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Some Issues Regarding Entrepreneurial Universities and Intellectual Property

1. Introduction

Historically, the main tasks of a university have been instruction and research. *Alma mater* has been a benevolent and kind mother feeding society with knowledge. The state has given its guarantees to such education and research activities at universities. Section 38 of the Constitution of the Republic of Estonia[*1] provides that: "Science and art and their instruction are free. Universities and research institutions are autonomous within the restrictions prescribed by law".

The present reality is, however, that the university as an instructor and disseminator of knowledge is increasingly becoming a seller of knowledge. The objective of this article is to examine the change in the role of the university in society as well as some accompanying theoretical and legal issues. The article discusses whether the university is becoming a type of entrepreneur in contemporary society and which role is played by intellectual property in it. Of various types of intellectual property[*2], the article focuses only on some issues of the patent policy of the university. The examples are mostly based on the regulatory documents of two leading Estonian universities — the University of Tartu (UT) and the Tallinn University of Technology (TUT).

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[1] Eesti Vabariigi põhiseadus. Entered into force on 3.07.1992. – RT 1992, 26, 349; 2003, 64, 429 (in Estonian). English translation available at http://www.legaltext.ee/et/andmebaas/document.asp?ptyyp=RT&q2=p%F5hiseadus&order=TA&tyyp=X&query=&display=1&nupp=Otsi%21 (17.09.2007).

[2] In this article, the notion of intellectual property is used as defined in article 2 (viii) of the Convention establishing the World Intellectual Property Organisation (WIPO), i.e., as the rights relating to the results of various creative and commercial activities. See Convention establishing the World Intellectual Property Organisation. Stockholm, 14.07.1967, entered into force on 26.04.1970. – 828 UNTS 3 (entered into force on in respect to Estonia 5.02.1994. – RT II 1993, 25, 55 (in Estonian)).

2. University as entrepreneur or entrepreneurial university?

The traditional activities of a university are instruction and research. In Estonian legal literature, the autonomy of a university has been defined through provision of instruction and research.[*3] This gives rise to the question of whether such constitutional guarantees also cover the business and economic activities of universities.

The contemporary university has been subjected to the task of participating in direct economic activities and promoting the development of society as a whole. Today's keyword, both in the European Union and on the global level, is innovation, and the role of universities in developing the innovation of a society is considerable.

The European Commission communication "Putting knowledge into practice: A broad-based innovation strategy for the EU"[*4] contains ten politically prioritised actions to implement the EU Lisbon strategy. Action 1 is directed towards the significant increase of "the share of public expenditure devoted to education and to identify and to tackle obstacles in their educational systems to promoting an innovation friendly society". Action 4 "Strengthening research-industry links" should contribute to the removal of administrative barriers which affect knowledge transfer between universities and industry. One of the aims is to encourage researchers' interaction with industry and their activities related to patenting, licensing and spin-off creation. Actions 7 and 8 are directed towards the enhancement of IPR protection. Special measures are introduced for universities by a special Communication[*5] to provide "better education and innovation skills". Several other EU documents have been passed to enhance university and industry links in developing innovation.[*6]

Estonian legislation proceeds from the traditional directions in the activities of universities when regulating the relations between universities and society. Section 1 of the Organisation of Research and Development Act[*7] regards scientific and technological creation as part of the Estonian economy. The Universities Act[*8] (UA), University of Tartu Act[*9] (UTA), and also the statutes of the University of Tartu[*10] (Statutes) set out as one of the missions of a university to provide services based on instruction and research, which are necessary for society.[*11] The statutes of the Institute of Technology[*12] operated by the University of Tartu imposes on the Institute of Technology, as an institution of the University of Tartu for research and development, the obligation to protect and commercialise the intellectual property of UT and to create a contemporary technological and material basis for filling the orders placed by entrepreneurs as well as state and other organisations in the fields of activity developed by the Institute of Technology.

The statutes of the Tallinn University of Technology proceed from different theoretical grounds. Subsection 47 (5) of the statutes of TUT[*13] defines TUT as an "entrepreneurial university" that "shall promote the innovative activities of its membership, offer in an active capacity research and development services to society, plan profit-based activities and make allocations contributing to the development of TUT".

The new role of the contemporary university is also reflected in several Estonian state and university strategies. The Government of the Republic Strategy Paper "Estonian Success 2014" provides that in order to increase the competitiveness of the Estonian economy it is important to develop cooperation relations between

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3 T. Annus. § 38. – Panel of editors led by E.-J. Truuväli. Eesti Vabariigi põhiseadus. Kommenteeritud väljaanne (Constitution of the Republic of Estonia. Commented Edition). Tallinn: Juura, Õigusteabe AS 2002, pp. 291–292 (in Estonian).

4 COM (2006) 502 of 13.09.2006.

5 COM (2006) 208 of 10.05.2006.

6 Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of Regions. COM (2007) 182 final, 4.04.2007. Improving knowledge transfer between research institutions and industry across Europe: embracing open innovation. Implementing the Lisbon agenda; Commission Staff Working Document Accompanying document to Economic and Social Committee and the Committee of Regions Improving knowledge transfer between research institutions and industry across Europe: embracing open innovation. Implementing the Lisbon agenda — Voluntary guideline for universities and other research institutions to improve their links with industry across Europe.

7 Teadus- ja arendustegevuse korralduse seadus. Entered into force on 2.05.1997. – RT I 1997, 30, 471; 2006, 14, 114 (in Estonian). Unofficial translation available at http://www.legaltext.ee (17.09.2007).

8 Ülikooliseadus. Entered into force on 18.02.1995. – RT I 1995, 12, 119; 2005, 61, 475 (in Estonian). Unofficial translation available at http://www.legaltext.ee (17.09.2007).

9 Tartu Ülikooli seadus. Entered into force on 21.03.95. – RT I 1995, 23, 333; 2004, 56, 404 (in Estonian). Unofficial translation available at http://www.legaltext.ee (17.09.2007).

