

THE QUALITY MANAGEMENT SYSTEM IN EDUCATIONAL INSTITUTIONS OF THE SLOVAK REPUBLIC: IMPACT ON THE RANKING'S POSITION

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Tsarenko I. O. The quality management system in educational institutions of the Slovak Republic: Impact on the Ranking's position

The purpose of the study is to verify the level of impact of Quality Management System (ISO 9001:2000) on the ranking university on an example of Technical University in Kosice. This article presents detailed analysis of the tools of ensuring quality in European Educational Area, the international standard ISO 9001-2000 "Quality Management System — Requirements" and correlation-regression analysis of relationship between faculties' positions in ARRA Ranking of Technical University in Kosice and the implemented quality management system. The own research gives the consciousness about the considerable impact of the quality management system in educational sphere nowadays, when the requirements to it are increasing so fast. It can be stated that quality in educational process is understood as the conformity to the defined, juridically proclaimed, standards of Educational Area. An interesting area of further research would be implemented process of certification quality management system at universities in Ukraine as an approach of increasing position in international rankings. The paper provides the analysis of relationship between faculties' positions in ARRA Ranking of Technical University in Kosice and implemented quality management system.

Keywords: quality management system; European Standards and Guidelines (ESG); ISO 9001:2000; quality of system of higher education; ARRA Ranking.

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Царенко І. О. Система менеджменту якості в навчальних закладах Словачкої Республіки: вплив на місце в рейтингу

Царенко И. А. Система менеджмента качества в учебных заведениях Словацкой Республики: влияние на позицию рейтинга

Метою дослідження є встановлення ступеня впливу системи менеджменту якості (ISO 9001:2000) на ранжування університету на прикладі Технічного університету в місті Кошице. Наведено детальний аналіз інструментів забезпечення якості в Європейському освітньому просторі, міжнародного стандарту ISO 9001:2000 «Система управління якістю. Вимоги», а також проведено кореляційно-регресійний аналіз взаємозв'язку результатів діяльності факультетів згідно з рейтингом ARRA Технічного університету в Кошице та впровадженою системою управління якістю. Це дослідження дає уявлення про значний вплив системи менеджменту якості в освітній сфері на сьогодні, коли вимоги до неї все більше зростають. Слід зазначити, що якість в навчальному процесі – це відповідність певним, юридично проголошеним стандартам освітнього простору. Цікавою сферою подальших досліджень виступає можливість впровадження процесу сертифікації системи менеджменту якості в університетах України як інструменту підвищення їх позицій у міжнародних рейтингах.

Целью исследования является проверка уровня воздействия системы менеджмента качества (ISO 9001:2000) на ранжирование университета на примере Технического университета в городе Кошице. Представлен подробный анализ инструментов обеспечения качества в Европейском образовательном пространстве, международного стандарта ISO 9001:2000 «Система управления качеством. Требования», а также проведен корреляционно-регрессионный анализ взаимосвязи результатов деятельности факультетов согласно рейтингу ARRA Технического университета в Кошице и внедренной системе управления качеством. Данное исследование дает представление о значительном влиянии системы менеджмента качества в образовательной сфере в настоящее время, когда требования к ней все больше возрастают. Следует отметить, что качество в учебном процессе – это соответствие определенным, юридически провозглашенным стандартам образовательного пространства. Интересной областью дальнейших исследований выступает возможность внедрения процесса сертификации системы менеджмента качества в университетах Украины как инструмента повышения их позиций в международных рейтингах.

Ключові слова: система управління якістю, Європейські стандарти та керівні принципи (ESG), ISO 9001:2000, якість системи вищої освіти, рейтинг ARRA.

Ключевые слова: система управления качеством, Европейские стандарты и руководящие принципы (ESG), ISO 9001:2000, качество системы высшего образования, рейтинг ARRA.

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Under current conditions of the comprehensive dissemination of knowledge-based economy and enhancing cooperation between the participants on the market, the improvement of the quality of educational services in the sphere of higher education through transformation of the learning process, which is substantiated by the challenges of modern society, is becoming more important. With regard to this, the tools and principles of

quality management systems are becoming more and more popular. To help the development of the educational sphere at the modern stage, national and supranational organisations work on developing a methodology for implementing the process of quality assurance.

