Key Performance Indicators (KPIs) as a Part of the Staff Performance Management at the University: A Case of Medical University

Yurii M. Safonov
Kyiv National Economic University Named After Vadym Hetman

Valeria G. Marichereda
Odesa National Medical University

Viktoriia I. Borshch
Odesa National Medical University

Mykhailo Khrapatyi
Interregional Academy of Personnel Management

Mykhailo Goncharenko
Interregional Academy of Personnel Management

The main purpose of this research is to conduct the theoretical and applied study of KPIs as an evaluation tool of universities' activity; to identify the issues of special organizational requirements for its use. In this study such basic methods as analysis, synthesis and comparison are used. Medical university and its staff are an object of the research. The article using the case of the medical university describes the Key Performance Indicators of the university, its principles and practices of application, provides a justification of the optimality of the selected system for the evaluation and development of the university's staff and its efficiency to achieve the university's strategic goals. KPIs are adapted in accordance with the requirements of the modern higher education and takes into account the main goals of the strategic plan of the university's development. The article describes in detail the principles of KPIs construction, based on the decomposition of the strategic goals.

Keywords: Key Performance Indicators, staff performance management, staff incentive system, medical university, higher medical education

INTRODUCTION

In modern conditions, higher education institutions carry out various types of activities: educational, research, socio-educational, financial and economic, innovative. In accordance with this priority requirement to universities is efficiency in such processes as administration, decision-making, adaptation of the organizational system to changes in the external environment, which in turn makes it urgent to

constantly monitor and evaluate the effectiveness of both the entire organizational system of the university and the evaluation of the effectiveness of structural units and staff. The main success factors of any organization: financial stability, optimization of internal processes, development of personnel (growth of professionalism of employees) – are complemented for the educational organization by the objectives of growth of quality of training of students, the need to ensure quality entry into the profession and attract quality applicants (Pogodayev, 2013). Thus, in the context of the growing role of the market economy in the higher education system, the management of modern universities has increasingly focused on strategic management. Accordingly, the role of the strategic pillar in governance is increasing. At the same time there is a problem of choosing the most significant indicators, which can really serve as indicators of both today and, first of all, the future success of the company, a metric of efficiency.

All of the above conditions make it necessary to organize a highly effective management system at the university, based on a balanced system of performance indicators that adequately reflect the speed and direction of movement to the goals. Thus, one of the main strategic tasks of the university administration is to draw up Key Performance Indicators (KPI) and to rate academic staff on their bases, including assessing the professional pedagogical activity.

This issue becomes even more relevant when the need to improve the universities' efficiency as a key element of the national modernization strategy of the higher education system exists. The modernization processes of higher education systems in various countries increase the significance of the university's results. This trend is based on several factors. Firstly, modern competitive conditions and the rapid development of scientific and technological progress force universities to dynamically change their goals and adjust their activities (Tsaras et al., 2018). Secondly, reduced public funding for universities increases their dependence on external sources, including various funding channels (Leshchenko et al., 2021). Thirdly, Governments and rating agencies are increasingly using quantitative and qualitative indicators of the university's performance and efficiency as indicators, while determining its place in national and international rankings (Badawy et al., 2018). The requirement to actively engage in research and demonstrate high results of publication activity and citation indices extends the university to its structural divisions and individual teachers, becoming a key component of their assessment and motivation system.

The use of Key Performance Indicators and the resulting indicators of achievement of the intermediate goals and objectives allows, on the one hand, to track progress towards the strategic goal of the higher education institution, on the other hand, it is a tool for operational management and timely corrective action towards the achievement of its strategic orientations. Its main idea is to focus on the profit and to asses the contribution of each staff and each structural department into the general income of the higher education institution. Thus, KPIs include, both financial, and non-financial indicators (Khashab et al., 2020).

The study of the systems of evaluation of academic staff's performance, the use of these systems to motivate academic staff is the most prioritized and strategically important for the university activities, is of great scientific and practical interest.

