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**METHODOLOGICAL
APPROACH TO THE
FORMATION OF
THE MONITORING
SYSTEM FOR THE
COMPETITIVENESS
OF INSTITUTIONS
OF HIGHER
EDUCATION**

Establishment and development of the educational sphere in Ukraine requires from educational institutions the formation of a market-oriented management strategy of institutions of higher education (IHEs) at a specific market of educational services aimed at creating and increasing their competitive advantage. According to the results of the research, the conclusion has been made about the fact that the level of the IHE competitiveness greatly depends on the level of strategic management and technology. The main goals of the strategic management in the context of ensuring competitiveness are to be the following: to expand the number of training programs and specialties in the field of pre-university and university education; to improve the quality of specialist training in accordance with the modern requirements; to increase scientific and academic potential; to implement new educational technology and teaching methods; to conduct scientific research and developments at a high level; to optimize the IHE structure; to improve material and technical resources of the educational institution according to the current standards.

In order to carry out these tasks and form a market-oriented strategy of the educational institution, it is necessary to develop and implement an integral monitoring system of the performance, business activity and, as a result, the IHE competitiveness at the market of educational services.

Socio-economic phenomena and processes have traditionally been the objects for monitoring: ecological state of the environment, people's standard of living, social and labour relations, socio-economic state of cities and towns, business activity of enterprises, financial and economic activity of business entities, etc.

The term 'monitoring' was introduced into the scientific use shortly before the United Nations Conference on the Human Environment that was held in Stockholm, in 1972. In scientific sources, monitoring is understood as: the process of detecting significant deviations in the course of the implementation by production systems [1]; the mechanism of constant monitoring of controlled indicators of financial activity of the enterprise, determining the size of deviations of actual results from the planned ones and determining the causes of such deviations [2]; a system of observations, assessing the quality of management of financial and economic activity of production systems (monitoring of financial and economic activity) over a certain period of time, as well as determining the future state of financial and economic activity based on effective business decision-making.

Constant monitoring makes it possible not only to assess the degree and quality of implementation of plans, but also to predict the results of activities and their relevance to the planned value; monitoring is needed to prepare reasonable reports [4, p. 13-14]. A special feature of monitoring, as noted in [4], is the repeatability, which is realized in the aggregate of several studies carried out according to a single plan, algorithm, toolkit; in sequence (at defined intervals) and in order to obtain results that characterize the dynamics of the object changes within the period of studies.

The works of such national and foreign scientists as N. Alekseenko, D. Aistrakhanov, I. Blank, J. Johnston, V. Galitsin, P. Yegorov, B. Litvak, B. Leong-Hong, R. Mann, E. Karpov, M. Pugachova, V. Stepashko, M. Titova and others were dedicated to the study of program and methodological monitoring issues. However, some problems remain controversial and underdeveloped, in particular with regard to the subject matter of competitiveness, including IHEs, which necessitates the solution to this problem both from a theoretical and a practical points

of view. The research has shown that among the tasks of monitoring the performance of an institution of higher education in the context of ensuring competitiveness are the following: the development of a system of target indicators and the choice of monitoring methodology; obtaining a quantitative assessment of the competitive potential level for substantiating programs and activities of scientific, technical, educational, instructional and socio-economic directions and developing a market-oriented strategy for the development of IHEs, aimed at increasing the competitive advantage.

Monitoring, as a process of scientific research (data control, analysis, synthesis and forecasting), has its own tools and methods that are used to achieve goals and justify effective management decisions. Existing foreign and domestic experience shows that monitoring means descriptive characteristics of key performance indicators of business activity in all spheres without any further generalization and calculation of the integral indicator. At the same time, during the monitoring process, it is desirable to obtain quantitative estimates of the indicators that are the most important in terms of assessing the level of effectiveness and efficiency achieved by the enterprise, since the results of monitoring are the basis for the development of the enterprise development strategy.

The concept of monitoring is considered by scholars in a broad and narrow senses: in a broad sense, monitoring means the collection of such actions as collection and systematization of data, their archiving, processing, analysis and forecast; in a narrow sense, “monitoring is a regular observation for keeping track of trends” [5, p. 7]; “a system of regular monitoring of processes and identifying the main trends that occur in the external and internal environment of the enterprise for timely operational assessment of emerging situations” [8, p. 67]. It should be noted that monitoring and observation are not identical concepts, as during the monitoring, on the basis of observation data, the following procedures are performed: assessment of the current state of objects; data analysis to determine the patterns of objects development; short-term forecasting of the state and trends of objects development; visualization of monitoring results and their presentation to users.

