represented by the *k*-means clustering. The abovementioned algorithm was applied to create typological classification of 25 agricultural enterprises of Kyiv region, which are approximately at the same stage of development. The essence of each stage of the algorithm is presented below.

The 1st stage. Forming the plurality of *X* objects. The study was conducted in the form of a questionnaire (interview) in order to identify the nature of the link between innovation and investment activity and economic effectiveness. The object of the research was the influence of innovation on the financial position of business entities. As a result, all agricultural enterprises were classified according to the level of their income and connections between income from innovation and that influenced by other factors. A prerequisite for selection of enterprises was the same stage of the developmental cycle: all enterprises have started functioning before 2005. The survey was conducted using standardized questionnaires and personal observation.

The 2nd stage. Identification of the list of variable characteristics of agricultural enterprises economic activity. The typological classification of enterprises should not contain too many classes, because its development aims to facilitate planning and boost the effectiveness of innovation and investment activity management. Given the above, we can define three clusters. Of course, this is a hypothetical assumption, and as any hypothesis, it should be justified and confirmed with statistical data. The hypothesis of our research is that there are three types of agricultural enterprises according to their active involvement in innovation and investment activity, including:

1. Enterprises active in innovation and investment, maximally focused on the development of innovations in agriculture, constantly engaged in research and bringing own developments to the market ("explerent" enterprises).

2. Enterprises moderately active in innovation and investment, allocating significant resources for research and development, marketing and sales network, but engaged in mass production of products for a wide range of customers, who are satisfied with the average price range and who have "average"

requirements to product quality ("violent" enterprises).

3. Enterprises moderately passive in investment and innovation, guiding their developments on a limited number of consumers of agricultural products ("patient" enterprises).

Quantitative variables describing the examined agricultural enterprises will be used to create the typological classification based on k-means clustering. At this stage it is important to check that the assumptions about linear independency of variable characteristics is true. The degree of linear dependency between two variables can be evaluated using Pearson correlation coefficients. After checking linear independence of variables characterizing economic activity of the studied agricultural enterprises (n = 25), we defined the number of variables including income from agricultural activity (p=10)(Table 1). Together, the statistical data form R matrix, the dimension of which is *(n x p)*.

Table 1 – Description of variables used to create typological classification
of agricultural enterprises

No	Code of the indicator	Name of the indicator	Characteristics of the indicator
1	TA	Total area	Hectares
2	GP	GP production per 100 hectares of agricultural land, thousand UAH	GP per 100 hectares of agricultural land, thousand UAH
3	ISCP	Income share from crop production, %	Income share, %
4	ISLP	Income share from livestock production, %	Income share, %
5	QLE	Qualification level of employees	Experts' evaluation (from 0 to 5 points)
6	PEA	Profitability of economic activity	%
7	PPCI	Payback period of capital investment	Years
8	GRI	Growth rate of investment	%
9	IP	Readiness of employees to perceive new information and use it in the production process	Experts' evaluation (from 0 to 3 points) (yes/average/no)
10	SI	The share of investment in successful innovation projects made over the past few years in the total amount of investment in innovation activity of the enterprise during the same period of time $$\varphi = \frac{Iy}{Itot}$$	% φ - The share of investment in successful innovation projects made over the past few years in the total amount of investment in innovation activity of the enterprise during the same period of time; Iy – the amount of investment in successful innovation projects made over the past few years, thousand UAH; $Itot$ - total amount of investment in innovation activity of the enterprise over the past few years, thousand UAH.

The 3rd stage. Clustering of business entities. Classification of the selected agricultural enterprises was performed using *k*-means clustering, which was aimed at defining internally homogeneous enterprises for further analysis of their structure and the development of individual strategies. Application of *k*-means clustering needs a hypothesis for the required number of clusters. Previous studies give reason to believe that the most appropriate division of agricultural enterprises comprises three clusters *(k = 3)*. Once initial data are formalized and the hypothesis about the number of clusters is

substantiated, the abovementioned algorithm of k-means clustering is implemented.

The 4th stage. The assessment of the quality of clustering is based on the analysis of values of F-test (*Fisher-Snedecora*) for each variable.

The 5th stage. Creation of the typological classification of agricultural enterprises. The following statistical parameters are analysed in order to develop the typological classification of agricultural enterprises: *min* – the minimum value of the *j-th* feature; *max* – the maximum value of the *j-th* feature; $\overline{x_j}$ – the average arithmetic value of the *j-th* feature; S_j – the standard deviation of the variable of the *j-th* feature; V_j – the coefficient of the variation of the *j-th* feature; *Q1* – the bottom quartile, *Q3* – the top quartile, *Q* – the deviation quartile; *Me* – the median; *As* – the asymmetry coefficient.