The main goal of this paper is theoretical and applied study of the organizational and administrative framework for the use of Key Performance Indicators (KPIs) as an evaluation tool of universities' activity along with the staff incentive system for stimulating the pedagogical and scientific activities of the academic staff.

MATERIALS AND METHODS

This research study continues from the previous work done by the authors on how best to manage the strategic and operational processes at the higher education institutions. The analysis and the descriptive study, presented in this paper, was conducted in two parts. Firstly, the basic principles of the Key Performance Indicators were determined and analyzed; then the organizational requirements for integrated use of Key Performance Indicators at the medical universities were considered. The object of research is the medical university and its staff.

The key research methods used in this study are content and data analysis, summarization and comparison in order to systematically and objectively describe phenomena of Key Performance Indicators

in the higher education system and to identify the general positions of the assessment approach based on KPIs for the medical universities. The data synthesis and analysis are the key value-added elements of this research, which could help to find out the relevant organizational and administrative system for the use of KPIs in order to analyze medical universities' activity.

The type of research data, used in this research study is derived, combined from different data sources, such as statistics, annual reports (national, and of medical universities), research papers, publications of foreign scientists. The authors used the statistical data and the information from the annual reports of five medical universities of Ukraine to understand the necessary set of Key Performance Indicators for medical universities. Also, in this study the national annual reports of the Ministry of Education and Science of Ukraine were used to understand the Key Performance Indicators for the higher educational institutions in general. Research papers and publications of foreign scientists were exploited to find the general conceptual framework of this research study.

The authors have set themselves the following research tasks:
1. First of all, what is the advantage of KPIs for higher education?
2. Secondly, how the KPIs can be reflect in medical universities' annual reports?
3. Thirdly, how the KPIs are connected with strategic management system?
4. Fourthly, what is the organizational and administrative framework to establish KPIs at the medical university?

The main conceptual framework of this study is presented in Fig. 1.

FIGURE 1
CONCEPTUAL FRAMEWORK OF THE CONDUCTED STUDY
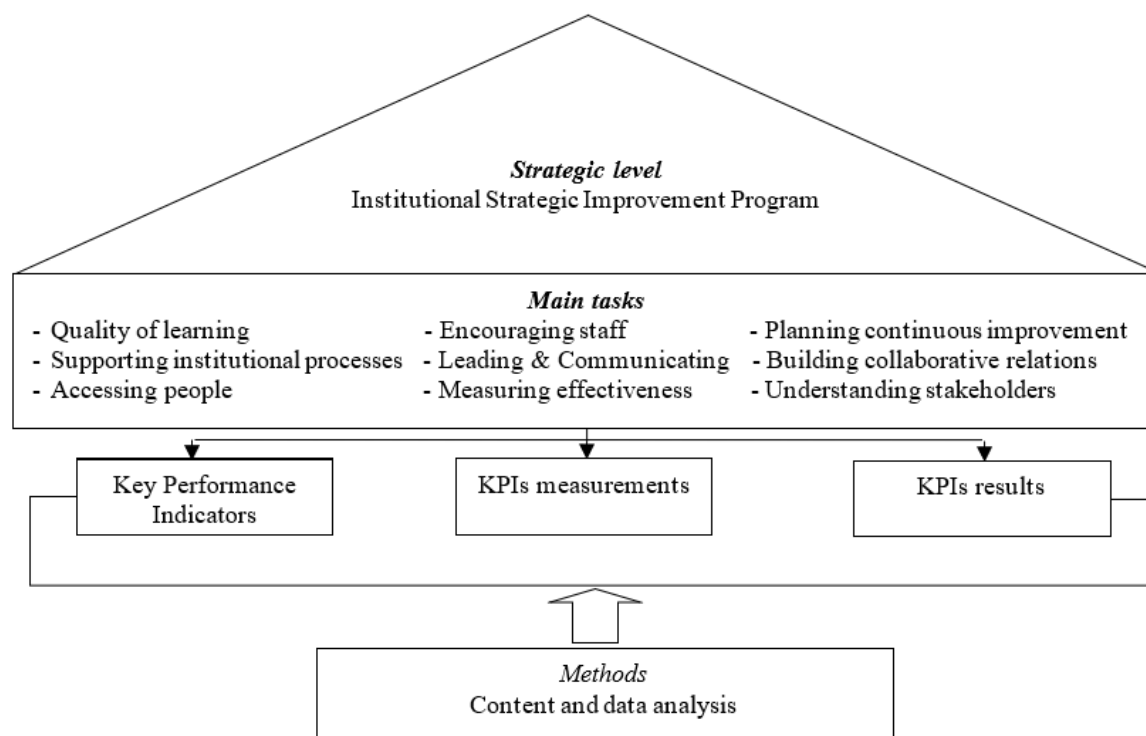
The theoretical basis of the research study includes the works of modern scholars that are devoted to the issues of KPIs for the higher education institutions. The integration of above-mentioned methods and research approach has resulted the main conclusions of this descriptive study, presented below.

