

Patenting in Romania. A brief analysis based on national statistics

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Abstract

A patent gives the author the right to use or sell an invention, and other entities are legally prevented from using the invention without their permission. An invention patent represents an asset for the holders, which can generate income, competitive advantages on the market, being a guarantee of the originality of the products for consumers. The paper proposes an analysis of patent applications registered in the period 2011-2021 at the State Office for Inventions and Trademarks, Romania. For documentation, scientific databases such as Clarivate Analytics, Scopus or Google Scholar, relevant information from online media, national and European research regulations were used. Data used in the research were collected from official statistics. The analysis showed that during the analyzed period there was a general tendency to reduce patent applications registered with the public authority in Romania. Significant decreases in requests were found for natural persons, against the background of the increase in requests from legal entities. The research showed that there was a steady decline in the number of patent applications from foreign applicants, reaching less than 15% in 2021 compared to 2011. Private companies registered an average of 100-200 patent applications per year, in while universities have shown a significant increase in the patenting of inventions. Research units in Romania have registered a doubling of the number of patent applications during the evaluated period. Although there are positive signals from Romanian research institutes and universities, overall, innovation and patenting in Romania register modest performances, compared to the European situation. The study is useful for the business environment, for identifying viable partnerships in innovation, respectively for public authorities, which must develop national strategies to support innovation.

Keywords: innovation, patent, technological transfer, Romania.

Jel Codes: I23, O31, O34

1. Introduction

Businesses and innovators need simple and cost-effective ways to protect their inventions, nationally or internationally. The invention patent is a contract, whereby the legal right to use or sell an invention rests exclusively with its author. Third parties, natural or legal, may not produce, use, offer for sale, sell or import a product or process based on the patented invention. From an economic point of view, a patent represents an asset for the holder and a strategic advantage in the market. The patent can generate revenue by commercializing the copyright (permission to temporarily use the invention through a license agreement or by selling the patent) and can provide exclusivity for a product or method. In the market economy, holding the patent is a strong argument for potential investors, it represents an advantage in positioning on the market and a guarantee of the originality of the products in front of consumers. Other entities may not manufacture, use, offer for sale, export or import a product or technological process based on your patented invention.

2. National patenting legislation

According to Romanian legislation, a patent can be granted for any technical invention having as its object a product or a process, provided that it is new, involves an inventive activity and is susceptible to industrial application. An innovative technology can be registered, as a process, in the description of the invention highlighting the phases and operations carried out within the process, described by technical characteristics (temperatures, pressures, times, speeds, viscosities, chemical compounds or shapes) on each of them (State Office for Inventions and Trademarks OSIM, 2022).

An inventor/applicant can obtain an invention patent in Romania by submitting a patent application to OSIM, but the granted patent is only valid on the territory of Romania, or he can submit a patent application to the European Patent Office (EPO), recognized at European level. After obtaining, the European patent must also be validated by the national patent office in each country where the author applies for protection. In some countries, national law

requires the translation of the patent or the payment of a fee, by a certain date. Exclusive rights to the invention are valid for a limited period of time, usually 20 years. Once it has expired, the patent cannot be renewed (EPO, 2022). To benefit from international protection, the patent author will apply to the World Intellectual Property Organization (WIPO). The Patent Cooperation Treaty (PCT) provides international protection for inventions, assists national patent offices with patent granting decisions, and facilitates public access to a wealth of technical information related to these inventions. By filing an international patent application with WIPO, applicants can simultaneously seek protection of the invention in a large number of countries (WIPO, 2022a). Domestic legislation in the field of patenting is harmonized with the European one, represented mainly by The European Patent Convention (EPO, 2020). At the national level, the OSIM website refers to Law 64/1991 on invention patents, republished in 2014.

3. Short literature review

The specialized literature presents little information regarding the innovation process and patenting in Romania. The official statistics, presented by the National Institute of Statistics NIS, on industrial innovation are summary and only cover the period 2002-2018 (NIS, 2022). The analysis of the number of innovative companies, by activities and size classes, shows that between 2002-2018 in Romania between 3,000 and 10,000 companies were registered with product innovations, business processes (completed, unfinished and/or abandoned) and with research and development activity. More than 50% of these companies are small firms (NIS, 2022).

An evaluation of the position of Romanian innovation at the European level is carried out by Iancu (2014), using the European Innovation Scoreboard EIS statistic (2013). The author shows that there is a discrepancy between the good results regarding the commercialization of innovation and Romania's constant position as a modest innovator, with aggregated results well below the European average.

The valorisation of Romanian patents through technology transfer is also analysed by Bechir (2016), who specified that at most 5% of inventions end up being applied. Not many inventions are capitalized because there is no interest from investors, public institutions, bodies that could use them, and the number of advisers in the field of industrial property is very low in Romania.

