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SYSTEM OF METHODS OF DIAGNOSTICS OF INNOVATIVE DEVELOPMENT OF THE ENTERPRISE

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The theory and practice of diagnostic analysis of innovative activity of the enterprise has a large number of methods for its evaluation, but none of them is universal in the new economic conditions. The paper identifies that one of the problems of quality information and analytical support for the management of innovative development of the enterprise is the lack of a systematic approach to the formation of methodological support for its diagnosis. This negatively affects the timely diagnosis of negative trends and the results of management decisions on innovative development of the enterprise. Based on the analysis of existing interpretations of the concept of "innovative development of the enterprise" in scientific works, it is proposed to clarify the concept of "diagnostics of innovative development of the enterprise". Based on the analytical review of approaches to the diagnosis of innovative development of the enterprise and evaluation methods used in their context, an approach to the formation of a system of methods for diagnosing the innovative development of the enterprise, which takes into account the scale and objectives of its activities.

Introduction

The innovative development of many enterprises not only in Ukraine, but also around the world in today's conditions has slowed down in the face of organizational problems caused by a pandemic that has spread throughout the world. At the same time, neither their organizational and legal form, size, scale and types of activity, nor the taxation system matter. The key to the economic development of the enterprise was not only the need to introduce innovative products, but also the use of non-standard, innovative approaches to organizing the work of all personnel of the enterprise. In such conditions, timely diagnosis of negative trends and results of decision-making on innovative development of the enterprise becomes problematic. The lack of a clear system for monitoring the innovative development of enterprises slows down the adoption of effective and timely management decisions. Despite the

fact that the theory of diagnostic analysis of innovative activity of the enterprise has a large number of methods for its evaluation, however, none of them is universal in the new economic conditions.

In the scientific literature, the work of many scientists is devoted to the study of problems and prospects of innovative development of the enterprise. The expediency of using various methods to assess the level of innovative development of the enterprise has been studied by such domestic scientists as: Karyuk V.I. [1], Lepeyko T.I. [2], Maslak O.I. [3], Mykytyuk P.P. [4], Radionova I.V. [5], Sidorchuk I.P. [6] and others. The analysis of internal factors of innovative development of the enterprise is covered in the work of foreign authors Christensen K. and Raynor M. [7], as well as the works of Skrynkovsky R.M., Pavlovsky G., Kostyuk N.R., Koropetsky O.O. [8], Kobrina L.Y. [9], Mykolaychuk I.P. [10], Bondarenko M.I. [11]. Various theoretical and methodological issues of diagnostics of the state of the enterprise are presented in the works of Voronkova A.E., Zagorna T.O. [12], Hetman O.O., Shapoval V.M., Kryvovyazyuk I.V., Shvydanenko G.O. [13]. Recently, researchers have paid considerable attention to the improvement of diagnostic methods as one of the elements of the enterprise management system. But, despite the sufficient level of elaboration of the outlined issues, the problem of lack of a systematic approach to the formation of effective tools in the form of a set of methods for diagnosing innovative development as one of the elements of enterprise management system, which would allow for dynamic monitoring in accordance with the scale and objectives of its activities. Therefore, the purpose of the work is the analysis and systematization of modern methods of diagnostics of innovative development of the enterprise.

Analysis of approaches to diagnostics of innovative development of the enterprise

Management of innovative development of the enterprise is aimed at increasing the efficiency of its activities, which requires economic diagnostics and

