Performance Indicators Development in Function of Higher Education Quality Monitoring

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Abstract The aim of this paper is to explore issues of higher education institution's performance indicators development in Croatia. Accepted standards and regulations require defining of key performance indicators, but the process and the method of their choice and the definition is optional to institutions. Higher education institutions are obligated to measure and track performance. They need to define key performance indicators, in accordance with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and defined strategic goals. Tracking performance is important for program financing of higher education and performance monitoring of selected institution's program goals and higher education in general. For higher education institutions, it is important to monitor and improve the quality. For that purposes they need to develop adequate and comparable performance indicators. In order to create comparable indicators it is necessary to conduct a detailed analysis of performance measurement of related higher education institutions in Croatia and the European Higher Education Area. The basis for performance measurement is information that institution owns, acquires and processes. In order to be relevant, indicators need quality information basis for their measurement. This paper analyzes the current performance indicators of selected institutions from Croatia, Great Britain, Canada and Australia. Based on the analysis, as the result of work, we propose indicators for one higher education institution. Authors propose a methodology for development of indicators, as well as a way of measuring and monitoring performance.

Keywords Performance indicators • Quality • Higher education

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1 Introduction

The globalization processes that take place in all areas of human work and activities represent a strong economic, political and social force that promotes the internationalization of higher education. Although higher education institutions are established primarily to meet the needs for higher education population of some countries, their international activities are increasingly more pronounced and significant. The extent, scope and complexity of the international activities of higher education institutions have grown over the last two decades (Altbach and Knight 2007). International activities of higher education institutions has strongly influenced the increase in the scope of activities related to cross-border cooperation and mobility while the United States, United Kingdom and Australia are the most popular destinations for study abroad. These are the world's strongest providers of transnational education (Van Der Wende and Westerheijden 2001).

The challenges that higher education is faced around the world include: the need to ensure quality and standards due to the continued increase in the number of students, reducing budgetary subsidies per student, the need for greater accountability because of increased autonomy and deregulation institutions, the requirements of different stakeholders for a high quality and comprehensive information on programs, learning outcomes and institutions as a whole (Campbell and Rozsnyai 2002; The World Bank 2002; Schwarz and Westerheijden 2004). Development and strengthening of institutions of higher education in the international higher education area is limited by several factors: regulation, quality assurance and recognition (Dos Santos 2000; Campbell and Van Der Wende 2000). The concept of quality assurance means all policies, processes, activities and mechanisms to recognize maintain and develop the quality of higher education (Glanville 2006). The focus of higher education is teaching, learning and research, while the management and administration represent support to these processes. Quality assurance engaged in the development and improvement of quality is for all three areas (Schwarz and Westerheijden 2004). Ensuring quality and standards of their programs is important to the successful delivery of services, and thus the activities of higher education institutions in domestic and international Higher Education Area.

Standards and body for independent external evaluation of the quality of such control mechanisms for the first time in Europe appear in the mid 1980s in Great Britain and the Netherlands (Cave et al. 1997; Rhoades and Sporn 2002). Discussions on Quality Assurance which followed the mid 1980s took place at the national level in the United Kingdom, the Netherlands, Belgium, Denmark, Finland and Norway. Ensuring quality was observed in the context of limiting budget spending and the need for greater accountability in higher education (Van Vught and Westerheijden 1994; Rhoades and Sporn 2002). The aim was to increase the autonomy and improve the performance of higher education institutions, and the implementation of self-control, self-assessment and evaluation of the program were seen as mechanisms to ensure the quality of institutions. In the absence of systematic procedures for evaluation of higher education institutions in Europe, the

European Commission in 1991 established a European pilot project for evaluating quality in higher education, with the aim of raising awareness of the importance of evaluation and improvement of procedures and knowledge transfer between higher education institutions (Thune and Staropoli 1997; The World Bank 2002).

The basis for systematic care of quality assurance, as a prerequisite for successful business, institutions of higher education was introduced by the adoption and signing of the Bologna Declaration in 1999. In order to increase the mobility and employment of European citizens and increasing the international competitiveness of the European Higher Education Area 47 countries have so far signed this document (UNESCO 2014), and among them Croatia in 2001. One of the most important goals of the Bologna Process is quality assurance in higher education, taking care of the establishment of comparable criteria and methodologies (European Ministers of Education 1999). The initiative to establish comparable criteria as a basis for evaluating and developing quality improved by the establishment of the European Network for Quality Assurance in Higher Education 2000 (ENQA), publishing the document Standards and Guidelines for Quality Assurance in the European Higher Education Area—ESG (ENQA 2009) and establishing a European register for quality assurance in higher education—EQAR.

ESG represent a global framework for measuring and ensuring the quality of higher education institutions (Kohoutek 2009). Standards and guidelines should serve as a source of improving the quality of higher education institutions (further HEI) in the provision of services and justify their institutional autonomy. To students those guidelines should enable better quality access to services in the European higher education area, and to the agencies that carry out the external evaluation of quality should provide a high level of accessibility and comprehensibility of the results of the evaluation (ENQA 2009; Kohoutek 2009; Kauko and Berndtson 2013).

Development of quality assurance system in Europe is closely linked with the development of strategic business management of higher education institutions (Rhoades and Sporn 2002). Higher education institutions at lulled, traditional, unsystematically accessing business can no longer respond to the needs of the education market and the many challenges they face. Management, teachers and administration of modern higher education institutions systematically define plans, programs, priorities and expenses to ensure their future (Keller 1983). In a time of constant change as it is today, with higher education increasingly bind concepts like corporate governance, enterprising, innovative and customer-oriented business (Rasmussen 1998). In doing so, strategic planning is seen as a tool for the establishment of a change, strengthening institutions and achieves success (Machado and Taylor 2010). Strategic planning and business management should define and implement strategy so as to take into account various internal and external conditions, where it ensures a high level resources management in achieving desired goals (Machado and Taylor 2010; Taylor and Miroiu 2002).

Initiatives to increase the quality of public services, lower budgetary allocations for public purposes, the creation of the citizens in a friendly environment and greater performance in the management operations of budgetary users, demand

for monitoring the efficiency and effectiveness of higher education institutions (Matei 2009; Guthrie and Neumann 2007; Chalmers 2008a). To monitor the performance of higher education institutions can use different models: the Balanced Scorecard (Kaplan and Norton 1996; Niven 2003), European Quality Improvement System—EQUIS (EFMD 2014), Value Added Measurement (Kim and Lalancette 2013), European Foundation for Quality Management Excellence Model (EFQM 2003), Association to Advance Collegiate Schools of Business Accreditation Standards (AACSB 2013), World University Rankings methodology (Reuters 2014), as well as models from other international and national (ASHE 2013) accreditation of institutions. At the centre of all these models, as a tool for measuring and monitoring performance, and strategic business management of higher education institutions stand out performance indicators.

Performance indicators are objective measures that provide adequate information and statistical framework for monitoring the performance of institutions in which allow comparison among areas, over time and generally accepted standards (Burke et al. 2002; Poister 2003; Chalmers 2008a, 2008b). By studying literature in performance measurement, it is evident that there are numerous attempts to define performance indicators of higher education, in theory and practice. However, the development of performance indicators is not an easy job and depends on a number of factors: information users, availability information platforms for performance measurement, the desired quality standards, strategy of HEI, comparability, development institutions and higher education system in general.

This paper will therefore explore the role of performance indicators in monitoring the quality of HEI's viewed through the prism of strategic management and program financing of higher education. Below are studied and analyzed the performance indicators selected institutions of higher education in Croatia and the UK, as representatives of the European Higher Education Area and the developed world systems performance measurement—Australia and Canada. Through a review of the problem of the existing performance measurement the authors develop performance indicators in the example of one institution of higher education in Croatia. Based on the analysis of application performance indicators in monitoring and improving the quality and comparing (benchmarking) institutions shall be adopted conclusions on the significance of performance indicators about monitoring the quality of higher education institutions.

2 The Role of Performance Indicators in Monitoring the Quality of HEI's

2.1 The System of Quality Assurance in HEI's

The need for providing quality programs and services has become a part of everyday life of all higher education institutions in the European Higher Education

Area, and developed as a "consequence" of internationalization and the Bologna process. Responsibility for the quality of provided services, its assurance and improvement, primarily are borne by higher education institutions (Dolaček-Alduk et al. 2008). To ensure the quality of the educational process, HEI's established systems of quality assurance. Quality assurance system represents institutional mechanism of HEI's that enables further development of the quality and provides a clear formal mechanisms for its monitoring. Each HEI is developing its own quality assurance system (further QAS) based on legal regulations, the ESG, follow good practices of other HEI's and previous experience of HEI's in the establishment and implementation of QAS. Establishment of QAS is a complex and demanding process that involves continuous research, monitoring, evaluation, supervising and improvement of the activities of HEI's (Budimir et al. 2014).