RESULTS AND DISCUSSION

The proposed approach to the assessment of higher education institutions is based on Robert S. Kaplan and David P. Norton (1996) framework's KPIs model, which was introduced through the Balanced Scorecard. R. Kaplan and D. Norton's (1996) assessment approach covers the different indicators of four areas, among which is financial growth, clients, internal development, learning and innovation. But the idea to assess the quality of higher education institution came up since 1920s. Afterwards different researchers have provided different ideas for determining and forming KPIs in different areas. For example, different researches provide wide types and characteristics of KPIs: David Parmenter (2010) and Wayne W. Eckerson (2009), W. Peng, T. Sun, P. Rose and T. Li (2011) etc. But it is necessary to divide the existing approaches to KPIs on three ones:

1) manual approaches (Arora & Kaur, 2015; Ali et al., 2013; Khalifa & Khalid, 2015; Granberg & Munoz, 2013);
2) selection approaches (Diamantini et al., 2014; Keck & Ross, 2015; Ning et al., 2011; Peng et al., 2011);
3) predict approaches (Suryadi, 2007; An et al., 2004; Stefanovic, 2014; Yin et al., 2014).

Nevertheless, the predict approach is the most vital, because it is based on "for the problem and their possible value range". Further, we will consider the KPIs model for higher education institutions, based on prediction principle.

What Is the Advantage of KPIs For Higher Education?

Today, the modern higher education system is increasingly adapting economic and managerial technologies and tools of the business environment. This trend is taking place because more and more higher education is aimed at increasing the competitiveness of domestic educational institutions at the international level. And improving the competitiveness of public institutions, regardless of their focus, is no easy feat for their management system. It needs an exorbitant amount of information to measure the performance of the faculty, facilities and the institution as a whole. Thus, university's management system has adopted the Key Performance Indicators (KPIs) for proving value and analyzing performance.

Analyzing the definitions of this technology introduced in management theory, we can highlight the following:

- KPIs are indicators of success in a certain activity or in achieving certain goals;
- KPIs are quantitative indicators of the achieved results;
- KPIs are indicators that can be measured quantitatively and are considered the most important for evaluating the efficiency of the company, its department or individual employee.

For our opinion, the most relevant definition of the KPIs concept is from the point of view of business processes, and it is the following: KPIs are performance metrics to measure and analyze the efficiency and productivity of business processes of any company, regardless of its property's form. KPIs are used to solve the following tasks:

- to show the level of the company's, its structural departmentsэ and its staff efficiency;
- to measure the progress of the achievement of the goals and target indicators by employees and the company;
- to link the remuneration with the final results of staff activity;
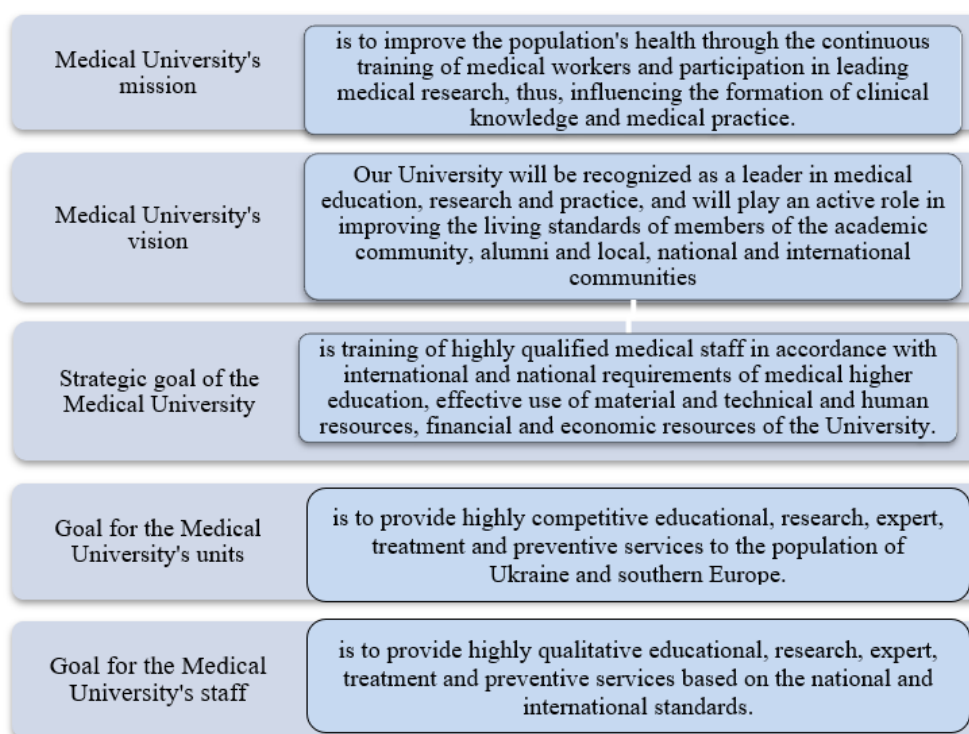- to give the company's activity a systemic character.

Thus, the main task of KPIs is to help the to understand and measure success of any company, which is also very important for educational institution. KPIs in higher education help to understand how an institution, program, units, academic staff, course or even a student is progressing toward their goals. The main advantage of KPIs is their versatility. They are aimed at increasing the interest of all the participants of the educational process (namely, administrative, academic and support staff, students) in the results of the institution's activities and determining the quality and efficiency of their work in order to receive bonuses. KPIs can be used to evaluate the work of the entire educational institution, its individual units,

and specific employees. They also make it possible to compare the indicators of several units for the same time period. Using this managerial tool, the educational institution is able to identify an effective and ineffective units or staff, to assess their contribution to the final goal.

Organizational and Administrative Framework for KPIs Establishment at the Medical University

As a result of the KPIs use, educational institution has the opportunity to provide a targeted orientation of the activities for its units and staff, as well as to clearly formulate the business processes taking place in the organization. Therefore, the KPIs of each employee derives from the goals of educational institution and its units and is implemented in one direction of activity. The example further illustrated details cascading of the goals of the medical institution (Fig. 2).

FIGURE 2
CASCADING OF GOALS BY THE EXAMPLE OF MEDICAL UNIVERSITY

Medical University's mission	is to improve the population's health through the continuous training of medical workers and participation in leading medical research, thus, influencing the formation of clinical knowledge and medical practice.
Medical University's vision	Our University will be recognized as a leader in medical education, research and practice, and will play an active role in improving the living standards of members of the academic community, alumni and local, national and international communities
Strategic goal of the Medical University	is training of highly qualified medical staff in accordance with international and national requirements of medical higher education, effective use of material and technical and human resources, financial and economic resources of the University.
Goal for the Medical University's units	is to provide highly competitive educational, research, expert, treatment and preventive services to the population of Ukraine and southern Europe.
Goal for the Medical University's staff	is to provide highly qualitative educational, research, expert, treatment and preventive services based on the national and international standards.