analysis, effective control, planning and forecasting. The organization of diagnostics as the main component of management of innovative development of the enterprise allows not only to reveal crisis phenomena, but also to establish tendencies and potential opportunities in uncertain conditions of managing. Existing methods of diagnosing innovative development are characterized by sufficient diversity. The reason for this, in our opinion, is the ambiguity in the interpretation of the concept of "innovative development of the enterprise". Thus, some scientists formulate this concept as the development of the innovation process, others equate the innovative development of the enterprise to changes in the innovative potential of the enterprise. Some believe that it is a set of relationships that arise in the course of purposeful increase of economic efficiency and competitiveness, or a means of using new opportunities (ideas, resources, etc.) to maintain or gain a new competitive advantage [14]. At the same time, most are inclined to believe that the innovative development of the enterprise leads to qualitative changes [9, p. 152]. More fully, this concept is defined as "… the process of directed natural change of the enterprise, which depends on the innovation potential of the enterprise and the source of which are innovations that create qualitatively new opportunities for further enterprise in the market by implementing the ability to find new solutions, ideas and inventions" [4]. But in our opinion, this concept should be considered as "… a complex process that brings in line with the external internal capabilities of the enterprise on the basis of constant search and use of new areas and ways to implement existing and future opportunities" [15]. Based on the synthesis of the concepts of "innovative development of the enterprise" and "diagnostics", which is presented in the educational literature [12; 13] is proposed to diagnose the innovative development of the enterprise to understand the process of timely recognition of signs and identification of negative (critical or crisis) phenomena in the management system of innovative development of the enterprise on the basis of local changes and established dependence of internal capabilities.

Diagnosis as a research process is characterized by the object, purpose, task and methods [12, p. 22]. Comparing the existing approaches and methods of assessing the level of innovative development of the enterprise, recently covered in the works of scientists, it can be stated that they differ in almost all respects:

– the purpose and objectives of the assessment (monitoring the creativity of collective intelligence of staff; identifying and solving problems (existing, possible) inhibition of innovative activity of staff in the context of ensuring the effective functioning and development of the enterprise; increase the validity of innovative projects);

– objects of evaluation (innovation potential of the enterprise; competitiveness of the enterprise; phases of innovative development; innovation process; efficiency of the enterprise activity; market value of the enterprise, etc.);

– in terms of innovation potential by its components (ability and effectiveness of innovation potential, by types of enterprise resources; intellectual capital; personnel, etc.);

– a set of groups of indicators that reflect certain objects of evaluation, their number in the group, types of indicators and the method of their calculation or collapse;

– factors influencing innovation and enterprise development.

In most cases, an integrated indicator is used to assess the level of innovative development of an industrial enterprise, using the formulas of either the geometric mean or arithmetic mean or the product of the integral coefficients by groups of relevant objects of evaluation and their respective weights. Also, methods of economic and mathematical modeling, methods of expert evaluations and evaluation scales are almost always used. This approach is complex. Comparative analysis of approaches to the diagnosis of innovative development of the enterprise is presented in table 1, which allows to determine the positive and negative factors of their application.

Table 1

Comparative analysis of approaches to diagnostics of innovative development of the enterprise (compiled by the author)

App-roach	Authors	Object of study	Evaluation methods	Set of indicators
1	2	3	4	5
By the level of competitiveness of the enterprise	Andrushkiv V., Ivanov Yu., Kuzmin O., Oberemchuk V., Porter M., Samulyak V. [16]	The level of competitiveness as a benchmark of IRP	Retrospective, analytical and forecasting methods	Competitiveness indicators for in-depth analysis of the internal state of the enterprise in the dynamics
Complex by the level of capacity development	Ivanova N. [2]	Elements of innovation potential: market, production, personnel, investment	Analytical methods, index method	Comparative indices by elements of potential
	Samulyak V., Feschur R., Fedonin O. [2]	Components of potential	Methods of assessment of the lowest potential on the principle of "weak link"; retrospective analysis and forecasting	Key indicators for all components of the potential or indices
	Kasyanova N. [2]	Components of financial, production, marketing, labor, information, investment and innovation, management potential	Methods of financial analysis; method of the sum of places	
	1) Otenko I., Tsopa N. [2]; 2) Soboleva T.O. [17]	1) Components of innovation potential. 2) Components of capacity, own and external resources; additionally a synergetic component through innovation activity	Methods of statistics, retrospective, analytical methods and forecasting, EMM, retrospective, analytical and comparison methods	
	Maksymenko I. [2]	Elements of production potential		