Furthermore, an additional argument in favor of the need to introduce such systems is the rapid development of the higher education system, which necessitates the creation

of formalized systems that could ensure the implementation of academic standards. All this is possible with the introduction in universities of quality management systems (QMS), compatible with the standard ISO 9001: 2008. The additional argument confirmed the necessity of undertaking activities leading to the assurance of the suitable level of the quality of students' education and starting the mechanisms favourable for the continuous improvement of the education processes is the increasing competition within the free market of educational services and the approaching drastic fall of the youth amount graduated from secondary schools [15]. Thus, the implementation of the system of quality in educational institutions is quite necessary under current conditions of the functioning of higher education. However, a quite controversial among scientists is the issue of impact of such systems on the position in the ranking of a university that implemented such system. This problem is the focus of our paper, and that's why we will mathematically verify the relationship between the components of the system and the result values as well as their impact on the position of a higher education establishment in rankings.

In this paper, we provide an analysis of the tools for ensuring quality in European Higher Education Area by different national and supranational organisations. After the analysis, we discuss the international standard ISO 9001-2000 "Quality Management System – Requirements". We found the results of rating of Technical University of Košice for the period 2005-2015, which were conducted by the ARRA Ranking. Using the obtained results we compare the change in the position of the university after implementing the ISO 9001:2000 in 2006. In this paper, we consider the following questions:

- ✦ what is the most wide-spread tools for increasing the quality of higher education;
- ✦ what is the specifics of the European Association for Quality Assurance in Higher Education (ENQA);
- ✦ why the European Standards and Guidelines are very important;
- ✦ what are the peculiarities of the ISO 9001:2008 for the educational institutions.

In the second part, we analyzed the implementation of ISO 9001:2000 by Technical University of Košice and the changes in TUKE's position in the ARRA ranking in terms of its faculties after the implementation of the process.

Nowadays, under conditions of the increased interest to the problems of quality of higher education, the national and supranational institutions actively implement various kinds of monitoring programs to carry out the process of evaluation and comparison of systems of higher education.

Among the supranational institutions ensuring the quality in the sphere of education a central place belongs to the European Association for Quality Assurance in Higher Education (ENQA), which aims to promote cooperation, exchange of successful experiences, and integration of quality management systems.

The Berlin communiqué confirmed the main direction of ENQA activities: cooperation with the European University Association, and the National Students' Union

in Europe to develop common standards, procedures, and areas of quality assurance; research and implementation of appropriate ways of the licensing and accreditation of agencies and bodies for quality assurance and / or accreditation. In May 2005, in Bergen, Ministers of Education adopted the "Standards and Guidelines for Quality Assurance in the European Higher Education", which were developed by ENQA, and as a result provided the consultative status to the BFUG (Bologna Follow-Up Group) [6; 29].

ENQA undertook the development of a register of the agencies, based on the common standards of good practice, and transformation of the network in an association, which is open to agencies of the countries that participated in the signing of the Bologna Declaration [5].

As part of the implementation of the Bologna process, the European Network of Quality Assurance (ENQA) has to adapt universities. First of all, it concerns Ukrainian universities, in which the Bologna process was implemented in 2007.

The European Network for Quality Assurance in Higher Education (ENQA) was established in 2000. The basis for its creation were the "European Pilot Project for Evaluating Quality in Higher Education" (1994-1995), the materials of Council Recommendation 98/561/EC of 24 September 1998 on European cooperation in quality assurance in higher education, and the text of the Bologna Declaration of 1999 [9].

To form the system of quality assurance according to the Bologna Process, the Ministers of countries participating in the Berlin communiqué gave a task to ENQA through its members, in cooperation with the European University Association (EUA), European Association of Institutions in Higher Education (EURASHE) comprising universities of applied sciences, university colleges, as well as national and sectorial associations and other higher education institutions, and the European Student international Bureau (ESIB). As result, there was created the E4 group to develop "the harmonized standards, procedures, and guidelines for quality assurance". The developed Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) – were approved at a conference in Bergen in 2005. Moreover, on 4th March 2008 in Brussels (Belgium) there was created the European Quality Assurance Register for Higher Education (EQAR), whose founder was the E4group.

The European quality assurance system, governed by the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), is, in turn, based on the following basic principles:

- ✦ the interest of students and employers, and society as a whole in high quality of higher education;
- ✦ the key importance of the autonomy of institutions and agencies, which is balanced by the understanding that autonomy brings a serious responsibility with it;
- ✦ systems of external quality assurance must meet their aims and not to complicate the work of educational institutions more than it is necessary for the implementation by this system its tasks.

The ESG consists of three parts:

- 1) internal quality assurance in higher educational institutions;
- 2) external quality assurance of higher education;
- 3) quality assurance in the activities of agencies in external quality assurance.