Bichescu et al (2017) do an analysis of patenting at the national level, with implications at the European level. The authors highlighted the fact that patent applications at the national level are below the European average. Romania's innovation performance, reflected in the EIS, is modest.

Stanciu (2018) analyses patenting in Romania and the use of patents in technology transfer activities. The research carried out highlighted the creation in 2009 of the Innovation and Technology Transfer Network (ReNNIT), favoured by the allocation of funds in the period 2007-2008 by the relevant ministry. Its role is to support the interaction of SMEs with innovation providers, represented by universities, research institutes and companies specialized in RDI. There are few functional technology transfer centres in academic institutions, and the results obtained from them are modest.

An analysis of the costs of patenting Romanian inventions, made by Andreea Paul, the president of the NGO "Initiative for Competitiveness", cited by Iacob (2019), shows that they are more than twice as high as in Germany and three times as high as in Poland, and Romanian patenting procedures are twice as long as in South Korea. The fees charged at OSIM for patenting domestic inventions are higher than those in Slovakia, the Czech Republic, Serbia, Poland, Germany, Canada, China or the Russian Federation.

The analysis carried out by the Representation in Romania of the European Commission regarding Romanian innovation shows that investments in research and innovation mean investments in the future of Europe. The strengths of the innovative process in Romania are the friendly environment for innovation and the impact from sales. Penetration of broadband services and Exports of high-tech products are the only indicators that show a performance close to the European average of Romanian innovation. Indicators on innovators, firm-level investment and human resources show weaker dimensions of innovation. The lowest indicator scores for Romania are recorded for Lifelong Learning, SMEs with product or process innovation, SMEs with marketing or organizational innovation, SMEs that innovate internally (European Commission, 2022).

Huian et al (2022), analyses the technology transfer performance of public research institutes in Romania from the perspective of the capacity to generate patented technology, correlated with institutional, human, commercial and financial factors. The research results confirmed the positive influence of skilled human resources and commercial resources, represented by technology transfer and spin-off offices. Institutional factors were also relevant in addition to the research domain.

Caviggioli et al (2022), investigated the relationship between the activity of a university in a technological field and the innovative activities of firms located in the same geographical area. The results obtained showed a strong correlation between the development of a research field at the university, with technological transfer activities, and the development of local companies, specialized in the same technological field. In addition, the existence of a significant technological distance between the portfolios of inventions available at academic institutions and the field of activity of local firms has a negative impact on the further specialization of host regions.

The WIPO statistics (2022b) regarding Romania show a number of 13,125 Romanian patents registered internationally, with a maximum recorded in 2011 (1,599 patents) and a minimum of 1,157 patents registered in 2020. More than 80% of patent applicants are Romanian citizens. No Romanian university holds a patent. In the Global Innovation Index (GII) ranking, which ranks world economies according to their innovation capabilities, based on 80 indicators, grouped into inputs and outputs of innovation, Romania ranks 46 out of the 131 countries evaluated. Romania performs better in innovation outputs (51) than innovation inputs (46) (WIPO, 2022b).

4. Materials and methods

For bibliographic documentation, open access articles were used, available on Web of Science - Clarivate Analytics, SCOPUS, Google Scholar or ResearchGate, respectively. The legislative regulations regarding patenting were selected from the Romanian legislation, published on the website of the State Office for Inventions and Trademarks OSIM, respectively the European ones, published by the European Patent Office (EPO). The data needed for the research were collected mainly from the national statistics, available on the OSIM website, of the National Institute of Statistics NIS and of the World Intellectual Property Organization (WIPO). The available information was selected, processed and statistically interpreted. The obtained results were compared with the data from the literature, for validation.

5. Results

5.1. Patents registered in Romania

The evolution of the number of patents accredited in Romania is presented in figure 1.

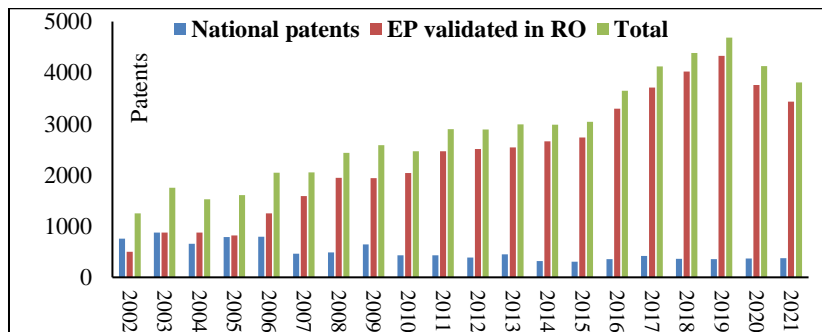


Figure 1. Patents registered in Romania (2002-2021)

Source: Author, by using OSIM (2022b)

After a positive evolution of the total number of patents registered in Romania in the period 2002-2019, with a maximum of 4,686 units in 2019, a period of regression followed in the period 2020-2021, with a reduction of approximately 20% in 2021, compared to 2019. This evolution was mainly supported by requests for recognition at OSIM of European patents registered EPO, submitted by entities not resident in Romania. The number of patents registered at OSIM experienced a permanent decrease during the analysed period, with a halving of patents obtained in 2021 (376 units), compared to 2002 (755 units).