Continuation of the Table 1

1	2	3	4	5
Complex in the level of development of innovation potential	1) Yefimova S.A., Grinko T.V. [18, p.34]. 2) Yeresko I.G. [19]	Innovative potential of enterprise personnel	Forecasting methods; index, verbal-numerical scales (Harrington's scale), methods of index folding, EMM	Main indicators (indices) specific to the sphere of activity: innovation intensity; intellectual, professional development of the educational level of the staff; technical and technological equipment of labor and others
	Myasnikov V.O. [20]	Innovative potential through components: ability (human capital, organizational and managerial structure, social, informational and scientific and technical components) and capacity effectiveness (material and technical, production and technological, financial and economic, marketing and environmental components)	Methods of multidimensional statistical analysis for integrated assessment; methods of expert assessments and EMM	Indicators that reflect the quantitative indicators of the components of the potential
Complex by IDE level	Maslak O.I., Sokurenko P.I, Collected O.M. [3]	IDE by elements: innovation potential; adaptability to market conditions; efficiency of innovation activity; ability to ID; enterprise flexibility	Methods of statistical analysis, analytical, expert methods, forecasting; scale of gradation of the state of the integrated indicator	ID indicators by its components, an integrated indicator of the IDE
	Sidorchuk I.P. [6]	IDE by elements: LS; production and sales potential; organizational and managerial level of production; research activity; intellectual potential; financial and economic support of ID; market opportunities; effectiveness of innovation	qualitative and quantitative analyzes; scoring of IDE elements; expert assessments; methods of convolution of the integrated indicator	Average industry standards and averages; IDE element coefficients; integrated indicator IDE

Continuation of the Table 1

1	2	3	4	5
Process by stages of the life cycle of the enterprise	1) Adizes I., Greiner L., Kizim M., Lippit D., Ponomarenko V., Tridid O., Schmidt W. [2]; 2) Kalishenko V.O., Martyusheva L.S., Tereshchenko O.V., Verba D.V. [19]; 3) Doroshuk G.A., Pechkurova A.E. [21]	Innovative potential through the level of use of innovative resources at the stages of the life cycle of the enterprise	Qualitative and quantitative analyzes, method of dynamic programming, methods of forecasting; EMM methods	Coefficient of production intensification, the share of growth in output due to intensive and extensive factors; indicator of the proportion of intensity, indicators of the "portrait" of the enterprise
System by IDE factors	1) Skrynkovsky R.M., Pavlovsky G., Kostyuk N.R., Koropetsky O.O. [8, p.250]. 2) Kobrin L.J. [9, p.153]	IDE factors: 1) ID; innovative activity of staff; provision of the enterprise with intangible assets; property for ID; promotion of innovative products on the market. 2) External: the state, competitors, suppliers and consumers. Internal: financial; staffing; technical-technological and organizational-managerial components; marketing support	Forecasting methods; index accounts, expert methods, index collapse methods, graph analytical method, DEA-analysis	Key relative indicators and their dynamics of changes
Structured approach by IDE resources	Proshak V.V. [19]	Resources for IDEs by their types	Methods of analogy, qualitative and quantitative methods of analysis, regression-correlation and cluster analysis, expert methods; methods of multifactor comparative analysis of the main indicators of innovation, EMM	Key relative indicators by types of resources and their dynamics of change
Competence approach	1) Mykolaychuk I.P. [10]; 2) Leszek Kozioł et al. [22]	IDE through the competence of the enterprise on the elements of innovation potential and ID factors	EMM methods; expert assessment, the method of competitive profile of the enterprise, GAP, SWOT-analysis	Key relative coefficients by elements of innovation potential, main ID factors and competencies

