

THE CREATION OF QUALITY MANAGEMENT SYSTEM IN THE CONTEXT OF REGIONAL COMPETITIVENESS OF REGIONAL UNIVERSITY ENVIRONMENT OF THE SLOVAK REPUBLIC

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1 INTRODUCTION

Competitiveness has become one of the important features of the current development of national economies. Apart of the traditional view on economy, which was related with productivity and economic growth, the main focus today is aimed on modern technology development, service and knowledge-based economy.

Education in the placed context is increasingly proving its being strategic goods and power, which is shaping ability of the society (state, community, family) to face current challenges and to adequately meet their needs, or even survive as a organized unit. The quality of university education and research is an important sign of international attractiveness and competitiveness of Europe. Ensuring quality education at universities is a permanent process of organising, providing and checking their educational, scientific, artistic and managerial activities to ensure their efficient and perspective function. At universities, it is necessary to focus on capacity expansion and quality increase. The key to achieve this goal is a flexible system where universities respond to the particular requirements of young people same as to demand for lifelong learning and the most premium of them are at the same time the centres of research and development on internationally comparable level.

Questions of quality at universities – to ensure quality, to evaluate quality or to verify quality – have always been extremely sensitive area. This sensitivity is also reflected in the wording of the declaration, which is quite broad and includes only the expression is of „the support of European cooperation in ensuring the quality with the intent to establish comparable criteria and methodologies.¹

¹ The recommendation of the Council from 24.9.1998 on European cooperation in ensuring quality in higher education (98/561/EC) published in Official journal L 270/56 7.10.1998; Bologna declaration of ministers responsible for higher education (19.6.1999), Prague Communiqué (19.5.2001); Berlin Communiqué (19.9.2003); draft of recommendation of the Council and European parliament on further European cooperation in ensuring quality in higher education from 12.10.2004 as COM (2004) 642 final.

There has not yet been processed any broader analysis of the university environment (later „UE“) from the point of view of competitiveness in the separate regions in Slovakia. Certain examples of the analysis are „Reports on the evaluation of universities in Slovakia“, realized by the ARRA agency,² Sector report about the state of university schooling in Slovakia³ and accreditation of universities in Slovakia⁴.

Our primary concern in this area is the identification and evaluation of the mechanism of the creation of quality management in UE and implication of the issue on regional framework within the terms of the criteria of competitiveness on the basis and example of public universities⁵ in Slovakia.

The issue and the methods are a continuation of the approaches from the contribution published in the journal „Quality Innovation Prosperity XII/1-2008“, where the selection of regions was made the way that from the level NUTS II (Slovakia – East, Central, West) four regions with the comparable parameters (the Košice Region, the Prešov Region, the Banská Bystrica Region, the Nitra Region) were chosen. At this stage of the considered problem we expand the regional application to all eight regions of Slovakia.

2 METHODOLOGY

As there is no finality of life, so the lasting existential effect of concepts and theories is not possible too. Under development it is necessary to make revisions in the conceptual apparatus of science itself, but also in the methodology of science.

On the basis of above mentioned we considered following as the main starting points of investigation:

² Academic ranking and rating agency, whose aim is to provide the information about the quality of individual university institutions in Slovakia to public, and to adopt a way of evaluation and increasing the quality of education provided by university institution in Slovakia.

³ Project of two-year evaluation of 24 universities in Slovakia by European association of universities (EUA) has been finished by the conference called „Sector report about the state of university schooling in Slovakia“, which took place in Bratislava between 18 and 19 of February 2008.

