ROMANIAN ACADEMIC INVENTICS IN 2001-2010 YEARS

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Abstract. Humanity has always been a knowledge-based society and has evolved as such. This feature prevails during contemporary period and is explicitly recognized.

According to the law, inventions, utility models, trademarks, designs and (industrial) models, topographies of semiconductor products, plant varieties and animal breeds are subject to protection. Invention is the widest known and the most respected intellectual-property element in industrial business.

Patenting involves, essentially, the explicit manifestation from a natural personal or legal entity of the interest towards the protection, within a certain geographical area, of an intellectual property, to the purpose of obtaining several advantages. They are mainly of a material nature. The prestige and the acknowledgement of the technical creation capacity are aspects of a moral nature that cannot be overlooked. They generate, inter alia, recognition and attraction.

The abstracts of the patent applications and of the awarded patents are published in the Official Bulletin of Industrial Property (BOPI), which is being monthly issued.

The paper herein submits synthetic data, examples, and an analysis referring to the patent applications and to the solicited and respectively obtained patents by Romanian universities, published in BOPI during the period 2001-2010.

Keywords: inventics, patent application, patent specification, university, Romania

1. Introduction

At the beginning of the month of September 2011, the classification of the universities throughout Romania (accredited or authorized to temporarily function, State-owned, private and confessional) was rendered public [1]. It is assumed that this classification was correctly achieved, on the basis of a methodology [2]. The fact that the classification-underlying criteria ("rules of the game") were rendered public less than a month previously to the classification publication may be a discussion subject; however it does not change the status quo.

According to the classification, which refers to 90 State-owned and private universities, there are identified:
- 12 advanced research and education universities;
- 22 education and scientific research universities;
- 8 education and artistic creation universities;
- 48 education-focused universities.

The 7 military academies are included within the category of the education and scientific research universities.

The classification considers several criteria. Scientific research holds significant importance in a university's "score", with the value of 0.6 for the fundamental fields Mathematics and Natural Sciences, Engineering Sciences, Biomedical Sciences. For this criterion, there are mainly considered the cumulated relative influence score (SRI) of the papers published in ISI Web of Knowledge-indexed magazines, the publications in the proceedings of the ISI Proceedings-indexed conferences and the (national, international and triadic) patents. It is obvious that the international visibility is pre-eminently pursued.

Patents obtained by Romanian universities significantly contribute to the result corresponding to this criterion. For the field of the engineering sciences, the main patent generator as a result of the scientific research, the weightings are:

Name of the variable	Weighting
SRI	1
OSIM patents	0.5
International patents	5
Triadic patents	15

The data submitted in the paper exclusively reflect the patent applications and the awarded patents published in BOPI during the period 2001-2010 [3].

In the Official Bulletin of Industrial Property, the abstracts of the patent applications and the awarded patents are numbered and accompanied by the symbol of at least one section from the international classification of the patent

applications [4], which reflects the knowledge field that the respective patent applications or patents refer to. The significance of these symbols is the one conferred by the international classification, this way:

A – Current necessities of life
B – Various industrial techniques. Transport
C – Chemistry and metallurgy
D – Textiles and paper
E – Fixed civil engineering
F - Mechanics. Lighting. Heating. Armament. Explosive
G - Physics
H - Electricity

In the present paper, a single symbol was considered for every patent application / patent specification, the principal one.

For those patent applications and awarded patents with two or several applicants, the degree of participation equal to 1/(no. applicants) was considered. For instance, if there are three applicants, the first was allotted a contribution of 0.34 and the others, a contribution of 0.33. In case of four applicants, a contribution of 0.25 was considered for every one.

2. Information

The number of patent applications (total, only with Romanian applicant; with at least one university from Romania as applicant) registered at OSIM and published in BOPI during the period 2001-2010, as well as the overall weighting for the ones with at least one university from Romania as applicant, for each year separately and for the overall decade, are shown in table 1. The weightings relate both to the total number of patent applications, and to the number of the patent applications with Romanian natural person or legal entity as applicant.

In accordance with the international classification, the numbers of patent applications solicited by Romanian universities and published in BOPI over the analyzed period are shown in table 2.

In table 3, there is presented the number of patent applications published in BOPI over the decade 2001-2010, per year and per total decade, for the Romanian universities. The table comprises neither the universities focused on education, which have no published patent application, nor the military academies (which, as a matter of fact, have no published patent applications). The order of the universities observes the classification according to OMECTS 5262/2011 [1].

Similar information to those submitted in tables 1, 2 and 3, however referring to national patents with Romanian universities as holders, awarded by OSIM and published in BOPI during the years 2001-2010, may be retrieved in tables 4, 5 and 6.

Table 1. Patent applications published in BOPI, during the decade 2001-2010, with Romanian universities as applicants

	Patent applic. / 2001	**Patent applic. / 2002**	**Patent applic. / 2003**	**Patent applic. / 2004**	**Patent applic. / 2005**	**Patent applic. / 2006**	**Patent applic. / 2007**	**Patent applic. / 2008**	**Patent applic. / 2009**	**Patent applic. / 2010**	**Total 2001-2010**
All	999	932	934	937	1012	730	740	657	765	808	**8514.00**
RO Univ.	5	5.34	4	4.33	13.34	8.84	26.5	92.83	109.55	134.97	**404.69**
RO only	887.75	858.8	839.42	762	891.25	662.67	677.51	626.44	728.5	779	**7713.34**
% RO Univ. / All	0.501	0.573	0.428	0.462	1.318	1.211	3.581	14.129	14.320	16.704	**4.753**
% RO Univ. / RO only	0.563	0.622	0.477	0.568	1.497	1.334	3.911	14.819	15.038	17.326	**5.246**

Table 2. Patent applications of the universities, published in BOPI over the decade 2001-2010, according to the international classification