10 Adopted by decision No. 47 of the University of Tartu Council on 28.05.1999, registered by Minister of Education directive No. 201 of 24.08.1999.

11 UA § 4 (2), UTA § 2 (2), Statutes § 4.

12 Approved by regulation No. 8 of the University of Tartu Council on 26.05.2006, clauses 3.2 and 3.4.

13 Approved by regulation No. 14 of the Tallinn University of Technology Council of 16.12.2003, registered by directive No. 86 of the Minister of Education and Research of 4.02.2004.

enterprises, their clients as well as institutions of higher education, and research and development.[*14] The development plan of the University of Tartu for 2008 (UT Development Plan) proceeds from the objective that "the University of Tartu shall increase intellectual capital through the transfer of knowledge and know-how as well as research and development activities, shall use it on a much wider scale in society, particularly in innovative production and knowledge-based politics, and shall considerably increase the profit derived from the implementation and protection of intellectual property".[*15] Further to that, the development plan of the Tallinn University of Technology for the years 2006–2010[*16] (TUT Development Plan) provides that in the context of an entrepreneurial university, TUT shall promote the development of the national innovation system and technology and know-how transfer and extend contract-based cooperation with domestic large enterprises and organisations of the public sector.

To define the new role of the university in society, above all, two alternative questions must be answered: (1) has the university become a type of entrepreneur — an entrepreneurial university —, or (2) whether it continues to be a traditional university, but the traditional areas of activity of the university must be complemented, and participation in entrepreneurship must be included as a new area of activity. This also gives rise to the question whether the new role of the university should be clearly reflected in legislation as well.

The activities of universities are increasingly associated with the provision of commercial education, additional training and consulting services offered for a fee, organisation of research events based on the participation fee, commercialisation of intellectual property, which could be manifested in the creation of spin-offs[*17], licensing of intellectual property and its assignment, etc.[*18] Both commercial training as well as research and development services constitute a rather significant part of the budget of Estonian public universities. At the same time, the bulk of the funds used for research in Estonian universities comes from the state budget. The share of private capital in financing research in Estonian universities is still relatively modest, if compared to the relevant proportions in the US, for example.

It is common knowledge that the task of a university is to participate in the promotion of the economic development of society. The state takes clear interest in financing research in universities. The classical areas of interest of the state to finance the research in universities comprise culture, health and national defence.[*19] The need to ensure a healthy living environment must be included here as well. At the same time, the creation of prerequisites for financing research contributes to the economic development of the state. This prerequisite has been taken as the basis in the relevant research and development policies of the US, Japan and European Union. It is the extremely clear interest of the state in obtaining a specific service from the universities that does not allow for defining universities as classical entrepreneurs in private law in our opinion. Universities may engage in entrepreneurship within the limits of the tasks imposed by the state and the rules prescribed by the state. These tasks allow for referring to the contemporary university as an entrepreneurial university.

The category of the entrepreneurial university has established itself in specialised literature over the past few years. For example, the entrepreneurial university has been defined as a university that has a wide scale infrastructure for supporting internal enterprise. In addition to traditional fields, the activities of such a university include commercial courses, consulting services, the patenting of its inventions, licensing of the results of various creative activities deriving from the university and establishment of start-ups.[*20] The contemporary

[14] Estonian Success 2014. Government of the Republic Strategy Paper, clause 9. Available at http://www.riigikantselei.ee/failid/EE2014.doc.pdf (7.11.2006) (in Estonian).

[15] Approved by decision No. 79 of the University of Tartu Council, clause 14.

[16] Approved by decision No. 10 of the Tallinn University of Technology Council, clause 5.3.

[17] The TUT has defined a spin-off as a legal person in private law, which has been established at the participation of an employee of a university or research institution or a member (members) of a university or an employee (employees) of a research institution and uses the results and/or know-how of the research and development of the university or research institution in its activities and has been registered according to the internal rules of procedure of the TUT. See § 1 (3) of the Principles of the External Economic Activities of the Members in the Tallinn University of Technology. Approved by regulation No. 8 of the Tallinn University of Technology Council of 22.04.2003.

[18] The bases of the knowledge services in the Tallinn University of Technology, approved by regulation No. 5 of the Tallinn University of Technology Council of 18.03.2003 can be provided as an example here; their objective is to develop a range of TUT knowledge services provided and ensure the development of knowledge services (§ 2 (1)).

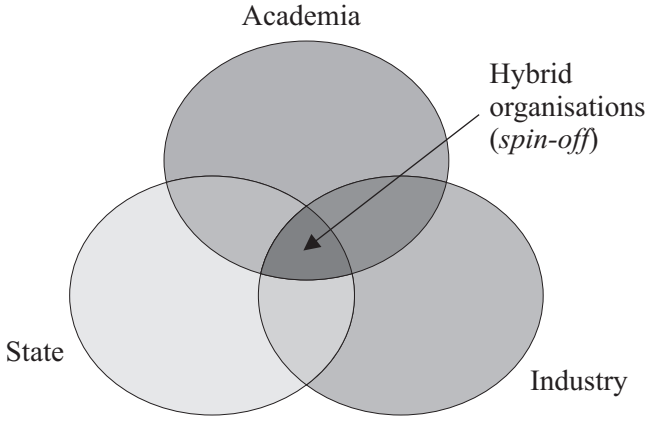
[19] H. Etzkowitz, L. Leydesdorff. The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. – Research Policy 2000/29, Elsevier Science B. V, pp. 110, 117.

[20] M. Jacob, M. Lundqvist, H. Hellsmark. Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology. – Research Policy 2003/32, Elsevier Science B. V, pp. 1555–1556. For the concept of an entrepreneurial university, see B. R. Clark. Creating Entrepreneurial Universities: Organizational Pathways of Transformation. – Issues in Higher Education 1992/12. London: Pergamon Press; L. L. Leslie, S. Slaughter. Academic Capitalism — Politics, Policies and the Entrepreneurial University. Baltimore, MD: John Hopkins University Press 1997; H. Etzkowitz, A. Webster et al. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. – Research Policy 2000/29, pp. 313–330; H. Etzkowitz. MIT and the Rise of Entrepreneurial Science. London: Routledge 2002; H. Etzkowitz. Research groups as quasi firms: the invention of the entrepreneurial university. – Research Policy 2003/32, pp. 109–121.

university has become an important part of creative industries.*[21] The role of the university in creative management is expressed in the creation of new knowledge and its commercialisation, and to a lesser degree also in production.