To establish mechanisms for internal quality assurance in accordance with the ESG, HEI's must have (ENQA 2009; Budimir et al. 2014):

Defined Policies and Procedures for Quality Assurance Institutions are expected to have a defined policy and strategy of quality, in line with the mission, vision and strategy of the institutions. As mechanisms for monitoring performance, improvement and development of QAS are established: the body responsible for quality assurance, internal regulations, manual for quality assurance, annual plans and objectives of activities and others.

Mechanisms for Approval, Monitoring and Periodic Review of Programs and Awards For successful completion of study programs are defined: enrolment quotas, the curriculum, detailed execution plans of the course. Approval procedures, audit and improvement of study programs should be clearly defined, taking into consideration the involvement of all stakeholders in the process.

Defined Transparent Criteria, Rules and Procedures for the Assessment and Evaluation of Students' Work It is necessary to ensure equal conditions of assessment for all students, which is achieved by defining the unique conditions at the institutional level and at the level of all the courses and continuous informing students.

Mechanisms for Ensuring the Quality of Teaching Staff and Mechanisms for Verification of Their Eligibility The HEI should analyze the situation of teacher resources, their workload in teaching and other activities, and allow for continuous training of teachers' competencies and other skills. Evaluation of the teachers is implemented through student surveys, evaluation of scientific and professional work.

Insured Educational Resources and Support for Students It is necessary to analyze the availability of educational resources (teachers, space, equipment, finance, teaching materials, administrative support, etc.) and continuously implement measures to improve availability.

Established Information System to Collect, Analyze and to Use Relevant Information The higher education institution should monitor and report on student

progression and success, employability of graduates, satisfaction of students programs, effectiveness of teachers, profile of the student population, the availability of educational resources, and key indicators of success.

Mechanisms for Objectively, Impartially and Continuously Informing the Public In addition to the website, which is the basic way of informing the public, HEI's should be utilized and use other media notification and take care of the accuracy and objectivity of information processed.

In order to improve the quality, institutions with specified define additional standards in the field of scientific and professional work, cooperation with industry, international cooperation and other areas not directly covered by the ESG.

Evaluation of the effectiveness of institutions and programs in relation to the set minimum standards (ESG) is carried out through several steps (Kohoutek 2009). First step is self-evaluation, carried out by teachers and other stakeholders of the institution in accordance with the criteria set by the competent agencies. Second step is to read external documents, prepared by independent experts who reviewed the evidence and interviewing stakeholders and provide recommendations to the Agency. After that, Accreditation Agency revises evidence and recommendations and makes a decision on compliance with quality expectations. At the end there is a follow-up phase in which the institution is developing a strategy for improving quality in accordance with the identified weaknesses and recommendations.

For the purpose of monitoring and measuring the performance, the agency submits to HEI's a number of schedules according to ESG, through which they should show the performance indicators. However, HEI's in Croatia usually do not have a mechanism or model, for monitoring their performance, and therefore they cannot on easy way, because of the lack of systematic monitoring indicators, collect all the data and process them in accordance with the required (Ćukušić et al. 2014). The periodicity of the external evaluation, results in a situation that HEI's are not following the performance continuously. Therefore, the definition of key performance indicators, which is prescribed with standard 6—Information system of higher education institutions, and their systematic monitoring of the institutions of the utmost importance to assure and improve the quality of HEI's. Reliance on key performance indicators in the field of quality assurance in consideration of a full picture of the performance of the institution has a number of drawbacks and limitation: indicators are significantly related to the requirements of agencies (outside body), following only the output values (outputs) rather than the connection with the input values (inputs) (Ćukušić et al. 2014), and do not take into account the financial indicators. Therefore, the authors explore the role of indicators in strategic management and program funding (financing by agreement) of HEI's.

2.2 Strategic Management and Program Funding of HEI's

HEI's today are faced with many challenges in their activities: a complex organizational structure with a number of external constraints, insufficient financial resources, the need for better decision-making and quality decisions, new technologies, better connectivity with the economy, globalization and internationalization of higher education, competitiveness, unpredictability (Machado and Taylor 2010). In order to successfully respond to the challenges HEI's are introducing strategic planning and business management. Although each institution develops its own, unique system of strategic management, steps in development are common to most successful models: defining the mission and vision, analysis of the internal and external environment (SWOT analysis), comparison with similar institutions (Benchmarking), setting the strategy (strategic areas and goals), definition of performance indicators, define action plans, data collection and reporting on performance, evaluation of the performance and return on impact of HEI's activity and evaluation of strategies and adaptation to change.

Central position in the strategic planning occupies performance indicators. In order that performance indicators become a useful management tool, they need to be carefully defined, in accordance with established objectives and strategy.

Strategic business management of HEI's is being driven by the adoption of strategic documents at the EU level—Horizon 2020, and national level—Strategy for Education, Science and Technology (Croatian Parliament 2014). Internationalization of Higher Education encourages countries to create specific strategies of higher education related to mobility (Newman and Graham 2013; Finland Ministry of Education 2009; EUA 2013). Strategic areas and goals differ among countries, but facilitating access to education, increasing student mobility and sustainable funding, are common features of most strategic documents.

End of the twentieth and beginning of the twenty-first century was marked by trends that significantly affect financing of the higher education. The cost of tuition per student increased significantly, the number of students also, increased expectations of all stakeholders due to the development of knowledge-based economy, the budget fail to follow the growth of costs, globalization enhances the effects of costs growth and uncertainties of government revenues, the liberalization of the economy leads to decentralization and the privatization of public entities including institutions of higher education (Knight 2009). Solutions for the financial pressures on the governments are seeking on the expense and revenue side. Enhancing the number of teaching groups and teaching load, reject the less important programs, increased financial responsibility of the HEI's management (new public management), and introduced tuition fees for all or part of the students, reducing the student scholarships and others.

Extra pressure on the financing of higher education has created a crisis due to which the economic situation of many European countries has deteriorated significantly since 2008. There are very frequent structural reforms in education that seek to rationalize consumption, increase the transparency and efficiency of use of

limited budgetary resources. The state budget continues to be a major source of financing of the majority of higher education institutions in Europe, but the ways of allocating that budgetary resources are different. Line financing in recent times was replaced with block grants which funds have been allocated for a particular activity or cost item.

Institutions of higher education in Croatia from 2012/2013 entered into the system of financing through funding agreements. Programme contracts are contracts between the founders and the HEI about financing on the basis of the agreed program objectives, results and performance indicators for their implementation. According to a study from the European University Association in 2013 (EUA 2013) in two thirds of surveyed European countries (15 of 22) HEI's enter into some kind of program contracts.

The idea of the program funding occurred back in 2008 when the Croatian Ministry of Science, Education and Sports started concluding agreements with public institutions of higher education on financing subsidies participation in the cost of study for full-time students on the basis of a special decision of the Croatian Government (MSES 2014). In 2012 seven public universities and 14 polytechnics and colleges entered into three-year contracts (the pilot program contracts) on the full subsidy of participation in the cost of full-time students study. The above contracts, Ministry and public higher education institutions jointly and in accordance established general and specific objectives which serve to achieve the greatest possible improvement in the system of teaching and education in Croatia, and thus indirectly improve the quality of management of public institutions of higher education. Defined were six general and nine specific objectives (MSES 2014). Higher education institutions have the ability to choose the objectives that fit into their development strategy, in cooperation with the competent ministry HEI's defined the desired results and performance indicators which will measure their implementation. Defining activities that are considered effective for achieving the targets selected higher education institutions are able to carry out independently.

Budget Act from 2008, in Croatia has introduced the obligation of program budgeting and financial plans of budget users. The starting point of resource management and service delivery program planning is a strategic plan, and to monitor the achieved results it is necessary to define measurable performance indicators.

