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EVALUATION OF THE EFFICIENCY OF STATE INSTITUTIONS OF HIGHER EDUCATION IN UKRAINE: THEORETICAL PRINCIPLES AND GENERAL METHODOLOGICAL APPROACHES

Abstract. The purpose of the article is to study the theoretical issues of determining the effectiveness of state higher educational institutions of Ukraine and the development of theoretical and methodological principles, as well as general methodological approaches to its evaluation. To implement it, the authors formed and proposed a supplement to the thesaurus of management of the concept of «key performance indicators» (Key Efficacy Indicators, KEI), which, in the context of the object of study, is proposed to understand a set of numerical indicators of public higher education. nature, which are the central element of the system of evaluation of its activities in terms of its effectiveness and efficiency in order to achieve certain goals of the state institution of higher education. In order to form a stable basis of the evaluation methodology, a classification of key performance indicators was formed according to 16 features, according to which the corresponding groups were identified and their characteristics were given. The outline of the methodology is based on the basic classification features of key performance indicators, in particular by: types (efficiency and effectiveness), degree of importance (major and minor) and areas of coverage (educational, research, financial, contingent, infrastructure, socio-ethical); it provides for the final definition of an integrated key performance indicator through the sum of complex indicators of efficiency and effectiveness or the sum of complex indicators of educational, research, financial, socio-ethical spheres, as well as areas of contingent and infrastructure. The final formation of the methodology for assessing the effectiveness of state institutions of higher education will optimally and deeply assess the activities of these entities, which will contribute to the actual implementation of all management functions in time and space to fulfill their mission, objectives and development goals.

Keywords: key performance indicators, key efficacy indicators, effectiveness, efficiency, public higher education institutions.

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ОЦІНКА ДІЄВОСТІ ДЕРЖАВНИХ ЗАКЛАДІВ ВИЩОЇ ОСВІТИ В УКРАЇНІ: ТЕОРЕТИЧНІ ЗАСАДИ І ЗАГАЛЬНІ МЕТОДИЧНІ ПІДХОДИ

Анотація. Метою статті є дослідження теоретичних питань визначення дієвості державних вищих навчальних закладів України і розроблення теоретичних-методологічних засад, а також загальних методичних підходів до її оцінки. На її виконання авторами сформовано і запропоновано доповнення тезауруса управління поняттям «ключові показники дієвості» (Key Efficacy Indicators, KEI) під якими, у контексті об'єкта дослідження, пропонуємо розуміти сукупність числових показників діяльності державного вищого навчального закладу натурального, умовно-натурального і вартісного характеру, які є центральним елементом системи оцінки його діяльності щодо її ефективності та результативності задля досягнення визначених цілей державним закладом вищої освіти. Для формування стійкого базису методики оцінки сформовано класифікацію ключових показників дієвості за 16-ма ознаками, за якими ідентифіковано відповідні ним угруповання і надана їхню характеристику. В основу контурно сформованої методики покладено базові класифікаційні ознаки ключових показників дієвості, зокрема: за видами (ефективності та результативності), ступенем вагомості (головні і другорядні) і сферами охоплення (навчальні, дослідницькі, фінансові, контингенту, інфраструктури, соціально-етичні); вона передбачає кінцеве визначення інтегрального ключового показника дієвості через суму комплексних показників ефективності та результативності або суму комплексних показників навчальної, дослідницької, фінансової, соціально-етичної сфер, а також сфер контингенту та інфраструктури. Кінцеве формування методики оцінювання дієвості державних закладів вищої освіти дозволить оптимально і глибинно оцінити діяльність вказаних суб'єктів, що

сприятиме реальній реалізації усіх функцій управління в часі і просторі на виконання їхніх місій, завдань і цілей розвитку.

Ключові слова: ключові показники ефективності, ключові показники дієвості, результативність, ефективність, державні заклади вищої освіти.

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Introduction. The development of the global information society has directly and indirectly led to the transition to a new world order, in which knowledge becomes the most important product of activity, largely low-capital goods, a significant factor in socio-political influence and even a new currency. This system-forming principle of building a society based on knowledge — society 5.0 (Super Smart Society) — is universal for all system levels: from higher to lower [1, p. 41]. As any society, as a social system, is based on an economic system, economists from different countries have recently been paying more and more attention to the importance of knowledge, with American scientists J. Grayson and K. O'Dell noting: «Education is directly related to competitiveness. No society can have high-quality products without high-quality raw materials. Education creates human capital, which in combination with physical capital gives an increase in productivity and quality. This has always been true, but doubly true for a global, technically complex economy» [2, p. 253]. Obviously, higher education is the quintessence of the process of knowledge generation, and therefore the effectiveness of higher education institutions is the key to Ukraine's real involvement in information and communication processes and projects.

