

## COMPARATIVE ANALYSIS OF SCIENTIFIC RESEARCH PERFORMANCE OF SOME ROMANIAN FACULTIES OF ECONOMIC SCIENCES

Tiță Silviu Mihail<sup>1</sup>, Neșțian Andrei Ștefan<sup>2</sup>

<sup>1</sup> Alexandru Ioan Cuza University, Iasi, Romania, nestian@uaic.ro

<sup>2</sup> Alexandru Ioan Cuza University, Iasi, Romania, silviu.tita@uaic.ro

**ABSTRACT:** In this analysis on the evolution of scientific research performance of some Romanian faculties of economic sciences we identify and compare the results obtained by these entities in the research field by using bibliometric output indicators (ISI articles, Database indexed articles). The objective of this research is to determine some the connections between the situation of the research production of these faculties and systemic changes with impact on this situation, hence offering data to support managerial decisions regarding the research activity in those faculties and in similar ones. The results show the ascendant evolution and the connections with the changes in institutional and individual performance management systems in the Romanian higher education.

**KEYWORDS:** research evaluation, performance, indicators, economic research, change management

### 1. INTRODUCTION

In Romanian universities, the performance assessment of economic scientific research shows important evolutions in the last 10 years and the determinants of this change are to be found, most probably, in the evolution of the entire national higher system.

To the general public, the economic scientific research offers the prospect of a thorough understanding of the connections between phenomena, processes and actors on the global economic scene. The results of this field have grown in importance in recent times, due to the transformations that have embraced different regions: major economic crisis, crisis of national economies or economic growth of some emergent economies. Despite the fluctuation of the global economy, the general context shows that impressive amount of money are invested by major actors in the research activity. „In the USA, the federal funds for R&D increased from \$72.86 billion in 2000 to \$114.45 billion in 2009, while in China, in 2000, the number is 89.6 billion Chinese yuan (about \$11.2 billion); in contrast, in 2009, the R&D investment reaches 580.2 billion Chinese yuan (about \$82.9 billion). With the fast growth of R&D investment, government funding is playing a more and more important role in scientists' research and paper publishing" [1]. The European Union allocate, in the European Horizon 2020, a budget of €70 billion for 2015-2020 [2].

Regarded with some degree of reluctance for many years, sometimes considered a consumer of financial resources without notable results, the scientific research in economy reached a point when many other scientific areas expect theoretical models, concepts and practical ideas to take away the gloomy economic prospects of the recent years and the uncertainties about the strength and sustainability of the current economic model.

The field of economic research, although has recorded undeniable progress, continues to show two major weaknesses: a) include a lack of realism; b) offers little support for developing new practices [3]. Economy, compared with Physics or other physical or exact science, lacks precise numerical laws since the human behaviour, a determining factor in many economic phenomena, can hardly be reduced to an equation or a factor score.

In order for us to understand the value of economic research, one must turn to the general concept of value of the research. One way of assessing the economic value of the research is to measure research productivity, as publications. There are two main approaches for evaluating research productivity, widely applied by various countries or institutions: peer-review and bibliometric methods. Both have been criticized and both have pros and cons [4]. Still, the use of bibliometrics by several governments, as part of the assessment of research

productivity, shows the emerging importance of bibliometrics in shaping the future of academia [5].

Performance assessment of economic scientific research, as in other scientific fields, is based on bibliometric indicators too. „Recent developments in bibliometric indicators, particularly for measurement of publication quality, have led many governments to introduce the more or less extensive use of these indicators in their next research assessments. The use of such measures is still limited to the natural and formal sciences where publications in international journals and conference proceedings are the most accepted form for the diffusion of research outputs, and where the publications therefore represent a trustworthy proxy of research outputs” [6]. In a counter argument about the usefulness of bibliometric indicators, we find that “in the arts and humanities and most of the social sciences, bibliometric indicators are considered not yet sufficiently robust to inform peer review” [7].

Bibliometric indicators used to measure research performance are mainly based on two central elements: number of publications and citation count. The statistics based on the number of publications primarily reflect the quantitative output of research activity [8].

The results of economic scientific research are widely disputed because economists do not have a singular evolutionary direction of their knowledge and, in many cases, they try to logically or mathematically model certain phenomena or processes in order to eliminate certain failures or inefficient decisions, brought to light by transient and haphazard situations. Moreover, both national and international propensity for the use of complex mathematical models of economic research makes the results difficult to be applied by practitioners as they tend to be action oriented and not looking-for complicated analyses.