An entrepreneurial university promotes a regulatory and institutional framework that differs from that of a traditional university. The regulatory framework must provide prerequisites for researchers to support the entrepreneurship of the university. One of the potential measures is to consider inventions as part of research.*[22] An entrepreneurial university presumes the existence of a structural unit that unites academics and industry, research and the utilisation of resources assigned for research in line with market demand.*[23] As a rule, a special structural unit (Technology Transfer Office — TTO; Research and Development Department — RDD, etc.) is established to support the entrepreneurship of a university, and its activities are prescribed by the rules issued by the university. Scholars have also raised a justified question to what extent would knowledge be communicated to industry if there were no mechanisms for identifying knowledge and ensuring its use.*[24] Some universities have taken as the basis an approach according to which such technology transfer organisations must work very closely with the faculties and researchers of universities. This would contribute to the identification of the opportunities provided by research, which can be used in business and which the university can commercialise.*[25] However, any commercialisation presumes the analysis of new knowledge created by the university from the point of view of legal protection. It must be emphasised that the creation of a structure supporting commercialisation is not an objective on its own. There is a point in such a structure, provided that it supports the protection and commercialisation of the intellectual property created at the university or by the university. Thus, there is a direct link between the new role of the university and intellectual property.

The institutions operating in society have different functions; hence, it is necessary to create a new model of cooperation between universities and society. Etzkowitz and Leydesdorff provide the following model for discussing society, industry and university, which in our opinion is an excellent expression of the role of the contemporary university.*[26]



The model creates a new institutional infrastructure in the overlapping area of the activities of various institutions, where each participant assumes the role of the other participants and the characteristics of a so-called hybrid organisation appear. The authors are of the opinion that it is a universal model that is characteristic

[21] Several doctrines of creative industries, cultural industries, copyright-based industries, etc. have been developed. See, e.g., A. Kalvi. The Impact of Copyright Industries on Copyright Law. – Juridica International 2005 (10), pp. 95–104; A. Kalvi. Kultuuritööstuse olemus ja selle osatähtsus rahvamajanduses (The Nature of Cultural Industry and Its Role in the National Economy). – Juridica 2002/10, pp. 656–657 (in Estonian).

[22] For instance, the patent applications and patents registered in a member state of the Organisation for Economic Cooperation and Development (OECD) or the European Union are considered as a criterion for assigning basic financing (§ 3 (1) 5)). The coefficient of both a patent application and two or more chapters in a recognised monography of international circulation is two (§ 3 (1) 4)). See Conditions and procedure for assignment of basic finances to research and development institutions. Regulation No. 11 of the Minister of Education and Research of 21 March 2005. – RTL 2005, 34, 483 (in Estonian).

[23] M. Jacob, M. Lundqvist, H. Hellsmark (Note 20), pp. 1555–1556.

[24] H. Etzkowitz, L. Leydesdorff (Note 19), p. 110.

[25] M. Wright, S. Birley, S. Mosey. Entrepreneurship and University Technology Transfer. – Journal of Technology Transfer, Kluwer Academic Publishers 2004/29, p. 241.

[26] The authors themselves call it the Triple Helix Model of University-Industry-Government. See H. Etzkowitz, L. Leydesdorff (Note 19), p. 111.

of all states seeking to create an innovation and knowledge-based economy.[*27] Estonian universities have significant experience in the practical application of that model.[*28]

Although the model provided describes, above all, the overlapping objectives and activities of different institutions, the impact of its implementation is wider. It has also been pointed out in specialised literature that the university culture is in the process of change. Entrepreneurship, as an economic and business activity, is increasingly accepted as part of university culture.[*29] Acknowledgement of intellectual property is becoming more and more a part of university culture; an entrepreneurial university is unthinkable without intellectual property. The principle "patent and prosper" has become part of academic culture.[*30]

The entrepreneurship of a university does not mean that the university must become a company. The concept of an entrepreneurial university based on economic and business activities must be linked to the traditional concept based on instruction and research. It may be inferred that Estonian universities have redefined, to date, or are redefining their traditional role. Nevertheless, only TUT has defined itself unambiguously as an entrepreneurial university in its regulatory documents. Although the activities of UT conform to all the criteria of an entrepreneurial university, UT does not specifically define itself as an entrepreneurial university. Perhaps the concept of an entrepreneurial university still needs to be adjusted to the present university culture in Estonia.

Proceeding from the principles concerning the role of universities in developing innovation provided in the EU regulatory documents and the current practice of the Estonian universities, we are of the opinion that the principal Estonian legislation governing the activities of universities (above all, the Universities Act, the University of Tartu Act, the Research and Development Organisation Act) should be improved. It would be necessary to specify the rights and duties of a university in the Universities Act, which would facilitate the use of the research results for commercial purposes (commercialisation).

It would also be necessary to redefine the interpretation of the autonomy of universities provided in § 38 of the Constitution. This constitutional provision should serve as a guarantee for the instruction, research and economic activities of universities.

3. Intellectual property as a prerequisite for an entrepreneurial university

3.1. Significance of intellectual property in society

Intellectual property is one of the foundations of a knowledge-based economy. Intellectual property aims to encourage the development and dissemination of knowledge and innovations, with a view towards fostering social progress.[*31] Intellectual property ensures investment in research, culture and other areas. Unless investments in research are protected, this could become an impediment to scientific progress. The provisions of intellectual property can be regarded as the protective mechanisms of certain economic interests. Economic activities may also in turn affect the development of intellectual property. That is why specialised literature has indicated that the scope of intellectual property continues to expand.[*32] Intellectual property is the main property of a university and its creation may be seen as the core role of a university.[*33] As the objective of this paper is to analyse, first of all, the effect of patent law upon the implementation of the entrepreneurial university theory, the other types of intellectual property will be discussed only in the context directly related to the subject below.[*34]

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[27] H. Etzkowitz, L. Leydesdorff (Note 19), pp. 111–112.

