COMPARISON OF SCIENTIFIC SOCIO-ECONOMIC RESEARCH PERFORMANCES IN EASTERN EUROPEAN UNIVERSITIES*

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Abstract: *Scientific research performance measurement and its analysis creates the context where universities are forced to develop strategies to increase the values obtained from indicators such as number of scientific articles, the number of citations of these articles, h-index, g-index, etc. The purpose of this article is to analyze the performance differences arising in the socio-economic science between major universities in South-Eastern Europe, many of them EU Members. In addition, to see where they stand compared to Western Europe, will include a brief review of the results of a major university as London School of Economics and Political Science.*

Keywords*:* performance measurement, indicators, Southeastern Europe, database of scientific articles
JEL Classification: I23, L2, L8

INTRODUCTION

The idea behind this paper is not to create a ranking of Eastern Europe socio-economic sciences universities or faculties but „the need for accountability in Higher Education (HE) has led governments, research authorities and University administrators to assess research performance using single indices that allow comparisons and rankings. The concern for the implications of poor performance in such rankings has led Governments to consider taking some action." (Panaretos and Malesios, 2009).

Performance in scientific research depends on internal and external factors. Researchers or research teams from universities are constrained by legislative measures or called by the partners in the economic environment to conduct studies and provide solutions to solve some economic and social problems. Legislative constraints and the desire of those who teach or do research activities to promote, generates a particular need to publish scientific papers in journals and conferences

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proceedings. The current economic crisis has forced managers of large companies to invest in research at international level: „the ongoing development of the service sector in the Western economies and the increased competition between firms in a globalized world brought about a substantial demand for high quality managerial skills. This transformation helped Business Schools [B-Schools, thereafter] to become important players in the education sector. While in the 1950s their main purpose was to provide basic, professionally oriented education, these days scholarship and research become essential dimensions of their mission such as understood by society and by themselves. (Besancenot, Faria and Vranceanu, 2009). If from the point of view of teachers involved in the research work this presents an advantage in recognition and relevance of research, this approach has generated a problem "business schools have recently been criticized for placing too much emphasis on research relative to teaching, and for producing research that is to narrow, irrelevant and impractical" (AACSB, 2008). Subject to some criticism, socio-economic area is caught in the middle as the inability to transform results into knowledge suitable for technology transfer generates a negative behavior, but conditions in recent years allow us to state that through our research we can bring solutions to increase social performance economic.

In another context, the core business of a university is research and teaching, but research quality is what separates top universities from their competitors. Institutions that produce the best research receive the largest share of public funding and private philanthropy. There is also a significant relationship between the quality of research and the extent of industry funding (Gulbrandsen and Smeby, 2005).

Under these conditions, performance measurement is to promote research collectives and teams who develop scientific papers useful for their funders, both public and especially private. Publishing an article is a complex process because the pressure on relevant international journals is high and scientific works go through an evaluation process by peer-review and then another assessment process of their scientific quality and relevance by the number of citations. Thus bibliometry, the science that measures these performances has become a standard tool of science policy and research management in the last decades. In particular, academic institutions increasingly rely on citation analysis for making hiring, promotion, tenure, and funding decisions (Weingart, 2005).

Bibliometric statistics and indicators are source data for the development of decision-making rules to finance science. The growth of state support for basic science stimulated the international use of scientific productivity (SP) indicators, such as the number of articles published, their citation,

and the impact factor of scientific journals, to assess the contribution of national sciences to world science (Markusova, Ivanov and Varshavskii, 2009).

Since the introduction of the h-index (Hirsch, 2005) a number of studies have shown the practical use of this measure to evaluate scientists within specific disciplines. (Boell and Wilson, 2010).

Common evaluation criteria that characterize quality of research at scholar level are productivity and impact. Traditional bibliometric indicators, like number of published papers and number of received citations, aim to separately capture these criteria; recently proposed indexes, e.g. the h index (Hirsch, 2005), try to measure, in a single note, more aspects of quality. The h index of a scholar is the highest number h of papers published by the scholar that have each received at least h citations (Franceschet, 2010).