Considering this acknowledged need to focus the economic scientific research towards more practical applications, the contradiction between the difficulty of modelling the reality and the difficulty to propose a practical application of theoretical models makes the Economics a field where bibliometric performance measurement is intensely criticized by scientific researchers. The alignment to the practices in other scientific areas is leading towards scientific publications whose practical application possibilities by practitioners are reduced, while the quest for practical applicability leads towards consultancy and less visible national or international publications.

Based on this dichotomy, this article is focused towards measuring the scientific performance with national and international visibility, without an examination of issues related to the practical applicability of these results of economic research.

## **2. METHODOLOGY**

This research aim is to identify the changes in the research output of the main academic entities in Romania operating in the field of economic research and to highlight some of the determinant of this evolution.

For this we chose to make a comparative analysis between the results of scientific research in the main universities and economic science faculties in Romania. The economic science faculties chosen can be considered the leading providers of research in the field of economy in Romania: Academy of Economic Studies (ASE) in Bucharest occupies the 4th place in the national ranking published by the Ministry of Education, Tourism and Sports in 2011. The Faculty of Economics and Business Administration, the Faculty of Business and the Faculty of Political, Administrative and Communication (FSEGA, FB, FSPAC-UBB) are members of Babes-Bolyai University, ranked on the 2<sup>nd</sup> place amongst the Romanian universities. The Faculty of Economics and Business Administration from the Alexandru Ioan University of Iasi (FEAA-UAIC) enjoys the university's rank as the 3<sup>rd</sup> one in the national ranking. The Faculty of Economics and Business Administration of the University of West Timisoara (FEAA-UVT) is the last selected, as the university is ranked in the top 15 universities in Romania.

Data on the analysed faculties were collected from three different sources: (1) the ranking of Romanian universities reports, available by university and by domain, (2) the Institute of

Scientific Information (ISI Philadelphia USA) - Web of Science (WoS) and (3) the Scopus database. In terms of period, the selected data were from 2005 to 2015, with some missing values for some years. These values were missing due to the fact that some faculties have no articles indexed between 2005-2007 in the international databases WoS and Scopus, and the fact that ranking reports do not cover the years 2005, 2011 and 2012 -2015. Even if these years are missing from the evaluation reports, we consider the available data relevant to our analysis, since we can check and compare the differences between the information reported on each source. Moreover, we consider the available data significant and reliable for our research because they came from objective international sources and from an official Romanian institution. The relevance of the data is high, as the same type of data has been used in 2011 in the ranking of Romanian faculties. Back then, by a legislative measure, each university was requested to evaluate and report their performance on a complex list of performance indicators.

According to data extracted from the above mentioned research publication databases, the search procedure revealed a problem related to how researchers declare the name of the institution they are affiliated to. For example, there are articles in which the authors named the faculty and the university and articles in which the authors named only the university. In the second case, the articles were retrieved by choosing the „business” domain in the search procedure. For this reason we present two tables: one with information specific to each faculty and one specific to each university, in all cases the data on faculty being included in data about the „business” domain. The above described situation has no correspondence at the Academy of Economic Studies in Bucharest, which is a university. In this case the search was performed by entity name.

The key indicators used for assessing the scientific research activity are the internationally relevant ones: the number of articles with ISI impact factor, the number of scientific articles in ISI, scientific articles indexed in International Scientific Publication Databases.

The first limit of this scientific research is that in the analysis the compared entities are different as organizational structure: one is a university, comprising several faculties, while the other entities are faculties. This also comes with a difference in size, the ASE personnel involved in research being, on a multiannual average, approximatively on a ratio of 4/1 compared to the faculties of UBB with economic research and a ratio of 6/1 compared to FEAA-UVT and FEAA-UAIC.

Another limitation is that in the reported values, included articles could be in fields other than economics (social sciences, mathematics, computer science, engineering etc). This may occur if the articles are developed by researchers from the given faculties in collaboration with people from other scientific fields. Web of Science and Scopus, through their domain indexing, are preventing some search errors, but we cannot state as certain the fact that all the results of our search procedure are in the field of economic research.

