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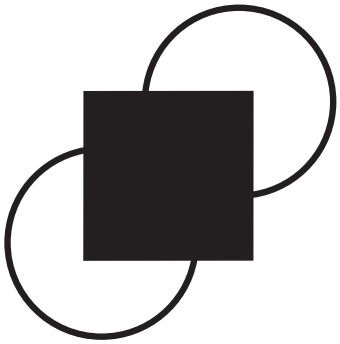

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QUANTITATIVE CHARACTERISTICS OF INTELLECTUAL PROPERTY OBJECTS IN UNIVERSITY INFORMATION ENVIRONMENT

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Abstract

Introduction: Many researchers agree that the goals of scientific research are description, prediction, and explanation/understanding. Thus, science builds our knowledge for the surrounding world and the processes and phenomena. The potential value of scientific research can change lives; to help governments, industries, society, etc. to improve their work. The scientific works are part of the national and the world heritage and is a result of the creative activity of its creator who explores the surrounding world; the processes that occur in it; the elements that build it, and the connections between them; and expresses them through his own scientific views, understanding, knowledge, attitudes, competences; thus, fulfilling the main goals of scientific research, set above. Considering this statement, results in the fact that all scientific works need protection, especially their intellectual property (IP) aspects. It needs to be emphasized that the objects of copyright differ from the other objects of intellectual property mainly with their focus on satisfying, in particular, the spiritual and cultural values of society. The economic incentive is not always the leading reason behind the creation of copyright objects. Right here, copyright objects differ from the objects of industrial property. The creative activity is not subject to judgment, for example, to the requirement of novelty, as in inventions.

The goal of this paper is to make a common characteristic of the objects of IP, in particular the industrial property – basic definitions and term of protection. For this purpose, the following research task is set – an overview of the classification of the types of IP works will be made, and then defined if these objects are part of the university information environment. This will be achieved through analysis of data maintained by the Patent Office of the Republic of Bulgaria and the presence of intellectual property objects, with university as the applicant – an overview of patents, utility models, trademarks, industrial designs and new plant varieties and animal breeds. As a result, the most common IP objects in universities will be displayed, as well as the universities with the largest number of registered objects in the registers by the Patent Office.

The methodology for achieving the main objective of the study and solving the set research tasks include the following specific methods: content analysis, comparative analysis; synthesis of the obtained information.

Conclusion: Research on IP objects, its place and importance for the development of modern society are becoming more and more relevant, both nationally and globally. It is an instrument that promotes intellectual property objects with a special aspect on copyright and creates an electronic information industry. IP rights are a challenge to today's information society and the globalizing world, together with policies on the preservation, protection and accessibility of digital objects, coherence, consistency and cooperation between curricula programs and new technologies.

Keywords: objects of intellectual property, intellectual property, industrial property, university information environment, Bulgaria.

1 INTRODUCTION

Education is the foundation of a prosperous society because the transfer of knowledge has always been a priority for its development. The huge potential of the technology and its application in the modern environment through training in a university environment determine the relevance of new skills and new knowledge that should be a part of the university curricula [1]. To the current two classic functions of universities – training of highly qualified specialists and dissemination of knowledge among the general public, a third new function is added, namely raising awareness of the intellectual property problems of future professionals. Universities are becoming one of the most powerful generators of intellectual property, and hence of innovation. Intellectual property (IP) adds another mechanism for universities to disseminate the knowledge that they generate and to have that knowledge used in the economic sector.

Understanding IP issues around knowledge transfer can help get discoveries from the lab to the marketplace.

It is necessary for universities to make efforts to raise awareness of IP issues in the academic community, to research IP right, by engaging in a transfer of technology to industrial partners to create value and benefit for society. Last but not least, students and universities have to be aware with the consequences of the lack of knowledge and the inability to protect their intangible assets under the form of IP, including from risks such as misuse of foreign intangible assets, industrial espionage, etc. [2]

IP and IP issues are not the sole or even the primary focus of a university. However, failure to properly consider IP issues can lead to frustrating and costly problems. Fortunately, realistic, and efficient management of IP in research, teaching, and extension requires only a minimal working understanding of the issues and an ability to access on-campus assistance in dealing with them [3].