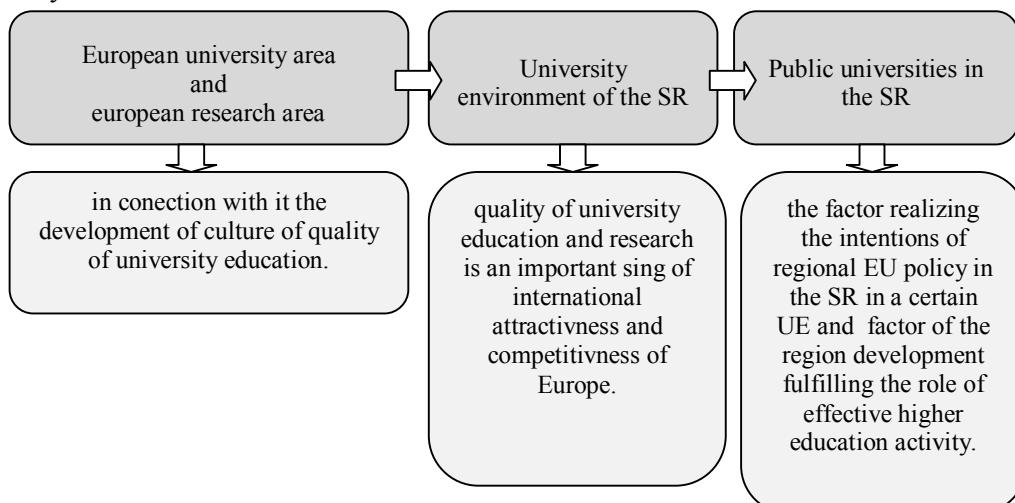
⁴ Main evaluative organ, that will issue its proposal, is Accreditation Committee, advisory body of the Slovak Government (later only AK). All university materials of all-university package character, or for individual faculties, were processed on the basis of the Regulation of the Government of Slovak Republic, nr. 558/2007 about AK, the resolution of the Ministry of Education about the criteria of assessing the fitness of universities to realise facilitation procedures and procedures to name professors, valid since 15 June 2008, as well as the decision if the minister, who set the criteria for incorporation of certain schools into the category University, High School or Technical High School (KZU 1 to 6, valid from 1 January 2008)

⁵ <www.minedu.sk>

- competitiveness and revival of economy and society based on knowledge,
- importance of quality in UE: „Quality is the basic condition of trust, relevance, mobility, compatibility and attractiveness in university education“ (Salamanca Convention, 2001),
- the possibilities of implementation of Quality management system following the requirements of the ISO 9001:2000 norm in UE,
- implementation of process approach in Quality management system: external and internal evaluation, identification of processes and interrelations among them. Starting point thesis: „Process approach is the way to achieve the desired results through managing activities and related resources such as processes“,
- strategy of quality in the conditions of universities - overall intentions and directions of university in the area of quality formulated and authorized by top management,
- goals of quality: desired results in the context of efficient use of resources to achieve these results,
- documentation of quality management processes at universities,
- human resources as a factor of time in the quality management system, ensuring the changes, information and engagement in the „quality“ direction,
- UE in Slovakia in the context of legislative changes and European trends.
- processes and phase changes as the key to success in a competitive environment.

Based on previous knowledge, we set a target of the contribution, which is the theoretical development and practical generalization of quality management mechanism applied to public universities in the separate regions of Slovakia and to determine the order of regions in terms of competitiveness in the UE segment.

Key variables:



Monitoring regional differences across Slovakia and the evaluation of regional university environment under the conditions of regions in Slovakia from the perspective of their quality was realised based on the own evaluative implement, namely **Index of quality of regional university environment** (later only “IK RVŠP”) was a supportive process.

3 RESULTS AND DISCUSSIONS

IK RVŠP is a summary index which tells us about the quality of university environment in municipalities in Slovakia and it is the combination of values of four chosen statistical indicators. It was constructed from four sub-indices and each of the sub-indices has particular indicators. Sub-indices are the result of calculations obtained based on statistical data from individual indicators in each sub-index.

Name of sub-index	Weight in IK RVŠP
Macroeconomic performance and stability	25 %
Institutional quality	15 %
Innovative performance	30 %
Human resources	30 %

Figure 1 – IK RVŠP Sub-indices (Source: Own working-out)

During calculations the weights of the sub-indices were defined, which were attributed to them by respondents from both external and internal segment of university environment, where we conducted the survey. The content of respective sub-indices and indicators was maintained in synchronicity with the content of the questionnaire in order to be able to compare them. This enabled us to compare the data and it meets the methodology and the formulation of the target. The data are from 2006, and it is the last year where the statistical data are available in needed indicators. In the sub-index Institutional Quality we used the methodology to follow the trends in the framework of two-year time period – the years 2006 – 2007, because there are available statistic data.