The membership of ENQA is composed of European quality assurance agencies or other quality assurance organisations in the field of higher education that have been operating and conducting actual quality

assurance activities for at least two years. Members meet the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) as confirmed by an external agency review (ENQA). According to the last data, for the past years the quantity of the member countries has increased largely, which is illustrated by the map in Figure 1.

As we can observe, the majority of European countries are involved in the process initiated by ENQA. Besides Italy, Sweden, the Czech Republic, Slovakia, Macedonia, Croatia, Bosnia and Herzegovina.



Fig. 1. The map of the countries that joined ENQA

Source: developed by the author.

Besides ENQA, the quality issues are also considered by a number of other organizations, such as the European Students' Union (ESU), the European University Association (EUA), the European Association of Institutions in Higher Education (EURASHE), individual members of the subregional European Agency safeguard students, universities, and other institutions of higher education to increase the transparency of quality assurance in European higher education.

So, the conclusions of the the final report of UN Decade of Education for Sustainable Development (2005–2014), despite the positive results, defined the main challenges for ESD, which concern higher education: translation of commitments into implementation requires coordinated change at multiple levels – in governance, planning, academic programmes, facility management and financial systems; deeper innovation in staff development and across institutions is necessary to transform curricula and pedagogy; disciplinary boundaries continue to be barriers to the exploration of complex issues, and to the preparation of learners with the capacity to address complexity [8].

Although the progress over the course of the Decade was patchy from region to region, the evaluators nevertheless highlighted a number of areas where substantial headway had been made in higher education (HE) for sustainable development.

These include, inter alia: publication of nearly a dozen higher education declarations and commitments signed by institutions all around the world, which demonstrate that the Education for Sustainable Development (ESD) is gradually working its way into mainstream thinking; introduction

of specific courses and research centers; great advances from institutional leadership; increasing student demand for sustainability-related education; greater potential of distance and online learning models; a rise in the number of professional development programs for higher education teaching staff; expanded networks of higher education institutions (HEIs) that build capacity and expand the influence of ESD; and increased interest in sustainability-related research and research into ESD itself [13].

One of the possible ways that will allow universities to withstand the tough competition on the educational market is the development and implementation of quality management systems in accordance with international standard ISO 9001-2000 «Quality Management System – Requirements» [16; 17].

One of the well-known quality management frameworks, which is often used, is the ISO 9001:2008 standard. This standard sets the requirements for implementing a quality management system in an organization, independently of its dimension or type of activity, including education institutions.

The ISO 9001:2008 standard establishes the minimum requirements to set up such a system, which are organized in five blocks (Fig. 2):

And the truth is that some HEIs have indeed decided to implement such quality management systems [26], obtaining benefits such as a cost effective method for accountability, development of an improvement-driven focus through refocusing core processes to improve both productivity and service levels, to take into

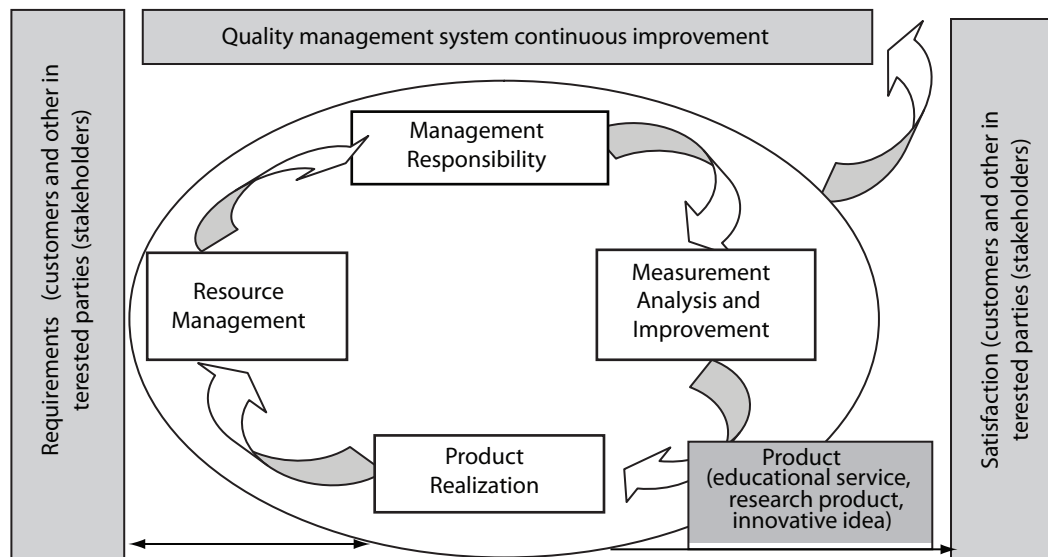


Fig. 2. The ISO 9001:2008 standard model [18]

account a broader number of stakeholder views, to enhance the use of data for quality assurance purposes and improvement in inter-departmental working conditions and student enrolment [7]. Nevertheless the truth is that the application of the ISO 9001 in higher education has been generically limited to the institutions' services and not to their core functions, namely teaching and learning.