1. RESEARCH METODOLOGY

International comparison of scientific research performances in Eastern European universities was based on existing data in two databases of scientific articles Web of Science and Scopus. The period of analysis was between the years 2005-2012 and includes in a significant proportion all articles published by the selected universities in the socio-economic sciences area.

The research started with the idea of comparing the results of scientific research of socio-economic sciences universities or faculties in this part of Europe. For this purpose were chosen some representative universities in countries such as Czech Republic, Poland, Hungary, Slovakia, Romania, Bulgaria and Serbia. Educational institutions are representative for each country and are leading providers of social and human sciences research for the communities they belong to. In terms of the faculties / universities type, they can be divided into two groups: faculties of belonging to socio-economic science universities that, in addition, have other areas of education and research, in this category being: Alexandru Ioan Cuza University of Iași, Babes-Bolyai University of Cluj Napoca from Romania, Corvinus University from Hungary that besides social sciences has two Faculties of Horticulture and Belgrade University, one of the most prestigious institutions of higher education in Serbia. University of Warsaw falls into the category of those entities with different specializations but a significant proportion fall within the social and human sciences. Researcher's desire was that the other selected entities to fit into the same category, but a research of universities in the Czech Republic and Slovakia have concluded that beneficial for the comparative analysis is

to consider two universities with economic specific: University of Economics in Bratislava and University of Economics Prague.

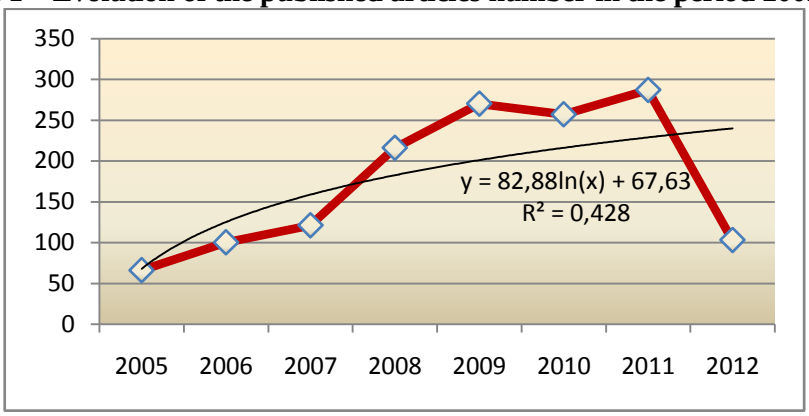
From the foregoing analysis results that the countries of Eastern Europe, forced into a sort of competition within the union and competition with other universities, began with small steps to develop strategies for funding scientific research but also methodologies of evaluation and performance monitoring of their researchers in this field. Of the entire analyzed countries, only one who has not yet achieved the relevant performance measurement strategy is Serbia, but with the adoption of the EU accession criteria, it will be forced to develop and apply a strategy in science.

Research limitations depended on access to information in the analyzed databases as between the two sources is a major difference regarding the encoding mode. In order to search, were used the search systems in Web of Science and Scopus, and the chosen criterion was the name of the concerned faculty and university. There are significant differences in how the universities and faculties names are coded because Web of Science uses some abbreviations while the Scopus makes this easier search using the full name of the institution and its substructures. For this reason in some cases the Web of Science search is more difficult and there is the possibility that the results are different. Another limitation depends on the specific search method of the Web of Science and is because these abbreviations for certain faculties are very difficult to be identified, the researchers preferred to use the scientific research, in our case "economics, social science ". Thus, it is possible that researchers are not only from within that university, they may be from other faculties and departments of the concerned university, the motive is that Web of Science displays the criterion and two other appropriated.

2. THE RESEARCH RESULTS

In the period 2005-2012, according to data gathered from the Web of Science database, the analyzed Faculties of Economics from Eastern Europe have published a total of 1420 articles. From Figure 1 it is noted that in this period was an upward trend and we believe that it would have a positive trend with an R-square greater than 0.5 if the data were analyzed by the end of 2012. As for the last part of this year, was not processed the number of items, the trend function $y = 82.88 \ln(x) + 67.63$ defines the upward curve of the indicator.