Methodology:

Basic formula for the calculation of IK RVŠP on the example of the sub-index of Macroeconomic performance and stability (later “MEVS“):

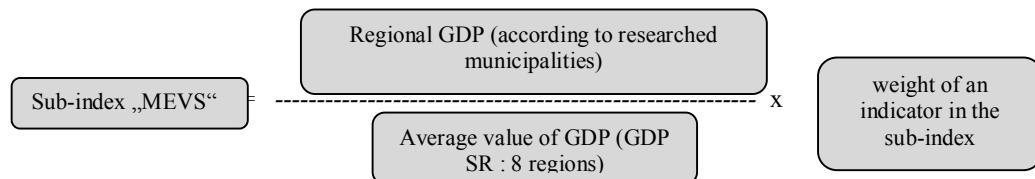


Figure 2 - Basic formula for the calculation of IK RVŠP (Source: Own working-out)

3.1 The Macroeconomic performance and stability sub-index

Education and training are determining factors for potential of excellence, innovation and competitiveness of each country. At the same time they form an integral part of the social dimension of Europe, because they are the implement to transmit the values of solidarity, equal opportunities and social participation and they are of positive influence to health, reducing crime, environment, democratization and general quality of life. The sub-index of Macroeconomic performance and stability is a significant factor influencing the interest in studying at a university in a municipality, and it is also related to the opportunities for getting employed after graduation and characterizes given environment from the economic and social perspective. **Growth performance** and stability includes GDP growth and GDP dependent economic level of the country (expressed in GDP per capita). The essential growth factor is labour productivity, the development of which is usually followed by economic growth (Table 1).

If the height of regional development and regional added value are domineering in the Region of Bratislava and the Region of Košice, then it is important to point out the differences in the productivity of labour, where absolutely dominates the Region of Bratislava, which is given by the economic structure of the municipality and the share of activities with higher added value. The last place is occupied by the Region of Prešov. The Region of Bratislava dominates also in the indicator of the number of the employed, which is closely related to the size of the region as well as the number of population. The first place belongs to the Region of Košice in the indicator of the number of people willing to get employed, and both the Region of Banská Bystrica and the Region of Prešov are close behind, as it is generally known that these municipalities belong in Slovakia to the ones with relatively high unemployment rate.

Table 1 – Resulting values of indicators in the sub-index “Macroeconomic performance and stability” (Source: Own calculations)

Region	Resulting values of indicators in the sub-index Macroeconomic performance and stability				
	Regional GDP (in mill. Sk)	Regional value added (in mill. Sk)	Labour productivity (in mill. Sk)	Average employment rate (in thousands of persons)	Disposable number of applicants for a job (thousands of persons)
BSK	2,10	1,88	20,36	1,22	-0,25
TTSK	1,00	1,04	9,75	0,87	-0,49
TNSK	0,83	0,94	4,54	0,73	-0,51
NSK	0,89	0,82	4,19	0,79	-1,00
BBSK	0,72	0,70	4,61	0,68	-1,67
ŽSK	0,83	0,91	5,27	0,78	-0,74
PSK	0,65	0,68	3,57	0,76	-1,64
KS K	0,97	1,03	8,22	0,79	-1,71

Legend:

BSK – The Region of Bratislava

TTSK – The Region of Trnava

TNSK – The Region of Trenčín

NRSK – The Region of Nitra

BBSK – The Region of Banská Bystrica

ZSK – The Region of Žilina

PSK – The Region of Prešov

KS K – The Region of Košice

3.2 The Institutional quality sub-index

In this indicator internal segments of UE are prevalent, while the number of public universities in the region and their faculties as well as the capacity of business subjects both are a significant factor for the opportunities for studying for people interested in tertiary education and for getting employed in the labour market.