Rethinking the paradigm of IP educational system will assimilate the existing traditions and will outline new priorities as: information literacy and expanding distance learning opportunities, open access to knowledge and reworked teaching kits, underlining the importance of value and management of IP rights in the digital world [4]. The educational paradigm of education for a lifetime is changing into lifelong learning, taking on the position: education as a value and element of the culture of relationships in the new millennium [5].

2 METHODOLOGY

Systematization and analysis of the current state of the objects of intellectual property, possession of the higher schools in the Republic of Bulgaria. The method of research and content analysis is applied in the identification, systematization, summarization, and analysis of the selected information.

3 RESULTS

Intellectual property already plays a major role in our daily lives, finding application in every field and aspect. The role of intellectual property in the university information environment is also crucial. The scientific content that is created in it requires a continuous process of protection, as scientific works must not be vulnerable in any way.

Depending on the specific field in which the university offers education, different works are created, which are the object of intellectual property [6], [7].

3.1 Intellectual Property Objects Classification

Based on the intellectual efforts made in the creation of intellectual products, they can be conditionally divided into two groups:

- Industrial property.
- Objects of copyright and related rights.

Copyright on works of literature, art and science arises for the author with the creation of the work (Article 2 of the Law on Copyright and Related Rights), i.e., the author receives protection on the work created by him at the moment he created it, and no actions are required for the registration of the object of copyright. The only thing the author has to do is to fix the created work on a material carrier, i.e., to objectify it (Art. 3, para. 1 of the Law on Copyright and Related Rights). Copyright is protected as long as the author is alive and 70 years after their death, and in the case of works created by two or more authors, this period begins to run after the death of the last surviving co-author (Art. 27, para. 1 and para. 2 from the Law on Copyright and Related Rights).

Scientific works are classified as subject to copyright and enjoy the full protection it provides.

There are also rights that are related or “neighbouring” to copyright and are therefore called “**related rights**”. It can be said that there are four types of related rights: rights of performers on their performance; rights of phonogram producers on phonograms; rights of the producers of the original recording of a film or other audio-visual work who have the exclusive right to the original and the copies obtained as a result of that recording; Broadcasters’ rights over their radio and television programs. Related rights arise automatically at the time of creation of the protected object – performance, recording, program. The term for which the related rights are recognized is determined by law and

cannot be shortened or extended, as this term is 50 years and is calculated from the beginning of the year following the year of occurrence of a certain event.

The concept of industrial property includes the following objects:

- Inventions.
- Utility models.
- Industrial designs.
- Marks (trade, collective, certificate).
- Geographical indications.
- Topology of integrated circuits
- New varieties of plants and breeds of animals

There is no specific definition of **invention** in our national legislation. It is accepted that inventive activity is a kind of creativity. The invention is protected by a document issued on the basis of an application filed with the relevant governmental or regional office, called a *patent*. The term of protection granted by the patent shall expire not earlier than 20 years from the date of filing of the application.

The **utility model** is quite similar to the invention, in particular the patent, so it is called a “small patent”. It should also be the result of a creative activity, which indicates the ways and means to achieve a specific technical result. Bulgarian legislation does not provide a specific definition of the utility model. The legal protection of the utility model is provided through registration with the Patent Office. Until 2006, the utility models received a patent for protection, but after 2006 and changes in the legislations they are already receiving a *certificate*. The validity period of registration of the utility model is 4 years from the date of submission of the application, and it can be extended for two consecutive periods of 3 years, i.e., the total term of protection may not exceed 10 years from the date of submission of the application. Compared to a patent that is valid for 20 years, the duration of legal protection with a utility model is half as short.

For the purposes of the Industrial Design Act, an **industrial design** is the visible appearance of a product or part of it, determined by the peculiarities of the shape, lines, pattern, ornaments, colour combination or combination of them (Article 3, paragraph 1 of the IDA). The validity of the design registration is 10 years from the date of submission of the application and may be renewed for three consecutive periods of 5 years, or total of 25 years.