Studies of statistics on the network of domestic higher education institutions show that the ratio between public higher education institutions and private higher education institutions in Ukraine today it is set at 72/28 [3]. The management system of domestic state higher education provides for a combination of a certain centralization in management at the level of the Ministry of Education and Science of Ukraine and a tendency to expand powers in the dynamics of the local government management subsystem in public higher education institutions. In the context of active reform of the latter, the issue of evaluating the activities of state higher education institutions is a fundamentally important issue that requires constant monitoring and research.

Review of literature sources and formulation of the problem. As Victor M. H. Borden notes in his paper Using Performance Indicators to Guide Strategic Decision Making, the question of developing national indicators to compare the performance of universities and colleges, and thus developing common approaches to assessing the performance of higher education institutions (primarily public) was carried out in the early 1970s years; Over the next decades, a system of performance indicators for higher education institutions was developed in Europe, which was introduced into the public education management system and gradually spread around the world [4].

Today, scientists are actively discussing this issue, as higher education institutions as generators of knowledge, ideas and information, as none of the system of social institutions have to change their activities and demonstrate extreme flexibility and resilience to change. All this requires the development of new approaches to assessing the performance of higher education institutions.

The study of recent research in this area shows the diversity of approaches to this issue, despite the global attempt to unify such indicators. Thus, the elaboration of the publication «Qualitative Indicators for the evaluation of universities performance» shows that the author (Fereydoon Azmaa, 2010) proposes to take into account indicators to assess the performance of universities: area and equipment, ICT, communications, graduates, social and cultural services, publications of magazines, non-teachers, financial affairs, teachers [5]. A more extensive list of indicators is found in a meaningful presentation (Peter Petrov, 2013), the author of which offers the following areas of grouping indicators: academic, financial, research, support, ethical [6]. The author of another publication (Vivian Chan, 2015) notes that the key performance indicators have long been considered: graduation, employment, the level of return of financial aid for student education. However, she emphasizes that time has confirmed the conditional effectiveness of these indicators [7]. Other research authors in a later publication (Mohammed Badawy, A. A. Abd El-Aziz, Hesham Hefny, 2018) argue that a significant number of previously developed indicators for higher education institutions are not yet the end result of the process; the main question is how to

choose indicators that meet the institution to achieve the goals, and how to measure these indicators [8]. However, especially valuable is the actual practical experience, which is proposed to consider the example of a company providing consulting services for the management of higher education institutions, a company that develops software for the management system of universities and colleges and the existing university. The first company (Precision Campus), having significant experience in the market of relevant specialized services, by developing existing approaches to the formation of key performance indicators (KRI), offers the following five categories: financial, student success, admission and enrollment, staff faculties, services and resources; these categories combine 29 key performance indicators [9]. The second company (Cascade) offers its customers 4 categories of key performance indicators — financial, administrative, training and research — which include 11 key performance indicators [11]. The fourth largest University of Glasgow in the UK in its Development Strategy for 2015—2020 indicates two main categories of key indicators: primary and secondary, which combine 22 indicators [10]. So, as we can see, there is no unity of views among different authors on the existing problem yet.

It should be noted that in Ukraine the study of the effectiveness of public higher education institutions is carried out for about 20 years, which, to some extent, is caused by the beginning of the application of the program-target method in the budget process. Among the studies devoted to the evaluation of the effectiveness of state higher bulk institutions, the work of N.V. Khvorostyana, A.K. Garashchenko, S.A. Matyukh, O.V. Chernysh, G.V. Sereda, who proposed in accordance: grouping of efficiency indicators by four groups (generalizing indicators of efficiency of activity; indicators of efficiency of use of work (personnel); indicators of efficiency of use of production fixed and working capital; indicators of efficiency of use of financial resources (working capital and capital investments) [12]; define the coefficient of integrated efficiency as the total score of four coefficients by areas, taking into account their importance: macroeconomic efficiency, market efficiency for the employer of the regional labor market, microeconomic or economic efficiency and individual investment efficiency for entrant / student / graduate [13]; group the system of indicators by areas: weight in society, consumers and other stakeholders, internal business processes, infrastructure and employees, finance [14]; focus on the following key performance indicators in terms of three levels (1st level: rectors and vice-rectors; 2nd level — the management of structural units; 3rd level — employees): financial, image, educational, personnel [15]; Note that each of the above authors in their publications points to the lack of unity of approach and emphasizes its need.