In this sub-index we used the methodology to follow the trends in the framework of two-year time period – the years 2006 – 2007, because there are available statistic data. It was based on the number of 20 public universities and 101 faculties in Slovakia in 2006 and 2007. Other data were calculated based on the data from the Annual report about the state of universities in Slovakia in 2006 and 2007, the number of business subjects was based on the Report of the statistical office of the Slovak Republic in 2006, 2007.

*Table 2 - Resulting values of indicators in the sub-index “Institutional quality”
(Source: Own calculations)*

Region/ year		Indicators in the sub-index “Institutional quality”					
		Number of universi- ties	Num- ber of facul- ties	The volume of paid social scholarships	Economic result of universities (million Sk)	Accommodation capacity of the universities (number of beds)	Number of business subjects
BSK	2006	2,00	2,29	2,11	2,03	3,74	1,52
	2007	2,00	2,29	2,18	1,01	3,77	1,52
TTSK	2006	0,80	0,63	0,42	-0,08	0,04	0,85
	2007	0,80	0,63	0,41	2,37	0,04	0,85
TNSK	2006	0,40	0,39	0,16	0,01	0,05	0,88
	2007	0,40	0,39	0,18	-1,55	0,05	0,86
NSK	2006	1,20	1,12	1,01	0,52	0,75	0,95
	2007	1,20	1,12	1,01	0,87	0,76	0,95
BBSK	2006	1,20	0,87	0,78	-0,41	0,69	0,85
	2007	1,20	0,87	0,85	1,52	0,66	0,84
ŽSK	2006	0,80	0,87	1,27	4,46	0,99	1,07
	2007	0,80	0,87	1,19	3,06	0,97	1,07
PSK	2006	0,40	0,63	0,75	0,08	0,32	1,02
	2007	0,40	0,63	0,78	0,05	0,32	1,05
KSK	2006	1,20	1,19	1,51	0,23	1,41	0,85
	2007	1,20	1,19	1,39	0,66	1,41	0,86

Even in this case the Municipality of Bratislava dominates by the opportunities for studying, accommodation capacities, as well as getting employed in the labour market, which is given by the potential of Bratislava as the capital of Slovakia. In comparison to 2006 the region has experienced a slight increase in a volume of paid social scholarships and the accommodation capacities. After the Region of Bratislava the worst social position by the amount of paid social scholarships is occupied by the Regions of Košice, Žilina and Nitra, respectively. In the year 2007 the situation got worse in the Regions of Košice and Žilina. On the other hand the slight improvement in comparison to 2006 has been

experienced by Bratislava, Trenčín, Banská Bystrica and Prešov Region. The lowest accommodation capacity for students is in the Regions of Trnava and Trenčín. In 2007 the accommodation capacity increased only in Bratislava and Nitra Region. In contrast in Banská Bystrica and Žilina Region the accommodation capacities slightly decreased. In the number of business subjects the first place is occupied by the Region of Bratislava, and close behind there are the Regions of Žilina and Prešov. This signalises that they create comparable conditions for doing business and this could in turn increase the ability of graduates to get employed particularly in these regions and thus increase competitiveness as well. The number of business subjects slightly increased in the Prešov and Košice Region. It is worth noticing the negative results of the Regions of Banská Bystrica and Trenčín (thus economic losses) in the area of economic result of universities in the region in 2006. Relatively distinctive success in this indicator is in the Region of Žilina, and behind it the regions of both Bratislava and Nitra. In 2007 the Region of Žilina was still the first, followed by Trnava and Banská Bystrica Region, which showed negative results in 2006.

3.3 The Innovative performance sub-index

As has already been mentioned, achieved values in the indicator of Science and research are the result of 14 data groups that express the potential and results of universities of given region in a complex way. The methodology of ARRA was based on the division of universities according to the Frascati manual to sciences: natural sciences, technical sciences, medicine sciences, agricultural sciences, social sciences, humanities. Faculties were assessed according to this division. Given averages from the report were then divided by the number of assessed faculties, so that achieved results would not be distorted by the different number of faculties (Table 3).

This index is dominated by the Bratislava Region in two indicators. Is it surprising to see that the position of a university in the Region of Nitra (3rd place from assessed universities and close behind the Region of Bratislava).