	Patent applic. / 2001	**Patent applic. / 2002**	**Patent applic. / 2003**	**Patent applic. / 2004**	**Patent applic. / 2005**	**Patent applic. / 2006**	**Patent applic. / 2007**	**Patent applic. / 2008**	**Patent applic. / 2009**	**Patent applic. / 2010**	**Total 2001-2010**
A	0	0	1	0	3	1	2	7	10	13.33	**37.33**
B	3	1	1	3	2.5	2	7	19.75	13.34	25	**77.59**
C	2	3	1	0.33	7.84	1.5	4.33	7.08	16.2	18.64	**61.92**
D	0	0	0	0	0	1	1	1	4	4	**11.00**
E	0	0	0	0	0	0.34	0	1	1.34	2	**4.68**
F	0	0	1	0	0	1	3	11	12	19	**47.00**
G	0	0	0	1	0	1	5.17	36	37.67	38	**118.84**
H	0	1.34	0	0	0	1	4	10	15	15	**46.34**
Total	**5**	**5.34**	**4**	**4.33**	**13.34**	**8.84**	**26.5**	**92.83**	**109.55**	**134.97**	**404.69**

Table 3. Portfolio of patent applications of Romanian universities, published in BOPI over the decade 2001-2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	%
Advanced research and education universities												
Universitatea din Bucureşti	0	0	0	1	0.33	1	0.5	2	2	1	**7.83**	1.935
Universitatea „Babeş-Bolyai" din Cluj-Napoca	0	0	0	0.33	0	1	0	5	1.33	5.2	**12.86**	3.178
Universitatea „Alexandru Ioan Cuza" din Iaşi	0	0	0	0	0	0	1	0	3	0	**4**	0.988
Academia de Studii Economice din Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea de Ştiinţe Agricole şi Medicină Veterinară din Cluj-Napoca	0	0	0	0	0	0	0	1	2	1.5	**4.5**	1.112
Universitatea de Medicină şi Farmacie „Carol Davila" din Bucureşti	0	0	0	0	0	0	2	1	4	0	**7**	1.730
Universitatea de Medicină şi Farmacie „Gr. T. Popa" din Iaşi	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea de Medicină şi Farmacie „Iuliu Haţieganu" din Cluj-Napoca	0	0	0	0	0	0	0	0	0.34	1	**1.34**	0.331
Universitatea Politehnică din Bucureşti	0	1.33	0	2	1.33	0	0.5	5.08	9.88	10.58	**30.7**	7.586
Universitatea Tehnică „Gheorghe Asachi" din Iaşi	1	0	0	0	0	1	12	7	13	18.33	**52.33**	12.931
Universitatea Tehnică din Cluj-Napoca	0	0	0	0	2	4	1.34	4.25	7	4	**22.59**	5.582
Universitatea „Politehnica" din Timişoara	0	0	0	0	0.5	0	3	1.5	1	3.33	**9.33**	2.305
Education and scientific research universities												
Universitatea de Vest din Timişoara	0	0	0	0	0	0	0.33	0.25	0	0	**0.58**	0.143
Universitatea din Craiova	0	0	1	0	0	0	1	0	0	2.5	**4.5**	1.112
Universitatea „Transilvania" din Braşov	0	0	0	0	0	0	0	3	13	22	**38**	9.390
Universitatea „Ovidius" din Constanţa	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea "Dunărea de Jos" din Galaţi	0	0	2	0	0	0	0	8	6	5	**21**	5.189
Universitatea „Lucian Blaga" din Sibiu	2	1	0	0	2	0	2	0	1	5	**13**	3.212
Universitatea din Oradea	0	0	0	0	5	0	0	1	0	2.2	**8.2**	2.026
Şcoala Naţională de Studii Politice şi Administrative din Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea de Ştiinţe Agricole şi Medicină Veterinară „Ion Ionescu de la Brad" din Iaşi	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea de Ştiinţe Agronomice şi Medicină Veterinară din Bucureşti	0	2	0	0	0	0	0	0	0	1.33	**3.33**	0.823
Universitatea de Ştiinţe Agricole şi Medicină Veterinară a Banatului din Timişoara	0	0	0	0	0	1	0	0.25	3	2	**6.25**	1.544
Universitatea de Medicină şi Farmacie „Victor Babeş" din Timişoara	0	0	0	0	1	0	0	0	0	0	**1**	0.247
Universitatea de Medicină şi Farmacie din Craiova	0	0	0	0	0	0	0	0	0	0	**0**	0
Universitatea Tehnică de Construcţii Bucureşti	0	0	0	0	0	0	0.5	1	0	1	**2.5**	0.618
Universitatea de Medicină şi Farmacie din Târgu Mureş	0	0	0	0	0	0	0	0	0	0	**0**	0
Education-focused universities												
Universitatea „Aurel Vlaicu" din Arad	0	0	0	0	0	0	0	1	1	0	**2**	0.494
Universitatea „Ştefan Cel Mare" din Suceava	0	0	0	0	0	0	0	49	40	38	**127**	31.382
Universitatea „Valahia" din Târgovişte	0	0	0	0	0	0.5	0.33	0	0	0	**0.83**	0.205
Universitatea Petrol-Gaze din Ploieşti	0	1	0	0	1.18	0.34	0	0.5	0	0	**3.02**	0.746
Universitatea „Vasile Alecsandri" din Bacău	0	0	0	0	0	0	0	0	0	7	**7**	1.730
Universitatea de Nord Baia Mare	0	0	0	0	0	0	2	2	0	2	**6**	1.483
Universitatea din Petroşani	0	0	0	1	0	0	0	0	0	0	**1**	0.247
Universitatea de Vest „Vasile Goldiş" din Arad	0	0	1	0	0	0	0	0	0	0	**1**	0.247
Universitatea „Petru Maior" din Târgu Mureş	0	0	0	0	0	0	0	0	0	2	**2**	0.494
Universitatea „Petre Andrei" din Iaşi	0	0	0	0	0	0	0	0	2	0	**2**	0.494
Universitatea „George Bacovia" din Bacău	2	0	0	0	0	0	0	0	0	0	**2**	0.494
Total patent applications	**5**	**5.33**	**4**	**4.33**	**13.34**	**8.84**	**26.5**	**92.83**	**109.55**	**134.97**	**404.69**	