[28] Several spin-off companies have been established in Estonian universities, such as Quattromed AS in the UT, ProtoBios OÜ in the TUT.

[29] M. Wright, S. Birley, S. Mosey (Note 25), p. 236.

[30] H. K. Schachman. From "Publish or Perish" to "Patent and Prosper". – Journal of Biological Chemistry 2006 (281) 11, March 17, p. 6903.

[31] OECD Council. Recommendation on the Licensing of Genetic Inventions. 23 February 2006 (C (2005) 149/Rev1), p. 5. Available at http://www.oecd.org/dataoecd/39/38/36198812.pdf (23.03.2006).

[32] P. Drahos. The Universality of Intellectual Property Rights: Origins and Developments, p. 1. Available at www.wipo.int/tk/en/hr/paneldiscussion/papers/pdf/drahos.pdf (10.01.2006).

[33] M. Wright, S. Birley, S. Mosey (Note 25), p. 235.

[34] For problems of copyright law in universities, see H. Pisuke. Copyright at Universities: Some Issues Concerning the Regulation of Academic Works. – Autoriu teises i literaturos, mokslo ir meno kurinius: aktualijos ir perspektyvos. Prane imu rinkinys. Vilnius Lietuvod Respublikos kulturos ministerija, Vilniaus universitetas, Mykolo Remeris universitetas 2004, pp. 57–67.

3.2. Intellectual property regulation supporting the entrepreneurship of a university

The Estonian legal system does not contain an Act directly regulating the intellectual property issues related to a university.[*35] Yet, it would not be correct to assert that such a regulation is non-existent. Thus, it is derived from § 12 (2) of the Patents Act[*36] (PA) that if an invention is created in the performance of contractual obligations or duties of employment, the right to apply for a patent and to become the proprietor of the patent is vested in the author or other person pursuant to the contract or employment contract. Subsection 13 (8) of the Patents Act provides that an author has the right to receive fair proceeds from the profit received from the invention.[*37] Subsection 32 (1) of the Copyright Act[*38] sets out a general rule, pursuant to which the author of a work created in the execution of his or her direct duties shall enjoy copyright of the work but the economic rights of the author to use the work for the purpose and to the extent prescribed by the duties shall be transferred to the employer. Consequently, a contract and provisions applicable within a university are decisive when it comes to an invention and works created in an employment relationship.

Section 117 of the UT statutes provides an important principle: UT shall recognise its members' moral and property rights resulting from their intellectual activity. Clause 11 of subsection 3 (2) of the TUT statutes sets out the development of legal protection of intellectual property as a task of TUT. The intellectual property policy of the universities is embodied in the principles of treating intellectual property (IP Principles), adopted by the universities as separate documents). The existence and content of the IP Principles serves as evidence of the objectives of the universities. On the one hand, it confirms that the administration of the university considers the area an important one and in need of independent regulation; on the other hand, it presumes the willingness of the academic community to adhere to the regulation. It would be ideal if the IP Principles are set out as the result of the natural development of the university culture, that is, when the academic members of the university recognise the need to protect their intellectual property and use it for economic purposes. It is claimed in literature that the relationship between the policy of the university as an institution and the individual behaviour and conduct of teachers and scientists often remains unclear.[*39] Based on Estonian practice, it may also be said that the academic staff of the university is frequently unaware or has minimum knowledge of the intellectual property policy of their university or does not observe several of its principles in practice. Below, the regulation of some intellectual property principles in Estonian universities will be analysed.

From a practical point of view, the most important question is to whom the rights to inventions created at a university belong. The principles governing the handling of intellectual property at the University of Tartu[*40] (Principles Governing IP at UT) provide an answer in clause 5.2. According to the provision, the transfer of the right to apply for a patent or other protection document, and the right to become the proprietor of a patent, utility model or other object of industrial property from the author, shall be formalised if the object of industrial property is created:

(a) as the result of the author's creative activities in the execution of his or her duties or on the basis of any other contract entered into between the university and the author;

(b) in the execution of duties arising from a contract between the university and the person ordering research and development or a research and development cooperation project by the author;

(c) when using the property of the university (equipment, working premises, contribution of the university staff, etc.).

In a similar manner, the proprietorship of intellectual property rights is governed by the Rules of Handling the Intellectual Property at the Tallinn University of Technology[*41] (Rules of Handling IP at TUT). Subsection 8 (1) of the Rules of Handling IP at TUT sets out a general principle according to which "[t]he industrial property belongs to TUT, if it has been created in the execution of contractual duties or official duties and/or the material resources of TUT have been used in the creative process". The Principles of Handling Intellectual

[35] Finland adopted in 2006 an Act governing the ownership of rights to inventions made at universities. See Laki oikeudesta korkeakouluissa tehtäviin keksintöihin (369/2006). Available at www.finlex.fi (29.11.2006).

[36] Patendiseadus. Entered into force on 23.05.1994. – RT I 1994, 25, 406; 2006, 58, 439 (in Estonian). Unofficial translation available at http://www.legaltext.ee (17.09.2007).

[37] In principle, it can be said that the rights of an inventor have constitutional bases in Estonia. See A. Kelli. Patendiõiguse põhiõiguslikud alused ja piirangud (Constitutional Bases and Limitations of Patent Law). – Acta Societatis Martensis 2005/1, pp. 158–172 (in Estonian).

[38] Autoriõiguse seadus. Entered into force on 12.12.1992. – RT I 1992, 49, 615; 2007, 13, 69 (in Estonian). Unofficial translation available at http://www.legaltext.ee (17.09.2007).

[39] M. Wright, S. Birley, S. Mosey (Note 25), p. 239.

[40] The principles governing handling of intellectual property at the University of Tartu. Adopted by directive No. 17 of 18 November 2003 of the University of Tartu Council (entered into force 28 November 2003).