A **mark** is an indication that is able to distinguish the goods or services of one person from those of others and can be represented graphically. Such indications may be words, including names of persons, letters, numbers, drawings, figures, the shape of the goods or their packaging, a combination of colours, sound signs, or any combination of such signs. The registration shall be valid for a period of 10 years from the date of submission of the application and may be renewed *indefinitely* for further periods of 10 years against payment of a fee. Marks could be trademarks, collective and certificate marks. A *trademark* is any sign that gives individuality to a good and service that a person offers and can be represented graphically. A *collective mark* is a mark which is the property of an association of producers, traders or persons providing services which are legally competent under the applicable law, and which is capable of distinguishing the goods or services of the members of the association from the goods or the services of others. The *certificate mark* shall be capable of distinguishing the goods or services in respect of which the proprietor certifies the material, the method of production of the goods or the manner in which the services are provided, the quality, accuracy, or other characteristics, other than geographical origin, from the goods or services, whose characteristics are not certified in this way.

A **geographical indication** is a designation of origin, being the name of a country, region or locality in that country used to designate a good originating there and whose qualities or properties are mainly or exclusively due to the geographical environment, including natural and human factors. For geographical indications there is *no* fixed period of validity, and it is terminated when the connection between the product and the environment in which the product is produced is terminated.

The **topology of integrated circuits** is an original topology, which is the result of the intellectual efforts of its creator and is not known among the creators of topologies and manufacturers of integrated circuits at the time of its creation. The protection of the topology shall be effective from the date of its first commercial use by the applicant, anywhere in the world, if a regular application has been filed with the Patent Office within two years from that date. The protection shall terminate 10 years after the end of the calendar year in which the registration took effect.

The protection of **new varieties of plants and breeds of animals** is regulated by the Law on the Protection of New Varieties of Plants and Breeds of Animals. It gives the following definitions:

- *Varieties* – created or discovered and developed varieties of plants of any botanical genus and species, including a branch, line, hybrid, or rootstock, regardless of the method (artificial or natural) of their production.
- *Breeds* – created or discovered and developed breeds, lines, and hybrids of farm animals, regardless of the method of obtaining them. Exceptions are local (indigenous) breeds of state-owned animals.

The legal protection of a variety shall be granted by means of a *certificate* valid from the date of issue, 30 years for varieties of trees and vines and 25 years for all other varieties of plants. The legal protection of the breed is also provided with a *certificate*, and the validity of the certificate is 30 years from the date of its issuance.

3.2 Current state of the objects of intellectual property, possession of the universities in the Republic of Bulgaria

The Patent Office of the Republic of Bulgaria, in respect of registered objects of IP, offers access to the following registers:

- State Register of Trademarks.
- State Register of Geographical Indications.
- State Register of Industrial Designs.
- State Register of Patents.
- State Register of Utility Models.
- State Register of European patents with effect on the territory of the Republic of Bulgaria.
- State Register of Supplementary Protection Certificates.
- Electronic Register of new plant varieties and animal breeds [8].

Based on the data entered in the above registers, we can determine which objects of intellectual property are applicable in the university information environment.

Among the registered **patents** from universities is the following:

- Status “Recognized” – 485.
- Status “In time for payment of fees” – 1.
- Status “In time for change” – 2.
- Status “Active patent” – 10.
- Status “Active patent in time for payment with a fine” – 3.
- Status “Substantive expertise” – 10.
- Status “Not issued due to non-payment” – 7.
- Status “Rejected application” – 12.
- Status “Withdrawn application” – 3.
- Status “Terminated due to expiration” – 1.
- Status “Terminated due to non-payment of annual fees” – 90.
- Status “Discontinued production” – 6.