Table 4. Patents published in BOPI, during the decade 2001-2010, having Romanian universities as holders

	Patents / 2001	Patents / 2002	Patents / 2003	Patents / 2004	Patents / 2005	Patents / 2006	Patents / 2007	Patents / 2008	Patents / 2009	Patents / 2010	Total 2001-2010
All	948	754	876	655	790	794	461	489	646	437	6850
Only RO patents	713	509	616.5	470.3	569.75	531.75	350.5	395	579.34	398	5133.14
RO Univ. patents	28.2	14	21	10	10.33	4	3	8.66	56.51	84.51	240.21
% RO Univ. / All	3.0802	1.8568	2.3973	1.5267	1.3076	0.5038	0.6508	1.7710	8.7477	19.3364	3.5067
% RO Univ. / RO	4.0954	2.7505	3.4063	2.1263	1.8131	0.7522	0.8559	2.1924	9.7542	21.2312	4.6796

Table 5. Patents of the universities, published in BOPI over the decade 2001-2010, according to the international classification

	Patents / 2001	Patents / 2002	Patents / 2003	Patents / 2004	Patents / 2005	Patents / 2006	Patents / 2007	Patents / 2008	Patents / 2009	Patents / 2010	Total 2001-2010
A	0	1	1	0	0	2	1	0	2	9.5	**16.50**
B	8	6	2	4	5	2	0	1	11.34	7.5	**46.84**
C	8	5	8	3	2.33	0	1	6.83	4.67	11	**49.83**
D	0	1	2	0	0	0	0	0	2	3.5	**8.50**
E	0	0	0	0	0	0	0	0.5	0	0.34	**0.84**
F	2.2	0	1	0	1	0	0	0	7	11	**22.20**
G	6	1	2	2	1	0	1	0	20	22.67	**55.67**
H	4	0	5	1	1	0	0	0.33	9.5	19	**39.83**
Total	**28.2**	**14**	**21**	**10**	**10.33**	**4**	**3**	**8.66**	**56.51**	**84.51**	**240.21**

3. Discussion

3.1. Patent applications with Romanian universities as applicant

The data within table 1 allow very suggestive graphical representations, figures 1, 2 and 3.

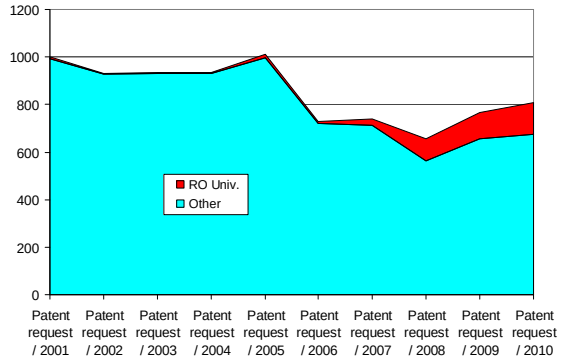

Figure 1. Evolution of the number of patent applications with Romanian universities as applicant in the framework of the overall number of patent applications, published in BOPI, during the period 2001-2010

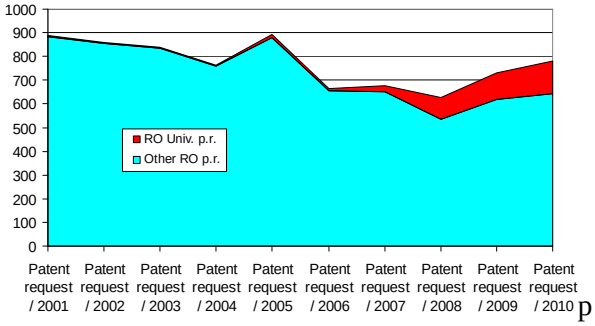

Figure 2. Evolution of the number of patent applications with Romanian universities as applicant in the context of the overall number of Romanian patent applications, published in BOPI, over the period 2001-2010

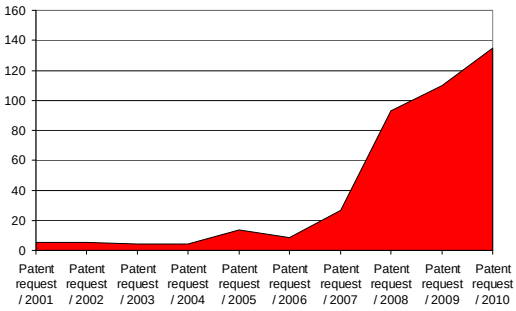

Figure 3. Evolution of the number of patent applications with Romanian universities as applicant, published in BOPI, during the period 2001-2010

During the analyzed period, in BOPI, 8514 patent applications were published, a maximum of 1012 patent applications being noted in the year 2005, and a minimum of 657 patent applications in the year 2008. Compared to the average per decade, of 851.4 patents/year, the average of the years 2001-2005, of 962.8 patents/year, is far superior to the average of the second half of the decade, of 740 patents/year. The drop is great, of more than 23%, and is due to the dramatic diminution in the number of patent applications from foreign legal entities, and also from Romanian natural persons (mainly due to the tax increase [5, 6]).