Given the conceptual provisions outlined above, it is logical to use such methods of processing of empirical data as the algorithm of fuzzy *K*-means clustering, correlation and regression analysis and creation of fuzzy algorithms. The object of analysis should include not only absolute values of economic parameters of agricultural enterprises, but also relative ones, such as coefficients of economic efficiency of resource potential components of the investigated business line.

After conducting cluster analysis, it is necessary to carry out gradation of performance results of agricultural enterprises by the economic and innovative-investment criteria. It should be noted that the increase in efficiency and revenue growth leads to a synergistic effect:

$$\mathrm{Ef}_{\mathrm{iinvest}}^{\mathrm{innov}} = \mathrm{Ef}_{\mathrm{invest}} + \mathrm{Ef}_{\mathrm{innov}},\tag{2}$$

where $\mathrm{Ef}_{\mathrm{invest}}^{\mathrm{innov}}$ stands for the effectiveness of innovative-investment performance of the business enterprise depending on its type; $\mathrm{Ef}_{\mathrm{invest}}$ stands for achieved economic effect from investment changes; $\mathrm{Ef}_{\mathrm{innov}}$ stands for achieved economic effect from innovation changes.

In turn, innovation, investment and economic effects may be represented as the following dependencies:

$$\begin{cases} Ef_{invest} = \dfrac{\partial W}{\partial t} + \dfrac{\partial Econ}{\partial t} \\ Ef_{innov} = \dfrac{\partial W}{\partial t} + \dfrac{\partial Technol}{\partial t} + \dfrac{\partial Intel}{\partial t} + \dfrac{\partial Info}{\partial t} \end{cases}\tag{3}$$

where $\dfrac{\partial W}{\partial t}$; $\dfrac{\partial Technol}{\partial t}$; $\dfrac{\partial Intel}{\partial t}$; $\dfrac{\partial Info}{\partial t}$; $\dfrac{\partial Econ}{\partial t}$ is the variable of the industrial, technological, intellectual, information and economic effectiveness respectively.

Substituting the abovementioned systems of equations (3) into equation (2), we obtain the following correlation:

$$Ef_{invest}^{innov} = 2 * \dfrac{\partial W}{\partial t} + \dfrac{\partial Econ}{\partial t} + \dfrac{\partial Technol}{\partial t} + \dfrac{\partial Intel}{\partial t} + \dfrac{\partial Info}{\partial t}\tag{4}$$

Thus, the assessment of the management effectiveness of innovation and investment activity of

agricultural enterprises is presented as a total change value of budget efficiency and income of business entities engaged in innovation and investment, science and technology.

The next step is to consider the indicator of innovation change probability at the enterprise level in the matrix of different factors.

$$W_{INV} = \begin{cases} AX_1 & AX_2 & \cdots\cdots & AX_i \\ AY_1 & AY_2 & \cdots\cdots & AY_j \\ BX_1 & BX_2 & \cdots\cdots & BX_n \\ BY_1 & BY_2 & \cdots\cdots & BY_m \end{cases} \qquad (5)$$

where W_{INV} is the relative probability of innovation implementation in production and economic activity of agricultural enterprises.

Practical application of this index will allow conducting comparative assessment of different agricultural enterprises according to their ability (probability) and potential transition to an innovative type of activity. This feature will impart the investors with the opportunity to reduce investment risks and arrive at more informed decisions when choosing investment objects highly interested in attracting external financial resources.

Probability of innovation changes at agricultural enterprises is represented in the form of the following amount:

$$W_{INV} = \frac{\sum_{i=1} AX_i + \sum_{j=1} AY_j + \sum_{n=1} BX_n + \sum_{m=1} BY_m}{\max\left(\sum_{i=1} AX_i + \sum_{j=1} AY_j + \sum_{n=1} BX_n + \sum_{m=1} BY_m\right)} * 100\% \qquad (6)$$

where $\sum_{i=1} AX_i$, $\sum_{j=1} AY_j$, $\sum_{n=1} BX_n$, $\sum_{m=1} BY_m$ is the total quantitative assessment of external active, external passive, internal active and internal passive factors that shape the conditions of transition to an innovative type of activity of an enterprise; $\max\left(\sum_{i=1} AX_i + \sum_{j=1} AY_j + \sum_{n=1} BX_n + \sum_{m=1} BY_m\right)$ is the maximum quantitative assessment of the abovementioned factors.

It should be noted that the innovative market could cause both positive and negative impact on innovation activity of agricultural enterprises. Thus, the numerical assessment of factors may have a negative range (under the negative impact on innovation activity of agricultural enterprises), a zero value (when the influence is absent) and a positive value (under the positive impact on innovation activity of agricultural enterprises).