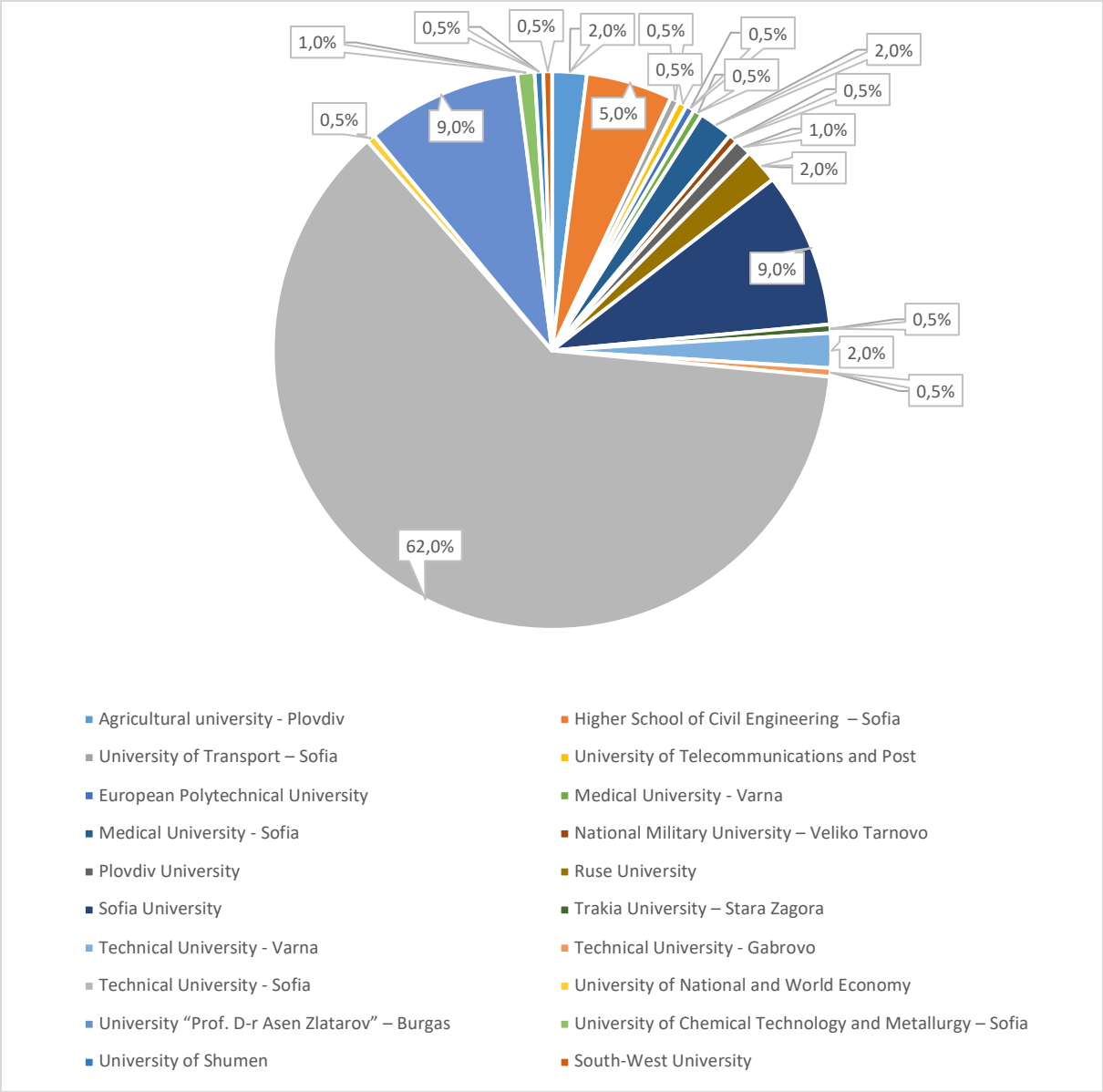

Fig. 1 Percentage distribution of patents from universities.

The university with the most patents for inventions with the status "Recognized" is the Technical University – Sofia with 365, and in second place is Sofia University "St. Kliment Ohridski" (57). Technical University – Sofia is the only one with a patent with the status "In time for payment of fees" – 1. With the status "In time for change" participates only with 2 patents Technical University – Sofia. With the status of "Active patent" again in the first place is the Technical University – Sofia (3), as Plovdiv University "Paisii Hilendarski" has 2, and the University of Telecommunications and Posts, Sofia University "St. Kliment Ohridski" and the University of National and World Economy participate with 1 each. Only two universities have the status "Active patent in time for payment with a fine" – Ruse University "Angel Kanchev" (2) and Technical University – Gabrovo (1). With the status of "Substantive expertise" most results are for the Technical University – Sofia (4). Medical University – Sofia has the most patents with the status "Not issued due to non-payment" – 5. Higher School of Civil Engineering "Lyuben Karavelov" has the most patents with the status of "Rejected application" – 3, and the same has the largest number with the status of "Withdrawn application" – 2. Technical University – Sofia is the only one with the status "Terminated due to expiration" – 1. Again, Higher School of Civil Engineering "Lyuben Karavelov" has the largest number with the status of "Terminated due to non-payment of annual fees" – 24, as annual patent fees are paid to maintain the patent, and for the beginning of each patent year shall be considered the filing date of the patent application, and the first patent year shall run from that date. The largest number with the status of "Discontinued production" is the Ruse University "Angel Kanchev" – 3 (Fig. 1).