2.3 Performance Indicators

All accentuated competition of HEI's in the international "market" in attracting students and teachers, desire to create a positive image, procedures of external and internal quality assessment, re-accreditation, strategic decision-making, and efficient management of financial resources, have created a continuing need for measuring and monitoring performance. Performance indicators, as a tool for performance measurement in higher education have been known since 1977

(Birch and Calvert 1977). Evaluating the effectiveness of the university on the basis of quantitative performance indicators in England was introduced in 1985 (Elton 2004), in Australia at the end of the 1980s (Henman and Luong Phan 2014), in Canada at the beginning of the 1990s (Almgren 2009). At the international level, the OECD formulated performance indicators for the purposes of comparability of higher education systems across countries (OECD 2007).

Performance indicators are taken from the private sector where they are used as an internal management tool. In the public sector usually measure the economy, efficiency, effectiveness and relevance of the results achieved and the objectives of the programs, projects, activities or processes (IFAC 2000). Performance indicators are usually divided into four basic groups (Chalmers 2008a). First group stands for Indicators of inputs (e.g. the average score of students when entering the study, the percentage of full-time students). Second group make Indicators of the process (e.g. the engagement of students, professional development of teachers). There are Indicators of output (e.g. the rate of progression through the study, the rate of graduates). At the end we have Indicators of outcome (e.g. the satisfaction of graduates, employee satisfaction).

Indicators of inputs and outputs are quantitative indicators, and the indicators of process and outcome are qualitative indicators. Performance indicators are the most effective when used and monitored through a system of performance measurement—control system to calculate the specific performance indicators at prescribed intervals in order to achieve effective and responsible management decisions. In order to be an adequate tool for measuring results and performance management, indicators should be relevant, understandable, reliable, complete, objective, neutral, timely and comparable (IFAC 2000). The role of performance indicators in monitoring the quality of higher education is manifold. First, performance measurement helps establish strategic goals of the institution. Monitoring the performance of the information on realization of the mission and instructs the administration of HEI's on the strengths and weaknesses of the institution. This allows the definition of a quality strategy and strategic business management of higher education institutions. Furthermore, performance indicators are an important tool for financial planning and efficient allocation of resources. Information about successful and less successful activities and projects, facilitate HEI's decision on the allocation of scarce financial resources in areas with greater prospects for success. Results efficiency measurements presented to the public increase the accountability of institutions for economic and efficient use of limited budgetary resources.

Performance indicators are an important instrument in the ranking of HEI's. Monitoring the performance which is based on objective indicators allows comparison among institutions. The position on the "market" and the desire to attract (quality) students positively influence the development of competitiveness and competitive spirit within and among HEI's. Results of efficiency measurements are an important tool in informing students, public and other stakeholders in higher education system, about the achievements of the institution. Repeated information increases transparency of HEI's which reflects positively on the quality of the whole system of higher education. Information provided by performance indicators

is important to regulators and agencies in the procedures of external evaluation of the quality and (re) accreditation of HEI's. Based on measurements of their achievement in the mission and strategic goals of the institution, and to comply with the minimum set of quality standards system, it allows the assessment and monitoring by external agencies. Regulatory authorities and agencies on the basis of information on the effectiveness recognize quality and they certify HEI.

Development and use of performance indicators in higher education is not simple and causing several political and technical issues. One can single out a few key problems. The first question is who should develop performance indicators. ESG standards and regulations on the conditions for issuance of licenses (MSES 2010) stipulates that HEI's must define key performance indicators. The need for defining indicators by the institutions stems from the desire (and need) for monitoring its own performance for the purposes of promotion, competition and accountability. However, subjectivity in the selection of indicators and control over the information that have HEI's may limit the quality of the monitoring results. On the other hand, the definition of indicators by regulatory bodies at the national or international level provides an opportunity for comparison and ranking of HEI's. However, the question arise about their comparability due to differences in national systems (Yorke and Longden 2004), the particular operations that may arise in certain years, sample selection which is monitored and others. Next question that arises is who the users of information are. In higher education system we can single out six key stakeholders (Ćukušić et al. 2014): students and potential students, teachers, administration of HEI's, University, Ministry and the wider community. Information needs of these stakeholders, as well as views on the effectiveness and quality of institutions differ significantly, which makes it difficult to define key performance indicators. Given the importance of performance indicators for monitoring the quality and financing of the HEI's, it is important to choose an appropriate model for measuring performance and to establish a balance between financial and non-financial, qualitative and quantitative indicators. One model that considers the needs of different stakeholders, combines financial and non-financial indicators derived from the strategy of institutions, and provides a framework for strategic management and performance measurement is BSC model (Niven 2003). Once you have defined key performance indicators, established target values and activities, management information system should collect data, process them and provide information on business performance. In information systems of HEI's often there is no single database needed to calculate performance indicators but they should be collected from various sources (accounting, student services, personnel records, records of the relevant ministry, etc.). Given the unquestionable importance of performance indicators in monitoring the quality of HEI's and a number of difficulties that arise in their definition, below the authors analyze the performance indicators of selected HEI's and approaches in their definition.

3 Analysis of Performance Indicators of Selected HEI's

Research about performance indicators of selected HEI's was carried out based on the analysis of available information of the results of performance measurement at the web site of selected HEI. Since the ESG regulated reporting obligations on key performance indicators, and the web site is considered to be the central tool to disseminate all relevant information to interested parties, this kind of research is considered to be relevant. The research results are presented in tabular form through the following elements: the name of the HEI and defined performance indicators. These data are supplemented by information about monitoring of the performance which is regulated at the national level, but also based on the information available on the national website, relevant (inter) national studies and the research conducted by other authors. In conclusion of the chapter authors analyze the approaches in defining key performance indicators and provides an overview of the most commonly used indicators. For research purposes we have chosen ten HEI's from four countries. HEI's were randomly selected.

3.1 Key Performance Indicators of Selected HEI's in European High Education Area

For the purposes of research performance measurement in the European Higher Education Area selected were the two countries: the United Kingdom (see Tables 1 and 2) and Republic of Croatia (see Tables 3 and 4). Higher education institutions in the UK have 30 years experience in measuring, monitoring and reporting on the success of its programs. Sector indicators were developed at the end of the last century and have been systematically published since 1999 (Pollard 2013). Unlike them, higher education institutions in Croatia only in the last 4 years become familiar with the concepts of performance measurement and performance indicators. Level Indicators sector have not yet been developed. We can say that HEI's in Croatia are still finding their paths in this complex area. Therefore, the experiences that higher education institutions in the UK have, can significantly contribute to the understanding and to the quality of the establishment of processes related to performance measurement in higher education Croatian.

Performance indicators at the level of the higher education sector are not developed and made publicly available in Croatia. Summarised below are the criteria for assessing the quality and efficiency of the processes of external quality assessment and accreditation of higher education institutions in Croatia. Results of measuring performance based on the above criteria are not monitored and are not published at the national level. In addition to these criteria, the HEI's are signed program contracts that contain performance indicators to achieve the set goals, but not publicly available indicators for monitoring at the sector level. Performance indicators are defined in the Strategy for Education, Science and Technology.

Table 1 Key performance indicators of selected HEI's in Great Britain

Key performance indicators: Lancaster University (LU 2014)		
Teaching		
Input	**Output**	**Outcome**
UCAS points/Graduate entry standards Staff/student ratios Library/ISS expenditure Home/EU student numbers Overseas student numbers	Degree classes awarded Student Satisfaction Retention of students	Graduate track employment Alumni engagement
Research		
Input	**Output**	**Outcome**
Research student numbers Equipment condition and expenditure	Research degrees awarded Number of publications Research grant income Third mission income Percentage recovered of full economic cost	Citations per faculty International esteem Economic impact Technology transfer
Finance		
Input	**Output**	**Outcome**
Staff cost as % of total cost Non-HEFCE income per staff member	Cash generation Surplus Current Asset ratio Debt to income ratio	Credit rating Reinvestment in University activities
Staff		
Input	**Output**	**Outcome**
Posts filled at first advertisement Accidents at work	Staff satisfaction Staff turnover Sickness absence	Diversity
Estates		
Input	**Output**	**Outcome**
Maintenance spend as % of insured value Energy costs and consumption	Estate condition Quality of facilities	Environmental impact Staff and student satisfaction with facilities
Key performance indicators: University of Northampton (UN 2010)		
Student experience	*Financial sustainability*	
NSS Overall student satisfaction % Graduate Employability % Student Mix pt:pg:I Taught completion rate % Internationalization of the curriculum	% Cash flow from operating activities Pay costs as % income Reserves as % total income % School targets met Dependency on funding council income	
Intellectual capital	*Strategic partnership*	
Research and Enterprise income Investment in facilities (£FTE)	Community and Civic Engagement Private/public sector CSR	

(continued)