Setting objectives, methodology and research methods. The purpose of the article is to study the theoretical issues of determining the effectiveness of state higher educational institutions of Ukraine and the development of theoretical and methodological principles, as well as general methodological approaches to its evaluation. To achieve the objectives of the study were used such scientific methods as analysis, synthesis, deduction, induction, emergence, classification, system and functional methods. The research methodology provides practical confirmation of the hypothesis of achieving the maximum objective assessment of the effectiveness of public higher education institutions. Its proof is carried out through the construction of the classification of key performance indicators, based on which and taking into account the specifics of modern state institutions of higher education in the article formed an integrated key performance indicator, which is described by a linear algebraic equation.

Results and discussion. The so-called key performance indicators are a well-known quality management tool; these are numerical performance indicators that help measure the degree of achievement of goals and the optimality of the process, namely: effectiveness and efficiency [16]. Consideration of this definition in semantic focus leads to the conclusion of an obvious tautology: key performance indicators allow us to measure efficiency and effectiveness. Regarding the correlation of these concepts in the economic context, scientists I.O. Momot and A.O. Demchenko emphasize the need to distinguish between the categories of «effectiveness» and «efficiency», each of which «...has an independent meaning, equally important for the evaluation of the enterprise, and can not replace another concept» [17]. This position is actually confirmed by international quality management standards; Yes, ISO 9000: 2015. Quality management systems. The main provisions and the dictionary (ISO 9001: 2015 Quality management systems — Fundamentals and

vocabulary) clauses 3.7.10 and 3.7.11 establishes the following definitions: efficiency — the relationship between the result achieved and the resources used; effectiveness — extent to which planned activities are realized and planned results are achieved. The above allows us to propose appropriate terminological and substantive innovations, namely: instead of the common concept of «key performance indicators» to introduce the concept of «key performance indicators» (Key Efficiency Indicators, KEI) with the acquisition of the latter such conceptual color in the context of the object of study: numerical indicators of the activity of the state higher educational institution of natural, conditional-natural and cost character, which are the central element of the system of evaluation of its activity for its efficiency and effectiveness in order to achieve the set goals by the state higher education institution.

The elaboration of the presented approaches to the formation of key performance indicators demonstrated not only their multi-vector nature, but also the diversity of such indicators. Under these conditions, it is necessary to form a classification of key performance indicators of state institutions of higher education, as a theoretical and methodological basis for the development of sustainable and effective methods of assessing their effectiveness. The study of this issue allowed us to propose such a system of groups (*Table*).

Table

Classification of key performance indicators of state higher education institutions in Ukraine

Classification feature	Types of indicators	Characteristics of indicators
By types	effectiveness	characterize the degree of implementation of the planned activities and obtaining the planned results by state institutions of higher education
	efficiency	characterize the relationship between the achieved result and the resources used by public institutions of higher education
By levels of management goals	strategic	reflect the overall performance of public higher education institutions for a significant period and allow you to adjust plans for the next term (from 1 year or more)
	tactical	reflect the overall performance of public higher education institutions for a small period and allow you to adjust plans within the specified period (up to one year)
	operational	reflect short-term general and structural activities of state institutions of higher education (per month) in order to adapt goals and objectives to constant changes in conditions
Over time	the overdue	reflect the results of public higher education institutions after the end of the period
	advanced	reflect the intermediate results of public higher education institutions to ensure the ability to manage the situation within the reporting period to achieve the intended results at the end of the last
For the purpose of the request	the targets	reflect the degree of proximity of state higher education institutions to the defined goal.
	process	reflect the level of effectiveness / efficiency of the relevant process within the activities of public higher education institutions and allow to assess the possibility of its acceleration or reduction of costs without consequences for quality
	project	characterize the effectiveness / efficiency of the project and its individual parts within the activities of state institutions of higher education
According to the influence of the environment	exogenous	characterize the state of the external environment of state institutions of higher education in order to form the most reliable results on endogenous indicators
	endogenous	characterize the state of the internal environment of public higher education institutions
According to the method of regulation	the normative ones	are fixed by normative-legal documents on the assessment of the activity of state institutions of higher education
	recommended	by international and domestic organizations on the activities of state institutions of higher education
	free formed	on the initiative of state institutions of higher education within the activities of the latter
According to the degree of importance	the main ones	characterize the efficiency / effectiveness of the most important essential tasks within the framework of achieving the goals set by the state higher educational institutions
	secondary	characterize the efficiency / effectiveness of all other secondary tasks within the achievement of the goals set by state higher education institutions
By areas of activity	of the main functional activity	indicators of efficiency of the main functional activity, which is proposed to understand the activities of state institutions of higher education in the field of education and science in accordance with their functional purpose
	auxiliary infrastructural activity	indicators of efficiency of auxiliary infrastructural activity of state institutions of higher education, which is connected with the organization of the main functional activity and infrastructural support of the latter