[41] Rules of Handling Intellectual Property at Tallinn University of Technology. Adopted by directive No. 4 of 21 March 2006 of the Tallinn University of Technology Council (entered into force 21 March 2006).

Property in the Estonian University of Life Sciences[*42] (IP Principles of Estonia University of Life Sciences) (clause 4.2) and the Regulation of Legal Protection of Intellectual Property in the Tallinn University[*43] (IP Regulation of Tallinn University) (clause 3.3) generally proceed from a similar solution. Thus, all the leading Estonian universities in public law have proceeded from the interests of the university as an institution regarding the proprietorship of intellectual property. Several countries use, as an alternative, a completely different approach where the rights rest with the immediate creator. Sweden, for example, uses a system, according to which the teacher has exclusive rights to the inventions created by him or her, which he or she exercises at his or her discretion (so-called teacher's exception).[*44]

Several problems may arise in practice when determining the inventions created in the execution of duties and the proprietorship of the rights. For example, who will hold the rights if a researcher finds a technical solution while on holiday? There have been situations in practice when an employee of a university keeps the knowledge of an invention created in the exercise of duties to himself or herself, takes up a post with a new employer and then applies for the legal protection of the invention. The above-mentioned situation has been regulated in Finland where the Act of Inventions Made at Universities has been adopted. Subsection 12 (3) of the Finnish Act provides that if the patent application is submitted within six months of the expiry of the employment contract, the inventor must prove that the invention was not created during the validity of the previous employment relationship. In Estonia, a similar dispute must be settled on the basis of the regulations on intellectual property of the universities and it must be agreed, on a case-by-case basis, who holds the rights.

If it derives from an employment contract that the university as the employer holds the rights to the invention created in the course of work, the inventor has the right to receive remuneration for his or her invention. Subsection 13 (8) of the Patents Act provides that an author has the right to receive fair proceeds from the profit received from the invention. This gives rise to the question what constitutes "fair proceeds". Specialised literature recommends the application of the principle that the compensation payable to a researcher for his or her invention should at least be as good as he or she would receive when commercialising the invention himself or herself.[*45] Such a principle cannot obviously be applied in practice as it does not take into account of the interests of the university.

The principles of intellectual property of Estonian universities apply the principle of "fair proceeds" rather differently, leaving the author 1/3 to 2/3 of the profit received. Thus, clause 5.3 of the Principles Governing IP at UT prescribes that UT generally pays the author 2/3 of the profit received from the invention, from which the legal protection of the invention and other such costs have been deducted first.[*46] Clause 3.16 of the IP Regulation of Tallinn University provides that the author has the right to receive fair proceeds on account of the profit received from the invention and the proceeds are divided according to the principle that the share of the university may not be below 33%. Section 10 of the Rules of Handling IP at TUT is the most specific concerning the proceeds payable to the inventor, which provides that the division of proceeds shall be based on the general rule, according to which the authors' proceeds constitute 1/3 of the profit received, 1/3 of the profit belongs to the structural unit(s) of TUT contributing to the creation and development of the industrial property and 1/3 to the commercializer of the industrial property; exceptions may be made upon the division of the proceeds at the rector's consent, while the share retained by TUT may not be below 20%.

The model chosen by TUT, in which the inventor, the faculty and the technology transfer unit obtain 1/3 of the profit each is also relatively widespread elsewhere in the world. Such division of proceeds may be reasoned by a researcher's duty to contribute to the development of the university and his or her structural unit as well, since he or she receives his or her basic salary in addition to the 1/3. However, it is questionable if 1/3 of the profit is sufficiently motivating for the employee. The decision of the University of Tartu to give 2/3 of the profit to the researcher may be ascribed to the expected objective of motivating researchers to more intensive inventing activities, which will certainly have a positive outcome both for the reputation of the university and its economic activities.

It has been studied in several countries to what extent the formal pay policies to researchers, the faculty and technology transfer unit contribute to the commercialisation of research and the entrepreneurship of the university.[*47] It is obvious that without the positive attitude of researchers and the faculty the university cannot

[42] Approved by regulation No. 15 of the Estonian Agricultural University Council of 23.12.2003.

[43] Approved by regulation No. 9 of the Tallinn Pedagogical University Council.

[44] There is a discussion about the possible change in the current system. Two alternatives are seen as the main options. Firstly, an obligation to notify the university of the invention could be imposed on employees with research duties (mandatory reporting). This enables the university to decide whether to start negotiations with the employee for the acquisition of the rights or not. According to the other option, the university will, in return for compensation, acquire immediately all the rights related to the invention (takeover). See M. Levin et al. The right to the results of higher education research, p. 26. Available at http://regeringen.se/content/1/c6/05/34/08/5b44c128.pdf (21.02.2007).

[45] M. Levin et al (Note 44), p. 22.

[46] Clause 4.3 of the IP Principles of Estonian University of Life Sciences is essentially identical with clause 5.3 of the TU IP Principles.

[47] G. D. Markman, P. T. Gianiodis, P. H. Phan, D. B. Balkin. Entrepreneurship from the Ivory Tower: Does Incentive Systems Matter? – Journal of Technology Transfer 2004/29, Kluwer Academic Publishers, p. 354.

develop and introduce new technical solutions. One such study showed, however, that increasing the share of proceeds given to researchers and faculty did not correspond with their entrepreneurship or result in the creation of additional inventions to be commercialised. Nevertheless, increasing the share of the proceeds of employees of the technology transfer unit had a positive effect on the commercialisation of the inventions.[*48] Perhaps it would be necessary to conduct a similar study in Estonian universities and research institutions, which would enable the universities to implement certain more uniform criteria in the future.