End of the Table 1

1	2	3	4	5
Functional-parametric approach	Boyarova E.A. [23]	Functional centers of responsibility as centers of reproduction, expanded and innovative: industrial production personnel, production financing, means of production, tangible assets, intangible assets, personnel, business, innovation assistance, internal financial and investment support, financial business relations, investment and partnership relations, financial and economic security	Quantitative and qualitative methods of forecasting, balance sheet, EMM, functional analysis, dynamic ratio of changes in results	Structured indicators of performance of economic functions and economic return with preliminary transformation of qualitative parameters of economic functions (economic return) into indicators of the level of their performance (receipt)
Abbreviations: IDE - innovative development of the enterprise; ID - innovative development; IP - innovative project; EMM - economic and mathematical modeling; LS - logistics				

The use of the approach to diagnosis by the level of competitiveness of the enterprise, on the one hand, allows to identify key factors of success of the enterprise on the basis of a sufficient list of indicators for comparison with competitors. On the other hand, there are: the lack of unambiguous approaches to assessing the level of competitiveness of enterprises through a wide range of proposed methods and a certain static assessment of the competitive position of the enterprise when compared with others [2, p. 138].

The most common is an integrated approach using different methods of index approach to information processing. This allows you to use: the method of analogies to calculate the integrated indicator of assessment of innovation potential, the use of a matrix of individual indicators and the rate of return of innovation potential; methods for assessing individual components of innovation potential using a graph-analytical method. On the positive side, the evaluation indicators cover the necessary areas of activity of the enterprise, which allows to identify both reserves in the innovative development of the enterprise and the conformity of the existing potential

to the degree of innovative development, as well as to define the boundaries between goals and opportunities.

At the same time, such an approach requires a significant amount of input data for evaluation, which not only burdens the time and resources, but also complicates the choice of optimal methodology. This also applies to the system approach, which differs from the objects of research (factors influencing innovation development) and the system of indicators.

Within the process approach, the most informative methods are: assessment of individual components of innovation potential by calculating the "portrait" of the enterprise and assessing a more complex system with calculations of the resulting indicators of its use, production intensification coefficients and indicators of "efficiency ratio". The structural approach allows to deepen an estimation of resource components of innovative potential in the course of calculation of efficiency of innovative activity of the enterprise, to carry out an estimation of a certain component of innovative potential with use of the standardized coefficients of factors of influence. At the same time, these standardized indicators limit the areas of decision-making on the correspondence between the goals and opportunities for innovative development of the enterprise.

The competency approach to diagnostics of innovative development of the enterprise deserves special attention. In fact, a model of innovation development management is created, which is directly related to the information-analytical system, which ensures the adoption of effective innovation decisions. However, the subjectivity of the data obtained through methods of assessing the innovation potential and root competencies of the enterprise, distorts the process of making effective management decisions.

The functional-parametric approach to diagnostics in operation development in the process of functioning of innovation-oriented enterprise, which is aimed at integrating economic and managerial diagnostics into a single system of economic and organizational decision-making and allows not only to identify specific results of enterprise development control influence through the centers of responsibility

(provision, reproduction, expanded and innovative reproduction) [23]. The methods involved require careful selection of information and the establishment of standards or standards of dynamic changes in interdependent (interrelated) indicators, which, despite the quality of the diagnostic results, complicates the process.

Despite the fact that the number of methods of information processing, identifying problems of innovative development of the enterprise is quite large, but in fact, modern analysts use in their professional activities a small number of such tools. This is justified not only by the competencies of the analyst, but also by the scope and scale of the enterprise, its organizational and legal form, financial capabilities, etc. That is, there is no single system of methods for diagnosing the innovative development of the enterprise and for each enterprise such tools will be unique.