Considering the ISO 900 requirements show that their implementation will meet the ESG principles. Addressing management responsibility will lead to the implementation of policy procedures for quality assurance, while the approval, monitoring, and periodic review of programs and awards as well as the assessment of students are covered under product realization. When implementing the resource management requirements, the quality assurance of teaching staff and learning resources and student support standards are addressed.

The process of implementation is not so easy, but results in a number of benefits. The universities that implemented the quality management system according to ISO 9001 standard are considered by their customers as credible, reliable and well-organized. This raising of the prestige, and assumption of better position in the ranking of universities result directly from the advantages, which the implementation of the quality management system brings, among which are

- ✦ ensuring the system for management of resources and knowledge;
- ✦ starting the constant process of improving the university;
- ✦ guaranteeing the efficient flow of information about each task and their realization;
- ✦ improvement of functioning the university and its management,
- ✦ quick and effective solving problems;
- ✦ avoiding mistakes (instead of repairing them);
- ✦ changing approaches to ensuring the quality of education;

- ✦ improving the planning and budget discipline;
- ✦ increasing the productivity and effectiveness of the university;
- ✦ growing responsibility, motivation and commitment of the workers [22; 23; 25].

Before starting the analysis of the quality management system in TUKE through the achieved results of ARRA ranking during 2006-2016 years, we consider it necessary to describe the educational environment in Slovakia in view of the modern trends of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) in comparison with other countries of Central and Eastern Europe (Tbl. 1).

As shown in Table 1, unlike Poland, for example, the Slovak Republic has fully integrated the principles of ESG to the education system in order to provide its more fast growth. All this preceded by a full assessment of higher education in the country (The European University Association (EUA) has been commissioned by the Ministry of Education in the Slovak Republic (ME SR) jointly with the Slovak Rectors' Conference (SRC), which is primarily focused on the evaluation of all Slovak public and state higher education institutions with a particular focus on the research capacity at the national level, which was conducted during 2005-2007. The final report on the evaluation defines the following objectives [14]:

- ✦ to address the quality of educational provision and to allow for sufficient internal differentiation to cater for the wide range of diverse needs and student profiles;
- ✦ to take the challenge of competence orientation seriously, both in the dialogue between universities and employers as in the approaches to teaching and learning within higher education institutions;
- ✦ to enable its universities and other higher education institutions to educate and train more graduates in natural and technical sciences;
- ✦ to provide up-to-date scientific infrastructure and library resources;

- ✦ to introduce a more systematic responsibility and a trust-based approach to quality assurance of higher education institutions, away from methodologies of external control of minimal standards toward internal improvement-oriented processes of quality enhancement;
- ✦ to realise the Slovak quality assurance system commitment to the European Standards and Guidelines, which will give the universities the possibility to establish more coherent quality assurance and an underlying quality culture while reducing the control mechanisms that are currently dominating the system.

As we have mentioned, the implementation of the quality management system is defined as one of the challenges for higher education institutions of the Slovak Republic. And we consider it appropriate to conduct a more thorough research of the impact of applying ISO 9001:2000 in higher educational institutions, using the example of Slovakia.

The Technical University in Košice was the first university in the Slovak Republic, which implemented, after a long and demanding process, a quality management system. As a result, in 2006, the university received a certificate for the quality management system according to the ISO 9001:2000 in the field of Education, Research and Business Processes Provision at the level of public higher education institutions. And then, after regularly reviewed process of quality, the university defended the functionality of the quality management system and was awarded the certificate according to the ISO 9001: 2009.

The main activities of the Division of Quality Management at TUKE are defined as follows:

- ✦ Organizational facilitation of QMS;
- ✦ Preparation of documents for TUKE Board of Quality;
- ✦ Evaluation of internal and external audits at TUKE;
- ✦ Evaluation of main, managerial and support processes at TUKE;
- ✦ Metrological facilitation of processes at TUKE;
- ✦ Intellectual Property Right.[28]

But for us it is very interesting to estimate the changes of indicators of activities (which are calculated by ARRA Ranking) after implementing ISO 9001:2009 in this university.