In order to allow for the patenting of inventions and their later economic exploitation, the university must have enough information about the potential intellectual property objects created by its employees. For this purpose, the Estonian universities require, in their principles of intellectual property[*49], their teachers and researchers to report all potential inventions to the specified unit at the university.[*50] However, this gives rise to the question what happens if, instead of reporting to the relevant unit of the university, the teacher or researcher publishes an article describing the invention or gives a presentation at a research event. The obligation imposed on teachers and researchers in the intellectual property principles of the universities to patent the research results may come into conflict with § 38 of the Constitution. The comments on the Constitution, dating from 2002, take the position that "academic freedom protects both research and teaching of research achievements at the universities. As to research, both conducting research in itself as well as the publication and dissemination of the research results are protected".[*51] Naturally this does not mean that academic freedom could not be limited under any circumstances. The comments to the Constitution also set out that individual academic freedom and the objectives of the university may differ[*52] while the autonomy of the university and research institutions essentially means the right to organise itself[*53], which in turn may set as its objective the commercialisation of research results. It must be nevertheless analysed whether the desire of the university to commercialise inventions and participate in economic activities thereby is a sufficient basis for limiting academic freedom and whether the limitation of academic freedom for such purposes would be proportional.

It may be said that Estonian universities do not face any impediments arising from legislation to implementing the doctrine of an entrepreneurial university. The general regulation of the relevant legal Acts (the Patents Act, the Copyright Act, etc.) can also be applied to universities, and the lack of specific provisions does not hinder the entrepreneurship of the universities. Estonian universities have adopted their own intellectual property rules that are quite different from each other. It would obviously be necessary to harmonise these rules between the universities. This is in compliance with the interests of all the universities and teachers and prepares the ground for legislative regulation based on the interests of the universities. In such a case, it would also be possible to prevent any potential problems arising from the mobility of academic staff between the universities. The recommendation that the consistent implementation of the existing regulation, dissemination of information within the university and compliance with the regulations by teachers and researchers may sometimes be even more important than the creation of new intellectual property regulation[*54] applies also to Estonia.

At the same time, the authors support the position that the regulator should regulate more precisely the issues related to intellectual property created in the exercise of duties in the future. Several researchers have supported, since the beginning of the 1990s, the adoption of a special Act on inventions created in the course of work.[*55] One of the most recent scientific analyses originates from Jaak Ostrat, who has assumed the following position: "The legal regulation of industrial property created in an employment relationship and in the performance of any other contract needs to be developed further in Estonia".[*56] The idea of adopting specific provisions deserves to be supported. Yet it is disputable whether the inventions created at the universities need specific regulation in the form of an independent Act in Estonia, as has been done in Finland. It would be pos-

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[48] *Ibid*., pp. 357–360.

[49] Clause 8.2 of the TUT IP Principles; § 5 of the Rules of Handling IP at TUT; clause 7.2 of the IP Principles of Estonian University of Life Sciences; § 5 of the IP Regulation of Tallinn University.

[50] Further to the imposition of the reporting obligation on researchers, a measure supporting efficiently the commercialisation of research is the construction of research financing mechanism. If the state reduces the funds prescribed for research, the university must take better account of the needs of the economy and orientate itself to the wishes of the economic sector. Decrease in state financing may come into conflict with academic freedom. The comments on the Constitution have inferred correctly that academic freedom and institutional autonomy cannot be possible if there are no funds for research and teaching, Funds obtained from the private sector entail guidance by the wishes of those who allocate the funds; thus, it is important that the state support basic research. See T. Annus (Note 3), p. 292.

[51] See T. Annus (Note 3), p. 290.

[52] *Ibid*., p. 291.

[53] T. Annus. Riigiõigus (Constitutional Law). Tallinn: Juura, Õigusteabe AS 2001, p. 266 (in Estonian).

[54] H. K. Schachman (Note 30), p. 6897.

[55] Professor Ants Kukrus has proposed to adopt an Act on inventions made in employment relationships. See A. Kukrus. Tööstusomandi õiguskaitse (Legal Protection of Industrial Property). Tallinn: Mats 1995, p. 65 (in Estonian).

[56] J. Ostrat. Töösuhtes või muu lepingu täitmisel tehtud leiutise õigusliku reguleerimise probleeme. Kas lepinguvabadus või eraldi seadus? (Problems in the Legal Regulation of an Employment-Relationship Invention. Freedom of Contract or a Separate Law?). – Juridica 2007/3, p. 198 (in Estonian).

sible and obviously more economical to provide the principles of intellectual property created at universities in the applicable Patents, Utility Models and Copyright Acts.

3.3. Dilemma — to patent or publish?

The functioning of a university has historically proceeded from the principle that the academic community shares their knowledge with society through teaching and publication of research. When it comes to the patenting of inventions, however, the university acts based on commercial considerations. The goal of the patent system in itself is simple and understandable — to continually improve upon existing technology. At the same time, the knowledge created must become accessible to the public. The patent system guarantees to the inventor, in return for making his or her invention public, for a certain period, the exclusive right to prohibit any other persons from using the invention, except for those exceptional cases prescribed by law. The provision of exclusive rights is reasoned by the fact that if there had not been an inventor, the invention would not have been created.[*57] Below, we will examine the impact of patenting by the university on one of the underlying principles of the university — publication of research results.

The problem arising in connection with patenting and publication is related to the novelty requirement of the invention to be patented. Pursuant to § 8 (1) of the Patents Act, an invention is patentable if it is new, involves an inventive step and is subject to industrial application. The disclosure of the nature of the invention, for example, in a research paper, conference presentation and conference theses, can preclude the patenting of the invention later on. The legislator has attempted to alleviate the situation here and provided the grace period regulation of the invention[*58], according to which, in determining the state of the art, any information relating to an invention is not taken into consideration, provided that a corresponding request is submitted, if such information is disclosed by a person who is entitled to the patent or another person with the knowledge of the said person within twelve months before the filing date of the first patent application containing the invention in the Republic of Estonia or abroad.[*59] Here it must be kept in mind that due to the principle of territoriality of intellectual property the grace period need not exist in other jurisdictions or it may be considerably different there.