As a result of the synthesis of scientific works devoted to problems of monitoring [1, 2, 5-7], the following conclusions have been drawn regarding the advantages of its application in the activity management: the application of monitoring in the practice of management makes it possible to more reasonably approach the definition of goals and

objectives not only in relation to the object of monitoring, but also to the enterprise in general; the flexibility of the monitoring system enables its use in the management of various spheres of activity through the development and use of a system of performance indicators; the complexity of the monitoring system involves monitoring the state and trends of various monitoring objects (at the internal and external levels of performance) and ensuring the interaction of all structural units in order to manage the effectiveness and efficiency of the enterprise, eliminate deviations from the planned values of indicators and achieve the set goals.

An important conclusion made after the analysis of scientific literature was the definition of the role of monitoring in the process of managerial decision-making: based on the results of observation, monitoring provides the necessary information for making well-considered managerial decisions that requires the organization of the relevant service at the enterprise – the department that monitors the results of activities (quality of education, scientific achievements, financial, economic and other indicators that form competitive advantages and determine competitiveness of a higher educational institution) may be such a service at the IHE.

In preparing for the monitoring of the IHE competitiveness, it is expected to resolve such program and organizational-methodical tasks: the definition of the purpose, subject and principles of monitoring; formation of a system of target indicators of monitoring (target indicators are indicators that adequately characterize the investigated object – a process or phenomenon); justification of methods to be used at the stages of data collection, processing and visualization.

The synthesis of scientific works devoted to the problems of monitoring [5, 7] made it possible to define the following main functions: assessing, diagnostic, stimulating, corrective, and functions of providing feedback, forecasting and modeling as well.

In this study, the monitoring of IHE activities in the field of competitiveness will be understood as the process of ongoing observation, control, assessment, analysis and prediction of its effectiveness and efficiency to meet the needs of different groups of users.

The objective of monitoring in the field of managing the competitiveness of the IHE is to consider the receiving of information on the effectiveness of activities in the areas that determine its competitive advantages, on the basis of qualitative and quantitative

analysis and assessment of relevant indicators for the development and adoption of managerial decisions in the system of competitiveness management, forecasting the state of objects for monitoring and informing parties concerned.

Scholars point out the possibility of such situations in determining the target indicators, which constitute the subject area of monitoring [5, p. 16]:

1) a separate target indicator is set, which effectively characterizes the status of the subject area, as well as a certain set of additional indicators influencing it – independent (exogenous) variables or factors;

2) a group of target indicators is set, which effectively characterize the status of the subject area, as well as a group of independent factors;

3) a certain group of indicators-factors is set, among which the target ones are not defined, but which in aggregate sufficiently fully characterize the state of the subject area.

When forming a system of target indicators, it is necessary to take into account that one of the conditions, which should be consistent with the methodology of monitoring, is the ability to quantify all the studied indicators and factors.

The result of the analysis of scientific literature on the monitoring organization [1, 5-7] was the definition of the basic principles of its implementation in the field of competitiveness management. It is reasonable to distinguish three groups of such principles.

1. The principles determined by the peculiarities of the subject area of monitoring:

- the principle of the materiality of the information received, which will be provided to users (internal and external) to substantiate the conclusions, for decision-making and performance of certain actions;

- the principle of completeness of information and information support, which is to provide comprehensive information for assessing the achieved level of performance and effectiveness in all areas of the IHE activity according to which the competitiveness assessment is conducted;

- the principle of response is that the IHE develops policy and improves the management structure, plans and monitoring system, which provide openness for parties concerned (external – the Ministry of Education and Science of Ukraine, entrants, enterprises and organizations that are consumers of educational services, society; internal – management, personnel, teaching staff, and students) in terms of achieved competitiveness, response to inquiries and comments of

parties concerned, adequacy of information on the achieved level of performance in the relevant reporting.

