INFORMATION TECHNOLOGY AND KPIS DEVELOPMENT AT UNIVERSITIES

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Abstract

The paper presents importance of development and implementation of appropriate key performance indicators (KPIs) at universities in order to make preconditions for better strategic management of these institutions. Strategic management of the modern universities is based on vision, mission, defined strategy and strategic goals. But after defining the main strategic goals, the universities need indicators to enable monitoring of their implementation. Therefore, universities have enormous obligation to collect, access and analyze data on their key performance indicators. Today, that is almost impossible without quality IT support. Through Tempus project SHEQA public universities in B&H developed and implemented USKPI (University System of KPI) software that provides a simple and fast method of data collection, calculation and presentation of key performance indicators necessary for the efficient management of the University. Continuous monitoring and analysis of KPI creates a basis not only for strategic planning and management of higher education institutions, but also for accreditation, evaluation, tactical planning, enrolment procedures and so on.

JEL Classification: I21, I23

Keywords: Key performance indicators, KPI software, strategic management

Introduction

Knowledge is recognized as the new currency of the innovation economy and long-term economic success is tied inextricably to human and knowledge capital (HEA; 2013, 14). The emergence of the knowledge economy challenged the "ivory tower" status hitherto enjoyed by universities and academics, ushering in a new era for the higher education sector. Last fourteen years the European

Commission has continuously emphasized the role of universities in contributing to the knowledge society and economy (EC; 2005a, Eurydice; 2008), stressing that "Europe must strengthen the three poles of its knowledge triangle: education, research and innovation. Universities are essential in all three" (EC;2005b). Appropriate governance structures and processes are frequently regarded as a precondition to achieve these goals. The changing role of the state – higher education (HE) institutions relation has been visible in the form of enhancing institutional autonomy and stressing quality assurance and accountability. The strong correlation between institutional autonomy and high-performance was well-established in the literature on higher education (Aghion et.al; 2010, Salmi; 2011). Yet while there is consensus about the need for both autonomy and accountability, there is a divergence of opinion as to what constitutes the optimal balance between them. An overly mechanistic approach to performance evaluation can stifle innovation while an overly detached approach deprives stakeholders of reassurance about the quality of teaching, learning and research in the higher education sector (HEA; 2013, 16).

The monitoring of institutional performance has been on many university boards' agendas during the last decade. Many universities accepted that key performance indicators (KPIs) could be a useful tool for assisting with institutional performance monitoring. KPIs are sets of measures on aspects that are most critical to current and future success of an organization (Parmenter; 2010, 3), where competitive advantages may be built over competitors. KPIs can provide a set of competitive advantages in analysis where the results can be comparable to those in other organizations. Although the use of KPIs has become a hot topic at universities, little guidance or arguments on concrete selection of KPIs have been developed. Some of commonly used criteria in selection of KPIs are importance of specific KPI for institution, its relationship with strategic planning, measurability (quantification) and so on. Very often, the selection process is the result of managerial subjective judgments and may be driven by external stakeholders in universities.

In year 2006 the Committee of University Chairs (CUC) developed Report on the Monitoring of Institutional Performance and the Use of Key Performance Indicators (CUC; 2006) where proposed 10 high-level KPIs later refined in Report from 2008 (CUC; 2008, 14) here presented in Table 1. These KPIs were used in the measurement of institutional performance from a perspective of governors in higher education, covering both financial and non-financial aspects. Report from 2006 (CUC; 2006) included a number of self-assessment questions in each

of the ten performance areas covered by the high-level KPIs, and also a number of supporting (lower level) KPIs in each of the ten areas.

Table 1. High-level KPIs

Super KPIs	
Institutional Sustainability	Academic Profiles and Market Position
Supporting KPIs	
Student Experience	Student Diversity
Leadership & Governance	Staff & Human Resources
Financial Health	Estates
Regional Engagement	Commercialisation
Research Excellence	Research Income

Source: (CUC; 2008, 14)

Combination of these three types of monitoring tools (high-level KPIs, self-assessment questions and supporting KPIs) creates a logical monitoring framework, and a menu of illustrative monitoring tools which institutions can use and adapt as they wish (CUC; 2006, 1). In the Report from 2008 (CUC; 2008,14) they presented that universities included in that initiative mostly accepted and implemented proposed 10 KPIs while they are still experimenting with two super KPIs.

These trends identified in the European Higher Education Area clearly indicate the need for a thought-out, organised and high-quality approach to higher education governance in Bosnia and Herzegovina. These circumstances call for a strategic approach to the harmonization of the higher education governance system within Bosnia and Herzegovina and with the European Higher Education Area.