If we add to this limit the differences between the two databases, WoS and Scopus, we agree with Froghi's statement when debating about the value of research indexes resulted from each indexing system [5], "the fact that each index has prejudicial peculiarities poses a challenge in deciding which specific one to use." So, the main errors that can occur in the data series are related to the search procedure proposed in each database: Scopus and Web of Science. To illustrate the above, let's consider the case of Babes Bolyai University in Cluj, where there are three faculty contributing to the field of economic research: the Faculty of Economics and Business Administration, the Faculty of Political, Administrative and Communication and The Faculty of Business. It should be noted that in the other analysed universities, except The Academy of Economic Studies from Bucharest, the search provided only one option at faculty level. Since there is a big chance for some colleagues from 2 faculties to work together, we wonder if such an article is not listed by the search on both faculties, hence biasing the results. Other errors may be caused by lack of data in the annual time series, since we can see important differences between the analysed higher education institutions. However, the data shows clearly that during the years 2005-2008 the Romanian faculties of economic sciences were not interested to publish articles in journals indexed in international databases. On the

other hand, analysing data resulting from the auto evaluation reports we can state that they were focused at publishing articles in not indexed conferences or journals.

### 3. RESULTS

Between 2005-2015, according to the Scopus database, the analysed Romanian faculties of economic sciences published a total of 1.822 scientific indexed articles, as detailed on each institution in Table 1. On average they published a number of 165,63 scientific papers, but we observe significant differences between the examined entities. The highest performance on this indicator belongs to the Academy of Economic Studies, which published about 61.41% of the total articles, followed by Babes-Bolyai University in Cluj Napoca with approximately 19.86% of the articles, the Faculty of Economics and Business Administration from UAIC (Iași) with 12.62% and UVT (Timisoara) with 6.09%.

**Table 1** – Number of indexed articles in the SCOPUS database

	All	ASE	UBB	UAIC	UVT
Articles/total	1822	1119	362	230	111
2005	2	2	0	0	0
2006	3	3	0	0	0
2007	19	14	3	1	1
2008	75	39	26	5	5
2009	267	213	41	5	8
2010	230	172	36	10	12
2011	340	237	46	47	10
2012	281	151	63	48	19
2013	252	153	43	37	19
2014	172	54	61	39	18
2015	181	81	43	38	19
Mean	165,63	101,72	40,22	25,55	12,33
SD	141,22	86,43	18,04	19,74	6,81
Min	2	2	3	1	1
Max	340	237	63	48	19

Source: Scopus database, accessed in May 2016

In the analysed period, ASE has achieved an average 101.72 articles per year, while the other faculties have achieved an average of 40.22 - FSEGA-UBB, 12.33 FEAA-UVT, and 25.55 - FEAA-UAIC. The maximum number of articles has been reached by ASE in 2011 (340 articles) and by the other faculties in 2012. The data in Table 1 shows a significant increase in the number of articles published in the economic field in 2008 - 2011. This trend is supported by data from the database Web of Science (WoS). The differences between the two databases are normal, considering the fact that only about 2/3 of SCOPUS items are found in WoS.

Table 2 presents the results from the database WoS, with a search by the „business” key word in the domain field, supporting the previous statements, drawn from the data in Table 1. The average number of articles published by the considered faculty, in the years in which they are indexed in the WoS database, is 93.8. As mentioned above, a large number of articles are in the years 2011-2015 when the faculties understood the importance of publication of articles indexed by ISI. Continuing the analysis of the mentioned faculties, we note that there are differences on the average number of articles published in the two databases.

In Scopus database, the West University of Timisoara, whit the FEAA-UVT, has an average of 4.15 articles per year and the Alexandru Ioan Cuza University of Iasi, with the FEAA-UAIC has an average of 6.81. In the WoS database, Alexandru Ioan Cuza University of Iasi, with the FEAA-UAIC has averaged 26.81% out of the total of 2320 articles indexed in this database by the analysed institutions, Babes Bolyai University of Cluj Napoca 16.5%, West University of Timisoara 7.84% and the Academy of Economic Studies Bucharest 48.83%. For

the last one we can see that in the period 2005-2012 it has only five articles in Web of Science, as the rest of 1128 were published between the years 2012-2015, compared to other faculties that have over 20% of their articles published between the years 2005-2012.