Considering only the patent applications with Romanian applicant, a similar evolution may be noted, with great difference between the two halves of the decade. With respect to the average per decade, of 771.334 patents/year, the average of the years 2001-2005 is of 847.844 patents/year, and the average of the years 2006-2010 is of

Table 6. Portfolio of patents of Romanian universities, published in BOPI over the decade 2001-2010

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	%
Advanced research and education universities													
1	Universitatea din Bucureşti	0	0	0	0	1	0	0	0	0.33	0	**1.33**	0.5537
2	Universitatea „Babeş-Bolyai" din Cluj-Napoca	0	0	0	0	0	0	0	0.33	1.5	9.5	**11.33**	4.7167
3	Universitatea „Alexandru Ioan Cuza" din Iaşi	1	0	0	0	0	0	0	0	1	1	**3**	1.2489
4	Academia de Studii Economice din Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
5	Universitatea de Ştiinţe Agricole şi Medicină Veterinară din Cluj-Napoca	0	0	0	0	0	0	0	0	0	1	**1**	0.4163
6	Universitatea de Medicină şi Farmacie „Carol Davila" din Bucureşti	0	0	0	0	0	0	0	1	1	3	**5**	2.0815
7	Universitatea de Medicină şi Farmacie „Gr. T. Popa" din Iaşi	3	0	0	0	0	0	0	0	0	0	**3**	1.2489
8	Universitatea de Medicină şi Farmacie „Iuliu Haţieganu" din Cluj-Napoca	0	0	0	0	0	0	0	0	0	0	**0**	0
9	Universitatea Politehnică din Bucureşti	1	1	1	0	2.33	0	1	0	2.34	6.84	**15.51**	6.4569
10	Universitatea Tehnică „Gheorghe Asachi" din Iaşi	10	13	9	3	3	0	0	0	7	5	**50**	20.850
11	Universitatea Tehnică din Cluj-Napoca	2	0	1	0	0	2	0	1	0	4.34	**10.34**	4.3046
12	Universitatea „Politehnica" din Timişoara	0	0	1	0	0	0	0	0.5	0	1	**2.5**	1.0408
Education and scientific research universities													
13	Universitatea de Vest din Timişoara	0	0	0	0	0	0	0	0	0	0.33	**0.33**	0.1374
14	Universitatea din Craiova	6	0	0	1	0	0	0	0	1	0	**8**	3.3304
15	Universitatea „Transilvania" din Braşov	0	0	0	0	0	0	0	0	1	5	**6**	2.4978
16	Universitatea „Ovidius" din Constanţa	0	0	0	0	0	0	0	0	0	0	**0**	0
17	Universitatea "Dunărea de Jos" din Galaţi	0	0	0	0	3	0	0	0	3	2	**8**	3.3304
18	Universitatea „Lucian Blaga" din Sibiu	0	0	6	1	0	2	0	0	1	1	**11**	4.5793
19	Universitatea din Oradea	2	0	2	0	1	0	0	5	1	0	**11**	4.5793
20	Şcoala Naţională de Studii Politice şi Administrative din Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
21	Universitatea de Ştiinţe Agricole şi Medicină Veterinară „I. I. de la Brad" din Iaşi	0	0	0	0	0	0	0	0	0	0	**0**	0
22	Universitatea de Ştiinţe Agronomice şi Medicină Veterinară din Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
23	Universitatea de Ştiinţe Agricole şi Medicină Veterinară a Banatului din Timişoara	0	0	0	0	0	0	0	0	0	2	**2**	0.8326
24	Universitatea de Medicină şi Farmacie „Victor Babeş" din Timişoara	0	0	0	0	0	0	1	0	0	0	**1**	0.4163
25	Universitatea de Medicină şi Farmacie din Craiova	0	0	0	0	0	0	0	0	0	0	**0**	0
26	Universitatea Tehnică de Construcţii Bucureşti	0	0	0	0	0	0	0	0	0	0	**0**	0
27	Universitatea de Medicină şi Farmacie din Târgu Mureş	0	0	0	0	0	0	0	0	0	0	**0**	0
Education-focused universities													
43	Universitatea „Aurel Vlaicu" din Arad	0	0	0	0	0	0	0	0	1	1.5	**2.5**	1.0408
44	Universitatea „Ştefan Cel Mare" din Suceava	0	0	0	0	0	0	0	0	31	36	**67**	27.892
45	Universitatea „Valahia" din Târgovişte	0	0	0	0	0	0	0	0.33	0.5	0	**0.83**	0.3455
46	Universitatea Petrol-Gaze din Ploieşti	0	0	0	1	0	0	0	0.5	0.84	0	**2.34**	0.9741
53	Universitatea „Eftimie Murgu" din Reşiţa	1	0	0	1	0	0	0	0	0	0	**2**	0.8326
57	Universitatea de Nord Baia Mare	0	0	0	0	0	0	0	0	3	1	**4**	1.6652
58	Universitatea Ecologică din Bucureşti	2.2	0	0	0	0	0	0	0	0	0	**2.2**	0.9159
59	Universitatea din Petroşani	0	0	0	0	0	0	1	0	0	0	**1**	0.4163
65	Universitatea Hyperion din Bucureşti	0	0	0	1	0	0	0	0	0	0	**1**	0.4163
70	Universitatea Româno-Germană din Sibiu	0	0	0	1	0	0	0	0	0	0	**1**	0.4163
79	Universitatea „Petre Andrei" din Iaşi	0	0	0	0	0	0	0	0	0	2	**2**	0.8326
83	Universitatea „George Bacovia" din Bacău	0	0	1	1	0	0	0	0	0	0	**2**	0.8326
	Total patents	**28.2**	**14**	**21**	**10**	**10.33**	**4**	**3**	**8.66**	**56.51**	**84.51**	**240.21**	

694.824 patents/year, almost 18% lower. In the same years, the limit values are identified: a maximum of 891.25 patents published in 2005 and a minimum of 626.44 patents in 2008. The diminution by approx. 18% would have been greater unless higher interests had been manifested by research-development institutes and universities.

During the decade 2001-2010, the overall number of patent applications of the Romanian universities is of 404.69 – which would correspond to less than 0.5 patents per year and university!! It is annoyingly little and well below the overall academic community's innovation-invention capacity-teaching staff, researchers, doctoral students, master students and undergraduates. We should however appreciate that the trend is strongly on the rise, figure 3, with a significant step forward in 2008, and that, contrary to the general evolution, the universities submitted less applications in the first part of the decade (6.4 patents/year) and much more in the second half (74.438 patents/year). The minimum corresponds to the year 2003, of only 4 applications, and the maximum corresponds to the year 2010, with 134.97 patents.