We developed a selection of the most important factors shaping the conditions for transition to an innovative type of activity of agricultural enterprises (Table 2) based on the principle of sufficiency.

On the one hand, the suggested list is a sufficient set of factors that are necessary for a

comprehensive assessment of the management effectiveness of innovation and investment activity of agricultural enterprises, which takes into account minimizing the effect of cross-correlation. Nevertheless, in some cases this list may be supplemented by specific factors also having significant impact on the individual subjects of analysis.

The key feature of the proposed approach is the ability to compare individual agricultural enterprises by the level of use of their innovation and investment potential and determining the degree of probability of transition to an innovative type of activity.

Table 2 – The list of the most important factors shaping the conditions for transition to an innovative type of activity of agricultural enterprises

No	Classification type	Factor
1	External active factors	Direct industry or targeted subsidies, state guarantees for loans. Tax policy. Industry legal and technical regulations
2	External passive factors	Level of competition in the market. Development level of the areas of the company activity. Innovative infrastructure. Legislative framework in the field of innovative regulation. The degree of market openness to foreign capital
3	Internal active factors	Presence of strategic and tactical planning levels of company activity
		Orientation of staff toward innovation. Qualification of management
4	Internal passive factors	Existing production and technical resources. Ownership and organizational structure

The research results. As noted above, 25 agricultural enterprises of Kyiv region, which are approximately at the same stage of development, were selected to study the impact of innovation and investment activity. The collective market share in agricultural production of Kyiv region of these enterprises amounts to 0.542, or 54.2%. The study of homogeneity of the investigated companies by the results of innovation and investment activity was conducted basing on cluster analysis using STATISTICA 7 application package.

All investigated enterprises were divided into 3 groups (clusters). The analysis of each cluster (a group of enterprises that have uniform specific features of innovation and investment activity) is presented below (Table 3).

According to the table, the first cluster includes mostly medium-sized enterprises – "violent" enterprises (7 out of 25 investigated companies). "Violent" behaviour is typical for large enterprises that have significant resources and allocate large amount of money for research and development, marketing and sales network. The second cluster, the largest by the number of enterprises, mostly comprises medium and small companies moderately passive in innovative and investment activity – "patient" enterprises. They are characteristic of satisfying mass customer needs that are not standard; specialized profile of agricultural production; adaption to the particular market (16 out of 25 investigated companies). The third cluster includes large enterprises – "explerent" enterprises (venture capital companies) – characterised by satisfying innovation needs of consumers, experimental profile of agricultural production, high costs for research and development, advancement in innovations (2 out of 25 investigated companies).

Table 3 – **The typological classification of agricultural enterprises based on the results of innovation and investment activity** (calculated by athors)

No	Index	Cluster 1	Cluster 2	Cluster 3
		Moderately active enterprises ("violent" enterprises), 7 units	Moderately passive enterprises ("patient" enterprises), 16 units	Active enterprises ("explerent" enterprises), 2 units
1	**TA**, Total area, hectares	1500-3000	< 1500	3000<
2	**GP**, GP production per 100 hectares of agricultural land, thousand UAH	617	284	957
3	**ISCP**, Income share from crop production, %	54,7	42,3	78,5
4	**ISLP**, Income share from livestock production, %	45,3	57,7	21,5
5	**QLE**, Qualification level of employees (from 0 to 5 points)	1-3	0-1	3-5
6	**PEA**, Profitability of economic activity, %	27	12	43
7	**PPCI**, Payback period of capital investment			
8	**GRI**, Growth rate of investment, %	1-5	0 -1	5 <
9	**IP,** Readiness of employees to perceive new information and use it in the production process (from 0 to 3 points)	2	1	3
10	**SI**, The share of investment in successful innovation projects made over the past few years in the total amount of investment in innovation activity of the enterprise during the same period of time, % $$\varphi = \frac{Iy}{Itot}$$	48	6	76

The next step was to determine the influence of individual indicators on the effectiveness of innovation and investment activity of the investigated agricultural enterprises using the method of multivariate analysis. It was established that the effectiveness of innovation and investment activity of the investigated enterprises is influenced by three components (Factor 1, Factor 2 and Factor 3 respectively). The first component (Factor 1) includes the following indicators: TA (total area of agricultural land), GP (gross production per 100 hectares of agricultural land), ISCP (income share of

crop production), ISLP (income share of livestock production) and PEA (profitability of economic activity). Factor 1 has the load of 52.4863% and accounts for the effectiveness of industrial and economic activity of agricultural enterprises. Thus, Factor 1 components of the diagnostics of the effectiveness of innovation and investment activity of agricultural enterprises are characterised by the following correlation:

$$F_1 = \frac{1}{5{,}2486 \times (0{,}9475 \times TA + 0{,}9677 \times GP + 0{,}9642 \times ISCP + 0{,}9249 \times ISLP + 0{,}9483 \times PEA)} \quad (7)$$

The second component (Factor 2) includes PPCI (payback period of capital investment) and SI (investments into successful innovation projects).