**Table 2** - Number of indexed article in WoS database (by "business" domain)

	All	ASE	UBB	UAIC	UVT
Articole/total	2320	1133	383	622	182
2005	17	0	1	16	0
2006	25	0	6	18	1
2007	23	0	11	9	3
2008	36	1	12	13	10
2009	101	2	48	32	19
2010	75	0	38	24	13
2011	234	2	60	141	31
2012	349	155	56	111	27
2013	330	241	32	32	25
2014	640	384	90	138	28
2015	490	348	29	88	25
Mean	93,8	161,85	41,77	65,33	20,11
SD	84,28	166,97	25,01	54,13	9,50
Min	23	1	11	9	3
Max	234	384	90	141	31

Source: Web of Science database, accessed in May 2016

The analysis of data resulted from the database search made by faculty and institution name, without using the "business" domain in the search procedure (E.g.: *Search by: Alexandru Ioan Cuza Univ, Fac Econ & Business Adm*) presents a different situation in the case of Iasi, Cluj and Timisoara faculties, the number indexed of publications being smaller than the one resulted from the search by the "business" domain and closer to the results obtained by the search in Scopus (Table 3). In this case the average number of articles published by the Alexandru Ioan Cuza University and Babes Bolyai University are relatively close: 19,27% and 21,55%.

**Table 3** - Number of indexed article in WoS database (by institution name)

	All	ASE	UBB	UAIC	UVT
Articles/total	1632	1133	194	212	93
2005	1	0	0	1	0
2006	1	0	0	1	0
2007	7	0	5	2	0
2008	13	1	10	2	0
2009	37	2	20	7	8
2010	36	0	18	10	8
2011	58	2	19	25	12
2012	236	155	27	40	14
2013	308	241	30	27	10
2014	518	384	46	60	28
2015	417	348	19	37	13
Mean	148,36	161,85	21,55	19,27	13,28
SD	194,87	166,97	11,90	19,93	6,89
Min	7	1	5	2	8
Max	518	384	46	60	28

Source: Web of Science database accessed in May 2016

From the analysis of results by document type (Table 4) we emphasize the fact that the majority of the publications is represented by indexed conference articles (indexed as "Meetings" in table 4), followed by articles published in peer-review journals, books reviews, etc. From the difference between the two categories, indexed conference articles being almost

double compared to journals articles, we can observe the effect of the change of criteria for promotion in academic career.

**Table 4** – Number of indexed articles in WoS database (by document type), published between 2005-2015

	ASE	UBB	UAIC	UVT
ARTICLE	363	66	113	102
BOOK	12	1	13	10
REVIEW		2	4	7
MEETING	786	119	502	287
EDITORIAL	0	2	5	0
OTHER	0	0	1	0

Source: Web of Science database, accessed in May 2016

After the change in regulation, many the university teachers focused toward publishing articles in conferences which are indexed in the main databases but less strict on the quality and value of research criteria. The Ministerial Order no. 5.098, issued in October 2005 [9] by the Ministry of Education, sets a new standard for the conferral of the title of university professor. The minimal standard is set to 5-7 articles/studies/patents, at least 4 of them indexed by ISI or another recognized international scientific publications database. A similar order (no. 5.099/2005) [10] is issued for the conferral of the title of Associate Professor, with the minimum standard set to 2-4 articles and at least 2 of them indexed. A few months later, a new Ministerial Order, no. 3.548, issued in April 2006 by the new Ministry of Education [11], makes an addendum to the previously mentioned orders by introducing a list of equivalents to the previous minimal standards. According to this addendum, an article indexed by ISI is to be considered equivalent to four articles in national scientific reviews listed in B category by the NCHER. In fact, we see a softening of the minimal standards, but the trend was set and everybody understood that this softening will be just temporary. At the beginning of the next year, in February 2007, by the Ministerial Order, no. 356 / 2007 [12], the minimal standards for the conferral of the title of PhD Coordinator are set at the same level as those set in 2005 for the title of university professor, to at least 4 articles indexed by ISI or another recognized international scientific publications database.

In 2012 the minimal standards are raised once again. The Ministerial Order, no. 6560/2012 [13], issued in December 2012 introduces a methodology based on a calculated index, considering several types of contributions and a set of minimal standards to some of the contributions. For the title of professor the minimal standard is set to 15 articles, at least 4 of them in scientific journals indexed by ISI and with an impact factor different from zero. For the title of associate professor, the minimal standard is set to 8 articles indexed in international scientific publications databases.