Using statistical programme, we conducted the correlation regression analysis and received results for each faculty of the university. The data were taken for 2005-2015 [1]. We obtained the following regression model:

Faculty of Arts:

$$Y = -0.51814 + 0.21069X_1 + 0.20041X_2 + 0.20060X_3 + 0.20101X_4 + 0.19972X_5$$

Faculty of Economics:

$$Y = -0.05622 + 0.18805X_1 + 0.20448X_2 + 0.20922X_3 + 0.19044X_4 + 0.20766X_5$$

Faculty of Metallurgy:

$$Y = -0.51289 + 0.20604X_1 + 0.20118X_2 + 0.19095X_3 + 0.20373X_4 + 0.20058X_5$$

Faculty of Mining, Ecology, Process Control and Geotechnology:

$$Y = -0.49925 + 0.20377X_1 + 0.19975X_2 + 0.20085X_3 + 0.20791X_4 + 0.19862X_5$$

Faculty of Mechanical Engineering:

$$Y = 4.57648 + 0.19940X_1 + 0.05223X_2 + 0.32201X_3 + 0.21006X_4 + 0.19810X_5$$

Faculty of Electrical Engineering and Informatics:

$$Y = -7.30442 + 0.23671X_1 + 0.19118X_2 + 0.20353X_3 + 0.31616X_4 + 0.20762X_5$$

Faculty of Civil Engineering:

$$Y = 0.38919 + 0.18587X_1 + 0.20241X_2 + 0.19721X_3 + 0.20094X_4 + 0.21144X_5$$

Faculty of Manufacturing Technologies:

$$Y = -1.45190 + 0.22662X_1 + 0.20296X_2 + 0.20788X_3 + 0.19202X_4 + 0.20032X_5$$

Faculty of Aeronautics:

$$Y = -1.14049 + 0.26288X_1 + 0.17983X_2 + 0.14280X_3 + 0.17262X_4 + 0.20777X_5$$

where

Y – Total Score of Faculty in the ARRA Ranking

X1 – Study and Education

X2 – Students and Teachers

X3 – Publications and Citations

X4 – PhD Studies

X5 – Grant succes

Thus, analyzing the models, we can come to the following conclusions. Regarding the position in the ranking of Faculty of Arts, the most significant component influencing it is “Study and Education”, and the least significant one is “Grant Succes”; the most significant component influencing the position in the ranking of Faculty of Economics is “Publications and citations”, and the least significant one is “Study and Education”; the most significant component influencing the rating position of Faculty of Metallurgy is “Study and Education”, and the least significant one is “Publications and citations”; the most significant component influencing the position in the ranking of Faculty of Mining, Ecology, Process Control and Geotechnology is “PhD Studies”, and the least significant one is “Grant Success”; the most significant component influencing the position in the ranking of Faculty of Mechanical Engineering is “Publications and citations”, and the least significant one is “Students and Teachers”; the most significant component influencing the position in the ranking of Faculty of Electrical Engineering and Informatics is “PhD Studies”, and the least significant one is “Students and Teachers”; the most significant component influencing the position in the ranking of Faculty of Civil Engineering is “Grant Success”, and the least significant one is “Study and Education”; the most significant component influencing the position in the ranking of Faculty of Manufacturing Technologies is “Study and Education”, and the least significant one is “PhD Studies”; the most significant component influencing the position in the ranking of Faculty of Aeronautics is “Study and Education”, and the least significant one is “Publications and Citations”.

So, the ratio of the number of full-time and part-time students per teacher/professor/associate professor; the ratio of professors, associate professors, and

Table 1

The comparative characteristics of ESD transition factors for countries of Central and Eastern Europe