The universities throughout Romania very unevenly participate in the national patrimony of patent applications and, implicitly, of inventions. Among the 90 universities in the classification according to [1], the names of 59 thereof (2 universities of advanced research and education, 12 universities of education and scientific research, which include all 7 military academies, all 8 universities of education and artistic creation and 37 universities focused on education) are associated to no patent application published in BOPI in the overall decade 2001-2010.

In full agreement with the data from table 3, in figure 4, the universities with a portfolio of at least 10 patents (≥ 1 patent/year, as average) are emphasized.

If the presence within this elitist group of "Gheorghe Asachi" Technical University from Iaşi is normal, considering it is the very place where the National Institute of Inventics came to light, a very pleasant surprise is the presence of "Ştefan cel Mare" University from Suceava, net leader, although classified within the category of the universities focused on education. In fact, only four of the universities within the first category may be retrieved in this top, some other three being classified in the second category. I dare say that "Transilvania" University of Braşov being ranked third is honourable, although its reserves of original technical creation are much greater.

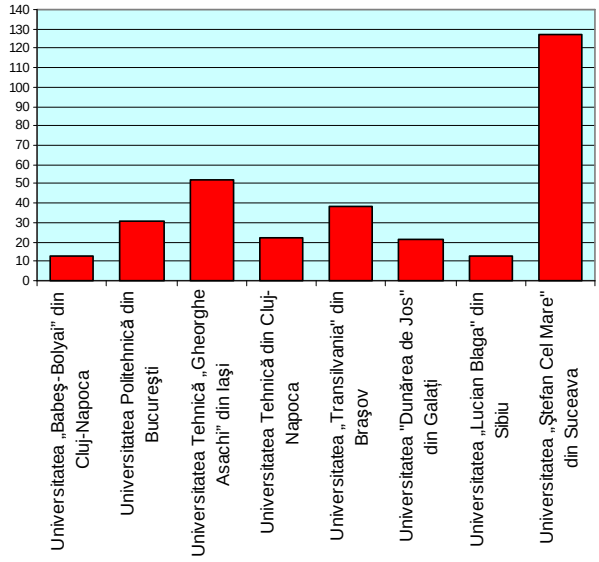

Fig. 4. Universities with a portfolio of at least 10 patents, published in BOPI during the period 2001-2010

As regards some Romanian universities, there is worth making some observations. No university has constantly conducted inventive activity; years or group of years could be identified for each, when no patent application was registered. Only the "Politehnica" University of Bucharest has manifested more or less constant preoccupation. Four-year clusters of inventive inactivity may be identified for some universities, which could be associated to a management little interested in patenting, possibly associated or caused by the resource penury. The innovation incapacity is excluded.

The progress marked by the significant rise in the number of patent applications solicited by universities is associated to the year 2007 and is reflected in the applications published in BOPI during 2008 and afterwards. The fact must be considered that, in normal procedure, since registering the patent application to its publication, six months or even more pass. This progress is very noticeable at the "Politehnica" University of Bucharest, "Gheorghe Asachi" Technical University of Iaşi, Technical University of Cluj-Napoca, "Transilvania" University of Braşov, "Dunărea de Jos" University of Galaţi, and at "Ştefan cel Mare" University of Suceava it is really spectacular. This evolution is suggestively reflected in figure 5.

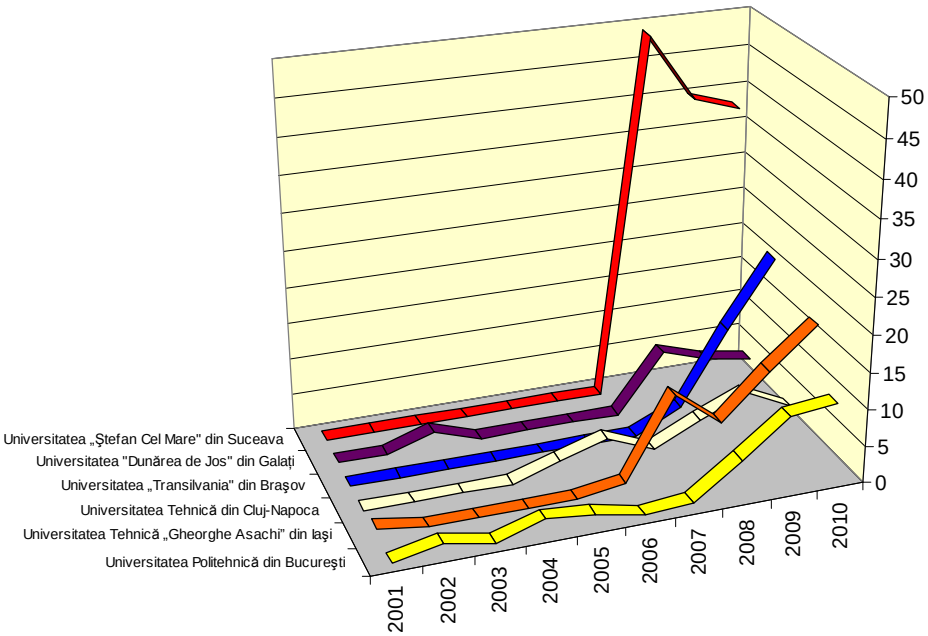

Figure 5. Evolution of the number of patent applications submitted and published in BOPI during the period 2001-2010, for the universities with at least 20 patents per total decade

With little chance of mistake, one can say that this evolution is also determined by the perspective of a classification of the universities and, in this context, by the interest manifested by some of them, to be situated in a higher category. It is almost obvious that the effort made by "Ştefan cel Mare" University of Suceava pursues this objective, given the multitude of single-claim patent applications and the quite narrow range of approached fields. The fact that most patent applications are the outcome of only two teams (team Cernomazu [7 ... 13] and team Gutt [14 ... 19]) emphasizes several enthusiasts, of several strong research nuclei. Continuing and extending these efforts will lead to a significant rise of the inventors' number, to a general opening towards creativity.