Table (continued)

Classification feature	Types of indicators	Characteristics of indicators
In terms of coverage	educational institutions	characterize the efficiency / effectiveness of the educational process of state institutions of higher education
	research	characterize the effectiveness / efficiency of research activities of public institutions of higher education
	financial	highlight the efficiency / effectiveness of economic activity (budget and economic) of public higher education institutions
	contingent	reflect the efficiency / effectiveness of the state and dynamics of the contingent of public higher education institutions (students and staff)
	infrastructure	characterize the efficiency / effectiveness of public higher education institutions in the field of educational process, research activities
	socio-ethical	highlight the effectiveness / efficiency of public higher education institutions in the implementation of social and ethical goals
According to the budget programs	expenses	reflect the volumes and structure of resources that ensure the implementation of the budget program, characterize the structure of expenditures of the budget program
	product	reflect the results of the main managers of budget funds for the relevant budget period within the budget program
	efficiency	characterize the economy when spending budget funds, the ratio between the product obtained and the resource spent
	qualities	cover the dynamics of achieving the goal and fulfillment of the budget program, compliance of the created product with the established standards (norms), level of realization of investment projects (for the whole period from the beginning of realization of these projects), performance of works, degree of readiness of construction objects; the level of satisfaction of users of public services in accordance with their purpose, the level of provision of public services to persons entitled to them; the level of mitigation of negative or strengthening of positive trends in the economy (relevant area of activity), the benefits for society from the implementation of the budget program, including the provision of gender equality
	cost-effectiveness	highlight the level of compliance with the strict regime of economy in the use of general and special funds by state institutions of higher education
	sustainability	characterize the financial stability of public higher education institutions
In terms of elemental content	complex	reflects more than one fact, phenomenon and process (group, generalized, integral)
	differential	characterize individual individual facts, phenomena and processes
By type of meter	natural	expressed in natural units
	value	expressed in value units
	conditionally natural	expressed in conditionally natural units
According to the content of the presented information	the structural	characterize the efficiency / effectiveness of the activities of state institutions of higher education by individual structural units
	thematic	characterize the efficiency / effectiveness of state institutions of higher education by individual types in the segments of activity
	general	characterize the efficiency / effectiveness of public higher education institutions in general
According to the volume of presented information data	segmental	characterize information data on the activity of state institutions of higher education of reference and accumulative nature.
	general	characterize the set of information data on the activities of state institutions of higher education of a final nature
According to the level of confidentiality	confidential ones	characterized by limited use by an established person or group of persons
	non-confidential	characterized by a presentation for all stakeholders
Mandatory submission	required	those that are mandatory for calculation
	on request	those that are determined by the relevant user requests

Sources: [18—25].

The presented classification takes into account the generally accepted approaches to the formation of key performance indicators, especially the functioning of higher education institutions in general and public higher education institutions in particular, as well as the conditions of budget institutions of Ukraine, which are, according to the Budget Code of Ukraine, state higher education institutions.

The development of each of the groups of indicators and their meaningful argumentation requires a separate independent powerful in volume and scientific substantiation of the study. Regarding the general quantitative nomenclature of key indicators, of course, it can vary, however, based on the well-known empirical Pareto rule, we propose to adhere to a known ratio, and therefore set it for major and minor key performance indicators at 20/80.