Transition-Factors	Czech Republic	Hungary	Poland	Serbia	Slovakia	Slovenia
Education for Sustainable Development – understanding	The term is not adopted by policy-makers and wider public; perceived as vague (ideological) term.	The term is understood in accordance with UN documents and national SD strategy; priority in teacher education	Not wide public support for SD. Environmental education includes economic and social dimension. No university has SD obligatory course.	SD misunderstood and interpreted as sustainable economic development. Orientation towards corrective & preventive measures and methodologies rather than SD principles	SD topics have been incorporated into relevant subjects; more than half of Slovak universities today have specific subjects devoted to SD. Initiatives to adopt a holistic approach: inclusion of social and economic dimensions in environmentally oriented HE teaching	Lack of discussion on SD in documents (e.g. climate change), SD and global education programs. SD study programs at PhD level
ESD policy documents	National EE strategy since 1992; national ESD strategy since 2008 – driven by UNECE documents. For HE level recommendations.	National Sustainable Development Strategy (2007). Since 2012 SD is a part of obligatory higher education Institutional Development Plan	SD principle in the Constitution (1997). National SD Strategy. National Strategy & Action Plan for EE and ESD. Not specific goals for HE level	National SD and ESD strategy, local strategies – include awareness. Strategy of Education Development for Serbia until 2020 (2012) – emphasis on HE.	System of ESD documents: strong accent on sustainability in all universities (“sustainable university” in Lüneburg declaration). Institutionalized cooperation of Ministry of Education and Ministry of Environment – Committee for ESD.	No national ESD strategy. “White Book” on education includes ESD topic; working group for ESD established by the Ministry of Education.
ESD implementation	ESD driving force – UNECE Strategy. Implementation failed (ESD Action Plan adopted but not fulfilled).	10 from 17 HEIs have institutional SD Strategy (need to comply with EU tendering process). No practical steps taken to introduce ESD into the curriculum or institutional administration.	3 driving forces for HE in general: Ministry, Accreditation Council, universities (HEIs have strong autonomy).	Implementation driven by national SD strategy and UNECE document (not congruent with the meaning of ESD); strong factor: interest of students	ESD implemented topdown; system is centralized. Dialogue in the ESD field has started. Action plan is comprehensive but not approved by the government (formalism).	Bottom-up – all 4 public universities have integrated sustainability principles into their curricula; 4 HEIs or departments thereof also signed the Higher Education Sustainability Initiative for Rio+20 in 2012
Competences (innovative approaches)	HE teaching – cognitive goals, not oriented towards competence development. Especially transdisciplinary competence missing.	-	-	Transmissive teaching; not promoting students' initiative – no innovation. No competences for collaboration (e.g. with business).	Discussions on new pedagogies held with multiple stakeholders. Not required or systematically supported in the HE system.	Not in the centre of attention
Research	SD research interdisciplinary and transdisciplinary (indicators for political decision-making). ESD research developing (Envigijka journal).	Project of the Institute of Educational Research and Development on “Quality Education” focused on e.g. the environmental aspects, as energy consciousness and environmental consciousness.	-	HEIs are still rather education than research institutions	Needs analysis in ESD; applied environmental research. No theoretical underpinning. Analysis of academic carrier of researcher and educators at HEIs in SR with regards to its optimization. Annual evaluations of fulfillment of National Action Plan objectives for ESD in HE sector.	Focus on: innovative projects in the field of ESD; analytical studies on ESD principles: ethics, didactics, etc.

Source: [2-4; 10-12; 19-21; 24].

teachers with PhD to the total number of teachers; the ratio of the number of professors and associate professors to the number of all teachers are the most significant variables for Faculty of Arts, Faculty of Metallurgy, Faculty of Manufacturing Technologies and Aeronautics. For Faculty of Economics and Faculty of Mechanical Engineering, the most significant variables are Number of Publications in WoK for the years under study, Number of Citations in WoK for the years per creative worker and Number of Citations in WoK per publication. And for Faculty of Mining, Ecology, Process Control and Geotechnology, and Faculty of Electrical Engineering and Informatics the most significant variables are the ratio of the average number of PhD graduates to the average number of all first-year PhD students; the ratio of the average annual number of full-time PhD graduates to the number of professors and associate professors; the ratio of the number of full-time PhD students to the number of bachelor's and master's degree full-time students. So, the most significant variables are the total grant funding from the KEGA and VEGA agencies per creative worker; the total grant funding from the APVV agency per creative worker; the total funding from foreign grants per creative worker; the total grant funding from all the above-mentioned agencies per creative worker to the Civil Engineering.

Analyzing the obtained results, we can summarise that the implementation of quality management systems in educational institutions provided a moderately sustainable position for the university in the short term and improvement of this position in the future. The evidence for this is the certification of the university in 2006, recertification in 2009, and the subsequent growth of the indicators.

However, in the context of faculties, we observe that the quality management system does not provide exceptionally the improvement of their positions (as can be seen from Fig. 3), but it creates the conditions that facilitate it with the use of the quality control tools defined within the framework of certification.

It should also be noted that in addition to the university's internal policy, we consider that the quality assurance is influenced by the external environment where the university operates. Indeed, under conditions of strengthening the relationship of participants in the Triple Helix, the development of one participant affects the enhancement of the quality component of the other. As we observe, the average nominal monthly earning of an employee, for example, in Kosice region, which is the second region (after Bratislava region) in the Slovak Republic, ranges from EUR761 in 2009 to EUR945 in 2015 [27]. This shows that the environment where the graduate will be employed ensures an increase of this indicator each year. Besides, the salary varies depending on the level of obtained education, which influences the interest to higher education.

