



Leadership in Higher Education Through Intellectual Property-Based Innovation at Universities

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Abstract

The purpose of this paper is to present the results of a research on the intellectual property, and in particular patented inventions with existing protection from the top 20 Bulgarian universities ranked in the field of economics by the Bulgarian University Ranking System. There are 52 Bulgarian universities in total (both public and private).

The report presents:

- *The number of patents owned by the targeted universities;*
- *The share that the owned patents represent from the total number of issued patents with existing protection;*
- *Ownership of patents that are applicable in the field of higher education;*
- *How do the number of patents owned relates to their position in the Bulgarian University Ranking System;*

The main question that the report aims to answer is whether from the existing data available in the databases and yearly reports of the Bulgarian Patent Office we can deduce that the targeted universities rely on their own patentable innovations in order to achieve leadership positions in the field of higher education.

Keywords: *intellectual property, innovation, higher education, leadership*

1. Introduction

With the establishment of the intellectual property system on the national and international level in the 20th century, a prerequisite was met for the economic realization of human creativity. The main goal of the system is to promote and protect novel creative ideas by giving them the characteristics of property. IP has an indispensable importance in the technological age that we live in. In 2020 over 3.2 million applications were filled in the world [1] and in that year the Chinese patent office received 1.5 million patent applications making it the leader in patenting activity with the USA, Japan and South Korea having much lower numbers [2]. According to a joint study by the European Patent Office and the European Union Intellectual Property Office from 2019 industries that depend heavily on IP account for 45% of total economic activity in the European Union (EU) 63 million jobs in the EU (29.2% of all jobs in the EU). [3]

Initially, the main beneficiaries of the IP system were individual creators/inventors, which is why we remember such names as Edison and Tesla, but with the development of technology – the need for large financial resources and many experts in order to build on the existing technological level - we see more and more the disappearance of the individual creator and that predominantly IP – especially in technology – is owned by organizations.

2. Universities and IP

One type of organization that should find great benefit in the intellectual property system is the university. Universities are a hub of vast knowledge in different areas. It has as its employees an academic staff whose main goal is to transfer knowledge by disseminating it among students which will in turn then use it in practice and benefit society. That is one aspect of universities – the educational process. Another one is the research that is carried out by the academic staff on which they base their professional academic growth. Their creative products are objects of intellectual property and are at the core of the technology transfer between universities and business.



We can designate as the initiator of the technology transfer trend between universities and business the United States of America where in 1980 with the adoption of the Bayh-Dole Act universities could own the results of the research carried out by their researchers which was financed by the federal budget. Prior to that the owner of the results was the state, which turned out to be ineffective because of core functions of the state are to regulate and control, not the commercialization of intellectual products. Creating the incentive for universities and research institutions to own and commercialize their intellectual products gave the necessary boost to the technology transfer process from universities to business. In the following decades many European countries followed with the change with the hope to replicate the success of American universities.

The introduction of technology transfer as a process in universities created the need for skilled professionals who would undertake the various tasks related to it – disseminating knowledge of intellectual property, communicating with the academic staff, initiating procedures for IP protection with the state authorities, finding potential licensees of the protected IP, negotiating contracts, etc. All this is usually done through a separate unit within the university called a technology transfer office. But overall IP – its ownership, protection and use are regulated under national legislation, and if adopted, a university intellectual property policy.

So far the transfer of technologies from universities has proven its worth in numerous countries. In American universities in 2020 there were 933 products created 27,112 invention disclosures in front of technology transfer offices, and over 8,700 patents granted [4]. That is the result of a large investment in research and therefore an overall focus on the creating innovation at universities that is shared both on the national level and by the universities themselves.

However, mainly due to the different legislative regulations of IP for the purposes of the planned economy and due to the recent change to a market economy, technology transfer and commercialization of university inventions is less prevalent in the former communist countries. In those countries the public ownership of the means of production required affected the mechanisms for protection of the objects of intellectual property, especially inventions [5]

2.The importance of Industrial Property for the Leadership of Bulgarian Universities

The aim of the paper is to look at the intellectual property, and in particular the inventions that have a national patent with existing protection of the top 20 universities in Bulgaria in economics ranked by the Bulgarian University Ranking System (BURS), and to see if there is link between the university's patenting activity and its rank position.[6] There are 25 universities ranked in economics in BURS. For the purposes of the report we have used the top 20.