1. Use of KPI in strategic management of public universities in B&H

Since Bosnia and Herzegovina is a country with complex structure, this complexity also reflects on state governance in higher education. Namely, in Bosnia and Herzegovina there is no ministry for education at the state level, because education is responsibility of the entity Republic of Srpska, cantons in Federation of Bosnia and Herzegovina and District Brčko. Result of such constitutional organization is existence of 14 different ministries and bodies which are competent for education, and of course higher education. Consequence of such complex constitutional

structure is that there are substantial differences, not just in approaches related to financing of public universities, but also in quantity of assignment of public money to them. In Bosnia and Herzegovina there is no consensus about the basic indicators for public sector funding and costs, not to mention other sources. Two public universities are even not in the budget of their ministries and they are financed through grants.

It is clear that both different ways of institutional organization and approaches to financing directly influence on the way of governance and management of public universities in Bosnia and Herzegovina. The degree of strategic management development at the institutional level is different from university to university.

As far as national level is concerned, Agency for Development of Higher Education and Quality Assurance (HEA) developed Criteria for accreditation and standards (OGB&H; 2010) where the first criterion is related to strategic management and performance monitoring of higher institutions. This criterion puts in focus necessity for strategic management, planning and performance monitoring at HE institutions in B&H. But, neither Criteria for accreditation and standards clearly defined Key Performance Indicators (KPI) at the national level nor required its usage at institutional level.

However, it is necessary to stress out that in the last decade development and modernization of institutional governance systems were significantly supported by the international projects in which all public universities in Bosnia and Herzegovina have participated. Public universities in Bosnia and Herzegovina have observed trends in European higher education and therefore have understood that is necessary to adopt some managerial approach if they want to be a significant key player in the further development of the society. That was the main reason why University of Mostar proposed idea for Tempus project called "Strategic management of Higher Education Institutions based on Integrated Quality Assurance System" – SHEQA. The main objectives of this project are analysing the existing KPIs for performance measurement in Europe, defining and implementing KPIs for performance measurement in B&H and contributing to strengthening and developing the strategic management at HEIs on the basis of KPI, which are used in the European Area of Higher Education (Rezić *et al*, 2013). Tempus SHEQA lasted three years, from 2010 till 2013. University of Mostar used experience and knowledge gained in that project to improve development of its KPIs and to integrate them with strategic planning.

2. Development of KPIs at the University of Mostar

University of Mostar has long tradition of using KPIs, but they are used mostly as a base for specific decisions (enrolment policy, new study programs, decreasing of drop out, etc.) and reporting to amenable ministries and other external stakeholder.

There is no, at least no purposely, direct relations between KPIs and university strategic goals. In the process of developing new university strategy and preparing for accreditation, top management of the University of Mostar has recognized the necessity to use KPIs for better performance monitoring of institution and that, in that case, KPIs should be directly related to strategic goals. That was reason why Team for strategy development decided that new strategy should be followed by strategic plan based on KPIs.

Development of new strategy was preceded by comprehensive analyses of internal and external stakeholders' opinions related to the future of University. The analyses were based on a survey conducted among actual and former rectors, vice-rectors, deans, vice-deans and among professors, assistants and students representatives. Also, the research was conducted on a convenience sample of external stakeholder like amenable ministries, companies and employment offices.

Survey consisted of questions about advantages/disadvantages of University, about what should be changed, about possible improvements and new ideas related to future development. The result of that survey was SWOT analysis of the University which was the basis for definition of new mission, vision and main strategic goals of the institution.

Strategic plan based on KPIs was constituent part of a new strategy. Way of measurement, data sources, way of data collection, responsibility and deadline were defined for each KPIs. Strategy, together with strategic plan was first passed through extensive internal analysis at faculty councils. Also, it passed through public discussion. All suggestions and recommendations were collected and analyzed first by Team for development of strategy and then by the Senate. Finally the Senate adopted new University strategy and strategic plan for period 2011-2016.

As it was already said, University of Mostar, as creator of Tempus SHEQA, during development of new strategy and definitions of KPIs used experience and knowledge from this project. For example, Team for development of strategy adopted template for KPIs definition developed in USKPI (University System of KPIs) software purchased through Tempus SHEQA (see Figure 2.)

3. IT support for KPI

Continuous monitoring and analysis of KPIs is almost impossible without qualitative IT support. During Tempus SHEQA workshops basic demands and initial model for development of IT support for monitoring KPI were defined.

Selected and at each B&H public university installed USKPI (University System of KPIs) software provides a simple and fast method of data collection, calculation and presentation of key performance indicators necessary for the efficient management of the University.