Suggestions on the research topic

The choice of methods for diagnostics of innovative development of an enterprise within the framework of a particular approach should be based on the following criteria:

– they should provide comprehensive coverage not only of all elements of the enterprise's innovative potential, but also of innovative projects and their implementation;

– to avoid excess subjectivism by using the methods of expert estimations;

– by applying the selected methods, the most significant internal and external factors affecting the innovative development of the enterprise should be determined;

– developed models and methods should reflect the integral result of interaction of resource components not only of innovative potential but also of innovative projects and impact factors (external and internal), taking into account time.

It is proposed to select the methods of information processing for the process of diagnostics of innovative development according to the principles of systematization and complexity in accordance with the scale and purpose of the

enterprise (fig. 1). This approach will create an effective system for monitoring the innovative development of the enterprise. In this case, the analyst, depending on the scale of activities and objectives, as well as the availability of information will be able to choose the type of diagnosis that will be most appropriate: rapid diagnosis or complex (detailed), or use both.

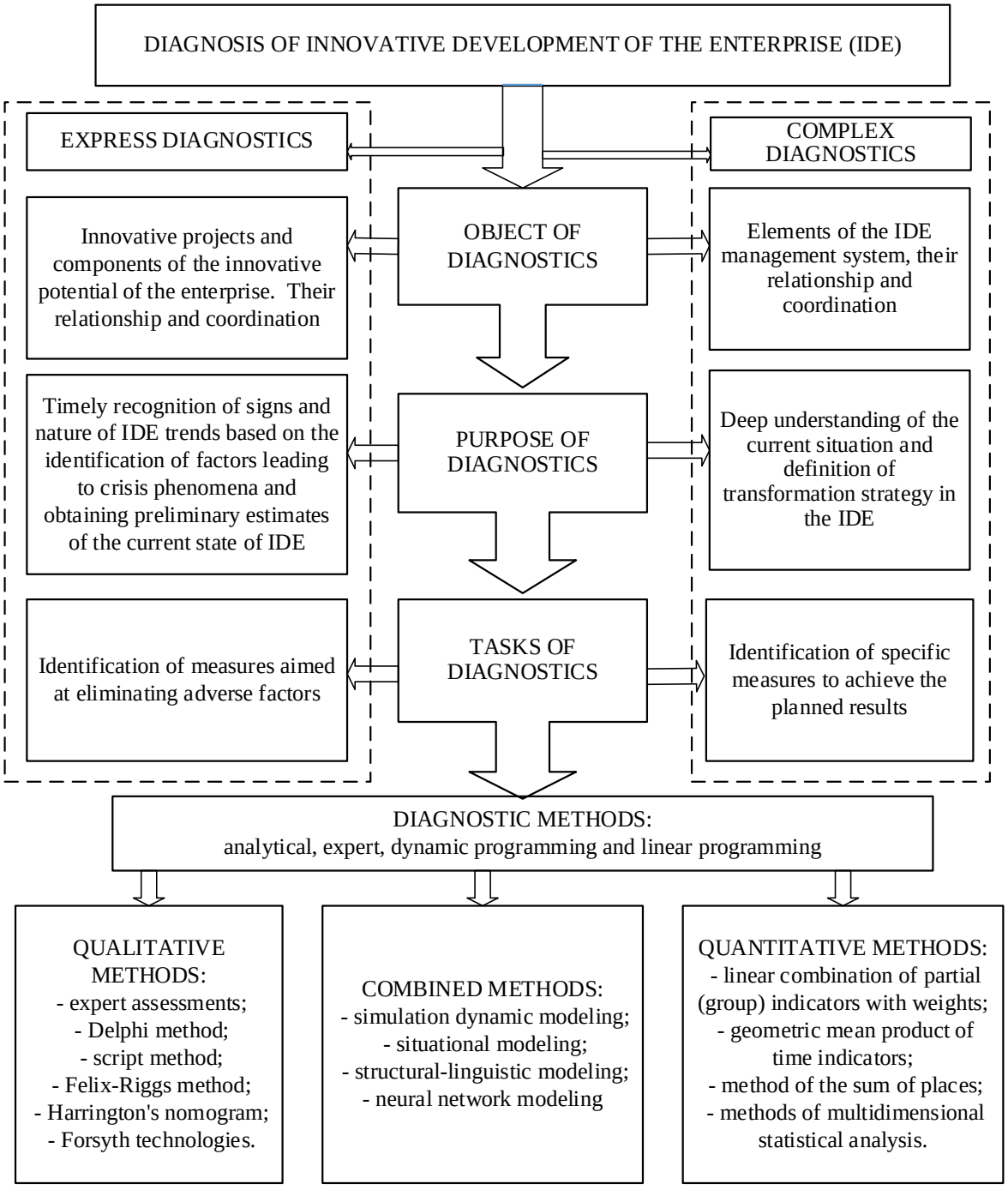

Fig. 1. The process of diagnosis of innovative development of the enterprise *(compiled by the author on the basis of [12; 20])*

Rapid diagnostics is the initial stage to the transformations that must take place in the enterprise in order to eliminate critical phenomena that slow down the implementation of innovative projects and improve the current state of innovation potential. At the same time, diagnostic methods are selected on the principle of minimizing the number of indicators and the complexity of their calculation. At the same time, due to comprehensive diagnostics, a comprehensive understanding of the current situation is formed, which allows to develop a strategy of transformations in the management system of innovative development, and to determine a list of specific measures to achieve the planned results. The selection of methods will depend on the current management system and the peculiarities of the business conditions of the enterprise. Comprehensive diagnostics should be carried out not more often than once a year and when the existing (or absent) system of monitoring the current state of innovative development does not allow to identify the main problems, their causes and determine the sequence of their solution.

This is due to the fact that the reliability of the results of such diagnostics is due to the large number of scientifically sound system of indicators (criteria), which should comprehensively reflect the specifics of the object of study, taking into account the impact of external and internal factors. processing.