The reduction of domestic patenting activity was due to the economic crisis, the high value of taxes and the increase of the domestic market's dependence on imports, against the background of the reduction of industrial production. The high share of European patents that requested recognition in Romania is evident in the figure 2.

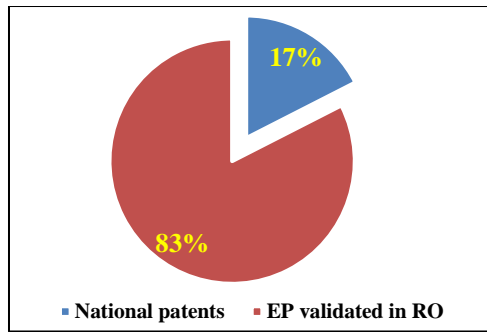


Figure 2. Patents registered EPO, vs OSIM

Source: Author, by using OSIM (2022b)

Over 80% of the patents registered in Romania during the analysed period are inventions patented at the EPO, which requested recognition at the national office.

5.2. Patent applications registered at OSIM

The evolution of requests submitted to obtain patents at the OSIM national office is presented in the figure 3.

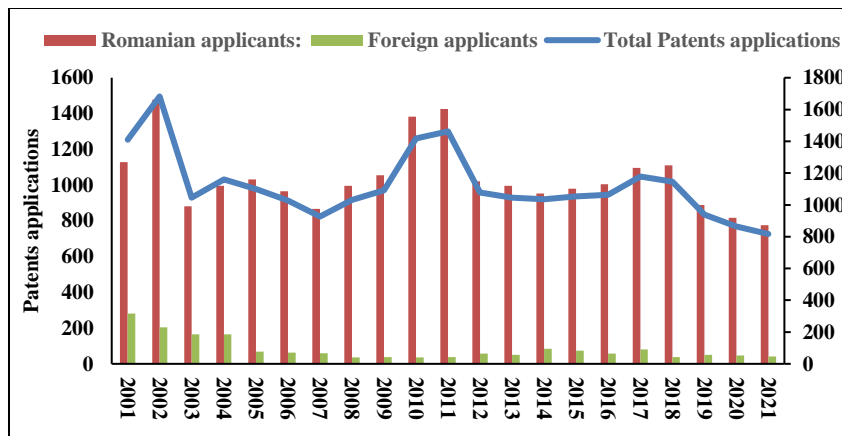


Figure 3. Patent applications registered at OSIM

Source: Author, by using OSIM (2022b)

The vast majority of patent applicants, to whom over 90% of applications belong, are from Romania.

The applications submitted come from individuals, companies, research units or public and private universities (figure 4).

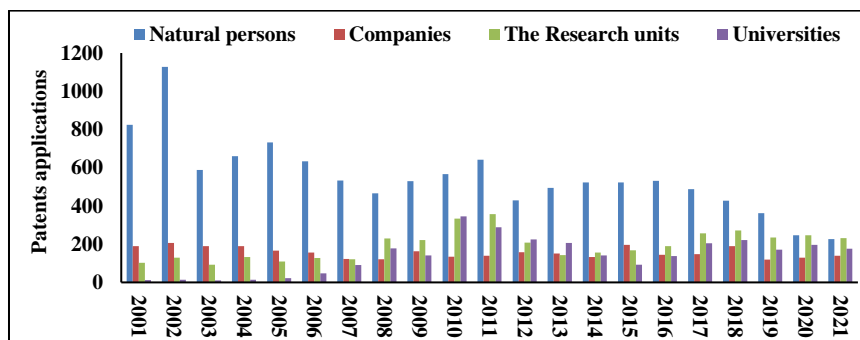


Figure 4. Patent applications registered at OSIM, by category

Source: Author, by using OSIM (2022b)

The share of requests belonging to natural persons decreased constantly during the analyzed period, reaching, from around 73% in 2001, to less than 30% in 2021, against the background of a significant increase in requests from research units (mainly institutes national research), which went from less than 10% in 2001 to almost 30% in 2021. Patent applications belonging to companies based in Romania evolved between 100-200 units.

The most spectacular evolution was registered in the case of Romanian universities, which reached, from 12 patent applications submitted in 2001, to 288 applications in 2011, respectively 177 in 2021.

5.3. Patent applications registered at OSIM by universities

Patent applications filed by universities between 2010 – 2020 is presented in table 1.