Table 1 (continued)

Academic staff with Doctorates % SSR Academic subject areas/41	Access Philanthropic endowments (% turn)
Key performance indicators: City University London (CUL 2012**)**	
Academic reputation—Position in Times Higher Education World University Rankings. The metrics it combines are: the learning environment, research quality and influence, industry income and international outlook (proportion of overseas academic staff and students).	
Position in The Times Good University Guide. The metrics this table combines are: research quality, student satisfaction, student entry qualifications, quality of degree outcome and completion, student: staff ratio, graduate prospects and spend per student on services and facilities.	
Financial performance—Surplus as a proportion of income (%)	
Environmental performance—Classification in People and Planet Green League	
Key performance indicators: University of Exeter (UE 2014**)**	
Entry profile. 'A' level qualifications and the background of our entrants (school type, socio-economic background). Progression and achievement. The %'s of students progressing to completion and gaining a 1st or 2:1. National Student Survey. The % of students highly satisfied/satisfied by the Exeter student experience. Graduate level employment. The % of graduates gaining a graduate level job/further studies, six months after graduation. Research quality. Measures of our research quality as determined by periodic national review. Research income. Research income, per member of academic staff. Research students. The numbers of active research students, per member of academic staff. Postgraduate taught student population. The % of students who are on a postgraduate (Masters) program. International student population. The % of students who are international fee payers. Earned income. The % of income generated that does not directly relate to the State.	

Table 2 Key performance indicators in HE system of Great Britain

Key performance indicators—sector indicators (HESA 2014)
1. Access/widening participation
2. Non-continuation/retention
3. Employment/outcomes
4. Research

Table 3 Key performance indicators of selected HEI's in Croatia

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Field of studies and students	Field of scientific work and innovation
Number of accredited study programs The number of students per teacher The percentage of components and study programs who have completed the first and second cycle of quality assurance Percentage of full-time students who achieved in the first year 60 ECTS The percentage of graduates per generation Average time of graduation Number of programs with multidisciplinary contents The number of programs that are running in a foreign language Number of student-ECTS achieved through lifelong learning programs Average% of the study program that uses tools of e-learning	Number of PhD dissertations The ratio between research funding and the number of teachers Number of published articles cited in SC Rank of the University of Rijeka in the system SIR (SCImago Institutions Rankings) The number of doctoral students in full-time employment Number of research projects by fields of science Number of collaborative programs at the University Number of support to the University Annual plans for the popularization of science Number of teachers and students who participate in institutional organized popularization activities
Field of capacity—human, financial and material resources	Field of connection with the community and economy and adjustment with community needs
Share of assistants and research assistants in teaching staff The age structure of assistant professors at the University Established system and financial instruments for lifelong learning staff The three-year plan to raise the personal standard of all employees The ratio of the number of students and teachers The share of student-ECTS allocated through lifelong learning programs Persons who have completed a systematic training for management The share of own revenues in the budget of the University The budget of the University in EUR/student The share of capital investment in the best equipment	Number of joint research projects with industry and local community A number of studies, surveys and expertise for the needs of the economy Number of research projects in partnership with organizations and/or institutions of civil society Number of contracts for consulting services Number of protection of industrial property The share of revenues from the provision of services to the economy and the local community and revenues from intellectual property in total revenue The number of development projects realized in cooperation with educational institutions
Integration into the European Union, openness to the world and mobility	
Number of Framework (FP) projects at University Number and structure of joint studies at University Share of teachers and students involved in exchange and mobility programs	Share of own revenues in University budget achieved through programs of education and competence for life in EU Share of own revenues in University budget achieved through structural funds of EU

(continued)

Table 3 (continued)

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Quality indicators of Civil Engineering in Osijek (Pinterić and Markulak 2013)	
The number of applicants compared to the number of students enrolled in the first year of study Total enrolment in the next academic year The number of graduates per year Employment after graduation The average length of study The average score of study The passing rate of prelim/examination The success of students transferring from university undergraduate to graduate studies	The number of students who have lost their student status The ratio of the number of teachers and students The share of the use of e-tools in teaching Number of staff publications State of equipment The number of field trips/student excursions/field work The percentage achieving signatures by subjects and studies
Performance indicators of program contracts funding of the University of Zadar (MSES 2012)	
Objective 1: Facilitate access to study and aid in studying for people with disabilities and students with lower socioeconomic status	Objective 2: Increase the number of people who have completed studies in STEM fields, and in the information and communication field and in interdisciplinary studies related to these areas
Signed an agreement with the county, local governments and civil society organizations for services for people with disabilities Provide a personal assistant for eight people with disabilities Removed architectural barriers and access for people with physical disabilities in the building Made analysis of the needs for special equipment for people with disabilities Made university form for students enrolling in the first year and next years of studies that examine the social profile of students to a variety of factors that influence the course of the study (e.g. Family financial status, education level of parents, disability, age, high school diploma, etc.) The completed university curricula at the beginning of the academic year 2013/2014. Created a database about the social profile of students of the academic year 2014/2015. Formed Fund for scholarships Defined criteria for obtaining scholarships that cover the cost of study Secured three major donors of the Fund Secured 15 student grants from the Fund	Launched one interdisciplinary undergraduate Made a proposal of graduate study program Prepared technical documentation for the construction of buildings of natural and technical sciences
	Objective 3: Facilitate access and quality assurance study for students older than 25 years
	Introduced quotas for the two places in the study program Prepared two lifelong learning programs Introduced quotas for students older than 25 years for the five people on the program of study for part-time students
	Objective 4: The internationalization of higher education institution
	Increased number of students, professors and administrative staff who participate in mobility programs (input and output) to 100 % (for 150 people) Held 12 international conferences, workshops and summer schools
Performance indicators of HEI's in Croatia (Budimir 2011, pp. 123–124)	
Financial indicators	Non-financial indicators
Recovery of costs Excess of revenues over expenses The realization of the plan by type of service A positive result	Progression in the professions Published papers Number of enrolled students The passing rate of students

(continued)

Table 3 (continued)

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Reducing liability	The quality of teaching
The execution of the revenue plan	The success of study
The gearing ratio of expenditures	Work efficiency
The execution of the plan by program	Capacity utilization
Implementation of the plan by source	Tracking the users' needs
Implementation of the plan	Valuation of processes and programs by users
Cover the cost of the investment in staff, premises and equipment	Customer satisfaction
	Number of projects
Cost-effectiveness	Effectiveness
Productivity	
Liquidity	

Table 4 Criteria for evaluating quality of higher education in Croatia

Criteria for evaluating quality of HEI's on the sector level (ASHE 2014)	
1. Criteria for evaluating the quality of higher education within the university and criteria for evaluating the quality of Polytechnics and Colleges: – Managing institution of higher education and quality assurance – Programs of Study – Students – Teachers – Education and research activities – Scientific Research and Projects – Mobility and international cooperation – Resources: professional services, facilities, equipment and finances	1. The criteria for judging the degree of development and effectiveness of the quality assurance system of higher education institutions (according to ESG): – Policy, mission, vision, general strategy of HEI/sub-strategies – Approval, monitoring and periodic review of academic programs and degrees of education – Scientific research – Assessment of students – Ensuring the quality of the teaching staff, his interactions, the impact on society of knowledge and contribution to regional development – Learning resources and support for students – The importance of access to information and the quality assurance system – Public information

3.2 Key Performance Indicators of Selected HEI's in Australia and Canada

At the global level, Australia and Canada, with the United Kingdom, are representing the country with the longest tradition and the most developed systems for performance measurement of higher education. HEI's in Australia in the last 10 years strongly contribute to the development of the Australian economy and have become one of the most important export products. The Australian

Government has therefore introduced a "market approach" to education. Universities are increasingly functioning as big companies, trying to attract substantial private funding, focused on monitoring costs and economic position in society. In these conditions, monitoring performance and quality assurance are becoming everyday and business imperatives of higher education institutions (Guthrie and Neumann 2007).

Measuring performance in Canada is seen as a mean of informing the public about higher education system, and is used as a tool for understanding and encouraging debate at the national level. Government institutions and performance indicators provide information important for the quality management and improvement system (HEQCO 2014). Their goal is to develop indicators that evaluate the system as a whole, and that at the same time is a good framework for the development of institutional indicators as a basis for evaluating their own performance. Both countries have developed sector indicators. In Tables 5 and 6 we are presenting indicators for Canada, while in Tables 7 and 8 for Australia.