CONCLUSIONS

In the paper we demonstrate that after implementing the quality management system in the university, its position in the external ranking improved, and, judging from

our mathematical prognosis, will continue improving. Of course, as we determined, to this result there contributed the regional indicators of the economic state, primarily, salary and innovation activities. Moreover, for the last years, Kosice region has been of interest for international corporations (including well-known automobile corporations), which operation requires qualified personnel and, first of all, graduates of Technical University. So, using the principles of Standards of ISO 9001 in the educational process, the university actually enhances its competitiveness, including the improvement of supply of graduates in the labor market, and can increase the labor market due to stimulating the interest of foreign investors, since the quality of human resources is the most important argument for creating new companies using advanced technologies and mechanical processes. But, of course, the results of the carried out analysis demonstrate that each faculty has its own opportunities for improving its position, and it should be taken into account in the future. However, it is worth noting that due to the rapid development of the educational environment, the analyzed university should continue working in the direction of improving the quality. This is possible through supplements ISO 9001: 2008 – the methodology «Plan-Do-Check-Act»– and the concept of identification and management of risk for the prevention of adverse effects implemented by ISO in 2015, which will help consolidate the position of the university and in the future. ■

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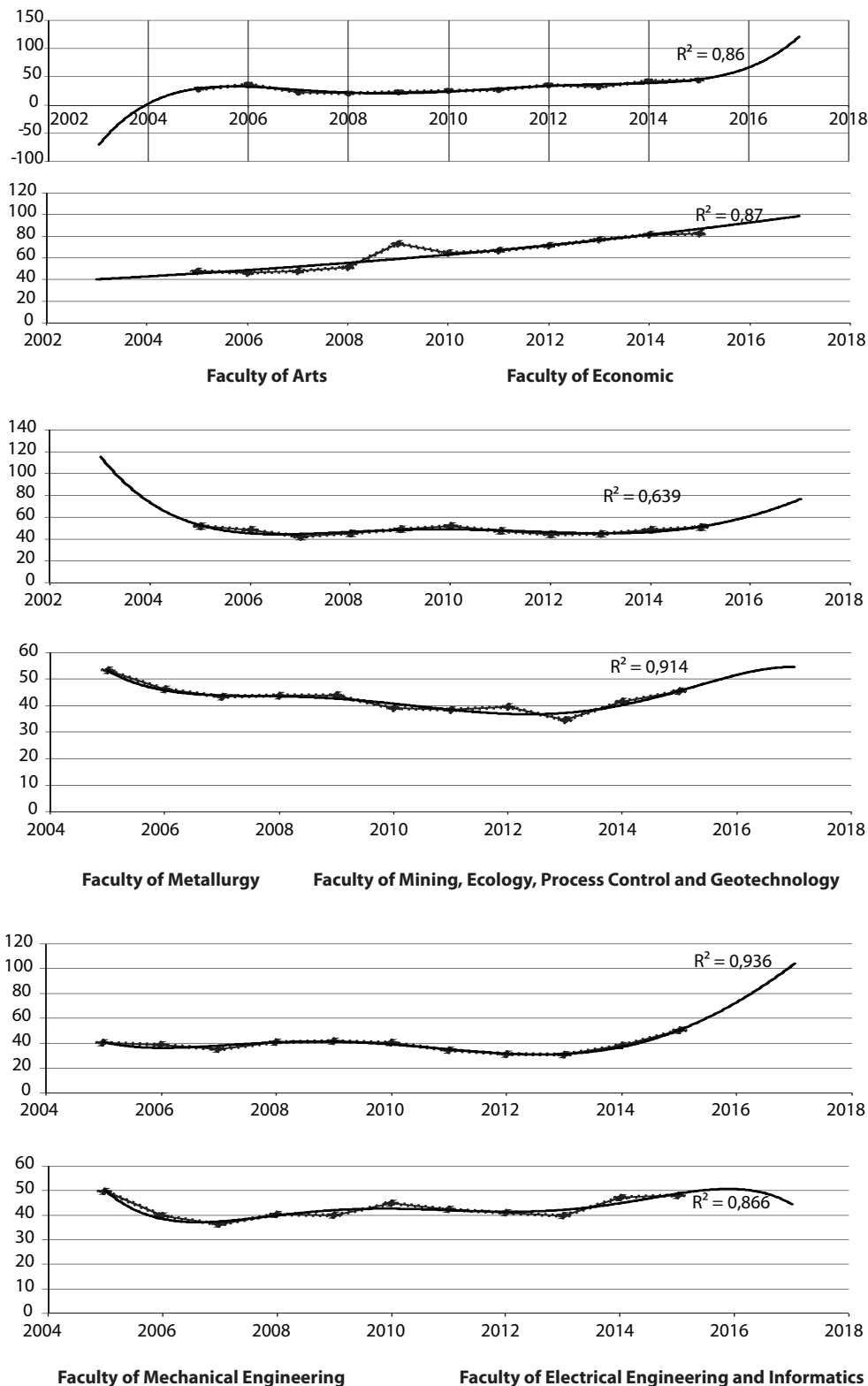


Fig. 3. The trend equation with the prognosis for TUKE

Source: developed by the author based on [1].