2. Principles of the monitoring system formation:

- the principle of the correspondence of the monitoring system possibilities to objectives and tasks of the development of the IHE in the field of competitiveness management is that the monitoring system should provide users with a set of analytical tools for solving all tasks that arise in the process of work;

- the principle of decomposition of tasks, which involves the separation of the following components of the subsystems of the monitoring system: interaction with databases; visualization; analysis; modelling; short-term forecasting; computer graphics; documenting;

- the principle of the monitoring system openness, that is the ability of the system to self-evolve, improve, increase its functions, and adapt to new tasks;

- the principle of interactive interaction with users of information through a user-friendly interface (the work of the system should be transparent, understandable and clear);

- the program and algorithmic automation of monitoring stages, which provides users with final results without over-specification of intermediate stages of problem solving;

- the principle of universality of mathematical methods, which involves the possibility to use unified algorithms at the early stages of the monitoring system formation;

- the principle of scientificity, which involves the maximum use of scientific methods and approaches for the implementation of monitoring procedures in the field of competitiveness management;

- the principle of integrity is that the monitoring system is an integral part of the management system of the IHE, and it has logical functional relationships with its other elements (components);

3. Principles for displaying information in the monitoring system:

- the principle of conformity, which is to ensure the correspondence between the object of observation (performance indicators in the areas of competitive advantage formation) and the used monitoring methods;

- the principle of consistency, which means that the indicators to be monitored must agree with one another and be considered in their interrelation;

- the principle of integrity is that monitoring of the competitiveness involves monitoring all fields and areas of the IHE activity, a comprehensive study of cause-and-effect relationships in the system of

competitiveness management;

- the principle of dynamism is that the monitoring system should monitor the indicators selected for monitoring in the dynamics, taking into account the changes that are characteristic for each stage of implementation of its development strategy;

- the principle of effectiveness is that competitiveness monitoring should act as an active tool in managing the IHE development and strengthening its market positions both in the domestic and foreign markets;

- the principle of planning, which means balanced development and consistent implementation of procedures for collecting and systematizing data, their archiving, processing, analysis and forecasting;

- the principle of structuredness is to identify the main components of the monitoring object and to form a system of performance and efficiency indicators for each of the components in order to justify a set of programs in the areas of the competitive advantage formation;

- the principle of systematicity is to establish interrelationships and interdependences between all major structural components of the monitoring object taken for analysis;

- the principle of functionality, which involves the possibility of observing and thorough analysis of the monitoring object in general and its components in order to predict the competitive positions of the IHE and development of regulatory influences (management measures);

- the principle of controllability, which involves providing a constant direct and reverse link between the monitoring object and the management body for a rapid response to changes in the state of the monitoring object, business process modelling and the effectiveness of economic decisions, plans and programs;

- the principle of reality is that the effectiveness of implementing a market-oriented (competitive) strategy and related programs will be high if they are developed taking into account the actual state of the monitoring object (competitive potential of the IHE) and external factors, and the management system is capable of a wide range of response options;

- the principle of consistency is that the implementation of a market-oriented strategy for the IHE development and a balanced set of strategic programs, as a long-term process, is carried out at successive stages, each of which requires appropriate justification, setting deadlines for implementation, developing reference standards and implementing a system of motivation.

Based on the general methodology of statistical monitoring and considering the peculiarities of the subject area of the IHE competitiveness, the following urgent tasks have been identified in course of the development of a methodological approach to internal monitoring of a higher educational institution competitiveness:

- analysis of the subject area of monitoring;
- studying the structure of information flows and modelling the needs of information users;
- definition of database structure requirements;
- formation of a balanced system of indicators and criteria for assessing competitiveness;
- development and introduction of reporting on the results of activities in the areas of the competitive advantage formation into the practice of the enterprise (development of reporting forms);
- development of methodological support with procedures for collecting, coding, visualization, preliminary and multidimensional data analysis, as well as calculation of target indicators (individual, group, complex and integral);
- ensuring the efficiency of data transmission channels and developing software and information resources for monitoring their own competitiveness by higher education institutions;
- recommendations on the data interpretation and their use in a market-oriented (competitive) strategy formation for the IHE development.

Thus, it follows from the considered above that the process of the IHE competitiveness monitoring requires the development of an appropriate system integrated into the general management system, as well as the preparation of methodological support for the implementation of the relevant monitoring procedures. The general structure of the proposed system for the IHE competitiveness monitoring is shown in Figure 1.7.

The following symbols are used in Fig. 1: EPC, SC, OMC and EC – respectively educational and pedagogical component, scientific component, organizational-managerial and economic component of the competitiveness; «→» – channels of data transmission in the system of monitoring; outgoing information flows; incoming information flows.