3.3 Performance Indicators as a Basis for the Financing HEI's in Europe

Measuring the expenses without reducing the quality of public services is one of the imperatives in the financing of European higher education. Budget funds are still the major source of financing HEI's, but the ways of their allocation change. The tendency today's budgetary system is effectively allocate limited resources and track the success of achieving of set strategic budget goals. European countries are therefore increasingly using performance measurement as a key element of budget financing. Models of financing and key performance indicators that accompany them are different in European countries. The use of program contracts is given in Table 9. Institutions of higher education funding are usually granted through the so-called blocks support. The amount of funds to be awarded to a higher education institution is conditional on the negotiation process, historical reasons or formula used for distribution. Regardless of the chosen model, funding is based on the measurement and monitoring of performance. Institutions of higher education shall conclude with the relevant ministries program contracts which include agreed targets and indicators to monitor their achievement.

The most important performance indicators applied in program funding of higher education in Europe (Estermann et al. 2013) are: the number of enrolled bachelor, number of the masters enrolled, number of doctoral graduates, the amount of EU/international financing, the amount of external financing, the number of graduates master's degrees, research evaluation, the number of bachelor graduates, number of credits, the number of doctorate students, number of employees, research contracts, international students, doctoral dissertations, scholarly activities, successful patent applications, an indicator of diversity, international employees, the

Table 5 Key performance indicators of selected HEI's in Canada

Key performance indicators: University of Calgary (UC 2013)	
Ratio of applicants to student intake Average entering grade from high school Student mix (graduate proportion of total enrolment) Student mix (international enrolment) Student to faculty ratio (total) Student to faculty ratio (graduate) Postdoctoral fellows	Sponsored research revenues (total) Sponsored research revenues (per tenure and tenure-track faculty member) Tri-council revenue (total) Tri-council revenue (per tenure and tenure-track faculty member)
Publications (total) Publications (per tenure and tenure-track faculty member) Citations (total) Citations (per tenure and tenure-track faculty member) New invention disclosures New licenses	Undergraduate student engagement Graduate student engagement Graduate satisfaction Degrees awarded Employment rate
Employee engagement Fundraising Financial health (endowment balance) Financial sustainability (unrestricted net asset) Financial sustainability (facilities condition index) Sustainability (Sustainability Tracking, Assessment and Rating System (STARS))	Teaching Undergraduate retention rate Graduation rate Time to completion
Key performance indicators: Ryerson University (RU 2014)	
Strategic direction	*Financial capacity*
Satisfaction with Overall Quality of Education Received at Ryerson National Survey of Student Engagement: Benchmark Summary Scores and Comparisons Applications : Registrants Ratio Mean Entering Average from Secondary School Scholarships and Bursaries as Share of Total Operating Expenditures Percentage of Students Retained from Year I After 1, 2, and 3 Years of Study MTCU Graduation Rate CSRDE 6-Year Graduation Rate and First-Year Retention Rate MTCU Employment Rate: 6 Months and 2 Years After Graduation Percentage of Faculty with Doctoral Degrees Value and Number of Peer-Adjudicated Research Grants per Eligible Faculty Member	Operating Deficit/Surplus as a Percentage of Operating Revenue Total Liabilities as Share of Total Assets Long Term Debt per FFTE Student Endowment per FFTE Student Ryerson University Endowment Fund Effective management Student : Faculty Ratio Faculty Turnover Rate Staff Turnover Rate Staff : Faculty Ratio Student : Staff Ratio Actual Space Inventory versus Space Guidelines Calculated by Council of Ontario Universities Facilities Condition Index (Deferred Maintenance/Current Asset Value) University profile Percentage of Alumni Who Made a Donation to University Annual Number of Non-Alumni Donors Annual Level of Donation Commitments

(continued)

Table 5 (continued)

Total External Research Funding Library Expenditures as Share of Total Operating Expenditures Library Expenditures per FFTE Student	Annual Level of Donations Received Media References to Ryerson: Newspaper Clippings, Newspaper Impressions and Broadcast References

Table 6 Key performance indicators in HE system in Canada

Key performance indicators—sector indicators (HEQCO 2013)
1. Access
2. Quality
3. Productivity
4. Social

percentage of employed graduates, space, impact on the community, patent applications, place on a national scale, a place in the international rankings.

3.4 Conclusions of Conducted Analysis

Based on the analysis of institutional and sector key performance indicators of selected higher education institutions and countries the following was concluded. Higher education institutions define key performance indicators based on the strategic goals of the activity. Sector indicators, if any, significantly affect the definition of institutional performance indicators. The number of performance indicators at the level of institutions somewhere is too large (preferably there should be about 20 defined indicators).Higher education institutions define the financial and non-financial performance indicators. Indicators are classified in the area of monitoring, with the most common areas defined as: students, teaching, scientific research and finances. Results of measuring performance are published in the annual reports on performance. In the annual reports, stating indicators provide information on the method of calculation and sources of information. Defined indicators used for benchmarking (comparison over the period, with target sizes and other similar institutions).

Indicators that are commonly defined as: students' satisfaction with teaching, teacher/student ratio, student mix, retention rate in the study, exam results, employment after graduation, number of publications, scientific advancement, income from research, expenditures for capital investments.

Selected institutions are examples of good practice performance measurement. Selected countries: Great Britain, Australia and Canada are examples of good practice in defining and monitoring of sector performance indicators. Croatia, despite taking the ESG standards and thus has committed itself to defining and

Table 7 Key performance indicators of selected HEI's in Australia

Key performance indicators: The University of Western Australia (UWA 2013**)**	
Education	*Research and Research Training*
Student satisfaction on the Course Experience Questionnaire Course completion rates Student pass rates Graduate employment outcomes Proportions of top school leavers enrolled Access rates for designated equity groups Expenditure ratios	Research grants Publication rates Higher degree by research completions Higher degree by research student satisfaction
Key performance indicators: Curtin university of technology (CUT 2012**)**	
Teaching and learning	*Research and development*
Effectiveness: Employment and Study Destinations of New First Degree Graduates Perceived Course Quality—Australian Graduate Survey Perceived Teaching Quality—Curtin eVALUate Unit Survey Subject Load Pass Rate Efficiency: Teaching and Learning Expenditure per Equivalent Full-Time Student Load (EFTSL) and as a Percentage of Curtin Total Expenditure Teaching and Learning Expenditure per Successful EFTSL Graduate Productivity Rate—Course Completions per 10 Full-Time Equivalent (FTE) Academic Staff Commencing (First Year) Bachelor Degree Retention	Effectiveness: Growth in Research EFTSL Institutional Grants ($) Ranking Total Research Income ($) Ranking Cooperative Research Centre ($) Ranking Research Publication (weighted Higher Education Research Data Collection (HERDC) points) Ranking Efficiency: Research Funding per Research Staff (using Research Performance Index database) Weighted Research Publication per Research Staff (using Research Performance Index database)

Table 8 Key performance indicators in HE system in Australia

Key performance indicators—sector indicators (AU 2014**)**
1. The University Experience Survey, measuring satisfaction of current students
2. The Graduate Outcomes Survey examining labor market outcomes of higher education graduates
3. Employer Satisfaction Survey to assess the generic skills, technical skills and work readiness of graduates

monitoring key performance indicators, still has not implemented those indicators at the national level. At the institutional level is usually accompanied by indicators of execution strategies. Information about key performance indicators, if defined, is not publicly available.

Table 9 The use of program contracts in Europe

Program contracts existing	Austria, Belgium—French-speaking, Germany, Denmark, Estonia, Spain, Finland, France, Iceland, Italy, Latvia, Netherlands, Portugal, Sweden, Turkey, Croatia
Program contracts do not exist	Belgium—Flemish-speaking, the Czech Republic, Hungary, Ireland, Norway, Poland, Slovakia,

Source: Estermann et al. (2013), MSES (2014)

These conclusions will be used in creating our own model on the example of a HEI in Croatia.

4 Development of Performance Indicators in the Case of Higher Education

4.1 Selecting and Defining Performance Indicators

Based on the analysis of need for performance measurement in the function of monitoring the quality and efficient business management, and analysis of the current state of monitoring the performance of the elected institutions, the following shows the selection and definition of performance indicators for one HEI in Croatia.