In total, Romanian universities submitted 2,231 patent applications in the period 2010-2020. The first 3 positions in the hierarchy are occupied by "Ștefan cel Mare" University of Suceava (with 472 applications), the "Gheorghe Asachi" Technical University of Iași, with Iași, with 267 applications, respectively the Polytechnic University of Bucharest, with 229 applications. If the 202 patent applications submitted by the "Transilvania" University in Brașov are added to these 3 first positions, the 4 universities accumulate more than 50% of the total applications submitted by Romanian academic institutions.

Patenting in the university environment mainly has scientific implications, being a criterion for promotion in higher technical education. Although the number of patent applications submitted by universities represents about 10% of the total registered at the national level, there are few academic institutions that properly capitalize on the patents obtained, through technology transfer actions.

Performance metrics	Model 1	Model 2	Model 3	Model 4
AUC score	0.71	0.71	0.76	0.87
Accuracy score	0.71	0.90	0.71	0.97

Table 1. Patent application, by universities

No.	University	City	County	2010	2015	2020	2010-2020
1	"Ștefan cel Mare"	Suceava	SV	130	5	29	472
2	UT "Gheorghe Asachi"	Iași	IS	32	12	28	267
3	Politehnica	București	B	31	7	15	229
4	"Transilvania"	Brașov	BV	22	7	6	202
5	UT Cluj-Napoca	Cluj-Napoca	CJ	25	10	18	187
6	"Dunărea de Jos"	Galați	GL	16	6	10	105
7	"Babeș Bolyai"	Cluj-Napoca	CJ	8	1	10	68
8	"Politehnica"	Timișoara	TM	9	8	3	60
9	"Petru Maior"	Târgu Mureș	MS	2	2	0	54
10	USAMV București	București	B	2	4	12	54
11	UMF "Carol Davila"	București	B	9	1	12	51
12	"Lucian Blaga"	Sibiu	SB	3	5	2	43
13	"Alexandru Ioan Cuza"	Iași	IS	4	1	7	42
14	Universitatea din Craiova	Craiova	DJ	9	2	4	41
15	UMF "Iuliu Hațieganu" Cluj Napoca	Cluj-Napoca	CJ	4	4	8	39
16	Universitatea din București	București	B	3	1	4	36
17	Universitatea de Petrol - Gaze Ploiești	Ploiești	PH	2	1	3	32
18	"Vasile Alecsandri"	Bacău	BC	7	x	0	30
19	USAMV Cluj Napoca	Cluj-Napoca	CJ	1	2	2	30
20	Universitatea din Pitești	Pitești	AG	5	1	2	29
21	UV "Vasile Goldiș"	Arad	AR	x	x	0	17
22	USAMV Timisoara	Timișoara	TM	3	2	2	17
23	"OVIDIUS" Constanța	Constanța	CT	6	1	2	17
24	UMF "Victor Babeș"	Timișoara	TM	4	3	4	15
25	USAMV Iași	Iași	IS	0	1	2	14
26	Universitatea din Oradea	Oradea	BH	5	1	0	12
27	UTC București	București	B	x	0	0	9
28	Universitatea Sapientia	Cluj Napoca	CJ	1	1	0	9
29	"Constantin Brâncuși"	Târgu-Jiu	GJ	0	2	0	8
30	UMF "Grigore T. Popa"	Iași	IS	1	1	0	8
31	"Valahia"	Târgoviște	DB	0	1	0	7
32	"Aurel Vlaicu"	Arad	AR	1	0	0	6
33	UMF Craiova	Craiova	DJ	0	0	2	4
34	Universitatea de Nord	Baia Mare	MM	1	0	0	3
35	Academia Tehnică Militară	București	B	0	1	0	3
36	UMF Târgu Mures	Târgu Mureș	MS	1	0	0	3
37	"Eftimie Murgu" Reșița	Reșița	CS	0	0	1	3
38	UVT	Timisoara	TM	0	0	3	3
39	"Nicolae Bălcescu"	Sibiu	SB	0	0	0	1
40	Apollonia	Iași	IS	0	0	0	1
Total				347	94	191	

Source: Author, by using OSIM (2022b)

Private universities occupy a modest position: Apollonia University in Iasi (1 application), Sapientia University (9 applications), UV "Vasile Goldiș" in Arad, with 17 applications. Patent applications submitted by the private academic environment represent less than 1.5% of the total recorded at national level.

5. Conclusions

Patenting is a process with strong economic implications, which can also contribute to strengthening the scientific prestige of universities and research institutes. Although Romania has a significant potential for innovation and patenting, the reduction of industrial production, the predominance of foreign capital in processing units, the lack of appropriate motivations for inventors have led to a reduced level of this activity, compared to developed European states. The realization of viable national strategies with tangible effects in support of innovation, patenting and technology transfer can bring more competitiveness to the national economy.

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