The patent applications solicited by the "Politehnica" University of Bucharest are certainly few compared with this University's size and technical-creation capacity, even compared with the experts' expectations and why not, with the ones nurtured by the public at large; and they are from variegated fields and are especially characterized through the collaboration with institutes and with the real economic environment [20 … 24]. The fact should be appreciated that in the very patent application, the applicant usually specifies the research centre whose result is the respective invention [25, 26].

The patenting activity in collaboration with the research-development institutes and with the companies characterizes not only the "Politehnica" University from Bucharest [27 ... 34].

Variegated research fields and several inventor teams are also identified at "Gheorghe Asachi" Technical University of Iaşi, the Technical University of Cluj-Napoca, "Transilvania" University of Braşov "Dunărea de Jos" University of Galaţi.

"Lucian Blaga" University of Sibiu also has in its portfolio, patent specifications whose authors are members of the teaching staff from other universities throughout the country, without their being co-applicant [35]. It is most likely that, in default of support from the universities wherein they deploy their activity, the respective inventors decided to promote their achievements also through the academic environment, and "Lucian Blaga" University of Sibiu manifested the necessary opening.

It is worth mentioning that in BOPI, there may be also found patent applications / patents with applicants / holders, natural persons who deploy their activity in the academic environment and who promote on their own behalf, some achievements [36 ... 44]. This aspect emphasizes that some universities exist which, for various reasons, cannot or do not want to take over through cession and to promote their employees' accomplishments or that the Romanian academic inventics is more consistent than the one reflected through the number of applications registered by the universities.

The patent applications solicited by Romanian universities, table 2, reflect preoccupations in all knowledge fields, however to different extents. The field G stands out as leader, by almost 30%, mostly following the multitude of applications with solar motor / actuator theme, claimed by "Ştefan cel Mare" University of Suceava. The fields B, with approx. 19.2%, and C, with approx. 15.2% rank second and third. The field E has raised the lowest interest, cumulating only 4.68 for the overall field, which represents little above 1% of the total.

3.2. Inventions with Romanian universities as holder

The mirror of the patent patrimony obtained by the Romanian universities and published in BOPI during the period 2001-2010, rendered in table 6, is more easily analyzed if it is supported by some suggestive graphical representations, figures 6, 7 and 8.

In the decade 2001-2010, in BOPI, 6885 patents were published, the distribution per years ranging between a maximum of 948 patents in 2001 and a minimum of 437 patents in 2010. The diminution is dramatic, of more than 50%. On the overall decade, the general tendency is the ongoing diminution of the number of patents obtained and published in BOPI, figure 6, with some oscillations which are not contrary to the trend. The most important drop occurred in 2007, is given by the drastic reduction in the number of patents obtained by natural persons (independent inventors) and, most likely, is due to the legislation modification [5, 6] as regards the taxes and facilities for examination and maintenance in force.

Considering only the patents with Romanian holder, natural person or legal entity, figure 7, the downward trend is less pronounced and the oscillations are greater. The minimum of only 350.5 obtained and published patents, registered in 2007, are very low and must be thought about.

The number of national patents obtained by Romanian universities was low and steadily falling during the period 2001-2007, and in marked increase for the years 2009 and 2010, figure 8. To a very good extent, this reflects the evolution of the number of patent applications registered and published in BOPI, however with a delay of approximately two-three years, the current duration elapsed between the application publication and the patent publication. The reduction of this period is not excluded, inclusively following the examination solicitation in emergency procedure.

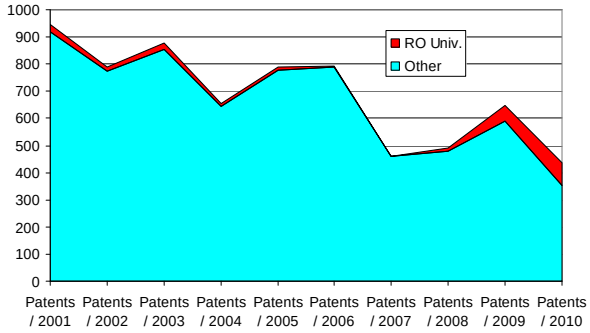

Figure 6. Evolution of the number of patents with Romanian universities as holder in the framework of the overall patents published in BOPI, during the period 2001-2010

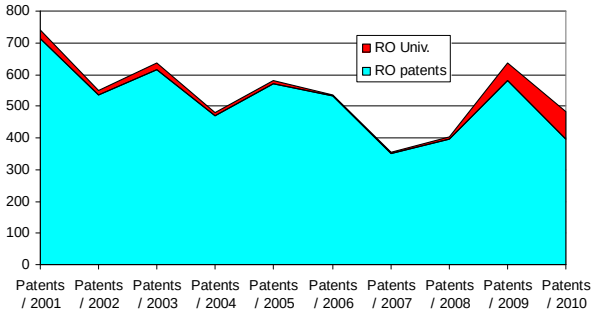

Figure 7. Evolution of the number of patents with Romanian universities as holder in the context of the overall Romanian-holder patents, published in BOPI, over the period 2001-2010

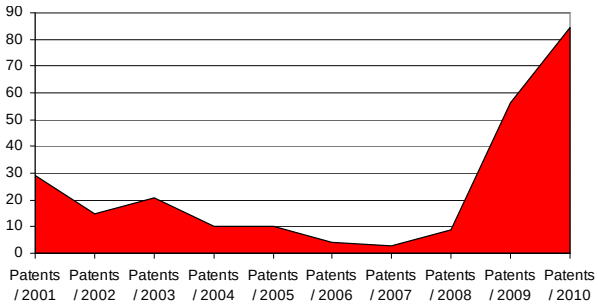

Figure 8. Evolution of the number of patents with Romanian universities as holder, published in BOPI, during the period 2001-2010

The years 2006 and 2007 may be considered very sad for the Romanian academic inventics, when only four and respectively only three patents were obtained throughout the country. It is obviously the reflection of the fact that between 2004 and 2005, the universities registered together only four patent applications. On this level, one cannot speak at all about the universities' function of scientific research, of their role in educating future experts.