Among the registered **utility models** from universities is the following:

- Status “Terminated due to non-payment of fees” – 20.
- Status “Discontinued production” – 3.
- Status “Rejected application” – 1.
- Status “Terminated due to expiration” – 10.
- Status “Active” – 21.
- Status “Published” – 3.

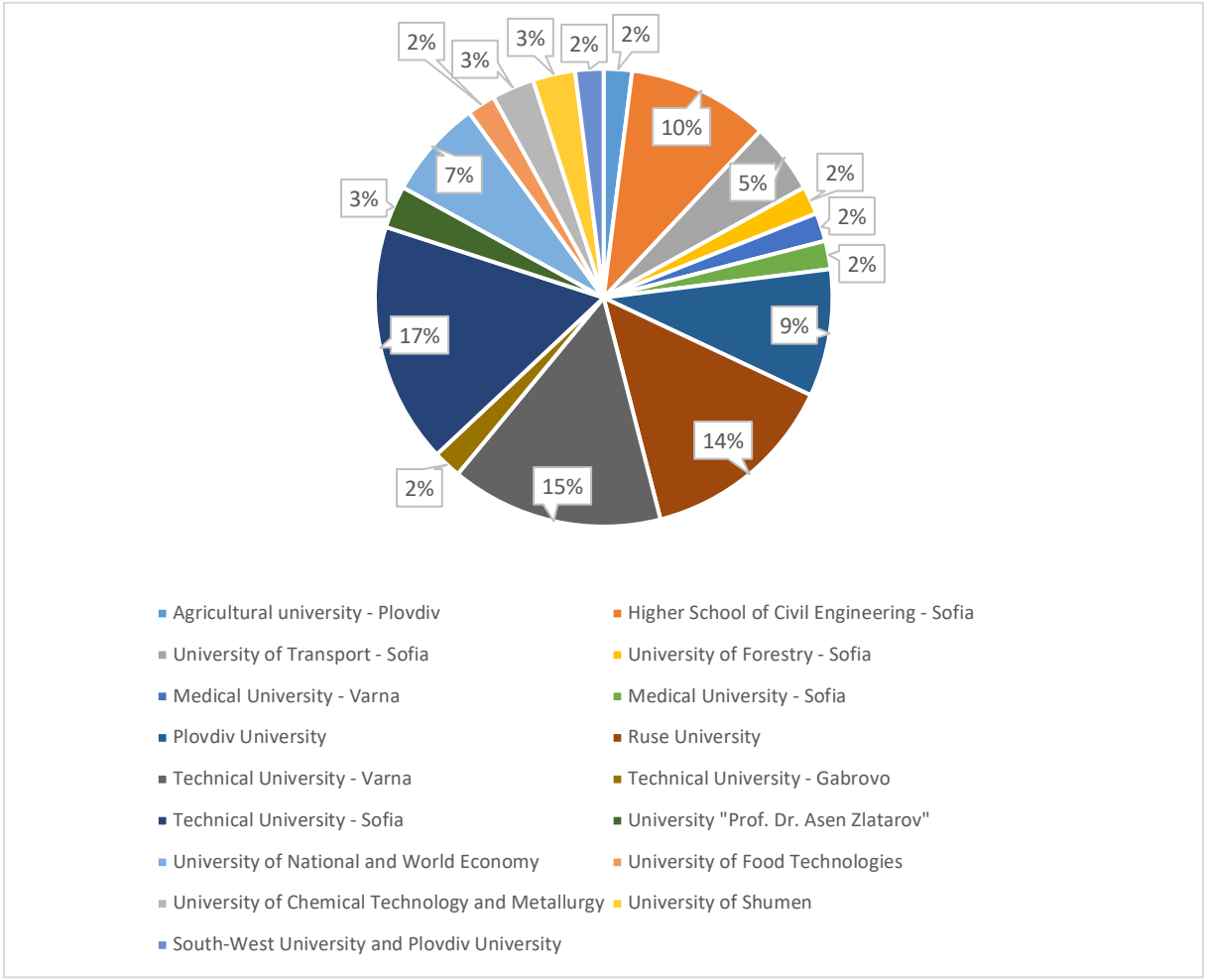

Fig. 2 Percentage distribution of utility models from universities.