3.4 The Human resources sub-index

Without high-quality human resources as one part of the R & D infrastructure it will be impossible to carry out research and development at the top European level. Sufficiency of qualified labour force is both the assumption and condition for growth of qualitative competitiveness on national and regional level. This was the basis for the construction of the sub-index and its indicators (Table 4).

Table 3 - Resulting values of indicators in the sub-index “Innovative Performance” (Source: Own calculations)

Region	Indicators in the sub-index “Innovative performance”		
	Number of employees in science and research at universities (employees with degree and higher qualifications)	Science and research*	Expenses for science and research in the municipality(thousands of Sk)
BSK	3,70	33,91	3,91
TTSK	0,30	27,59	0,61
TNSK	0,41	18,50	0,98
NSK	0,72	33,29	0,64
BBSK	0,54	22,18	0,30
ŽSK	0,80	15,38	0,50
PSK	0,33	16,87	0,17
KS K	1,11	67,33	0,88

Note:

* Average value according to the faculties of given university in the region, own calculations according to the results of ARRA 2007 evaluation, marked VV1A–VV10 (Source: www.arr.sk)

Table 4 - Resulting values of indicators in the sub-index “Human resources” (Source: Own calculations)

Region	Indicators in the sub-index Human resources		
	Population in the municipality with university degree	Studying and education*	Registered unemployed university graduates (AP 2006*)
BSK	1,90	87,42	-0,51
TTSK	0,74	47,58	-0,74
TNSK	0,92	41,66	-0,79
NSK	0,78	53,91	-1,26
BBSK	0,89	52,83	-0,85
ŽSK	0,90	44,43	-0,89
PSK	0,81	38,50	-1,63
KS K	1,04	67,22	-1,33

Note:

* Average value according to the faculties of given university in the region, own calculations according to the results of ARRA 2007 evaluation, marked SV1 –SV8 (Source: www.arr.sk)

* AP – arithmetic mean calculated from the values of May and September 2006 (Source: statistical results about unemployment of university graduates and youth)

If the position of all the assessed municipalities is the same in the indicator of university graduates, then in the indicator of Studying and education the Region of Bratislava achieves the results, followed by the regions of Košice, Nitra and Banská Bystrica respectively. This gives the evidence for the fact, that from the perspective of activities structure the universities are orienting equally towards academic activities, as well as towards science and research. The position of the Region of Prešov is given by the fact, that there is only one public university. It is important to note, that the results in the indicator of Studying and education were calculated similarly as in the indicator Science and research from the assumptions of ARRA, from 7 groups marked SV1-SV8. They express different aspects of performance of the assessed universities and their faculties and even in this case the average values from the ARRA report were divided by the number of faculties in two blocs of SV1-SV4 and SV6-SV8, so that the different number of faculties would not distort the objective position of given faculty/university/region in the assessment.

3.5 The summary of results from the Index of Quality of Regional University Environment

IK RVŠP should have mapped the UE in selected regions of Slovakia and identify its strengths and weaknesses from the perspective of quality evaluation. To illustrate the extent of background material we note, that 17 indicators in all the 8 Slovak regions have been defined in the framework of 4 sub-indices of IK RVŠP with the background in the statistical data on regional and national level. This helped to achieve its resulting values.

If we compared obtained results of IK RVŠP with the results from the questionnaire survey, all the relevant characteristics in the area of quality determinants, problem areas and the direction of UE development in assessed regions were confirmed (Table 5).

As can be seen in the summary table and graph, the highest values in all sub-indices are achieved by the Region of Bratislava, whereas the biggest differences among assessed regions occur in the sub-index of macroeconomic performance and stability and Innovation performance. Relatively high value in the sub-indices of Innovation performance (Indicator of Science and Research) and Human Resources (Indicator Studying and Education) is given by the construction of these sub-indices, as the data were taken from the ARRA report. There, the areas of Science and Research are complex activities of assessed universities evaluated under marking of VV1A - VV10 and thus relatively high number of data such as number of publications, number of citations, the ratio of PhD. students to lecturers and to the number of other students, the volume of finance obtained for granted programmes etc. Similarly, in the sub-index of Human resources in the indicator of Studying and education (marked in the ARRA report by SV1 - SV8 the main sides of activities of assessed universities

are expressed by the number of students, ratio of lecturers according to individual categories and in relation to students, the extent of interest in studying at given university from home and international students. The reason for processing such an extensive database is the essence of the Index of Quality of Regional University Environment, as the key characteristics of the UE quality are in the logic of index construction the areas of Innovation performance and Human resources. This fact is expressed by the weights of sub-indices in the framework of the IK RVŠP.