USKPI is a web-oriented i.e. database web centric application developed by using Oracle Application Express tools and it uses Oracle Database 11g Express Edition (XE) as a database.

Basic elements of USKPI software (Figure 1) are as follows (Rezić *et al;* 2013):

- User interface for maintaining set of master data and definition of indicators
- User interface for automatic and manual import of data about key performance indicators
- Reporting on indicator values
- Administration of security settings.

Figure 1: Basic elements of USKPI software – Main menu

Source: (Rezić *et al;* 2013)

The most important part of the master data is definitions of indicators. This part of the master data must be maintained carefully in order to correctly apply each individual indicator definition data (Figure 2).

USKPI software uses traffic lights for better visual presentation of KPI value (Figure 3).

Figure 2: Definition of indicators in USKPI software

Source: (Rezić *et al*; 2013)

Figure 3: Visual presentation of KPIs in USKPI software

Source: (Rezić *et al*; 2013)

It is obvious from Figure 3 that Index of financial resources – total budget is rising (green light) while index related to student fees is in stagnation (yellow light) and index related to donations declines (red light). USKPI software enables graphical data presentation (Figure 4).

Figure 4: Graphical data presentation in USKPI software
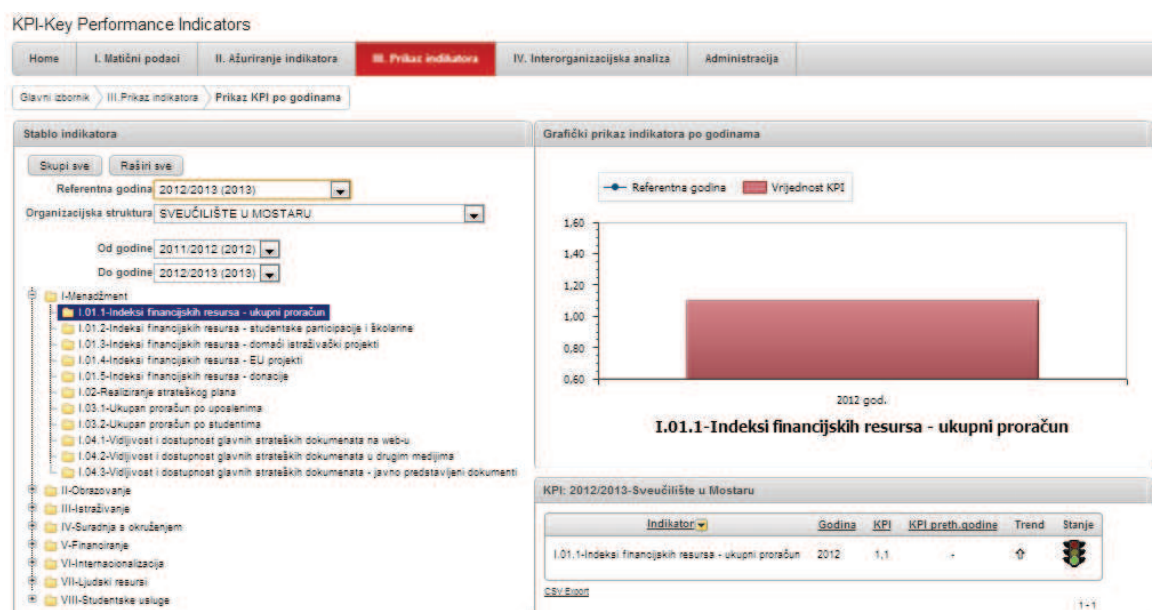
Source: (Rezić *et al*; 2013)

Tempus SHEQA project enabled University of Mostar and other B&H public universities to purchase and implement USKPI software. The final result is significant advancement in development and implementation of strategic management and performance monitoring at those institutions.

6. Conclusion

Continuous monitoring and analysis of KPI supported by USKPI software creates a basis not only for strategic planning of higher education institutions, but also for planning of higher education done by authorized institutions, both cantonal and state ones. USKPI software implementation could be crucial advantage for B&H public universities in efficient strategic management and monitoring of realization of their strategic goals.

The methodology to be used in the implementation of systems of management indicators in the university should have the direct participation of the manager's team. Management structure of universities and key persons responsible for the quality assurance collects accesses and analyze data on key performance indicators of universities. This process begins by defining the vision, mission, goals and strategy of the university. After defining the basic strategic goals, the university needs indicators to enable monitoring of their implementation. Key indicators should be complete and accurate. Each indicator must be measurable, and its way of measuring is to be clearly defined. It is essential that the definitions of these indicators do not change and are monitored from year to year.

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