Let us consider the elements of the monitoring system of the IHE competitiveness in more details. Labor and logistical resources are important components of the monitoring system of competitiveness, since the quality of the information received and, consequently, the

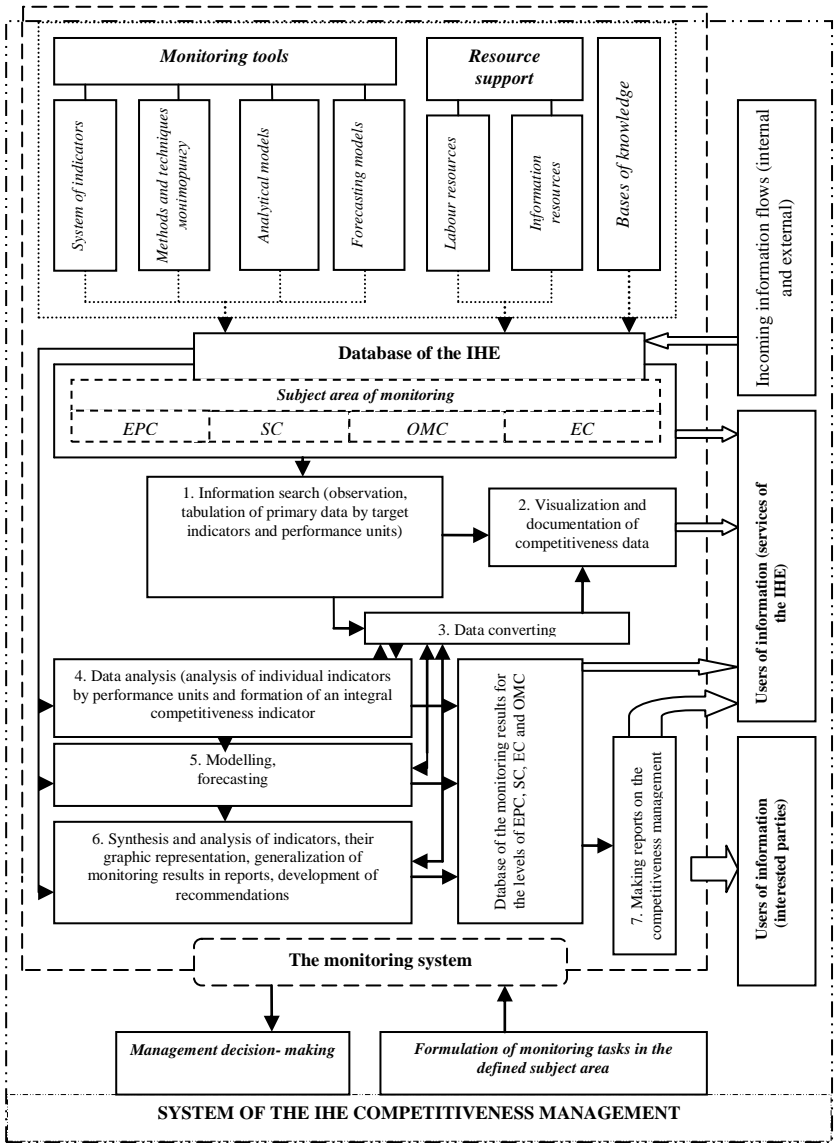


Figure 1.7 General structure of the monitoring system of the IHE competitiveness

Source: adapted by the author according to the data [5, 7]

effectiveness and validity of managerial decisions, conclusions and forecasts to a great extent depend on the level of facilities and personnel qualifications.

In order to assess the compliance of business qualities of management personnel and employees involved in the monitoring system, their competence and ability to perform their tasks promptly, the scientific literature suggests an indicator of personnel reliability [7, p. 39-40]. Generally agreeing with the appropriateness of using this indicator, it should be also noted that to assess the business qualities of the personnel, it is important to consider a set of characteristics of the employees who monitor the IHE competitiveness, in addition to their reliability.

Another important element of the monitoring system of the IHE competitiveness is the information support through which the processing of information coming from internal and external sources (incoming information flows) is carried out. The intensity of the monitoring system depends on the quality and level of information support; quality and multiplicity of calculations, completeness, reliability, efficiency and timeliness of analytical and reporting information; the validity of managerial decisions and the reliability of forecasts.