The university with the most registered utility models with the status “active” is the Technical University – Sofia (6), and the same has only 2 with the status “Terminated due to non-payment of fees” and 1 with the status “Published”. Higher School of Civil Engineering “Lyuben Karavelov” has the most discontinued utility models due to non-payment of fees – 6. University of Shumen “Konstantin Preslavski” has the most utility models with the status “Discontinued production” – 2. There is only one rejected application among the universities, and it is at the University “Prof. Dr. Asen Zlatarov”. The largest number with the status “Terminated due to expiration” is the Ruse University “Angel Kanchev” – 3. Three universities have 1 each utility model with the status “Published” – Plovdiv University “Paisii Hilendarski”, Technical University – Sofia and the University of National and World Economy *(Fig. 2)*.

Among the registered **industrial designs**, the following is evident:

- Status “Expired” – 5.
- Status “Registered” – 7.

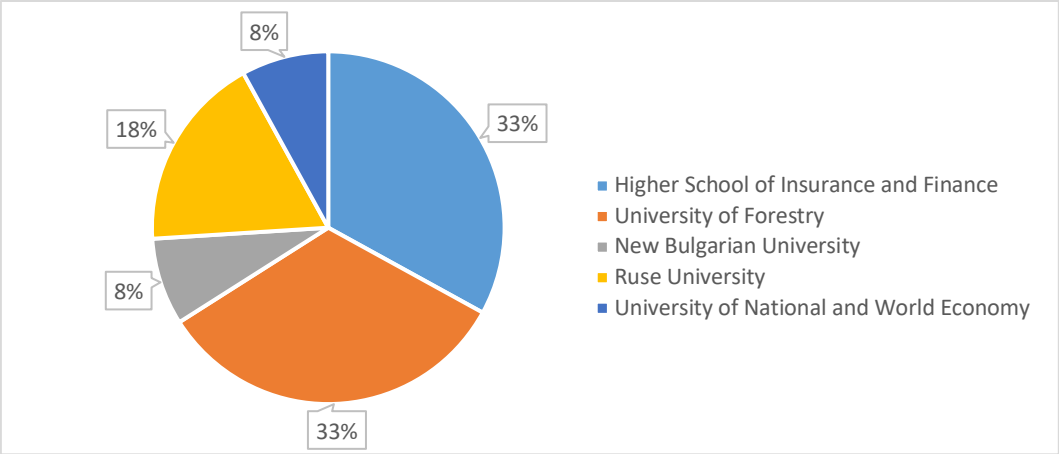

Fig. 3 Percentage distribution of industrial designs from universities.

Among the industrial designs with status "Registered", the leader is the Higher School of Insurance and Finance with 4 registrations, as the University of Forestry, New Bulgarian University and the University of National and World Economy have one registration each. The University of Forestry has the most industrial designs with the status "Expired" – 3, and the Ruse University "Angel Kanchev" has 2 *(Fig. 3)*.

Among the registered **trademarks** of universities is the following:

- Status "Expired term of protection" – 39.
- Status "Refusal of application registration – claimed seniority" – 9.
- Status "Registered" – 93.
- Status "In time for opposition and objection – claimed seniority" – 2.