Factor 2 has the load of 18.0429% and accounts for the effectiveness of investment activity of agricultural enterprises. Hence, Factor 2 components of the diagnostics of the effectiveness of innovation and investment activity of agricultural enterprises are characterised by the following correlation:

$$F_2 = \frac{1}{1{,}8042 \times (0{,}7410 \times PPCI + 0{,}8554 \times SI)} \quad (8)$$

The third component (Factor 3) comprises QLE (qualification level of employees) and IP (readiness of employees to perceive innovations). Factor 3 has the load of 10.62014% and accounts for the effectiveness of innovation activity of agricultural enterprises. Thus, Factor 3 components of the diagnostics of the effectiveness of innovation and investment activity of agricultural enterprises are characterised by the following correlation:

$$F_3 = \frac{1}{1{,}0620 \times (0{,}7669 \times QLE + 0{,}7826 \times IP)} \quad (9)$$

According to the results of the multivariate analysis the following model of assessment of management effectiveness of innovation and investment activity of agricultural enterprises based on determining maximum values of both innovation and investment and economic effects was developed.

Using the suggested theoretical and methodological approach, we carried out the assessment of effectiveness of innovation and investment activity of agricultural enterprises. The results of the assessment are presented in Figure 1 and Table 4. According to the suggested procedure for selection of strategic alternatives of innovation and investment development of enterprises, the following project packages of effective management of innovation and investment activity of agricultural enterprises were developed for each cluster (Table 5).

The logics of the suggested solutions leads to the formulation of three development scenarios. The first scenario is the scenario of extensive development with full use of available and involved external innovations (for "violent" enterprises). This scenario implies involvement of additional resources in production process. The increase of the amount of production factors is possible due to the use of labour of currently unemployed population and the use of non-cultivated agricultural land (estimated at 130 thousand hectares), as well as full restoration of worn-out fixed assets. Implementation of this scenario will ensure the increase of agricultural production. Therefore, this outline will create the opportunity to boost competitive advantages of the studied companies.

The second scenario is an innovative type of catching-up development (for "patient" enterprises). It suggests that along with the parameters presented in the first scenario, the acceleration of technological progress and the use of innovative technologies in agriculture will lead to innovative changes. Implementation of this synopsis is possible only under conditions of creating a unified infrastructure,

integrated development and use of territorial combinations of natural and economic resources, specialization and cooperation of production. It requires a focal type programs aimed at formation and development of cluster initiatives.
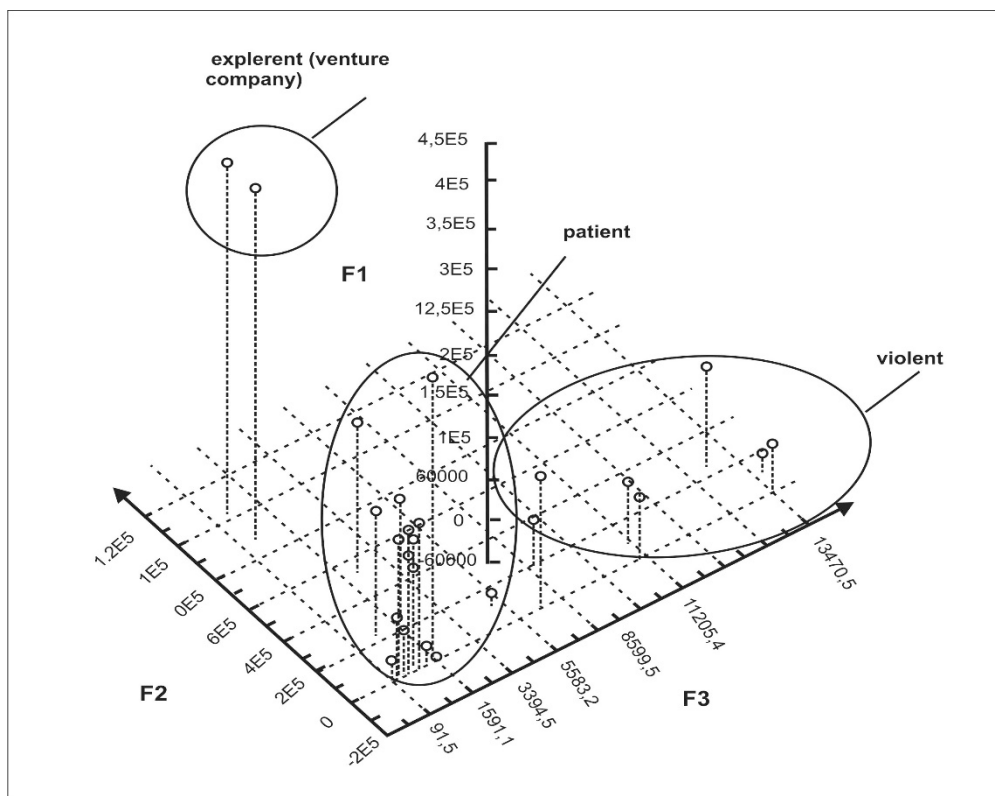