The patent search carried out using the electronic system of the Bulgarian Patent Office [7] (see fig. 1) shows overall very low activity among the universities in applying for patents for inventions which in turn means that it is not a focus of the examined universities to produce inventions as a result of their research work. The reasons for that may be different, such as:

- The existing national legislation and university IP policies might not incentivize researchers to create novel inventions;
- The culture of academic development of researchers solely through publications;
- Poorly developed entrepreneurial skills due to historical development of the country;
- Researchers preferring to commercialize their ideas through private companies and offering their services and knowledge outside of the university;
- Low IP awareness among academic staff;
- Lack of IP professionals in universities;
- Lack of financing for research which is aimed at the production of novel inventions as a final research result;
- Other reasons.



Higher Education School	Ranking position in BURS	Total Search Results by Applicant Name	Number of Active National Patents
Sofia University "St. Kliment Ohridski"	1	242	0
American University in Bulgaria - Blagoevgrad	2	0	0
University of National and World Economy	3	2	1
University of finance, insurance, business, entrepreneurship and financec	4	0	0
New Bulgarian University	5	0	0
University of Economics - Varna	6	0	0
Academy of Economics Dimitar. A. Tsenov	7	0	0
Varna Free University "Chernorizetz Hrabar"	8	0	0
International Business School - Botevgrad	8	0	0
Plovdiv University "Paisii Hilendarski"	9	6	3
University of Veliko Tarnovo St. Cyril and St. Methodius	10	0	0
Higher School of Transport "Todor Kableshkov"	11	4	0
South-West University "Neofit Rilski"	12	1	1
Agricultural university - Plovdiv	13	1	1
University of Shumen Konstantin Preslavski	13	0	0
Burgas Free University	14	0	0
University of Ruse "Angel Kanchev"	14	14	1
Trakia University Stara Zagora	14	0	0
Varna University of Management	15	0	0
Higher School of Security and Economics	15	0	0

Table 1 Patent search on active patents owned by the top 20 universities in the BURS ranking in economics

Examining the yearly and statistical reports of the Patent Office of the Republic of Bulgaria [8], [9] we can see that their data confirm the abovementioned (see fig. 2). We can see the following:

- The applications for patents of universities and the Bulgarian Academy of Science (BAS) are grouped together which makes it difficult to establish the exact number of university applications without conducting a search for all universities in Bulgaria. It should be mentioned that the Institutes of BAS and Universities are regulated by different legislative acts – The Bulgarian Academy of Science Act and the Higher Education Act, respectively, which makes their comparison difficult;
- There is a very low overall patent application activity in the country. The total application activity for 2020 is only 1.74% of all active European Patents on the territory of Bulgaria.
- The application activity of Universities and BAS compared to the total activity for 2020 is only 17.07 %.
- In the 5 years of statistical data that is presented below we cannot see a significant increase in patent applications among Universities and BAS research institute.
- Given the low application activity and the abovementioned low number of active patents by universities we can again conclude that the patenting of inventions cannot be a factor in the leadership positions of Bulgarian universities.



Year	Applications for Patents	
	Total	By Universities and the Bulgarian Academy of Science
2020	246	42
2019	193	25
2018	260	28
2017	225	30
2016	232	27

Table 2 Statistical data of the Patent Office of the Republic of Bulgaria on patent applications and active European patents in Bulgaria

The overall lack of production of inventions by universities, therefore a lack of products which can be transferred from universities to businesses for commercialization, means that the technology transfer system in the country is severely underdeveloped. There is no opportunity for technology transfer professionals to develop their skills. With low levels of transfer it means that the financing of the activities cannot be a priority for universities and will stay underfunded unless funded by the state. I might also conclude that the lack of patenting among academic staff can also imply a limited knowledge of IP – its creation, protection and use, which in turn would mean that they are not aware of the possibility for commercialization of such products and therefore prefer to base their professional growth on scientific papers, rather than inventions. This shows the need for a more widespread IP knowledge dissemination among not only academic staff but also students, because knowledge regarding intellectual property rights, patents and patent protection will give a framework to their research focus and improve the possibility of their products to reach market and generate revenue.

Conclusion

At the current moment technology transfer from universities to businesses and commercialization of university industrial property is not a factor in establishing leadership positions by Bulgarian universities. The low application activity, therefore, the lack of focus of scientific research towards creating results which are patentable, shows that universities and their researchers do not rely on intellectual property, in particular industrial property, as an important competitive advantage and a source of potential personal and organizational growth, the reasons for which could be complex and varied – cultural, economic, legislative, market size, etc. I can conclude that there isn't a relation between the patentable products of Bulgarian universities and their ranking position in the BURS.

References

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