Any behaviour violating the novelty of an invention (e.g., publication of a research paper, public recital of a conference presentation, etc.) can be prevented by explanation of the novelty requirement for patentable inventions to the researchers at a university. A researcher should thus know when a potentially patentable invention is concerned. When creating a potential invention as a result of research, he or she should consult the head of the structural unit, an employee of a technology transfer unit or any other employee of the support structure who helps decide whether patenting is economically justified. After the patent application has been filed, the researcher may publish the outcome of his or her research in research papers and presentations.

The relationship between publication and patenting may give rise to the question to what extent the university must patent inventions. Several arguments have been pinpointed in literature against patenting by universities.

The first argument against patenting by universities is related to the financing of research. One of the areas of activity of the university is research, and the necessary means are generally provided by the state (and ultimately by the taxpayer). This gives rise to the question why the university should make further profit through commercialising the patented invention and cannot simply disclose research data to society by publishing the outcome of research in an article, for example. Several objections can be made to this argument.

Patenting may indeed inhibit the use of research results, for which society has already paid.[*60] Patenting is traditionally motivated by remuneration of the inventor, return of the investments made, and other arguments. The widespread opinion is that an unpatented invention is not an attractive investment object for companies.[*61] Even the goal of the patenting strategy of the university is to promote investments in the economic application of

[57] WIPO. Introduction to Intellectual Property. Theory and Practice. London/Hague/Boston: Kluwer 1997, p. 7. See also H. Koitel. Rahvusvaheline eraõigus ja intellektuaalomandi kaitse (Private International Law and Protection of Intellectual Property). – Audentese Ülikooli Toimetised 2001/1, p. 49 (in Estonian).

[58] About the grace period for an invention, see J. Ostrat, R. Kartus. Leiutise uudsussoodustus (Grace Period for Inventions). – Juridica 2002/10, pp. 695–701 (in Estonian).

[59] Patents Act § 8 (3).

[60] B. M. Frischmann. Commercializing University Research Systems in Economic Perspective: A View From the Demand Side (2005), p. 2. Available at http://ssrn.com/abstract=682561 (6.11.2006).

[61] For a more substantial analysis of the statement it should be examined to what extent the industrial sector has implemented unprotected technologies created by the university. In essence, this is not precluded because besides intellectual property rights there may be other market barriers (expensive equipment, the financial capacity of the entrepreneur, the existence of the necessary human capital), which encourage investment in technology.

the invention.*[62] It has been correctly claimed in literature that an unprotected invention remains underutilised, since the research institution may lack the necessary resources while companies lack interest in developing the unprotected invention.*[63] An example could be the development of a medication, the discovery and marketing of which may be separated by several years, and which demands large investments. In the absence of adequate protection, the medicine would simply not be placed on the market.*[64]

Another argument against patenting by the university is the idea that companies have most often not reacted when their rights to patented inventions are infringed in research conducted at universities (*de facto* research exemption). Thus, unless universities engage in commercialising intellectual property, companies would overlook the infringement of intellectual property held by them in research.*[65] We cannot agree with such a position. A university cannot expect that there will be no reaction to their unlawful acts, but should instead influence the legislator to apply a more extensive exception to the use of inventions in research, restrict the range of patented objects, or apply for additional grants.

A threat to changing academic conventions has been pinpointed as the third argument against patenting by the university. It has been claimed that if the patenting of research results becomes an established practice, it will bring about imposition of restrictions on the use of knowledge and impede the dissemination of research results in society. Therefore, universities and researchers will no longer share research information with each other.*[66]

Such a threat does exist. It is nevertheless important to emphasise that patenting, in itself, is neither good nor bad. The core question is how the university will use the patented invention. The university may set the goal of only earning profit and blocking the activities of other people in certain areas in both the research and business sectors. At the same time, it is possible to pursue an open patent policy supporting society, economy and research, which will ensure honour, fame and income for the university. We can agree with the idea expressed by G. Hardin that society faces several problems that do not have a technical solution.*[67] The creation of the balanced intellectual property policy of the university is one of them. The progress of technology cannot prescribe here how the university should act.

Thus, patenting and publishing need not be always contrasted. Although publication should be avoided before filing the patent application, this is not the most important thing. The main question is related to what is patented and how the exclusive rights are used.

3.4. Intellectual property policy aimed at openness

A functional and mutually supportive cooperation between various social institutions is in the interests of the development of society. A university can contribute to achieving this through intellectual property policy aimed at openness. Some of the main aspects of this intellectual property policy will be discussed below.

It has been pointed out in scientific literature that the United States of America is characterised by a strong trend of measuring the contribution of universities to technical progress by the number of patents issued. Such an attitude is about to spread to both Europe and Japan.*[68] The strategy document "Estonian Success 2014" sets out the following objective: "the number of patents registered per 100,000 inhabitants in Estonia will be decupled, developing for that purpose technology transfer programmes and institutions".*[69] In our opinion, an increase in the number of patent applications and patents issued cannot serve as an objective itself. Applying for patents must proceed from economically justified grounds. When analysing the patenting of biotechnological inventions by universities, H. K. Schachman reached the conclusion that regardless of the large number of

[62] The Bayh-Dole Act regulating patenting by US universities is based on the theoretical assumption that technology transfer from the university to industry becomes simpler if universities have applied for patents for their inventions. The Bayh-Dole Act constituted the principle that universities could patent inventions that have been created from research funded by the state. – R. R. Nelson. Is University Patenting Necessary or Sufficient to Make University Research Valuable Economically? – O. Granstrand. Economics, Law and Intellectual Property. Seeking Strategies for Research and Teaching in a Developing Field. Boston/Dordrecht/London: Kluwer Academic Publishers 2003, pp. 349–350.

[63] B. M. Frischmann (Note 60), p. 25.

[64] Unfortunately IP protection does not solve all problems. For instance, recital 18 of Directive on biotechnological inventions (European Parliament and Council Directive 98/44/EC of 6 July 1998 on the legal protection of biotechnological inventions. – OJ L 213, 30/07/1998, p. 13) points out that the patent system provides insufficient incentive for encouraging research into and production of biotechnological medicines which are needed to combat rare or orphan diseases. That kind of goods could be considered "non-market goods" that are not provided or demanded effectively through market mechanisms. For the general discussion on non-market goods see B. M. Frischmann (Note 60), p. 13.