Figure 1 – **Visualization of the assessment of the effectiveness of innovation and investment activity of the investigated agricultural enterprises**

Table 4 – **The assessment of the effectiveness of innovation and investment activity of the investigated agricultural enterprises** (calculated by athors)

No	Indicator	Result, %		
		"Violent" enterprises	"Patient" enterprises	"Explerent" enterprises (venture capital companies)
1	The effectiveness of product innovations	58	21	72
2	The effectiveness of technological innovations	71	13	82
3	The effectiveness of management innovations	32	17	44
4	The effectiveness of external innovation resources	48	21	17
5	The effectiveness of internal innovation resources	56	37	10

Table 5 – Key components of projects for the effective management of innovation and investment activity of agricultural enterprises

No	The aim of the program	The aim of the suggestions	Enterprises	Enterprise type
1	Creating a product that is a standard (or its representation) and is necessary for operation of a wide range of related products	Organization of mass production, access to the mass market with own or acquired innovative products, outstripping competitors in serial production and its scale. Providing fodder for farms using local raw grain, meat and milk processing enterprises.	Ahrolend Ltd., Terezyne Ltd., Agro Invest Ukraina Ltd., Boryspil Sortsemovocheva Factory Ltd., Agrimatko-Ukraina JSC, Nibulon JV, Agro Holding Ltd.	"Violent" enterprises
2	High sales of a small amount of high-yield products with low production costs	Adapting to narrow segments (niches) of broad market through specialized production of new or upgraded products with unique characteristics. Expanding the range of agricultural products, which are in demand in the market.	Ostriykivske Ltd., Elevator Uspikh Rokitne Ltd., Ostrivske PE, Ahriss-Com Ltd., Sribna Khvylya Ltd., Factor-Konsalts Ltd., Kegichivske Farm, Matyushi Agricultural Company, Peremoha Agricultural Company, Shandra Agricultural Company, Zernove Farm, Nyva Pereyaslavshchyny Ltd., Ahropromyslova kompaniya Kyivshchyna JSC, Triumf Ltd., LNK Ltd., Baryshivska Zernova Kompaniya Ltd.	"Patient" enterprises
3	Repeated creation of products that have unique customer value	Entering the market with new, radically innovative products and capturing significant market share	Kompleks Ahromars Ltd. (Havrylivski Kurchata TM), Ahrofirma Berezanska ptakhofabryka JSC	"Explerent" enterprises

The third scenario is an innovative breaking type (for "explerent" enterprises). It suggests introduction of innovation and investment programs that reflect the way of achieving goals. This outline is local; therefore, it is focused on improving the structure of production through co-financing many disparate projects, ensuring progressive structural changes in agriculture of a specific region. In our opinion, the programs of the focal type are the most effective as they are aimed at formation of economic clusters based on a unified infrastructure, integrated development and use of territorial combinations of innovative, investment and economic resources, specialization and cooperation of production.

Conclusions. The research allowed drawing a set of conclusions. World agriculture is increasing the

involvement of technology and science into production process as it can be observed in the example of the developed countries. The importance of innovation for agricultural enterprises in current economic situation grows constantly. The expanding role of innovation under modern conditions should serve as the foundation for sustainable and effective economic growth of a single industry and the country as a whole. The research identified that innovation activity of agricultural enterprises is affected by technological, scientific, technical, organizational, management, information and communication, political and legal factors. This influence can be both positive and negative. During the research we have developed a methodical approach to determination of the effect of individual indicators on the effectiveness of innovation and investment activity of the investigated agricultural enterprises using the method of multivariate analysis. It was established that the greatest impact on the effectiveness of innovation and investment activity of agricultural enterprises is caused by industrial and economic, investment and innovation performances.