Such a cascading of goals is necessary for determining the quality indicators of service provision by the medical university. Having determined these indicators, we will find out how the staff and other participants of the educational process work, that is, we will be able to monitor key indicators in a certain time period and, based on the results of their achievement, we will build the incentive system. Thus, KPIs allow the medical university to manage efficiency, that is, to set measurable tasks, then to evaluate and motivate the achievements of personnel. The further stage is to understand, what kind of indicators medical university has to track, measure and analyze. For this purpose, in business environment it is proposed the standard classification, presented in Table 1.

TABLE 1
CLASSIFICATION OF KEY PERFORMANCE INDICATORS

Type of Indicator	Main direction for evaluation
KPIs of result	What is the result? (in a numerical form)
KPIs of expenditures	How many resources were spent?
KPIs of performance	To what extent does the business process correspond to the necessary algorithm / plan / program for its implementation? (performance indicators of business processes)
KPIs of productivity	What is the relationship between the result obtained and the time spent on obtaining it? (derived indicators)
KPIs of efficiency	What is the relationship between the obtained result and resource costs? (derived indicators)

KPIs at the university are structured according to several basic principles. Firstly, the KPIs are directly related to the objectives of the employee, unit or organization as a whole. Otherwise, using KPIs does not contribute to the result. Secondly, when creating a KPIs system, the capacity principle is taken into account, that is, KPIs display the degree of achievement of priority goals. Excessively high number of indicators could negatively impact on work, so KPIs are likely to be missed (Jackson, 2021).

While defining the KPIs for the medical university, we have to remember, that:
- ☐ KPIs structure the university's requirements for the academic staff;
- ☐ they establish causal relationships between key indicators of university development and individual indicators of academic staff activity.
- ☐ they are able to shift the focus from a systemic understanding of competitiveness factors to tools of personal effectiveness of academic personnel.

In summary, we can say that all KPIs are determined on the basis of objective reality, based on the analysis of the development of the medical university, taking into account the interests of key participants of educational process and stakeholders of the university. The implementation of the KPI system is based on the following principles:
- (a) the 10/80/10 rule;
- (b) the principle of partnership;
- (c) the principle of transferring efforts to the main direction of the company's activity;
- (d) the principle of coherence with the strategy of performance indicators.

The main stages of building a KPIs system are the following:
1. Clarifying the goals of the medical university
2. Formation of a working group for the construction of the KPIs
3. Formation of a holistic strategy for the implementation and development of KPIs
4. Development of goals and tasks of units and indicators of their activity
5. Explaining to the staff the benefits of using the KPIs
6. Development of a data collection mechanism for KPIs and a single database
7. Harmonization of the KPIs and determination of their weight, determined by the importance of each indicator (the weight is distributed as a percentage between the indicators of the group)
8. Planning and calculation of the wage bonus fund of the university and its divisions based on the KPIs
9. Selection of KPIs for the university as a whole
10. Understanding each business process of the university's units
11. Selection of KPIs for the university's units and their staff
12. Development of relevant documents regarding the construction and implementation of the KPIs
13. Presentation of the system to personnel

14. Implementation of KPIs
15. Control over the results of the implementation of the KPIs
16. Clarification of KPIs to maintain their relevance

In accordance with these stages, we can present the process of building the KPIs for business process "Administration of personnel", as shown at Fig. 3. In this way we can build KPIs for each business process in all structural divisions of the university.

KPIs for Medical Universities

It should be noted that in business practice the KPIs are based on the financial and economic performance of the company, primarily: (1) projected revenue; (2) planned net profit; (3) expected financial savings, etc.

The higher education is characterized by its non-profit-making nature and the absence of regulatory mechanisms for the generation and distribution of profit on the basis of performance. Nevertheless, the economic basis for the activities of medical universities takes place and is presented in a different, less explicit form: (1) intake benchmarks and the amount of budgetary financing; (2) targeted funding of the university's activity by the state and employers attracted by the university; (3) economic indicators of extrabudgetary work, etc.