[65] R. R. Nelson (Note 62), p. 359.

[66] *Ibid*., p. 357.

[67] G. Hardin. The Tragedy of the Commons. – Science 1968 /162, p. 1243.

[68] R. R. Nelson (Note 62), p. 348.

[69] Eesti Edu 2014. Vabariigi Valitsuse strateegiadokument, p. 10. Available at http://www.riigikantselei.ee/failid/EE2014.doc.pdf (7.11.2006) (in Estonian).

patents for which the universities had applied, the majority of them had not produced actual income.[*70] Hence, the formal approach patent for the sake of a patent does not take account of the economic prerequisites for intellectual property. Application for and commercialisation of a patent is related to large financial expenses and labour costs. From an economic point of view it is not reasonable to hold a patent if the income is zero or the expenditure exceeds revenue.

Even if formal indicators are not pursued as the goal, the university still has to consider what it should patent. It is appropriate to apply for protection if the invention is likely to make its way to market. Scholars also emphasise that it is justified to patent inventions which are close to commercial use.[*71] The decision to patent is an important question of the intellectual property policy of a university. The patent policy of a university always serves as a link between innovation and the motivation of subsequent research.[*72] It is in essence logical that further research output is based on the previous output. The university must regard itself here as part of the general infrastructure of knowledge-based economy and acknowledge that patenting is not the duty of the university but its right. The entire functioning of society cannot rely solely on market mechanisms because there are also, so to say, non-market goods. The allocation of such benefits is not regulated by the market but it is ensured by other mechanisms (culture, society, family, etc.) The free provision of knowledge by the university in its historically developed form is comparable to such unmarketable values as freedom of speech, access to education, etc.[*73] When exercising its patent policy, the university must also have regard for the promotion of research not only within its own institution but on the regional and global level. The objective of an entrepreneurial university should not be the monopolisation and blocking of further research. It would be in conflict with the internationalisation of the university and the principles of international cooperation.

If the university has decided to patent the invention, an approach aimed at openness is possible here as well. The fact that the university holds an exclusive right does not mean that the university should not permit the other research institutions to use its invention. Opinions have been expressed in literature that if universities patent inventions that are important inputs to further research, their licensing policies should ensure that all potential researchers are able to use the inventions for low transaction costs.[*74] In other words, the university should, above all, enter into non-exclusive licence agreements with users for commercial purposes or delimit the objective of an exclusive licence agreement so that the university itself retains the opportunity to issue licences for research.

It must be pointed out that the intellectual property principles adopted in Estonian universities attempt to govern the proprietorship of rights but remain rather laconic regarding the use of intellectual property. The authors of the paper are of the opinion that the objective of using the intellectual property created in research institutions should be clearly set out in the regulatory documents of the university. The wording of the objective of using intellectual property would send society an unambiguous message about the priorities of the university, including for example promotion of research through an open licensing policy, support for regional economic development, earning of income for teaching and research as well as for developing the infrastructure of the university, etc.

An important aspect in the use of intellectual property is consideration of the interests of the creator. Worth being observed, § 9 (5) of the Rules of Handling IP at TUT provides that TUT shall take account of the interests of the authors when entering into a licence agreement and also involve the authors in the negotiations.

4. Conclusions

The tasks of a university have undergone a significant change to date. Historically, universities have been characterised by open instruction and research. The provision of commercialised services and the use of research results for commercial purposes (commercialisation) have, by today, become an integral part of the activities of a university and its culture. Yet universities do not become commercial entrepreneurs. The concept of an entrepreneurial university, serving as the basis for the approach used by the authors of the paper, allows for defining the new role of the university as a participant in direct economic activities. The concept of an entrepreneurial university has been provided in the regulatory documents of the Tallinn University of Technology, while the University of Tartu in fact also functions as an entrepreneurial university. A relevant institutional

[70] H. K. Schachman (Note 30), p. 6902.

[71] R. R. Nelson (Note 62), p. 358.

[72] B. Koo, B. D. Wright. Economics of Patenting an Input Essential to Further Research. – O. Granstrand. Economics, Law and Intellectual Property. Seeking Strategies for Research and Teaching in a Developing Field. Boston/Dordrecht/London: Kluwer Academic Publishers 2003, p. 332.

[73] B. M. Frischmann (Note 60), pp. 11–14.

[74] R. R. Nelson (Note 62), p. 359.

structure has been established for promoting innovation. Nevertheless, according to the authors, the new role of the university as a participant in economic activities should also be reflected in Estonian legal acts.

The central notion of an entrepreneurial university is intellectual property. The general provisions of the applicable Estonian Acts concerning intellectual property (Patents Act, Copyright Act, etc.) can also be applied to universities. Estonian universities have adopted separate documents, defining the bases of the intellectual property policy of a university and establishing specific provisions for the individual types of intellectual property. As there are considerable differences between the principles, it would be necessary to harmonise them between universities. It is disputable whether the inventions created at universities require specific regulation in the form of an independent Act, as has been done in Finland. Yet it would be necessary to set out the principles of intellectual property created at universities by specific provisions contained in the applicable Patents Act, Utility Models Act and Copyright Act, etc.

Because of the use of research results for commercial purposes, questions about the relationship between the disclosure of research results for the public (publication) and patenting have become more frequent at universities. Patenting and publishing need not be always contrasted. However, as a rule, it is advisable to avoid publication before the patent application has been filed.

According to the authors, an increase in the number of patent applications and patents issued cannot serve as a goal in itself. Application for patents by universities must proceed from economically justified grounds.

One of the main issues related to intellectual property at universities is what is patented and how exclusive rights are used. Universities should use the exclusive rights obtained through patenting based on concordance between business interests and interests in promoting research. A university should issue licences to other universities and research institutions for using its inventions at favourable conditions. The authors are of the opinion that the intellectual property policy, including the patent policy, of universities should be open, enabling society to use the research results of universities.