Transition to an innovative model of economic development is impossible without investment. The analysis of publications led to the conclusion that there is no fully developed system for the assessment of innovation and investment activity of agricultural enterprises, which would unite the ideas of investment and on-going innovation. There are no recommendations for the choice of indicators that provide necessary and sufficient accuracy in the assessment of the effectiveness of an innovation project. Therefore, we formulated a methodology for assessing the effectiveness of innovation and investment activity of agricultural enterprises, which will allow companies to choose a rational strategy of innovation and investment activity. Conducted analysis of the effectiveness of innovation and investment activity of the investigated enterprises led to determination of the differences in the use of investment resources at the enterprises of 3 defined clusters. The comprehensive review and analysis of the components of innovation and investment activity of agricultural enterprises allowed to create the scenarios of effective management of innovation and investment activity that take into account companies' strengths and weaknesses, which, in turn, will lead to the improvement of the effectiveness of their innovation and investment activity.

Prospects of further studies lie in the justification of effective management future scenarios of the innovative-investment activity system of agricultural enterprises for the determine the appropriate strategy based on the integrated assessment of the different components impact for a choice of development strategy of agricultural enterprises that will enhance their future competitiveness and to attract the necessary financial resources for the effective and innovative directional development.

1. Altman W. Are you leading the way in innovation? / W. Altman // Engineering & Technology. – 2008. – № 3(19). – С. 72-75.

2. Бланк І.О. Фінансова стратегія підприємства: монографія / І.О. Бланк. – Київський національний торговельно-економічний ун-т. – К. : 2009. – 147 с.

3. Чабан В.Г. Інновації як умова підвищення конкурентоспроможності аграрного сектору / В.Г. Чабан // Економіка АПК. – 2006. – № 7. – С. 68-72.

4. Communication from the Commission to the Council, the European Parliament, the European economic and social committee and the committee of the regions "Innovation policy: updating the Union's approach in the context of the Lisbon strategy". – Brussels. – 2003. – 112 p.

5. Coombs R. A literature-based innovation output indicator. Research Policy / R. Coombs, P. Narandren, A. Richards. – 1996. – № 25(3). – P. 403-413.

6. Cygan Z. Nowoczesne działania innowacyjne przedsiębiorstw / Z. Cygan. – Wydawnictwo WSE-I, Warszawa: – 2001. – 77 p.

7. Департамент агропромислового розвитку Київської області [Електронний ресурс]. – Режим доступу : http://www.kyiv-obl.gov.ua/departament_agropromislovogo_rozvitku.

8. European Commission. Public consultation on the Europe 2020 strategy [Електронний ресурс]. – Режим доступу : http://ec.europa.eu/dgs/secretariat_general/eu2020/consultation_en.htm.

9. Fatur P. Going more open in innovation: Does it pay? / P. Fatur, B. Likar, & M. Ropret // International Journal of Industrial

Engineering and Management (IJIEM). – 2010. – № 1(3). – P. 77-83.

10. Freel M.S. Patterns of innovation and skills in small firms / M.S. Freel // Technovation. – 2005. – № 25(2). – P. 123-134.

11. Geroski P., Machin S. Do innovating firms outperform non-innovators? / P. Geroski, S. Machin // Business Strategy Review. – 1992. – № 3(2). – P. 79-90.

12. Hollenstein H. A composite indicator of a firm's innovativeness. An empirical analysis based on survey data for Swiss manufacturing / H. Hollenstein // Research Policy. – 1996. – № 25(4). – P. 633-645.

13. Кісіль М.І. Інвестиційна та інноваційна складові доктрини аграрної політики України / М.І. Кісіль // Економіка. АПК. – 2003. – № 7. – С. 82-87.

14. Лупенко Ю.О. Інвестування розвитку сільського господарства / Ю.О. Лупенко, Є.І. Лупенко // Економіка АПК. – 2008. – № 12. – С. 59-62.

15. Neely A. Innovation and business performance / A. Neely, J. Hii. –The Judge Institute of Management Studies, University of Cambridge, Cambridge, England, 1998.

16. OECD. Agricultural Innovation Systems: A Framework for Analyzing the Role of the Government. OECD Publishing [Електронний ресурс[. – Режим доступу : http://dx.doi.org/10.1787/ 9789264200593-en.

17. Oslo Manual Guidelines for Collecting and Interpreting Innovation Data / a joint publication of OECD and Eurostat. 3rd ed. OEC. – Paris : Organisation for Economic Co-operation and Development. – 2005.

18. Pravyk Yu. The Paradigm of Finding the Necessary High-Tech Products to Potential Customers: How to Order Ands Search for Innovative Product. New Approaches and Techniques/ Yu. Pravyk // Quality. Innovation. Education. – 2013. – № 6. – P. 7-11.