Conclusions

It was found that in the theory of diagnostic analysis there is no single understanding of the concept of "diagnostics of innovative development of the enterprise", which in practice complicates the process of selecting effective methods for monitoring the innovative development of enterprises and slows down effective and timely management decisions. Based on the generalization of existing in scientific works interpretations of the concept of "innovative development of the enterprise" and "diagnostics" under the diagnosis of innovative development of the enterprise it is proposed to understand the process of timely recognition of signs and identification of negative (critical or crisis) phenomena dependence of conformity of

internal possibilities of the enterprise to external. This approach allows to define the purpose, object and objectives of the diagnosis more clearly.

Carrying out a comparative analysis of modern approaches to the diagnosis of innovative development of the enterprise and the methods used in their context allowed to identify their disadvantages and advantages. It is established that they differ in almost all respects: purpose and tasks; objects of evaluation; a set of indicators and methods of their calculation or collapse; factors influencing innovative development. The most common is a comprehensive approach based on methods for assessing the level of development of innovation potential of the enterprise by its components. Among the new approaches there is a competency approach due to which a direct connection with the information-analytical management system is formed, which ensures effective decision-making and functional-parametric, which integrates economic and managerial diagnostics. But these approaches also have their drawbacks.

It is established that for each enterprise the system of methods of diagnostics of innovative development should be unique. The approach to formation of system of methods of diagnostics of innovative development of the enterprise which considers scales and the purposes of its activity and includes two types of diagnostics is offered: express diagnostics and complex diagnostics. This approach will create an effective system for monitoring the innovative development of the enterprise. The outlined main criteria for selection of evaluation methods allow streamlining the processes of information retrieval and analysis, and selected according to these criteria evaluation methods and models, will improve the quality of research on the formation and use of elements of innovation potential and projects, but also management efficiency.

The obtained results can be the basis for improving the management system of innovation processes in the enterprise. We consider the development of a strategy and the choice of the optimal variant of innovative development on the basis of qualitative diagnostic analysis to be a promising direction of further research.

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