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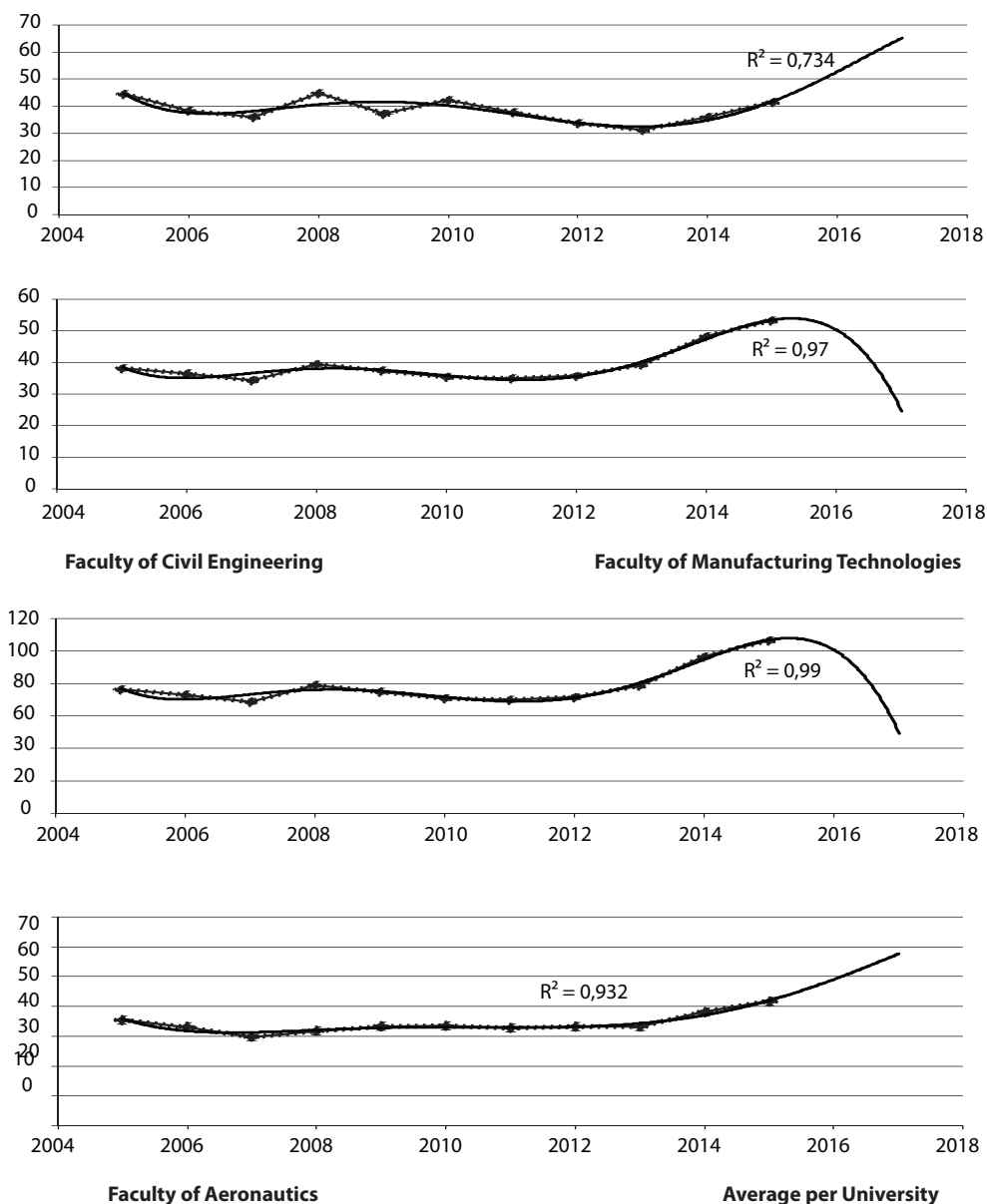


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