19. Roper S. Modelling the innovation value chain / S. Roper, J. Du, J.H. Love // Research Policy. – 2008. – № 37(6-7). – P. 961-977.

20. Schumpeter J. Business Cycles: a Theoretical, Historical and Statistical Analysis of the Capitalist Process / J. Schumpeter. – McGraw-Hill, New York. – 1939. – 385 р.

21. Sharma S. Inter-country R&D efficiency analysis: An application of data envelopment analysis / S. Sharma, V.J. Thomas // Scientometrics. – 2008. – № 76(3). – P. 483-501.

22. Spielman D. How innovative is your agriculture? Using innovation indicators and benchmarks to strengthen national agricultural innovation systems / D. Spielman, R. Birner // Agriculture and Rural Development Discussion Paper 41. – The World Bank. – 2008.

23. Sumberg J.Systems of innovation theory and the changing architecture of agricultural research in Africa / J. Sumberg // Food Policy. – 2005. – № 30. – Р.21-31.

24. Tidd B. Managing Innovation: Integrating Technological, Market and Organization Change / B. Tidd, J. Bessant, K. Pavitt. – John Wiley & Sons. – New York. – 2001. – 600 р.

25. Забуранна Л.В. Оцінка впливу інноваційної та інвестиційної діяльності фермерських господарств / Л.В. Забуранна // Актуальні проблеми економіки: -- 2015 – № 11. – С. 432-443.

26. Забуранна Л.В. Туристична підприємницька діяльність в аграрній сфері: теорія, організація : монографія / Л.В. Забуранна. – К. : ННЦ «Ін-т аграр. Економіки», 2012. – 479 с.

1. Altman, W. (2008). Are you leading the way in innovation? *Engineering & Technology, 3(19),* 72-75.

2. Blank, I. (2009) *Finansova strateghiya pidpriyemstva [The financial strategy of the enterprise]* Kyiv: Kyivskiy natsionalniy torghovelno-ekonomichniy universitet [in Ukrainian].

3. Chaban, V. (2006). Innovatsii yak umova pidvischennya konkurentospromozhnosti aghrarnogho sektoru. [Innovation as a condition for increasing the competitiveness of the agricultural sector.]. *Ekonomika APK – Economy AIC, 7,* 68-72 [in Ukrainian].

4. Communication from the Commission to the Council, the European Parliament, the European economic and social committee and the committee of the regions "Innovation policy: updating the Union's approach in the context of the Lisbon strategy" (Brussels, 11.3.2003 COM(2003) 112 final.

5. Coombs, R., Narandren, P., & Richards, A. (1996). A literature-based innovation output indicator. *Research Policy, 25(3),* 403-413.

6. Cygan, Z. (red.), (2001). *Novochesne djelaniya innivatsiyne pshedshembyerstv [Modern business innovation.]* Vydavn WSE-I, Varshava [in Polish].

7. Departament aghropromyslovoho rozvytku Kiyivskoi oblasti [Site of Department of Agricultural Development of Kyiv region]. *kyiv-obl.gov.ua.* Retrieved from http://www.kyiv-obl.gov.ua/departament_agropromislovogo_rozvitku [in Ukrainian].

8. European Commission (2010). Public consultation on the Europe 2020 strategy. *ec.europa.eu.* Retrieved from http://ec.europa.eu/dgs/secretariat_general/eu2020/consultation_en.htm.

9. Fatur, P., Likar, B., & Ropret, M. (2010). Going more open in innovation: Does it pay? *International Journal of Industrial Engineering and Management (IJIEM),1(3),* 77-83.

10. Freel, M.S. (2005). Patterns of innovation and skills in small firms. *Technovation, 25(2),* 123-134.

11. Geroski, P., & Machin, S. (1992). Do innovating firms outperform non-innovators? *Business Strategy Review, 3(2),* 79-90.

12. Hollenstein, H. (1996). A composite indicator of a firm's innovativeness. An empirical analysis based on survey data for

Swiss manufacturing. *Research Policy, 25(4),* 633-645.

13. Kisil, M. (2003). Investitsiina ta innovatsiina skladovi doktryny ahrarnoi polityky Ukrainy [Investment and innovation components doctrine of Agrarian Policy of Ukraine]. *Ekonomika APK – Economy AIC, 7,* 82-87 [in Ukrainian].

14. Lupenko, Yu., & Lupenko, E. (2008). Investuvannia rozvitku silskoho hospodarstva [Investing of agricultural development]. *Ekonomika APK – Economy AIC, 12,* 59-62 [in Ukrainian].