FIGURE 3
KPIS FOR BUSINESS PROCESS "ADMINISTRATION OF PERSONNEL" AT THE HR-DEPARTMENT OF THE MEDICAL UNIVERSITY
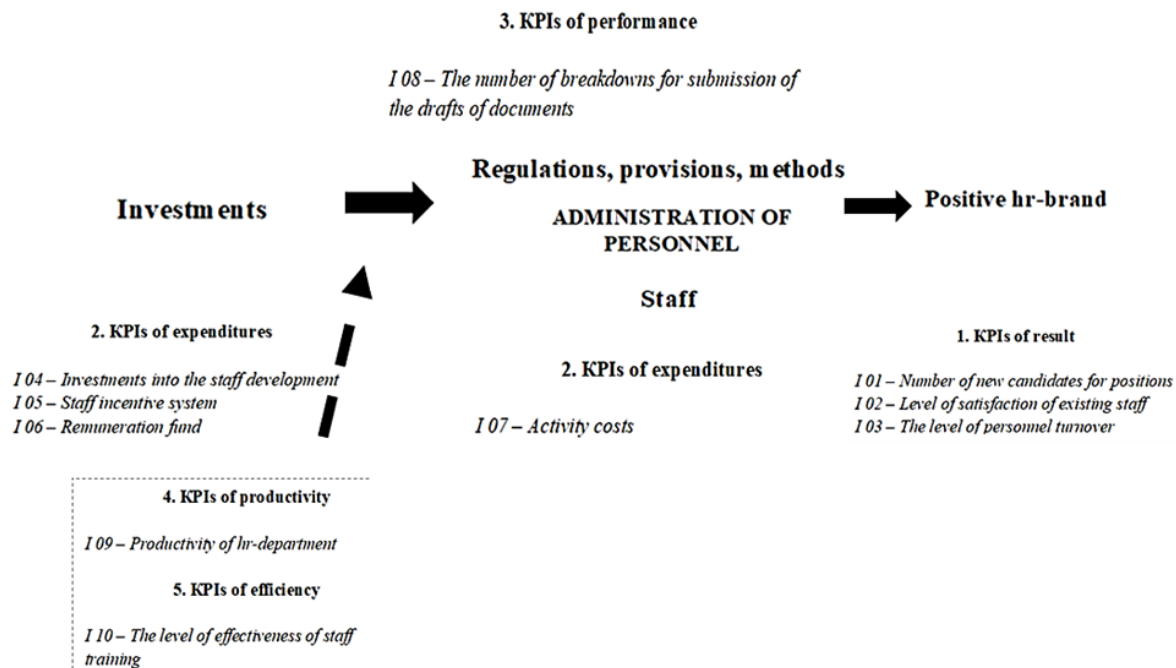
At the same time, medical university has a number of social objectives that are: (1) training of highly qualified personnel on relevant for labour market areas of professional activity, (2) educational work with the younger generation of citizens, development general cultural and personal competencies, etc.

Therefore, in the world practice of higher education for internal and external evaluation of the effectiveness of their work, the KPIs are built not only in the form of financial and economic indicators,

but also around the assessment of the quality of education provided by educational institution. In this context, the focus is on:

- the quality of learning outcomes at the level of educational programs;
- internal guarantees of the quality of education (or conditions of realization programs) that the educational institution provides at the institutional level and at the level of educational programs;
- external quality guarantees in the form of university's certification and accreditation.

Taking into account the different activities of the medical university, we can form a common system of KPIs, which are presented in Table 2.