As in the case of the patent applications, and as reflection of their distribution, the patent specification distribution on universities is strongly uneven. 60 classified universities obtained no

patent during the studied period: 2 universities of advanced research and education, 14 universities of education and scientific research, inclusively the 7 military academies, none of the 8 universities of education and artistic creation and 36 universities focused on education.

For all Romanian universities, often long periods of inventive inactivity or with low inventive activity are identified.

In figure 9, the top 10 Romanian universities with the most patents obtained and published in BOPI during the decade 2001-2010 are shown. With an average of at least five patents per year, "Ştefan cel Mare" University of Suceava clearly stands out, with patents exclusively obtained in the end of the period, most probably following emergency examinations, and "Gheorghe Asachi" Technical University of Iaşi, but with downward trend and most patents obtained in the beginning of the decade. The other universities cumulated a however reduced patrimony, around 10 patents / decade, hence approximately 1 patent/year for each.

For the universities with at least 10 patents obtained during the studied period, the evolution of the number of awarded patents is graphically presented in figure 10. An obvious upward trend is marked by "Babeş-Bolyai" University of Cluj-Napoca, the "Politehnica" University of Bucharest and "Ştefan cel Mare" University of Suceava.

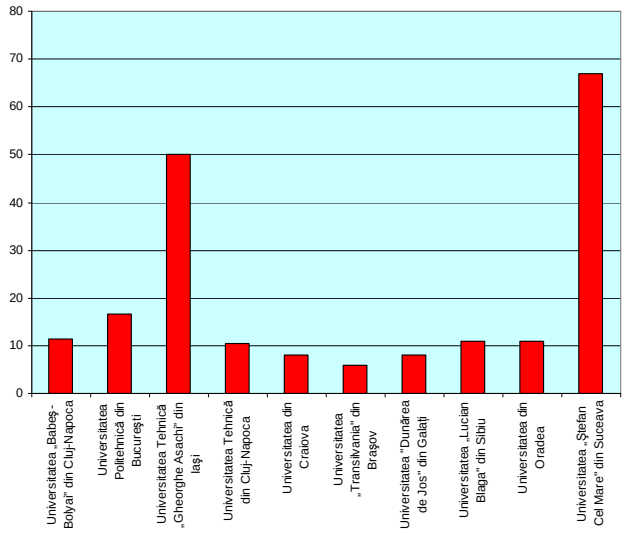

Figure 9. Top 10 universities with the most patents obtained and published in BOPI during the period 2001-2010

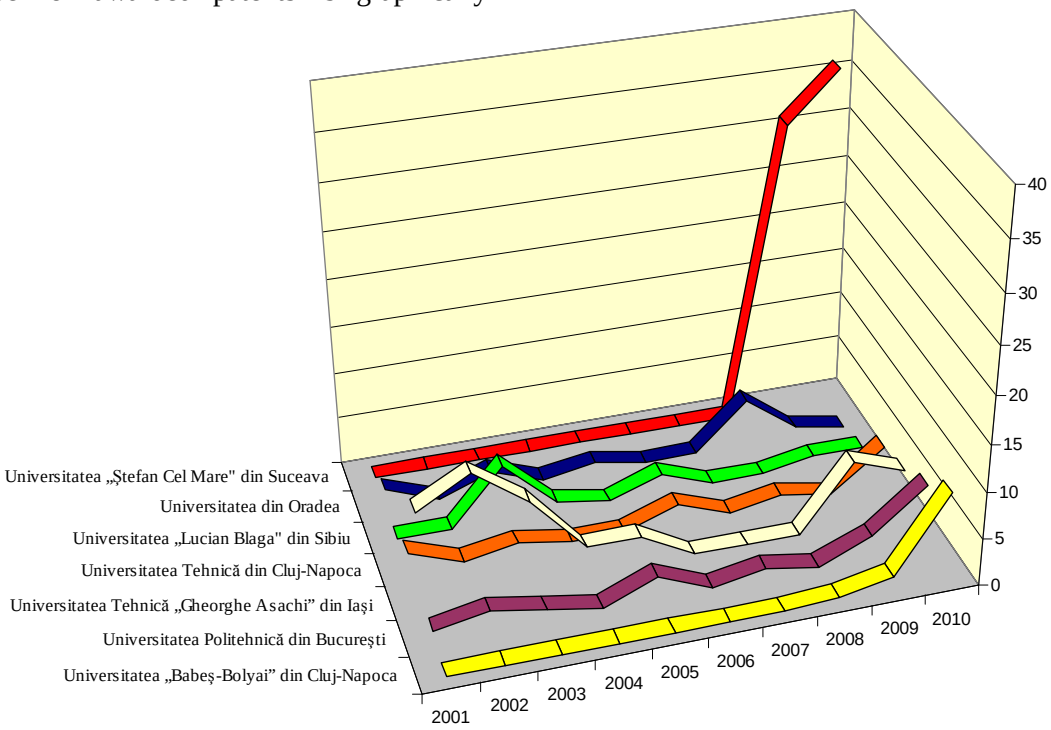

Figure 10. Evolution of the number of patents obtained and published in BOPI during the period 2001-2010, for the universities with at least 10 patents for the overall decade

3.3. Inventions with foreign universities as holder

Although few, foreign universities exist – from USA and Mexico – which registered patent applications in Romania [45 ... 48] and obtained patents [49 ... 56].

During the analyzed decade, no collaborations were identified between Romanian universities and foreign universities as regards the protection through patent of their possible scientific collaboration.

4. Conclusions

It is true that universities "*may play a vital role in the development of the national innovation system, as well as of the corresponding human resources*" [57], that such an implication on their part is even called for. Through their educational function, they are involved in training experts and through their research activity, they generate knowledge.