15. Neely, A., & Hii, J. (1998). *Innovation and business performance: A literature review.* The Judge Institute of Management Studies, University of Cambridge, Cambridge, England. Retrieved from http://89.249.21.76/data/696/521/1221 /litreview_innov1.pdf.

16. OECD, 2013. Agricultural Innovation Systems: A Framework for Analyzing the Role of the Government. OECD Publishing. Retrieved from http://dx.doi.org/10.1787/ 9789264200593-en (last accessed June/2014).

17. Oslo Manual (2005*). Guidelines for Collecting and Interpreting Innovation Data / a joint publication of OECD and Eurostat. 3rd ed. OECD.* Paris: Organisation for Economic Co-operation and Development.

18. Pravyk, Yu. (2013). The Paradigm of Finding the Necessary High-Tech Products to Potential Customers: How to Order Ands Search for Innovative Product. New Approaches and Techniques. *Quality. Innovation. Education, 6,* 7-11.

19. Roper, S., Du, J., & Love, J. H. (2008). Modelling the innovation value chain. *Research Policy, 37(6–7),* 961-977.

20. Schumpeter, J. (1939). Business Cycles: a Theoretical, Historical and Statistical Analysis of the Capitalist Process. McGraw-Hill, New York.

21. Sharma, S., & Thomas, V.J. (2008). Inter-country R&D efficiency analysis: An application of data envelopment analysis. *Scientometrics, 76(3),* 483-501.

22. Spielman, D., Birner, R., (2008). *How innovative is your agriculture? Using innovation indicators and benchmarks to strengthen national agricultural innovation systems.* Agriculture and Rural Development Discussion Paper 41. The World Bank.

23. Sumberg, J. (2005). Systems of innovation theory and the changing architecture of agricultural research in Africa. *Food Policy, 30,* 21-31.

24. Tidd, B., Bessant, J., Pavitt, K., (2001). *Managing Innovation: Integrating Technological, Market and Organization Change.* John Wiley & Sons, New York.

25. Zaburanna, L. (2015). Otsinka vplyvu innovatsiynoyi ta investitsiynoyi diyalnosti fermerskih hospodarstv. [Evaluation of the impact of innovation and investment activities of farms]. *Aktualni problemy ekonomiky – Actual Problems of Economics, 11,* 432-443 [in Ukrainian].

26. Zaburanna, L. (2012). *Turystychna pidpriiemnytska diialnist v ahrarnii sferi: teoriia, orhanizatsiia [Tourist entrepreneurship in agriculture: theory, organization].* Kyiv: NNTs IAE [in Ukrainian].

Л.В. Забуранна, д-р екон. наук, професор, професор кафедри менеджменту ім проф. Й.С. Завадського, Національний університет біоресурсів і природокористування України (м. Київ, Україна);

Т.В. Луцька, канд. екон. наук, доцент, доцент кафедри економіки і права, Національний університет харчових технологій (м. Київ, Україна)

Оцінювання ефективності управління інноваційною та інвестиційною діяльністю підприємств

У статті на основі використання багатофакторного аналізу була розроблена модель оцінювання ефективності управління інноваційною та інвестиційною діяльністю сільськогосподарських підприємств. Модель заснована на визначенні максимальних значень інновацій та інвестицій і економічного ефект. У рамках моделі для кожного кластера були розроблені проектні пакети ефективного управління інноваційною та інвестиційною діяльністю сільськогосподарських підприємств.

Ключові слова: типологія підприємств, аграрні підприємства, ефективність інноваційно-інвестиційної діяльності, кластерний аналіз, оцінювання ефективності, методологічній підхід, управління інноваційно-інвестиційною діяльністю.

Л.В. Забуранная, д-р экон. наук, профессор, профессор кафедры менеджмента им проф. И.С. Завадского, Национальный университет биоресурсов и природопользования Украины (г. Киев, Украина);

Т.В. Луцкая, канд. экон. наук, доцент, доцент кафедры экономики и права, Национальный университет пищевых технологий (г. Киев, Украина)

Оценка эффективности управления инновационной и инвестиционной деятельнотью предприятий

В статье на основе использования многофакторного анализа была разработана модель оценки эффективности управления инновационной и инвестиционной деятельностью сельскохозяйственных предприятий. Модель основана на определении максимальных значений инноваций и инвестиций и экономического эффекта. В рамках модели для каждого кластера исследуемых предприятий были разработаны проектные пакеты эффективного управления инновационной и инвестиционной деятельностью сельскохозяйственных предприятий.

Ключевые слова: типология предприятий, аграрные предприятия, эффективность инновационно-инвестиционной деятельности, кластерный анализ, оценка эффективности, методологической подход, управление инновационно-инвестиционной деятельностью.