The assumptions underlying the selection of indicators are following: HEI operates as a public institution in Croatia, HEI is engaged in teaching and scientific research, an analysis of the internal and external factors was made, the mission, vision and strategy of the HEI was defined, programming contract is in line with the strategy of HEI, the information needed to calculate the indicators are available at the HEI, key performance indicators are used to monitor the quality and strategic business management of HEI, collected information are presented to internal (students, staff, administration) and external (university, agency, department, public) system stakeholders, measurement results are used to make business decisions of various interest groups, but they are not the only source of information and they should be supplemented by the necessary quantitative and qualitative data.

In order to cover a wide range of activities through monitoring the performance HEI propose a definition of indicators through four areas: teaching process, teachers, professional and scientific research, resources. Quality assurance and internationalization as a component of performance monitoring are spread across all four areas. Proposed model by authors is given in Table 10.

On example of HEI authors have selected 20 key performance indicators that provide interested users with information about the quality of the HEI. Number of indicators may differ, as well as areas of measurement, depending on the interests of stakeholders. In order to make measure successful it is necessary to describe each indicator, its purpose and objective method of calculation, method of collection and

Table 10 Model for performance indicators

Performance indicators of teaching process area are related to the quality of university programs, satisfaction and achievement of students. Key performance indicators are: 1. Students' satisfaction with the programs and teachers. 2. Progress through the program. 3. The average duration of study. 4. Structure of students (student mix). 5. Students' satisfaction with the programs and teachers. 6. Ensuring the quality of study programs (revision).	Performance indicators of Teachers area cover qualifications, advancement and development of teachers as the most important educational resource. Key performance indicators are: 1. Student teacher ratio. 2. Number of advancement in rank. 3. The number of realized incoming and outgoing mobility of teachers. 4. Percentage of plan development for teachers. 5. The number of award-winning teachers.
Professional and scientific research is closely linked with the quality of teaching and teachers' work in this area and contributes positively to the quality of the teaching process. Key performance indicators are: 1. Number of publications per teacher. 2. The number of contracted projects per teacher. 3. Revenue from professional and scientific-research work per teacher. 4. Number of scientific advancement of teachers.	Area Resources includes monitoring of physical resources (space, equipment, financial resources, etc.) and human resources (teachers, administration, etc.). Key performance indicators are: 1. The proportion of own revenues in total operating revenues. 2. The cost per full-time student. 3. Space for education per student. 4. Coverage of teaching content in the recommended reading. 5. Satisfaction with administrative services.

sources of information, reporting deadlines, availability and way of presenting the results. For management purposes it is important to specify the measures that should be taken into consideration in order to increase the success of the HEI. The way of defining is shown in Table 11, on the example of indicator called Students' satisfaction with the programs and teachers.

4.2 The Use of Performance Indicators in Monitoring and Improving the Quality of Higher Education Institutions

Once defined, performance indicators can be applied in several areas that contribute to the quality of higher education at institutional and sector level. The use of indicators is particularly useful in: (re) accreditation, internal and external judgments of quality, comparing (benchmarking) the quality of institutions, business decision making, reporting, program planning and funding of HEI. The significance, the use and interpretation of indicators in these processes varies, depending

Table 11 Description of performance indicator

Type of information	Description
Description of indicators	Collected information about the satisfaction of students about courses, programs, studies and teachers.
The purpose of the indicators	Investigate the satisfaction of students in order to monitor the strengths and weaknesses of the study programs and HEI as a whole.
Data sources	Student survey was conducted
Data collection	The collection of information by student kiosks and/or entering the planned survey forms by the students, processing and analysis of student satisfaction with the course in the study, the teacher and the institution as a whole.
Deadlines	Survey at the end of each semester, reporting on a semi-annual and annual basis.
Responsible persons	A survey carried out through student service, processed by department heads, feedback by Vice-Dean for Education.
Availability of results	Management, all interested stakeholders.
The way of presenting results	Results satisfaction about teachers is published separately and anonymously for each teacher on page of HEI. Results about satisfaction of programs and teachers at the level of institutions are published in the annual report on key performance indicators on the website of HEI.
Measures to increase satisfaction with programs	The introduction of new ordinary and/or elective courses, better availability of literature, etc. as needed.
Measures to increase the satisfaction with teachers	Teachers' observations on the reasons that have led to poor perception of teachers by students and an action plan to improve efficiency.

on the objectives and tasks of the procedure itself as well as national goals and values of higher education.

(Re) accreditation is a process of external assessment and audit quality study programs that confirms that the institution meets the appropriate standards, thereby allowing it to be recognized among the stakeholders system (The Croatian Parliament 2009). The process of re-accreditation in Croatia is done by the Agency for Science and Higher Education (ASHE), on the basis of laws and regulations (MSES 2010). The basic document for assessing the quality is the Self-evaluation, which HEI has to compile in according to the instructions of ASHE. In the process of self-evaluation it is required from HEI calculating the set of performance indicators, such as: progress through the program, the ratio of student/teacher, employment after graduation,[1] teaching content coverage with required reading and others. By comparing the results of performance measurement with the specified standards and other similar institutions, competent Ministry's is bringing decision on issuing licenses for performing activities of HEI. HEI's that continuously monitors its

[1] It is an indicator on which HEI's have little influence and because of that it should be avoided since it doesn't represent only the quality of HEI but also the total country economy.

performance indicators can be detected in time of weakness and implementing improvement measures to ensure compliance with the predetermined minimum quality criteria.

HEI's in Croatia must have a system of measures and activities to ensure their accountability for performance and achievement of quality outcomes of educational and scientific activities (Croatian Parliament 2009), so-called quality assurance system (QAS). Evaluation of the degree of development and efficiency of QAS is carried out by the institution itself (internal audit) and ASHE (external independent periodical assessment of the internal quality assurance system—audit). With QAS judgment it shall be determined whether the activities and results of the activities that make up the system of quality assurance of higher education institutions are effective and in accordance with national and ESG standards, and it estimates contribution to the continuous improvement of quality and culture of education in the institution (ASHE 2010). External and internal audit of QAS is using indicators of performance such as: completing the audit programs of study, the percentage of plan development for teachers, etc., in order to compare achievements of HEI with defined criteria (ASHE 2009). Results efficiency measurements are used in the procedures of continuous quality improvement that HEI carries out.

Performance indicators have a very important role in comparing (benchmarking) institution quality with other similar institutions, the higher education sector as a whole, the targeted (default) values and through time. Benchmarking indicators such as number of publications per teacher, the number of contracted projects per teacher, average duration of studies and others allows HEI to evaluate its performance, identify its strengths, weaknesses and areas for improvement and for better decisions making (Pollard 2013). Performance indicators enable benchmarking at institutional and national level. At the institutional level comparison of quality boost competitiveness and competition between institutions. At the national level indicators allow evaluation and ranking of the HEI. Competitive bidding between HEI's has a positive impact on increasing the quality of university programs.

Higher education institutions that want to survive in the competitive environment that is established by the internationalization of the higher education, must provide high quality services at the lowest cost for taxpayers. For a successful and balanced management of the HEI, public managers need information on costs, prices of services, implementation strategy, program goals, methods for measuring performance of the program, financial and non-financial indicators and others (Budimir 2011). Indicators such as: satisfaction of students and teachers, programs, progress through the program, the average duration of study, employment after graduation, etc. help managers in making complex decisions about the performance of their programs, the necessary investments and improving the quality of existing and new study programs.

Indicators tracking incoming and outgoing teacher's mobility, student's structure, the number of scientific advancement of teachers, etc. are a good basis for the preparation and presentation of reports about performance. Reports about performance can be presented to different groups of internal and external stakeholders, as a basis for making business decisions, but also as the presentation of success in

order to promote the institution. Reporting about the selected set of indicators, which are relevant for national goals, provides state policy makers with useful business information (Pollard 2013).

To ensure responsible and purposeful use of the limited budgetary resources, in accordance with the objectives for the development of higher education in Croatia, activities of HEI's are financed through funding agreements. The implementation of selected institutional and national objectives, defined programming contracts, is monitored by performance indicators. Being one of the national objectives is Acquisition of qualifications in the period anticipated through study program (MSES 2014), indicators such as: progress through the program, the average duration of studies and similar, could be applied in order to monitor and improve the quality of higher education. Higher education institutions that achieve exceptional results, visible through indicators, in addition are financially rewarded, which represents a very concrete incentive for institutions in order to be responsible and to promote quality.