Figure 1 – Evolution of the published articles number in the period 2005-2012



Source: Web of Science

Out of the 1420, published in social and economic sciences, Babes Bolyai University of Cluj with 362 articles, have a share of 25.49%, Alexandru Ioan Cuza University of Iași with 296 articles, 20.84%, University of Warsaw with 253 publications, 17.81%, Corvinus University of Budapest with 220, 15.49%, Prague University of Economics, 217, 15.28% and Economic University Bratislava 5.07%.

Table 1 – Descriptive statistics – Number of Web of Science articles

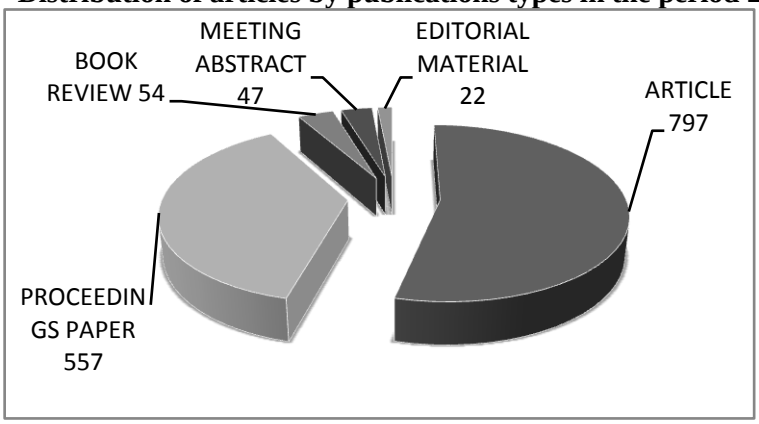
	Total	Cuza University	Babes-Bolyai University	University Economics Baratislava	Corvinus University	University Economics Prague	Warsaw University	University of Belgrad
Article	1420	296	362	72	220	217	253	
Article/all		20,84%	25,49%	5,07%	15,49%	15,28	17,81	
2005	66	6	7	4	5	17	27	
2006	100	23	11	11	17	13	25	
2007	121	15	20	3	23	20	40	
2008	216	27	53	11	36	45	44	
2009	270	58	80	17	40	40	35	
2010	257	59	79	10	37	40	32	
2011	287	92	81	9	46	32	27	
2012	103	16	31	7	16	10	23	
Mean	177,5	37	45,25	9	27,5	27,16	31,62	
SD	89,06	29,59	31,99	4,44	14,29	13,74	7,52	
Max	287	92	81	17	46	45	44	
Min	66	6	7	3	5	10	23	

Source: Web of Science

The descriptive-statistics analysis of the results show that on average universities published 177.5 articles, the maximum value being established in 2011 and minimum in 2005. This upward trend was due to the interest of universities to publish relevant articles in order to create research networks, another cause may be the growing number of magazines such as in Romania and implementing of evaluation and grading programs that forced universities to publish ever more. This is evidenced by the large standard deviation of 31.99, respectively 29.59 of Babes-Bolyai University and Alexandru Ioan Cuza University. Compared, University of Warsaw has a standard deviation of only 7.52 which means that the number of publications in the period was relatively constant, with no significant increases or decreases.

By publication type, universities have published in indexed journals a number of 797 articles but a significant number comes also from articles published in indexed conferences volume (557) the remaining are book reviews, meeting abstract or editorial material

Figure 2 – Distribution of articles by publications types in the period 2005-2012



Source: Web of Science

International recognition of the published articles value is determined by the indicator number of citations and H-index. The articles published by researchers from analyzed universities were cited in the period 2005-2012 by 2193 times. The high number of citations in socio-economic sciences area has Babes-Bolyai University in Cluj Napoca Romania 752 Bolyai percentage 34.29% and University of Warsaw Poland 663 value represents 28.86% of the total. A second two universities were cited articles 316, Alexandru Ioan Cuza University of Iasi, Romania and Hungary Corvinus University of Budapest of 248 times, with values exceeding 10%, University of Economics in Prague with 9.30% of the total.