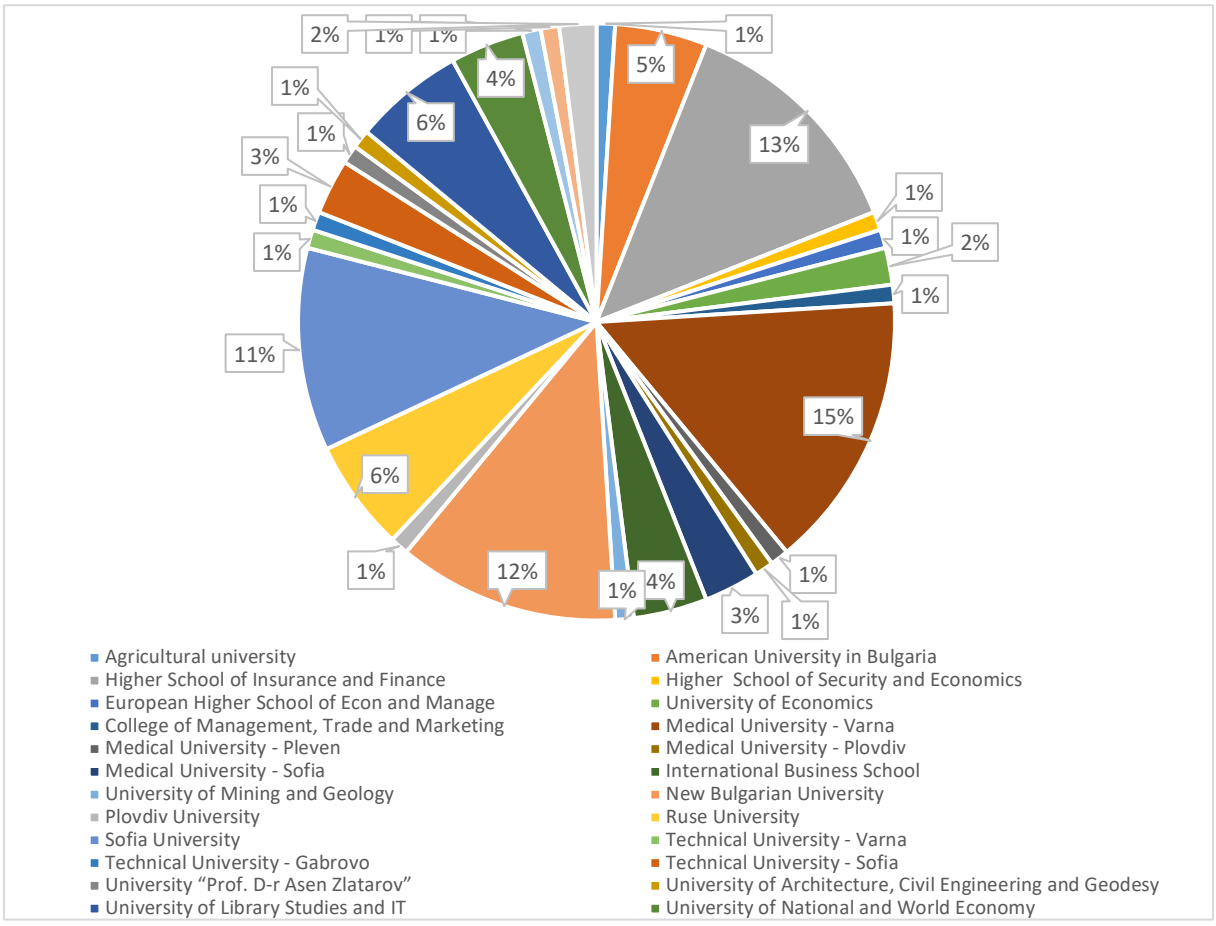

Fig. 4 Percentage distribution of registered trademarks of universities.

The university with the most trademarks with the status “Expired term of protection” is Ruse University “Angel Kanchev” – 6, and it also has 3 with the status “Registered”. The Higher School of Insurance and Finance has the most marks with the status “Refusal of application registration – claimed seniority” – 4, and it also has 14 with the status “Registered”. The leader in trademarks with the status “Registered” is the Medical University “Prof. Dr. Paraskev Stoyanov” – Varna (21), as the same does not have trademarks with the status “Expired term of protection” or “Refused registration”. The International Business School – Botevgrad is the only university that has 2 trademarks with the status “In time for opposition and objection – claimed seniority” *(Fig. 4)*.

Among the registered **new varieties of plants and breeds of animals** is the following:

- Status “Terminated due to unpaid annual fees” – 8.
- Status “Valid certificate” – 5.
- Status “Expertise in Executive Agency for Plant Variety Testing, Field Inspection and Seed Control /Executive agency on animal selection and reproduction” – 2.