*Table 5 – Resulting values of sub-indices of IK RVŠP according to municipalities
(Source: Own calculations)*

Region	Sub-indices of IK RVŠP				
	Macroekonomic performance and stability	Institutional quality	Innovative performance	Human resources	Summary index
	Weight 25%	Weight 15%	Weight 30 %	Weight 30 %	Weight 100 %
BSK	6,33	2,05	12,46	26,64	47,48
TTSK	3,04	0,40	8,55	14,27	26,26
TNSK	1,63	0,28	5,97	12,54	20,42
NSK	1,42	0,83	10,40	16,03	28,68
BBSK	1,26	0,60	6,91	15,86	24,63
ŽSK	1,76	1,42	5,00	13,32	21,50
PSK	1,01	0,48	5,21	11,30	18,00
KSK	2,33	0,96	20,80	20,08	44,17

Resulting values of IK RVŠP for the assessed time period and on the basis of chosen methodology determined the order of regions in such a way, that the highest value is achieved by the Region of Bratislava, followed by the regions of Košice, Nitra, Trnava, Banská Bystrica, Žilina, Trenčín and Prešov. This is the reflection of reality, that the potential of the regions of Bratislava and Košice and universities in the regions have the best results from the perspective of competitiveness. The state of UE in its external and internal segment in the regions of Žilina and Trenčín is comparable, while if the Region of Žilina shows higher performance in the sub-index of Human resources, the Region of Trenčín shows the higher value in the sub-index of Innovative performance. It is given by the number of business subjects in the region. The Region of Prešov belongs to regions with highest unemployment rate. Compared to other regions, there is only one public university in the Region of Prešov containing 8 faculties. Other

regions have the comparative advantage from the perspective of portfolio of study programmes offered, while in the Region of Prešov the choice is limited in relation to the standard indicators of the competitiveness.

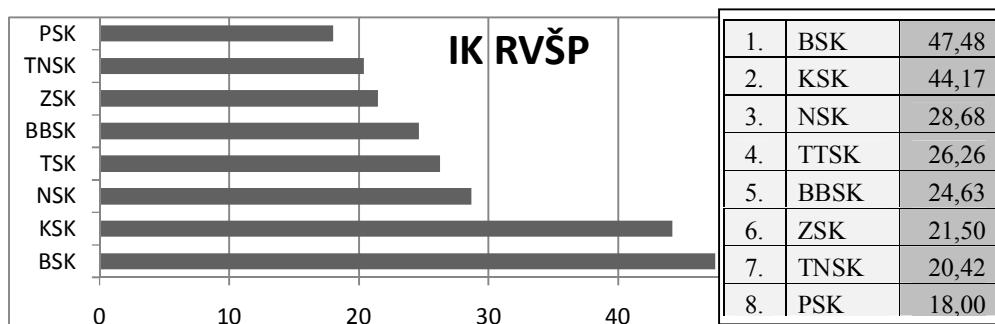


Figure 3 - Resulting values of IK RVŠP
Source: Own calculations

4 CONCLUSION

Obtained results of the evaluation of quality of regional UE has confirmed the correct construction and usefulness of the IK RVŠP for the identification of conditions in both external and internal segment of UE in the context of criteria of qualitative competitiveness. Used methodology can be used for this purpose in observing development trends in the framework of long-term time horizon and in the framework of all Slovak regions.

AFFILIATION

The contribution has been worked out as the continuation of the problems described in the dissertation thesis under the name Creation of the system of quality management in the context of european trends (on the example of university environment in the Slovak Republic).

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