Table 2 – Descriptive statistics – Number of citations in Web of Science

	Total	Cuza University	Babes-Bolyai University	University Economics	Baratislava Corvinus University	University Economics Prague	Warsaw University	University of Belgrad
Citations	2193	316	752	40	248	204	633	
Citations/all		14,40	34,29	1,82	11,30	9,30	28,86	
2005	52	-	46			1	5	
2006	73	-	49	1	6	3	14	
2007	152	1	76	3	9	21	42	
2008	243	14	99	4	21	28	77	
2009	297	32	92	6	37	39	91	
2010	448	94	125	7	53	46	123	
2011	586	121	164	11	87	34	169	
2012	342	54	101	8	35	32	112	
Mean	274,13	52,6	94	5,72	35,43	25,5	79,16	
SD	184,50	46,84	38,90	3,35	28,18	16,25	56,49	
Max	586	121	164	11	87	46	169	
Min	52	1	46	1	6	1	5	

Source: Web of Science

On average, the articles of the two universities Babes-Bolyai and Warsaw are cited by 94 times, respectively 79 times a year. The maximum number of citations for all higher education institutions analyzed was in 2011, with the minimum in 2005, with a standard deviation of 184.5.
Table 3 shows one of the indicators commonly used in determining the relevance of scientific articles and citation since 2005 h-index. It is noted that for Warsaw University, the twelfth article has 12 citations, Babes-Bolyai University eleventh article has 11 citations, Cuza University has h-index 10 and University of Economics in Bratislava h-index 4.

Table 3 - Number of citations in Web of Science

	Cuza University	Babes-Bolyai University	University Economics	Baratislava Corvinus University	University Economics Prague	Warsaw University	University of Belgrad
Without self-citations	246		40	248	188	546	
Average Citations per Item	1,07	2,07	0,56	1,13	0,94	2,5	

H-index	10	11	4	7	6	12

Source: Web of Science

Analysis of the publishing areas shows that the scientific production is very diverse with each university having areas where is performant. It can be seen in most cases that the first position is held by the economy domain, but besides these this are also health policy services, education research, sociology, social works etc..

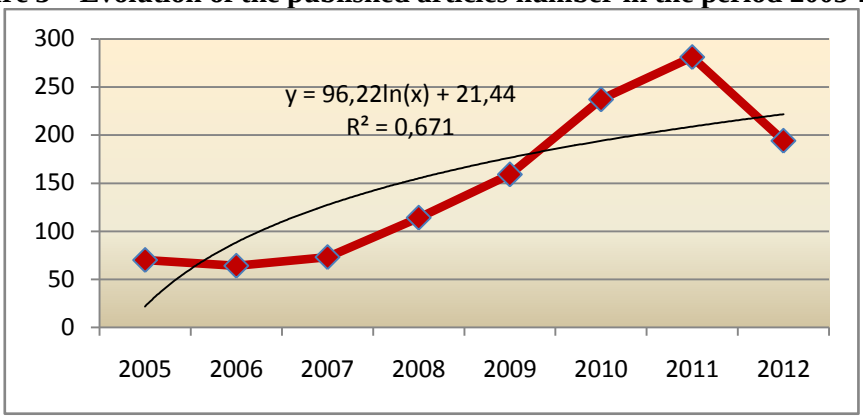
Table 4 – Domain articles distribution

Cuza University	Babes-Bolyai University	University Economics Baratislava	Corvinus University	University Economics Prague	Warsaw University
Economics	Public administration	Economics	Economics	Economics	Statistics probability
Management	Economics	Social sciences mathematical methods	Health policy services	Mathematics applied	Economics
Education educational research	Management	Political science	Health care sciences services	Computer science information systems	Operations research management science
Business	Operations research management science	Environmental studies	Operations research management science	Social sciences mathematical methods	Mathematics applied
Statistics probability	Business	Geography	Management	Management	Computer science interdisciplinary applications
Sociology	Mathematics applied	Mathematics applied	Political science	Political science	Management
Social work	Education educational research	Planning development	Business	Operations research management science	Planning development
Business finance	Business finance	Agricultural economics policy	Public administration	Computer science artificial intelligence	Business
Ethics	Statistics probability	Engineering multidisciplinary	Mathematics interdisciplinary applications	Computer science theory methods	Social sciences mathematical methods
Public administration	Social work	Business finance	Planning development	Business	Business finance

Source: Web of Science

According to the data from the Scopus database in the period 2005-2012, the analyzed universities indexed a total of 1153 publications. The evolution of this number can be described by a trend equation of the form y = 92.22ln(x) + 21.44 with R-square value of 67.1% which means that there are chances for future developments of publications volume to be described in the given formula.