5 Conclusion

The interest in measuring the performance of HEI's in Croatia is being driven by political and economic changes in Europe, by the internationalization of higher education and by the need to provide quality teaching and effective management of restricted resources. Institutions of higher education have the institutional autonomy, but state at the same time is asking for more transparency and accountability in their activities. In order to successfully respond to a series of external and internal challenges, higher education institutions define performance indicators as a basis for measuring and monitoring the performance of all institutional processes. The information provided with indicators show the level of realizing strategic goals and institutions of higher education as a whole and are therefore of utmost importance for monitoring the performance of higher education institutions. The use of performance indicators at institutional and national level is broad. Indicators allow and contribute to a simpler evaluation of the quality, comparing and ranking of higher education institutions, their better competition in the market of higher education, recognizing strengths and weaknesses, making quality decisions and strategic management, constructive dialogue on the mode of financing, the mobility of students and teachers, transparency and accountability towards public.

However, the development of indicators is not a simple but a very demanding and complex task for several reasons: indicators should provide relevant information to the numerous stakeholders in the system (students, teachers, administration, budget, general public), and their interests are not consistent, measurement of the performance requires sound and complete information that are often hard to reach and scattered through the entire system, performance indicators should enable a comparison between the institutions, which requires unification of models and ways of measuring, results of performance measurement should be the basis for

improving quality, when defining the indicators it should be taken into account quality standards, the development strategy of the institution, the surrounding conditions and a number of other internal and external factors.

Based on the analysis of selected higher education institutions of Great Britain, Australia, Canada and Croatia, the paper defined model for monitoring performance through four groups of indicators. This model can be used in every institution of higher education for the development of indicators and mechanisms in their own terms and conditions. Of course, for the evaluation of the quality and performance only results of key indicators cannot be taken into account but they must be combined with other quantitative and qualitative data, which depend on the needs of stakeholders. Since the key performance indicators are not defined at the level of the higher education sector in Croatia, and the paper has shown the need for that, it is expected that this paper will contribute to the discussions on measuring performance of institutions of higher education at institutional and national level.

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References

AACSB. (2013). *Eligibility procedures and accreditation standards for business accreditation*. Florida: AACSB. Accessed November 12, 2014, from http://www.aacsb.edu/en/accreditation/standards/2013-business/

Agency for Science and High Education (ASHE). (2009). *Kriteriji za prosudbu stupnja razvijenosti i učinkovitosti sustava osiguravanja kvalitete visokih učilišta u RH [Criteria for assessment of development and efficiency of system for quality assurance in HEI's]* [pdf]. Accessed November 30, 2014, from https://www.azvo.hr/images/stories/vanjska_prosudba/Kriteriji.pdf

Agency for Science and High Education Croatia (ASHE). (2010). *Vanjska neovisna periodična prosudba sustava osiguravanja kvalitete (audit) visokih učilišta [Audit of quality assurance system]*. Accessed November 30, 2014, from https://www.azvo.hr/hr/vrednovanja/postupci-vrednovanja-u-visokom-obrazovanju/audit-visokih-ucilista

Agency for Science and High Education Croatia (ASHE). (2013). *Kriteriji za ocjenu kvalitete visokih učilišta u sastavu sveučilišta [Criteria for quality assurance of HEI's as part of Universities]*. Zagreb: AZVO.

Agency for Science and High Education Croatia (ASHE). (2014). *Postupci vrednovanja u visokom obrazovanju [Evaluation procedures in HE]*. Accessed November 26, 2014, from https://www.azvo.hr/hr/vrednovanja

Almgren, E. (2009). *Ranking of universities and higher education institutions for student information purposes?* Stockholm: Swedish National Agency for Higher Education.

Altbach, P. G., & Knight, J. (2007). The internationalization of higher education: Motivations and realities. *Journal of Studies in International Education, 11*(3/4), 290–305.

AU (Australian Government). (2014). *Upholding quality - Quality indicators for learning and teaching*. Accessed November 26, 2014, from http://education.gov.au/upholding-quality-quality-indicators-learning-and-teaching

Birch, D. W., & Calvert, J. R. (1977). Performance indicators in higher education. *Educational Management Administration & Leadership, 5*(2), 15–27.

Budimir, V. (2011). *Accounting information and performance measurement in a function of public management*. Unpublished Doctoral Dissertation, Faculty of Economics and Business, University of Zagreb.

Budimir, V., Idlbek, R., & Jeleč Raguž, M. (2014). Sustav osiguravanja kvalitete u visokom obrazovanju: problematika uvođenja sustava osiguravanja kvalitete sukladno ESG standardima na veleučilištu [System for quality assurance in high education in accordance with ESG standards]. In *14th Croatian Conference on Quality and 5th Symposium of Croatian Society for Quality "Quality is not a coincidence" - Manufactured in quality, designed for success],* Baška, Island of Krk, Croatia, 15–17 May 2014, pp. 68–77.

Burke, J. C., Minassians, H., & Yang, P. (2002). State performance reporting indicators: What do they indicate? *Planning for Higher Education, 31*(1), 15–29.

Campbell, C., & Rozsnyai, C. (2002). Quality assurance and the development of course programmes. In *Papers on higher education*. Bucharest: United Nations Educational, Scientific, and Cultural Organization, European Centre for Higher Education.

Campbell, C., & Van Der Wende, M. C. (2000). *International initiatives and trends in quality assurance for European higher education* (Exploratory Trend Report). Helsinki: European Network of Quality Assurance Agencies.

Cave, M., Hanney, S., Henkel, M., & Kogan, M. (1997). *The use of performance indicators in higher education: The challenge of the quality movement* (3rd ed.). London: Jessica Kingsley.

Chalmers, D. (2008a). *Indicators of university teaching and learning quality*. Surry Hills: Australian Learning and Teaching Council.

Chalmers, D. (2008b). Teaching and learning quality indicators in Australian universities. In *IMHE General Conference,* 8–10 September 2008, Paris, France

City University London (CUL). (2012). *Our key performance indicators*. Accessed November 21, 2014, from http://www.city.ac.uk/about/city-information/the-city-vision/the-city-strategic-plan-2012-2016/overview/our-key-performance-indicators

Croatian Parliament. (2009). *Zakon o osiguravanju kvalitete u znanosti i visokom obrazovanju. [Law on assurance of quality in science and high education]*.Official Gazette 45/09, Croatia.

Croatian Parliament. (2014). *Strategija obrazovanja, znanosti i tehnologije. [The strategy of education, science and technology]*. Official Gazette 124/14, Croatia.

Ćukušić, M., Garača, Ž., & Jadrić, M. (2014). Odrednice i pokazatelji uspješnosti visokih učilišta u Hrvatskoj. [Indicators for performance measurement in Croatian HEI's]. *Društvena Istraživanja, 23*(2), 233–257.

Curtin University of Technology (CUT). (2012). *Annual report 2012*. Accessed November 26, 2014, from https://about.curtin.edu.au/files/curtin_annual_report_12_performance_indicators.pdf

Dolaček-Alduk, Z., Sigmund, V., & Lončar-Vicković, S. (2008). Osiguranje kvalitete visokog obrazovanja u europskom obrazovnom prostoru [Quality assurance of European high education area]. *Tehnički Vjesnik, 15*(1), 39–44.

Dos Santos, S. M. (2000). Introduction to the theme of transnational education. In *Conference of the Directors General of Higher Education and the Heads of the Rectors' Conference of the European Union*, Aveiro. Accessed November 14, 2014, from http://www.crui.it/crui/forum-rec/transn_education.pdf

EFMD. (2014). *EQUIS process manual*. Brussels: European Foundation for Management Development. Accessed November 26, 2014, from https://www.efmd.org/images/stories/efmd/EQUIS/2014/EQUIS_Process_Manual.pdf

EFQM. (2003). *EFQM excellence model: Higher education version*. Sheffield: Sheffield Hallam University.