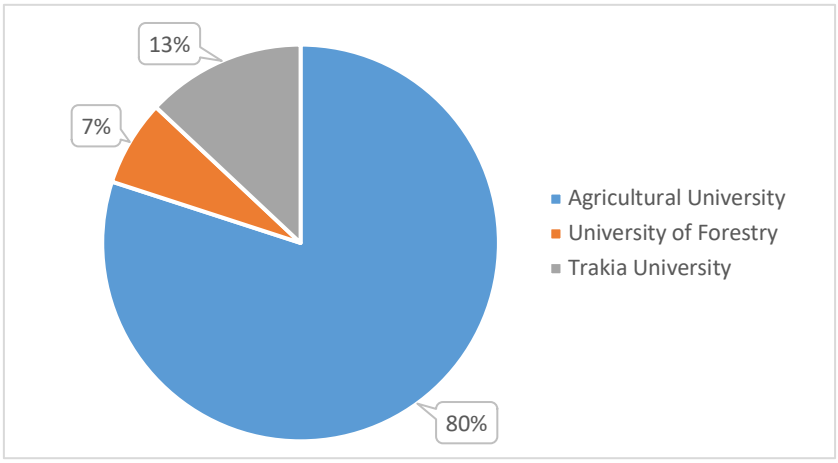

Fig. 5 Percentage distribution of registered plant varieties and animal breeds from universities.

In the field of new plant varieties and animal breeds, the Trakia University – Stara Zagora, together with the Agricultural Academy, have 2 registrations with status “Valid certificate”. The Agricultural University has 8 registrations with the status “Terminated due to unpaid annual fees”, with 1 registration with the status of “Valid certificate”, jointly with the Institute of Forage Crops, as well as 1 registration, along with the Institute of Cotton and Durum Wheat. There are only 2 procedures with the status of “Expertise in Executive Agency for Plant Variety Testing, Field Inspection and Seed Control /Executive agency on animal selection and reproduction” again at the Agricultural University, together with the Institute of Plant Genetic Resources “K. Malkov” *(Fig. 5)*.

4 CONCLUSIONS

The current state of the intellectual property objects registered by the university shows the existence of information on the registration, use and management of intellectual property.

The analysed current state of intellectual property establishes that out of 52 accredited higher education institutions on the territory of the Republic of Bulgaria, 34 have presence in the registers of the Patent Office of the Republic of Bulgaria, as the specifics of the professional fields in the field of higher education in some of them are applicable mainly objects of copyright and related rights.

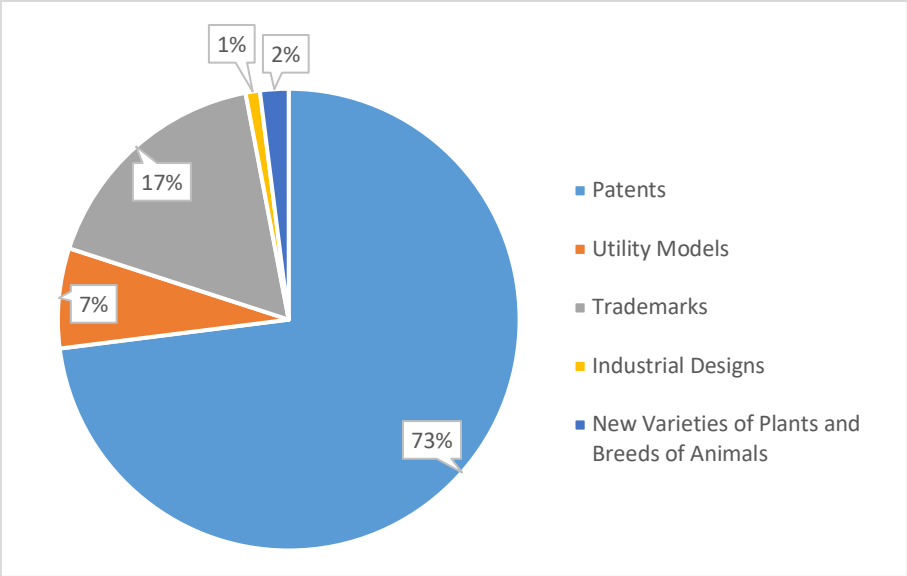

Fig. 6 Quantitative characteristics of the objects of intellectual property at universities.

Hence, those 34 universities are applicants for an object of industrial property – 630 patents, 58 utility models, 143 trademarks, 15 new varieties of plants and breeds of animals, 12 industrial designs – a total of 858 objects of intellectual property, in particular – industrial property *(Fig. 6)*, which is an indicator of the presence of a high level of knowledge on IP in the university information environment, as the trend of increasing knowledge in the field of IP remains positive. [9], [10].

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