TABLE 2
KPIS OF MEDICAL UNIVERSITY

Direction	Standardized Key Performance Indicators
The quality of education	– Graduation Rates – Course Success Rates – Passing Rates for Licensure Exams – Share of graduates, working on specialties – Share of foreign students – Completion Rates – Repeat Rates
Social protection	– Student Financial Aid Percentages – Tuition Costs – On-Campus Housing & Commuters
Scientific capacity	– SNIP – Share of funds from R&D – Number of published monographs – Number of articles in indexed international organizations publications
Human capacity	– Faculty Workload & Productivity – Student-to-Faculty Ratio – Faculty & Staff Tenure Rate – Faculty Turnover – Share of candidates and doctors in academic staff – Share of academic staff who passed qualification – Part-Time vs. Full-Time Faculty – Average monthly salary of academic staff – Satisfaction Rates for Academic Staff
Financial coverage and development of property complex	– Share of funds from profitable activities – Revenue, Grants & Funding – Share of funds for the maintenance of property – Share of funds for property development – Instructional Costs – Administrative Costs Per Student – Program & Department Budgets – Administrative Costs per Student

Medical activities	– Patient satisfaction with the quality of medical care provided – The share of discrepancy between the diagnosis of emergency medical care and the admission department of a medical organization – Average hospital stay
Level of administrative discipline	– Compliance – Fulfillment of accreditation requirements

The KPIs of the university departments should also reflect the approved development strategy. Lack of specific goals and objectives, as well as an appropriate system of assessment and motivation to specific performers at the university forms risks of not achieving key indicators of strategic development and reduces the managerial capacity of the university management to coordinate medium-term programs and projects and operational activities.

CONCLUSIONS

The study of the compliance of the educational services market with the labor market needs, taking into account the balance between supply and demand for labor, allowed the authors to identify priority areas for innovative management of the activity. The main vectors for the innovative development of VEIs are the introduction and development of new educational programs, innovations, and educational marketing. During the research, the authors also determined the following: main trends in the quality improvement of educational services provided by vocational education institutions to the labor market demand in qualified personnel; the increased segment of distance education; introduction of ICT; deep integration of industrial training process with production technologies at enterprises; conducting masterclasses and introducing modern forms of proficiency enhancement of future professionals; improving the work experience internship, the content of which is agreed with employers. The authors searched for new progressive forms of involvement of stakeholders in the management of VEIs development. These forms are associated with changing stereotypes, focusing on social and economic realities of the labor market, modern world trends, taking into account the features of national development.

In this paper, the authors have proposed the both important, and apparently doable Key Performance Indicators for medical universities, which can be used for any higher education institution. In view of foregoing, we can make a conclusion that in the modern globalization world, competition of each educational institution should be ensured by a range of different activities supporting its increasing efficiency. And one of the best ways maintain it is to structure the work of the administrative, academic and support staff on the base of Key Performance Indicators. KPIs enables the modern educational institution (1) to keep the necessary data, easier to read it and to get real-time updates; (2) to build an effective teamwork and collaborations between all the participants of educational process; (3) to set clear-cut goals for the administrative, academic and support staff; (4) to motivate staff on the bases of performance related KPIs.

Thus, the organization of assessment of the staff and units of the university in accordance with the main strategic goals provides an opportunity to effectively and equitably solve the tasks of their achieving in the context of limited resources and to purposefully improve quality of academic staff with the help of tools of individual evaluation. In this paper, we have considered the KPIs based on the predict approach. In our view, KPIs model for the higher education institutions has to combine process modeling, performance measurement, data mining models, and data technologies, to be efficient as a measurement approach. Also, it is extremely important to remember about trend analysis of higher education to achieve the institution sustainability. Thus, the main groups of indicators, which have to be assessed and analyzed, are academic, research and supporting (such as financial, administrative and so on) Key Performance Indicators. But nevertheless, for the medical institution it is essential to use social and medical indicators.

Thus, the practical value of KPIs is not appreciable for the higher education system. First of all, it helps the higher education institution to produce the high-value education services for its students. Secondly, KPIs set the stage for receiving the real up-to-date information about the activities results. Thirdly, by achieving societal impact, the higher medical education to create the productive research and academic culture. And fourthly, but certainly not least impact, that KPIs help the administration of higher education institution to encourage its staff to engage and deliver the general impact. Consequently, introduction of KPIs assessment model entails continuous improvement and performance excellence of higher education institution, to understand key processes and data needed to highlight its success and continuous improvement efforts for achieving the institutional mission.

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