Elton, L. (2004). Goodhart's law and performance indicators in higher education. *Evaluation and Research in Education, 18*(1&2), 120–128.
ENQA (European Association for Quality Assurance in Higher Education). (2009). *Standards and guidelines for quality assurance in the European Higher Education Area* (3rd ed.). Helsinki: ENQA.
Estermann, T., Pruvot, E. B., & Claeys-Kulik, A. L. (2013). *Designing strategies for efficient funding of higher education in Europe*. Brussels: EUA.
EUA (European University Association). (2013). *Internationalization in European higher education: European policies, institutional strategies and EUA support*. Brussels: EUA.
European Ministers of Education. (1999). *The Bologna declaration, joint declaration of the European Ministers of Education*. Bologna: EHEA. Accessed November 12, 2014, from http://www.ehea.info/Uploads/about/BOLOGNA_DECLARATION1.pdf
Finland Ministry of Education. (2009). *Strategy for the internationalisation of higher education institutions in Finland 2009–2015*. Helsinki: Helsinki University Print.
Glanville, H. (2006). *Osiguravanje kvalitete u visokom obrazovanju – priručnik [Manual on quality assurance in High Education]*. Croatia: ASHE.
Guthrie, J., & Neumann, R. (2007). Economic and non-financial performance indicators in Universities. *Public Management Review, 9*(2), 231–252.
Henman, P., & Luong Phan, N. H. (2014). CEQ and the performance regime in Australian higher education: A review of the policy context. *UQ Social Policy Unit Research Paper,* No. 7.
HESA (Higher Education Statistics Agency). (2014). *UK performance indicators in higher education*. Accessed November 21, 2014, from https://www.hesa.ac.uk/pis
Higher Education Quality Council of Ontario (HEQCO). (2013). *Performance indicators: A report on where we are and where we are going*. Toronto: Higher Education Quality Council of Ontario.
Higher Education Quality Council of Ontario (HEQCO). (2014). *Performance indicators for the public postsecondary system in Ontario.* Accessed November 21, 2014, from http://www.heqco.ca/SiteCollectionDocuments/HEQCOPerformanceIndicatorProjectConsultationPaper.pdf
IFAC. (2000). *Proposed study – Corporate governance in the public sector: A governing body perspective*. New York: International Federation of Accountants, Public Sector Committee.
Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Boston: Harward Business School Press.
Kauko, K., & Berndtson, E. (2013, September 4–7). ENQA's standards and guidelines for quality assurance in the European higher education area: An evaluation. In: *The 7th ECPR General Conference*. Bordeaux, France.
Keller, G. (1983). *Academic strategy: The management revolution in American higher education*. Baltimore, MD: Johns Hopkins University Press.
Kim, H. H., & Lalancette, D. (2013). *Literature review on the value-added measurement in higher education. AHELO Feasibility Study*. Paris: OECD.
Knight, J. (2009). *Financing access and equity in higher education*. Rotterdam: Sense Publishers.
Kohoutek, J. (2009). Implementation of the standards and guidelines for quality assurance in higher education in the Central and East-European countries – Agenda ahead. In *Papers on higher education*. Bucharest: United Nations Educational, Scientific, and Cultural Organization; European Centre for Higher Education.
LU (Lancaster University). (2014). Key performance indicators. Accessed November 21, 2014, from http://www.lancaster.ac.uk/vc/kpi.htm
Machado, M. L., & Taylor, S. J. (2010). The struggle for strategic planning in European higher education: The case of Portugal. *Research in Higher Education Journal, 6*, 44–64.
Matei, L. (2009). *Romanian public management reform: Theoretical and empirical studies* (Administration and public services, Vol. 1). Bucharest: Economica Publishing Houses.
Ministry of Science, Education and Sport (MSES). (2010). *Pravilnik o sadržaju dopusnice te uvjetima za izdavanje dopusnice za obavljanje djelatnosti visokog obrazovanja, izvođenje*

studijskog programa i reakreditaciju visokih učilišta [Regulation about terms of activities of HEI's, study programs and reaccreditation]. Zagreb, Croatia.

Ministry of Science, Education and Sport (MSES). (2012). *Ugovor o punoj subvenciji participacije redovitih studenata u troškovima studija u akademskim godinama 2012./2013., 2013./2014. i 2014./2015 [Contract about full subvention of student participation about costs of studies in academic years 2012./2013., 2013./2014. and 2014./2015]*. MZOS i Sveučilište u Zadru. Accessed November 2014, 29, from http://www.mzos.hr/datoteke/visoko/programski_ugovori/05_Zadar.pdf

Ministry of Science, Education and Sport (MSES). (2014). *Programski ugovori [Program contracting]*. Accessed November 19, 2014, from http://public.mzos.hr/Default.aspx?sec=3329

Newman, J., & Graham, A. M. (2013). *UK strategy for outward mobility*. London: UK Higher Education International Unit.

Niven, P. R. (2003). *Balanced scorecard: Step by step for government and nonprofit agencies*. New Jersey: Wiley.

OECD. (2007). *Education at a glance 2014. OECD Indicators*. Paris: OECD.

Pinterić, E., & Markulak, D. (2013). *Pokazatelji kvalitete na Građevinskom fakultetu Osijek – definiranje, praćenje, analiza, ocjena i izmjene [Indicators of quality on Faculty of Civil Engineering]. 13. Hrvatska konferencija o kvaliteti i 4. Znanstveni skup Hrvatskog društva za kvalitetu,* [13th Croatian Conference on the quality and 4th Symposium of the Croatian Society for Quality], Brijuni, Croatia, 9–11 May 2013, pp. 352–360. Accessed November 26, 2014, from http://issuu.com/kvaliteta.net/docs/hdk_cd_25_

Poister, T. H. (2003). *Measuring performance in public and nonprofit organizations*. San Francisco: Wiley.

Pollard, E. (2013). *How should we measure higher education? A fundamental review of the performance indicators. Part One: The synthesis report*. Brighton: Institute for Employment Studies.

Rasmussen, J. G. (1998). The chief and the ordinary professor: Decentralized and informal relationships as preconditions for strategic management in universities. *Tertiary Education and Management, 4*(1), 38–47.

Reuters, T. (2014). *World university rankings 2014-2015 methodology*. London: TES Global. Accessed November 26, 2014, from http://www.timeshighereducation.co.uk/world-university-rankings/2014-15/world-ranking/methodology

Rhoades, G., & Sporn, B. (2002). Quality assurance in Europe and U.S.: Professional and political economic framing of higher education policy. *Higher Education, 43*(3), 355–390.

Ryerson University (RU). (2014). *Ryerson performance indicators*. Accessed November 25, 2014, from http://www.ryerson.ca/content/dam/upo/performance/indicators/PerfIndCURRENT.pdf

Schwarz, S., & Westerheijden, D. F. (2004). *Accreditation and evaluation in the European Higher Education Area*. Dordrecht: Springer. Strategy of education, science and technology, Official Gazette 124/14, Croatia.

Taylor, J., & Miroiu, A. (2002). Policy-making, strategic planning and management of higher education. In *Papers on higher education*. Bucharest: UNESCO - CEPES.

The University of Western Australia (UWA). (2013). *Annual report: Key performance indicators*. Accessed November 25, 2014, from http://www.annualreport.uwa.edu.au/annual-report-2013/key-performance-indicators

The World Bank. (2002). *Constructing knowledge societies: New challenges for tertiary education*. Washington, DC: The World Bank.

Thune, C., & Staropoli, A. (1997). The European pilot project for evaluating quality in higher education. In J. Brennan, P. De Vrise, & R. Williams (Eds.), *Standards and quality in higher education*. London: Jessica Kingsley.

UNESCO. (2014). *Bologna Process*. Paris: UNESCO. Accessed November 14, 2014, from http://www.unesco.org/new/en/education/themes/strengthening-education-systems/higher-education/recognition/bologna-process/

University of Calgary (UC). (2013). *Annual report for the year ended March 31 2013 prepared for the Government of Alberta*. Accessed November 24, 2014, from http://www.ucalgary.ca/news/files/news/13-UNV-003-AnnualReport-digital.pdf

University of Exeter (UE). (2014). *Delivering our strategies: Measures of performance and success*. Accessed November 21, 2014, from http://www.exeter.ac.uk/about/vision/strategicplan/delivering/

University of Northampton (UN). (2010). *Raising the bar: Strategic plan 2010 – 2015*. Accessed November 21, 2014, from http://blogs.northampton.ac.uk/institutionalstrategyblog/files/2011/02/Strategic-Plan-2010-15.pdf

University of Rijeka (UoR). (2011). *Zbirno izvješće o provedbi Strategije u 2011 [A summary report on the implementation of the Strategy in 2011]*. Accessed November 26, 2014, from http://www.uniri.hr/files/staticki_dio/propisi_i_dokumenti/Izvjestaj%20o%20provedbi%20Strategije%20SuRi%20u%202011.pdf

Van Der Wende, M. C., & Westerheijden, D. F. (2001). International aspects of quality assurance with a special focus on European higher education. *Quality in Higher Education, 7*(3), 233–245.

Van Vught, F. A., & Westerheijden, D. F. (1994). Towards a general model of quality assessment in higher education. *Higher Education, 28*(3), 355–371.

Yorke, M., & Longden, B. (2004). *Retention and student success in higher education*. Maidenhead: Open University Press.