Figure 3 – Evolution of the published articles number in the period 2005-2012



Source: Scopus

Table 5 details each entity results; this time, compared with analyzes with information from the Web of Science database appears also the Belgrade University. Thus, regarding the number of articles, is noted that universities have published a relatively close number of articles, the differences are not so significant. Statistically analyzing it can be observed that the maximum value in the analyzed period in six of the seven universities ranges between 41 and 55 and the standard deviation is approximately equal.

Table 5 – Descriptive statistics – Number of Scopus articles

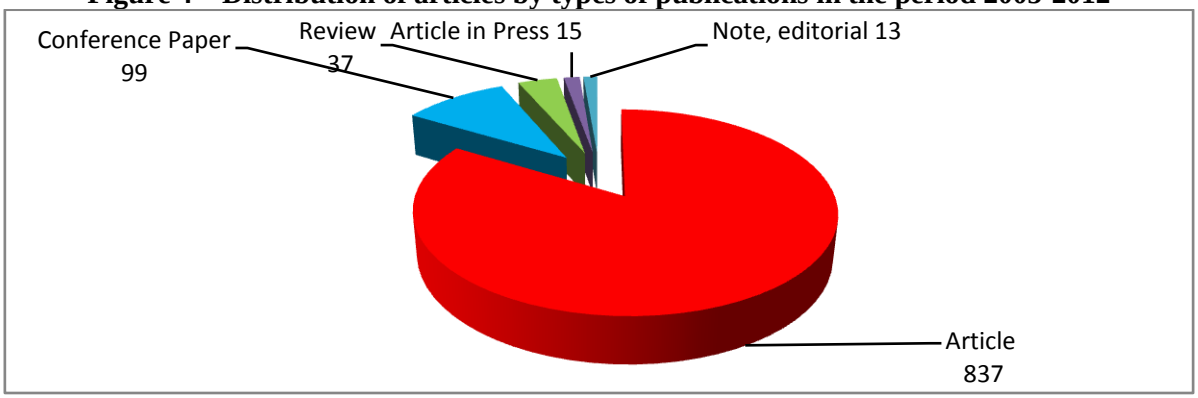
	Total	Cuza University	Babes-Bolyai University	University Economics Baratislava	Corvinus University	University Economics Prague	Warsaw University	University of Belgrad
Article	1153	134	178	110	178	193	188	172
Article/all		11,62	15,43	9,54	15,43	16,73	16,30	14,91
2005	70	1	3	25	4	20	12	5
2006	64	12	3	17	10	11	10	8
2007	73	3	3	8	16	7	20	9
2008	114	16	18	14	15	17	24	18
2009	159	17	29	7	31	25	23	21
2010	237	21	36	19	28	46	42	30
2011	281	41	41	16	48	46	28	55
2012	194	23	45	4	26	21	29	26

Mean	149	16,75	22,25	13,75	22,25	24,125	23,5	21,5
SD	82,60	12,56	17,86	7,00	13,94	14,64	10,14	16,20
Max	281	41	45	25	48	46	42	55
Min	64	1	3	4	4	7	10	5

Source: Scopus

Distribution of items number by type of publication highlights that in the Scopus database an estimated 837 of indexed publications are articles and much less, compared to Web of Science, are conference paper: 99.

Figure 4 – Distribution of articles by types of publications in the period 2005-2012



Source: Scopus

We can see that this database indexes in a significant proportion only articles and also the difference between the total results of the two sources is given precisely by the number of indexed conference proceedings.