At institutional level, the turntable was the Assessment Methodology for the classification of universities and the ranking of study programs, issued in 2011 by the Government Decision no. 789/2011. Complementing this decision, the Ministerial Order, no. 4072/2011, issued in April 2011, specifies at the second criterion – Scientific Research – the ISI Web of Knowledge indexed articles in the last 5 years [14]. A clear specification is made by pointing out the separate reporting of articles in impact factor reviews, articles in reviews without calculated impact factor and ISI indexed conference volumes (ISI Proceedings).

The analysis by document type of the data from Scopus [15] database shows a different situation because this source is indexing more journals than conferences. This is the most probable reason for the higher number of journal articles. Compared to the WoS [16] data, the situation is reversed: more journal articles than indexed conference articles (Table 5).

**Table 5** – Number of indexed articles in Scopus database (by document), between 2005-2015

	ASE	UBB	UAIC	UVT
ARTICLE	829	312	115	82
CONFERENCE PAPER	250	43	125	29
REVIEW	13	10	6	1
BOOK CHAPTER	26	8	0	4

ARTICLE IN PRESS	2	6	1	2
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Source: Scopus database, accessed in May 2016 [15]

Based on the results published by each university in the process of universities classification and study program ranking in Romania, for the period 2006-2010, we conducted an analysis of the number of articles published by academic staff in each faculty / university, highlighted in Table 6. Compared with the results from the international databases, here the number of ISI articles declared by the Faculties of Economics and Business Administration from the Al. I. Cuza University Iasi and West University Timisoara is smaller.

**Table 6** – Number of ISI articles from journals published (by institution) between 2006-2010

	ASE	UBB	UAIC	UVT
2006	5,92	3,5	5	3
2007	21,16	16,99	0	4
2008	38,4	39,36	1,58	2
2009	195,84	36,1	5,76	4
2010	105,27	27,97	4,5	1
Mean	73,318	24,784	3,368	2,8
SD	78,28	14,70	2,46	1,30
Min	5,92	3,5	0	1
Max	195,84	39,36	5,76	4

Source: Romanian universities ranking reports, 2012, <http://chestionar.uefiscdi.ro/> [17]

This difference can be explained only by problems in the internal reporting systems of the universities, since, at that time, many teachers and researchers had little experience in dealing with the system of international indexing databases and, in some cases, reporting the articles correctly was a new challenge.

#### 4. CONCLUSIONS

Comparing the performance of research based on the collected data for the four Romanian higher education institutions with activity in the field on economic sciences, we can clearly highlight a number of conclusions.

The evolution of the scientific publications indexed in international databases by all 4 institutions has a big gradient and marks an important transformation and a change of vision.

The evolution was mainly triggered by the changes in regulations impacting at personal level (standards for the conferral of the title of university professor, associate professor and PhD coordinator) and at institutional level (classification of universities and ranking of study programs), by the introduction of performance metrics taking into consideration the articles indexed in international scientific publication databases.

The analysed faculties of economic sciences have a higher number of articles published in indexed conference than journal articles. This might be caused by the recognized difficulty of Romanian researchers in the field of economic sciences to publish in important international journals. The first regulations requiring indexed articles did not make a clear difference between the indexed journals and the indexed conferences, and the easier way, the conferences way a natural choice. Now days, when the regulation clearly states the differences, we see the endeavour of Romanian universities to improve the quality of their journals in order to index them in the international scientific publication databases.

The change strategy in each institution was, in the best case scenario, responsive to the national change in regulation and was missing, in the worst case scenario. The highlighted evolution shows that most probably 2 of the institutions have developed and implemented a strategy to increase their performances in scientific research – Academy of Economics Studies Bucharest and the Faculties of Economics of the Babes-Bolyai University – in response to the systemic changes imposed by the Ministry of Education, while the other 2 faculties were not clearly oriented to perform in this important area: the faculties of Economics and Business Administration from the University Al. I. Cuza University Iasi and Timisoara West University.

The main confirmation for academic managers is that proactive strategies, based of foreseeing or being involved in conceiving the changes in national regulation, can bring faster internal

change and better results than the post-factum adaptive strategies. Also, this shows that, in these Romanian faculties, the force of external adaptive pressure – a change in national regulation – has greater and faster impact than the institutional strategies.

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