

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

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### 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 connections between the situation of the research production of these faculties and systemic changes with impact on this situation, hence offering an instrument for making available 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:** *change management, economic research, indicators, performance, research evaluation.*

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### 1. INTRODUCTION

In Romanian universities, the performance assessment of economic scientific research shows important evolutions in the last 13 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 socio-economic transformations which marked the evolution of different regions: major economic crisis, crisis of national economies, accelerated economic growth of some emergent economies, etc. 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” (Wang et al., 2012). The European Union allocates, in the European Horizon 2020, a budget of €70 billion for 2015-2020 (Galsworthy & Mckee, 2013).

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.

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The field of economic research, although recording undeniable progress, continues to show two major weaknesses: a) include a lack of realism; b) offers little support for developing new practices (Răboacă & Ciucur, 2004). Economy, compared with Physics or other exact science, lacks precise general 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 (Abramo et al., 2008). 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 (Froghi et al., 2012).

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” (Moed, 2005). 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” (Abramo & D’Angelo, 2011).

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 (Diem & Wolter, 2013).

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. The underlying principle for accepting the quality of the scientific results as relevant input in bibliometric measurements is that of the quality of the peer-review used in selecting the articles to be published. Unfortunately, the reviewers are not practitioners, but academics.

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 choose to make a comparative analysis between the results of scientific research in the main universities and economic science faculties in Romania, as proven by the public prestige. The economic science faculties chosen are the only present in the Times Higher Education World University Ranking 2019 from Romania. (Times Higher Education, 2019) They can be considered the leading providers of research in the field of economy in Romania: Academy of Economic Studies (ASE) in Bucharest occupies the 4<sup>th</sup> place in the national ranking published by the Ministry of Education, Tourism and Sports in 2011, and is ranked in 1000+ category by Times Higher Education ranking in 2019. 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 in 2011 and in 800-1000 category by Times Higher Education ranking in 2019. 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 in 2011 and is ranked in 1000+ category by Times Higher Education ranking in 2019. 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 and is ranked in 1000+ category by Times Higher Education ranking in 2019.

Data on the analyzed faculties were collected from three different sources: (1) the ranking of Romanian universities reports, available by university and by domain, (2) Clarivate Analytics, previously known and 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 2019, 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 -2019. 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 are 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 ISI indexed, 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 that could to 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 (Froghi et al., 2012): "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 analyzed 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 analyzed 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, analyzing 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 2005-2019, according to the Scopus database, the analysed Romanian faculties of economic sciences published a total of 3.081 scientific indexed articles, as detailed on each institution in Table 1. On average, they published a number of 205,40 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 85,07% of the total articles, followed by Babes-Bolyai University in Cluj Napoca with approximately 5,45% of the articles, the Faculty of Economics and Business Administration from UAIC (Iași) with 5,22% and UVT (Timișoara) with 4,25%.

In the analysed period, ASE has achieved an average 174,73 articles per year, while the other faculties have achieved an average of 7,45 - FSEGA-UBB, 11,91 FEAA-UVT, and 13,42 - FEAA-UAIC. The maximum number of articles has been reached by ASE in 2018 (420 articles) and by the other faculties in 2017. The data in Table 1 shows a significant increase in the number of articles published in the economic field in 2014 - 2019. 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 key word „business”, 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 444.23. As mentioned above, a large number of articles are in the years 2012-2019 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.

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

	<b>All</b>	<b>ASE</b>	<b>UBB</b>	<b>UAIC</b>	<b>UVT</b>
Articles/total	<b>3081</b>	<b>2621</b>	<b>168</b>	<b>161</b>	<b>131</b>
2005	1	1	0	-	-
2006	5	2	3	-	-
2007	11	6	5	-	-
2008	33	18	14	1	-
2009	89	72	9	1	7
2010	83	62	8	5	8
2011	88	52	12	12	12
2012	138	102	11	10	15
2013	237	215	4	9	9
2014	354	329	4	14	7
2015	410	376	12	16	6
2016	395	331	27	19	18
2017	470	413	21	23	13
2018	501	420	23	40	18
2019	266	222	15	11	18
Mean	205.40	174.73	7.45	13.42	11.91
SD	180.92	161.73	4.52	10.68	4.78
Min	1.00	1.00	0.00	1.00	6.00
Max	501.00	420.00	14.00	40.00	18.00