Compared to other source, the total number of articles citations is 3434, with approximately 1100 more citations. The distribution of the indicator on universities clearly shows that the University of Warsaw with 1661 citations has about 50% of the total, followed by the University of Belgrade with 600. Other universities have a low number of citations.

Table 6 – Descriptive statistics – Number of citation for Scopus

	Total	Cuza University	Babes-Bolyai University	University Economics Baratislava	Corvinus University	University Economics Prague	Warsaw University	University of Belgrad
Citation	3434	173	294	96	278	332	1661	600
Citation/all		5,03	8,56	2,79	8,09	9,66	48,36	17,47
2005	19	1	9	1		2	5	2
2006	70	5	16	4		11	31	8
2007	132	10	21	6	8	21	55	21

2008	298	8	24	12	14	41	135	72
2009	480	23	32	11	39	42	259	97
2010	724	36	66	23	58	70	366	141
2011	894	47	75	24	93	96	446	160
2012	644	43	51	15	66	49	364	99
Mean	407,62	21,62	36,75	12	46,33	41,5	207,62	75
SD	327,49	18,25	24,36	8,41	32,46	31,05	173,13	60,21
Max	894	47	75	24	93	96	446	160
Min	19	1	9	1	8	2	5	2

Source: Scopus

To highlight and correctly evaluate the performance of universities in Eastern Europe we consider useful for our analysis a comparison with one of the universities recognized at European level in the field: The London School of Economics and Political Science.

Table 7 – Number of publication and citation of London School of Economics and Political Science

	Publication	Citation
2005	517	102
2006	542	371
2007	545	936
2008	392	1923
2009	407	2837
2010	443	3376
2011	492	4319
2012	392	3696
Total	3720	17578

Source: Web of Science

Compared to universities from the East, London School of Economics and Political Science has a number of publications about 262% higher than all the analyzed institutions, the main socio-economic science providers in this part of Europe. Analyzing the number of citations we see that it is 801% higher.

CONCLUSIONS

Comparative analyzed, the performance of socio-economic universities in Eastern Europe is very close and there are no significant differences between the major universities. The only which departs only slightly from the group is the Economic University in Bratislava which will have to adopt a strategy to increase the number of relevant publications.

Compared with the great European universities, the performance of these entities is mediocre, hovering in the national limits within each country. In order to compete with the big universities is recommended that they develop together or in partnership with institutions in Western European several research networks to publish articles in journals with high international quote.

It is required to adopt some legislative measures on performance evaluation which have the effect of performance increase in this activity, as the case of Romania who adopted a law on the ranking of universities and their funding based on the results from this ranking. The result was the adoption by university of strategies regarding the publishing of scientific articles in relevant international journals.

REFERENCES

AACSB (2008) *Impact of research. Final report of the AACSB International*, available online at http://www.aacsb.edu/resource centers/research/default.asp.

Besancenot, D., Faria, J.R., Vranceanu, R. (2009) Why business schools do so much research: A signaling explanation, Research Policy 38, pp. 1093–1101;

Boell, S.K., Wilson, C.S. (2010) *Journal Impact Factors for evaluating scientific performance: use of h-like indicators*, Scientometrics Vol. 82, pp. 613–626.

Franceschet, M. (2010) *A comparison of bibliometric indicators for computer science scholars and journals on Web of Science and Google Scholar*, Scientometrics, Vol. 83, pp. 243–258;

Gulbrandsen, M., Smeby, J.C. (2005) *Industry funding and university professors' research performance*, Research Policy, Vol. 34, Issue 6, pp. 932–950.

Markusova, V.A., Ivanov, V.V., Varshavskii, A.E. (2009) *Bibliometric Indicators of Russian Science and of the Russian Academy of Sciences (1997–2007)*, Herald of the Russian Academy of Sciences, Vol. 79, Issue 3, pp. 197–204.

Panaretos, J., Malesios, C. (2009) *Assessing scientific research performance and impact with single indices*, Scientometrics, Vol. 81, Issue 3, pp. 635-670.

Weingart, P. (2005) *Impact of bibliometrics upon the science system: Inadvertent consequences?*, Scientometrics, Vol. 62, Issue 1, pp. 117–131.