The generalized procedure for assessing the effectiveness of public higher education institutions should be implemented through the definition of an integrated indicator in terms of the main types of key performance indicators — effectiveness and efficiency — according to the following formulas (1—3):

$$Klei = KIcp + KIce, \quad (1)$$

where $Klei$ — an Integral Key Efficacy Indicators;

$KIcp$ — a Comprehensive Key Performance Indicator;

$KIce$ — a Comprehensive Key Effectiveness Indicator;

with

$$KIcp = \sum_{i=1}^n KIpd, \quad (2)$$

$$KIce = \sum_{i=1}^n KIed, \quad (3)$$

where $KIpd$ — differential key performance indicator;

$KIed$ — differential key effectiveness indicator;

At the same time, the definition of an integrated indicator using indicators based on the scope will be based on the following formulas (4—8; 10);

$$Klei = KIlc + KIrc + KIfc + KIcc + KIic + KIsic, \quad (4)$$

where $KIlc$ — comprehensive key learning indicator;

$KIrc$ — comprehensive key research indicator;

$KIfc$ — comprehensive key financial indicator;

$KIcc$ — comprehensive key indicator of the contingent;

$KIic$ — comprehensive key infrastructure indicator;

$KIsic$ — comprehensive key indicator of the social-economic sphere;

with

$$KIlc = \sum_{i=1}^n KIld; \quad (5)$$

$$KIrc = \sum_{i=1}^n KIrd; \quad (6)$$

$$KIfc = \sum_{i=1}^n KIfd; \quad (7)$$

$$KIcc = \sum_{i=1}^n KIcd; \quad (8)$$

$$KIic = \sum_{i=1}^n KIid; \quad (9)$$

$$KIsic = \sum_{i=1}^n KIsid, \quad (10)$$

where $KIld$ — differential key learning indicator;

$KIrd$ — differential key research indicator;

$KIfd$ — differential key financial indicator;

$KIcd$ — differential key indicator of the contingent;

$KIid$ — differential key infrastructure indicator;

$KIsid$ — differential key indicator of the social-economic sphere.

According to the content of the above proposed definition, the characteristics of the key performance indicators of public higher education institutions in the context of the classification formed by them, we have a control equality (11):

$$KIcp + KIce = KIlc + KIrc + KIfc + KIcc + KIic + KIsic. \quad (11)$$

These general methodological approaches to assessing the effectiveness of public institutions of higher education take into account the well-known world approaches and are based on established scientifically sound theoretical principles, which increases the probability of effectiveness of the presented methodology.

Conclusions. Modern multi-vector multi-level processes require maximum optimization of the efforts of domestic state higher education institutions. Modernization of the management system of state higher education institutions requires above all the development of activity plans and development strategies of these entities, the implementation of which is not possible without a system of key performance indicators, is a set of numerical indicators of public higher education institution of natural, conditional and cost nature. which are a central element of the system of evaluation of the latter in terms of its effectiveness and efficiency in order to achieve certain goals of the state institution of higher education.

The development of a functioning methodology for assessing the effectiveness of state institutions of higher education is facilitated by the current classification of key indicators of the effectiveness of state institutions of higher education, which includes the following groupings by: types: effectiveness, efficiency; levels of management goals: strategic, tactical, operational; sometimes: late, ahead; purpose of the request: target, process, project; environmental influences: exogenous, endogenous; method of regulation: normative, recommended, free; degree of importance: major, minor; areas of activity: main functional activities, ancillary infrastructure activities; scope: training, research, finance, contingent, infrastructure, socio-ethical; budget programs: cost, product, efficiency, quality, economy, sustainability; elemental content: complex, differential; type of meter: natural, cost, conditionally natural; the content of the presented information: structural, thematic, general; volume of presented information data: segmental, general; level of confidentiality: confidential, non-confidential; mandatory submission: mandatory, on request.

Formed general methodological approaches to assessing the effectiveness of public higher education institutions take into account the main and secondary key performance indicators by type, weight and scope, and the definition of the integrated key performance indicator is carried out through a total score of two indicators by type and six indicators by scope. is a checksum.

Further development of the evaluation methodology requires identification of the optimal number and meaningful detailing of relevant key indicators, creation of a system of their score evaluation, rating scale, as well as organization of documentary support of the methodology in the form of a package of cumulative, grouping, calculation and generalizing media. The final formation of the methodology for assessing the effectiveness of public institutions of higher education will help increase the efficiency of management of these entities, and thus contribute to the growth of their productivity.

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