Source: Scopus database, accessed in September 2019

In Scopus database, the West University of Timisoara, with the FEAA-UVT, has an average of 11.91 articles per year and the Alexandru Ioan Cuza University of Iasi, with the FEAA-UAIC, has an average of 13.42. In the WoS database, Alexandru Ioan Cuza University of Iasi, with the FEAA-UAIC has 18.13% out of the total of 5796 articles indexed in this database by the analysed institutions, Babes Bolyai University of Cluj Napoca 7.23%, West University of Timisoara 6.04% and the Academy of Economic Studies Bucharest 68.60%. 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 3971 were published between the years 2012-2019, compared to other faculties that have over 20% of their articles published between the years 2005-2012.

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 West University of Timisoara and Babes Bolyai University are relatively close: 11.20 per year and 10.60 per year.



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

	<b>All</b>	<b>ASE</b>	<b>UBB</b>	<b>UAIC</b>	<b>UVT</b>
Articole/total	<b>5796</b>	<b>3976</b>	<b>419</b>	<b>1051</b>	<b>350</b>
2005	4		2	1	1
2006	17			16	1
2007	15			12	3
2008	31	1	6	14	10
2009	73	2	11	39	21
2010	87		12	54	21
2011	218	2	19	161	36
2012	346	160	23	134	29
2013	434	306	30	67	31
2014	702	465	39	149	49
2015	944	693	29	183	39
2016	688	577	20	51	40
2017	958	786	66	83	23
2018	878	661	115	77	25
2019	401	323	47	10	21
Mean	444.23	361.45	34.75	79.54	26.77
SD	354.85	295.05	30.38	59.24	12.55
Min	15.00	1.00	6.00	10.00	3.00
Max	958.00	786.00	115.00	183.00	49.00

Source: Web of Science database, accessed in September 2019

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

	<b>All</b>	<b>ASE</b>	<b>UBB</b>	<b>UAIC</b>	<b>UVT</b>
Articles/total	<b>4705</b>	<b>3976</b>	<b>159</b>	<b>402</b>	<b>168</b>
2005	0	0	0	0	0
2006	1	0	0	1	0
2007	2	0	0	2	0
2008	4	1	1	2	0
2009	17	2	0	7	8
2010	30	0	3	13	14
2011	51	2	3	33	13
2012	217	160	1	41	15
2013	350	306	1	30	13
2014	554	465	0	61	28
2015	787	693	8	64	22
2016	653	577	10	48	18
2017	874	786	40	37	11
2018	791	661	64	50	16
2019	374	323	28	13	10
Mean	313.67	265.07	10.60	26.80	11.20
SD	335.91	299.26	18.86	22.81	8.50
Min	1.00	1.00	1.00	1.00	1.00
Max	874.00	786.00	64.00	64.00	28.00

Source: Web of Science database accessed in September 2019

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 2005-2019**

	ASE	UBB	UAIC	UVT
PROCEEDINGS PAPER	2493	230	785	222
ARTICLE	1401	185	269	127
REVIEW	28	2	5	2
EDITORIAL MATERIAL	23	5	14	1
BOOK CHAPTER	72	29	32	2
OTHER	13	9	6	2

*Source:* Web of Science database, accessed in September 2019

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 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) 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 Romanian National Council of Scientific Research in Higher Education. 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, 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, 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. 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 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 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
JOURNALS	1836	127	116	103
CONFERENCE PROCEEDINGS	585	31	41	25
BOOKS	204	3	4	3

*Source:* Scopus database, accessed in September 2019

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/>

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, in the worst case scenario, was completely missing. 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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