At least in the technical field, the patent stands for the proof of the research capacity and generates recognition and respect. It is perfectly true that the "*determining factor of the success does not consist in the great number of new ideas, but in their implementation, through the achievement of products and services which accomplish value*" [58], but quality arises from quantity. Consequently, the number of obtained patents stands for an important indicator and contributes to "*impregnating the social environment with an innovating scientific culture …, fostering critical and exploring spirit*" [57].

During the decade 2001-2010, the overall number of patent applications of the Romanian universities corresponds to less than 0.5 patents per year and university!! It is annoyingly little and much below the entire academic community's innovation-invention capacity. The fact should be however appreciated that the trend is on a strong increase.

From the standpoint of the number of patent applications and obtained patents, for the analyzed period, "Ştefan cel Mare" University of Suceava ranks first as net leader, although it is classified in the category of the universities focused on education. The observation must be made that the results were only obtained during the years 2008-2010.

Constant invention-oriented results and preoccupations have been identified at "Gheorghe Asachi" Technical University of Iaşi and the Politehnica University of Bucharest, as well as at some other few universities throughout Romania. On the other hand, the study herein reveals that all Romanian universities often register periods of inventive inactivity or low inventive activity.

The fact that most Romanian universities do not show interest in obtaining patents reflects management deficiencies and not innovation-invention incapacity.

References

1. *** *Ordin 5262/2011*. Official Monitor of Romania, Part I, no. 637 of the 6th of September 2011
2. *** *HG 789/2011*. Official Monitor of Romania, Part I, no. 569, of the 10th of August 2011
3. *** *BOPI* (Romanian Official Bulletin for Intellectual Propriety) *Collection*, 2001-2010
4. http://www.wipo.int/classifications/en/
5. *** *Law no. 381/2005*. Official Monitor of Romania, Part I, no. 6, of the 4th of January 2006
6. *** *Government's Ordinance no. 41/1998*. Official Monitor of Romania, Part I, no. 959, of the 29th of November 2006
7. Patent application a 2007 00850. BOPI 5/2008, p. 29
8. Patent application a 2007 00871. BOPI 5/2008, p. 38
9. Patent application a 2007 00856. BOPI 5/2008, p. 40
10. Patent application a 2007 00869. BOPI 5/2008, p. 41
11. Patent application a 2008 00917. BOPI 12/2009, p. 49
12. Patent application a 2008 00961. BOPI 12/2009, p. 50
13. Patent application a 2009 00332. BOPI 5/2010, p. 43
14. Patent application a 2007 00714. BOPI 5/2008, p. 35
15. Patent application a 2007 00715. BOPI 5/2008, p. 36
16. Patent application a 2007 00705. BOPI 5/2008, p. 36
17. Patent application a 2007 00904. BOPI 5/2008, p. 37
18. Patent application a 2007 00905. BOPI 5/2008, p. 37
19. Patent application a 2008 00287. BOPI 10/2010, p. 37
20. Patent application a 2002 00274. BOPI 7/2002, p. 33
21. Patent RO 119897. BOPI 5/2005, p. 93
22. Patent application a 2004 00587. BOPI 12/2005, p. 30
23. Patent RO 122047. BOPI 11/2008, p. 92
24. Patent application a 2008 00792. BOPI 5/2010, p. 28
25. Patent application a 2004 00238. BOPI 10/2005, p. 27
26. Patent RO 120178. BOPI 10/2005, p. 83
27. Patent application a 2005 00958. BOPI 5/2006, p. 29
28. Patent application a 2004 00885. BOPI 6/2006, p. 31
29. Patent application a 2006 00208. BOPI 10/2007, p. 29
30. Patent application a 2006 00190. BOPI 10/2007, p 45
31. Patent application a 2006 00727. BOPI 3/2008, p. 16
32. Patent application a 2006 00894. BOPI 5/2008, p. 35
33. Patent application a 2008 00634. BOPI 12/2008, p. 28
34. Patent application a 2008 00424. BOPI 12/2009, p. 41
35. Patent RO 119444. BOPI 11/2004, p. 90
36. Patents RO 116355 … 116361. BOPI 1/2001, p. 50 … 53
37. Patent RO 116365. BOPI 1/2001, p. 55
38. Patent application 95-01704. BOPI 5/2001, p. 15
39. Patent RO 116951. BOPI 8/2001, p. 51
40. Patent RO 119002. BOPI 2/2004, p. 57
41. Patent application a 2007 00737. BOPI 4/2009, p. 14
42. Patent application a 2007 00216. BOPI 5/2009, p. 45
43. Patent application a 2007 00571. BOPI 5/2009, p. 47
44. Patent application a 2004 001145. BOPI 11/2006, p. 32
45. Patent application a 2001 00681. BOPI 1/2001, p. 13
46. Patent application 99-01178. BOPI 11/2001, p. 17
47. Patent application a 2002 01332. BOPI 4/2003, p. 25
48. Patent application a 2004 00584. BOPI 1/2005, p. 30
49. Patent RO 117096. BOPI 10/2001, 9. 76
50. Patent RO 117194. BOPI 11/2001, p. 96
51. Patent RO 117542. BOPI 4/2002, p. 75
52. Patent RO 118210. BOPI 3/2003, p. 62
53. Patent RO 118748. BOPI 10/2003, p. 52
54. Patent RO 119303. BOPI 7/2004, p. 68
55. Patent RO 119815. BOPI 4/2005, p. 93
56. Patent RO 120313. BOPI 12/2005, p. 82
57. Popescu, D.I., Meghea, A., Pincovschi, E. (2010) *De la Strategia Lisabona la Europa 2020* (*From Lisabon Strategy to Europe 2020*). AGIR Publishig House, ISBN 978-973-720-338-0
58. Guran, M.: *Managementul cercetării-dezvoltării şi al inovării* (*Management of research-development and of inovation*). AGIR Publishig House, ISBN 978-973-720-285-7, Bucureşti, 2010