The processing of the information entering the monitoring system involves the use of appropriate monitoring methods, the accuracy and rationality of which depends on the effectiveness of the monitoring system and the quality of “outgoing” information flows.

The monitoring method is a set of methods and processes for research and analysis of information, which establishes interrelations between indicators, assesses the achieved level of performance in the spheres of educational, instructional, innovative, financial and economic activities. The main methods used in the monitoring system are methods of economic and mathematical statistics, econometric and economic-mathematical methods, methods of modelling and forecasting, analysis and synthesis, expert analysis, computer graphics. In addition, the monitoring system of the IHE competitiveness, like any statistical monitoring system, should support traditional processing procedures that functionally correspond to the main stages of the data lifecycle [5, p. 51]: data collection; processing (verification, averaging, generalization, reporting); data transfer to different groups of users; further processing; accumulation; storage; preparation of information samples to order; presentation of information in various forms and its publishing in order to inform the parties concerned (vocational

guidance, information in the media, provision of information for the rating of IHEs).

The statistical monitoring system, developed for various subject areas of socio-economic research [5], has been adapted by the author to meet the objectives of monitoring the IHE competitiveness. Seven basic functional modes have been identified for this system (see Figure 4).

Information search (Mode 1) includes the study of monitoring objects, the formation of primary data (individual indicators) and their preliminary analysis. The information obtained at this stage forms the primary database, which can be used at the next stages of analytical work.

The information obtained at the first stage, after proper *documentation and data visualization* (Mode 2), is transmitted to internal users – in the IHE divisions for the control and development of operational responses, as well as experts (in licensing, accreditation). It is expedient to keep the results of monitoring in databases systematized and processed at this stage.

Data conversion (Mode 3) involves the following actions: construction of new structures, models, transformation of input data by computational procedures (finding summary data, determining the maximum, minimum, average values, etc.). The results of these operations are entered in the database of monitoring results to be used at the next stages.

Data analysis (Mode 4) involves in-depth study of the data obtained at the previous stage and their assessment. In order to solve these problems in the monitoring system, it is recommended to create and maintain a database of statistical data processing tools (statistical monitoring tools). The results obtained at this stage must be entered into the database and be accessible to users through documenting (compilation of reporting) and data visualization (Mode 7).

Modelling and Forecasting (Mode 5) involves the use of more complex tools than at the previous stages; the result of the use of this tool is the laws, models and forecasts. At this stage, the monitoring system of the IHE competitiveness carries out the analysis of the existing trends, their modelling and drawing up a forecast of the competitiveness level, considering the results of the analysis of the IHE potential and the monitoring of the environment. Since the results of this stage cannot be directly observed, they must be included in the database of results and provided to users through the documentation and visualization system (Mode 7).

Synthesis and analysis of indicators, their graphic representation, generalization of monitoring results in the report, development of recommendations (Mode 6) involve the generation of complex (multi-dimensional) indicators and the creation of graphic images and dependences in order to study the relationship between the phenomena, processes and indicators. Users of information can observe received graphic images both directly on the terminal (internal users) and on the university's website (parties concerned). The results of this stage are entered in the database of monitoring results.

The compilation of the monitoring results of the IHE competitiveness and the visualization of data (Mode 7) is a mandatory subsystem of the competitiveness monitoring system; its purpose is to prepare and provide information on the performance level achieved by the higher educational institution in the educational, pedagogical, innovation, financial and economic spheres for different groups of users, prepare non-financial reports and publicize them. The main functions of this subsystem are the analysis of information from the database of monitoring results and the development of a market-oriented strategy of the IHE.

Taking into account the specifics of a particular subject area, the author has concluded that the system of the IHE competitiveness monitoring must have properties of the developing system, that is, have a base frame for filling with information that can be modified and improved. Agreeing with the list of features of the system of strategic monitoring of financial and economic activity, which are defined in the work [7, p. 34-36], it should be noted that the monitoring system in the field of the IHE competitiveness management is characterized by the following: purposefulness, integrity, completeness and transparency, flexibility, objectivity, dynamism, cyclicity, efficiency, adaptability, and promise for application.

It should be also noted that the level of consumer's satisfaction with the educational service depends on the quality of the educational product (training programs, scientific training, conditions of training and additional services provided by the specific IHE), and on the level of marketing – the effectiveness of advertising, compliance with the market needs, quality and completeness of information. This value will characterize the level of the IHE competitiveness by all the components.

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