5. The Economic Function of Patents in the European Patent System

5.1. The Utilitarian Patent Law Theories and their Occurrence in the Field of Biomedical Sciences

As previously mentioned in this study, the term 'West' can be used to describe, among other things, market economy- and capitalism-oriented societies.[906] It means that in such societies, apart from the civil and political rights, economic and social rights providing individuals with the opportunity to achieve material well-being also hold an important place.[907] The importance of the aforementioned rights[908] is demonstrated in both international[909] and national[910] laws and regulations in force in the countries of the Western legal tradition.

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906 Herborth and Hellmann, 'Introduction: Uses of the West' (n 610) 2.

907 However, there is no complete agreement about economic and social rights among the states of the Western legal tradition. The ICCPR has not yet been ratified by the U.S., which, on the basis of the scholarly literature, is classified as belonging to the Western legal tradition.

908 Although human rights are regarded as indivisible in the legal doctrine, which denies the hierarchy of these rights, it is recognised that one human right is or may be given greater protection than others (e.g. Lijana Štarienė, 'Teisės į teisingą teismą, įtvirtintos Europos žmogaus teisių konvencijos 6 str., pobūdis, vieta ir apsaugos lygis kitų konvencijos teisių požiūriu' (2006) 10 Jurisprudencija 40, 41).

909 Declaration; European Convention on Human Rights; EU Charter of Fundamental Rights.

910 For example, see (1) Constitution of the Republic of Lithuania: ch I. The State of Lithuania; ch II. The Human Being and the State; ch III. Society and the State; ch IV. National Economy and Labour (Constitution of the Republic of Lithuania (*Lietuvos Respublikos Konstitucija*). *Valstybės žinios (Official Gazette)*, 1992, No. 33-1014); (2) 1949 Basic Law for the Federal Republic of Germany (German: *Grundgesetz für die Bundesrepublik Deutschland*): ch I "Basic Rights" (German: *Die Grundrechte*): Articles 1-19 cover rights related to protection of human dignity, as well as civil and political rights (Basic Law for the Federal Republic of Germany (*Grundgesetz für die Bundesrepublik Deutschland*) <https://www.bundestag.de/gg> accessed 30 May 2023); (3) 1978 Spanish Constitution (Spanish: *Constitución Española*): ch I discusses the model of state administration, the language, the flag, the minorities, etc., while ch II presents the list of fundamental rights and duties, as well as social and economic rights (Spanish Constitution (*Constitución Española*) <http://www.senado.es/constitu_i/index.html> accessed 30 May 2023).

One of the many means of implementing the economic rights and freedoms of individuals as well as promoting innovation and competition is the patent granting system,[911] which is based on both the doctrine of inalienable rights[912] and utilitarian theories.[913] From an economic point of view, a patent is a bargain between society and the inventor: through it, the state or its mandated regional organisations can normally grant an exclusive right with the possibility of preventing others from using a particular invention for 20 years.[914] Not only does this create an incentive to conduct scientific research and develop certain inventions, but it also obliges their disclosure to the public, as opposed to their being kept as trade secrets.[915] Thus, patents not only satisfy private interests, but also act in the interest of the public, as they seek to ensure social and economic well-being through the promotion of scientific and technological progress and competition.

Strengthening of cooperation among the European states regarding invention protection and creation of a common patent granting procedure are listed in the Convention as the main objectives of the European patent system.[916] However, according to E. van Zimmeren, the utilitarian aspects related to the granting of patents, which promote the development of inventions, their disclosure and the creation of social and economic well-being,

911 In addition to patents, there are other means, such as grants, prizes, subsidies and so on (see Guellec and van Pottelsberghe de la Potterie, *The Economics of the European Patent System* (n 7) 55-63).

912 For more on theories based on the Natural law doctrine, see van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523). For more on intellectual property theories based on Natural law, see Ramūnas Birštonas and others, *Intelektinės nuosavybės teisė* (Registrų centras 2010) 28-31.

913 For more on the creation of patent systems, see Fritz Machlup, 'An Economic Review of the Patent System', Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Cong., 2nd Sess., Study No. 15 (U.S. Government Printing Office 1958) 21-25; van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 182.

914 TRIPS Agreement, Art. 33.

915 See e.g. Machlup, 'An Economic Review of the Patent System' (n 913) 21; Mazzoleni and Nelson, 'Economic Theories about the Benefits and Costs of Patents' (n 60) 1038; Clarissa Long, 'Patent signals' (2002) 69 University of Chicago Law Review 625, 626; Hall and Harhoff, 'Recent Research on the Economics of Patents' (n 56) 544-545; Heidi L Williams, 'How Do Patents Affect Research Investments?' (2017) 9 Annual Review of Economics 441, 445.

916 EPC, Preamble.

are also important objectives of the establishment of the European patent system.[917] There are several major patent granting theories discussed in the scholarly literature based on the utilitarian philosophy: (1) the reward theory, (2) the patent-induced theory, (3) the disclosure theory, and (4) the commercialisation theory.[918]

The reward theory claims that the inventor has the right to compensation for creating and disclosing an invention to the public.[919] According to F. Machlup, this compensation is embodied by a temporary exclusive right to a particular invention which is granted to the inventor and which is proportional to this invention's utility to society.[920] It is also the market power provided by a patent which creates for the owners of the patent an opportunity 'to recoup the fixed costs of their research investments'.[921] Otherwise, the failure to recover investments may diminish the inventors' desire to develop patentable innovative products or processes in the future.[922] The disadvantage of this theory is the fact that it is not always possible to compensate the most merited innovator, and even if the invention is efficiently exploited, the compensation and its amount depend on the commercial success of that particular innovation, which is determined by various factors.[923]

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917 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 219-220 citing Danish Board of Technology et al. (2007), Policy options for the improvement of the European Parliament, STOA, IP/A/STOA/FWC/2005-28/SC16, available at http://www.europarl.europa.eu/stoa/publications/studies/stoa16_en.pdf, at pp. 33–4. Scholarly literature indicates that there are more utilitarian theories for justification of patent protection: e.g. (1) the prospect theory; (2) the rent dissipation theory; (3) the race-to-invent theory; (4) the portable fence theory. They are usually employed in order to correct the drawbacks of the main theories discussed in this research (ibid 204-212).

918 ibid 198-204.

919 ibid 198.

920 Machlup, 'An Economic Review of the Patent System' (n 913) 21.

921 Williams, 'How Do Patents Affect Research Investments?' (n 915) 441.

922 Yusing Ko, 'An Economic Analysis of Biotechnology Patent Protection' (1992) 102 The Yale Law Journal 777, 792 citing FREDERICK M. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 444 (2nd ed. 1980); William F. Baxter, Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis, 76 YALE L.J. 267, 268-69 (1966).

923 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 199.

The patent-induced theory, which is closely related to the reward theory, differs from the latter in that, according to this theory, in order to be compensated for an invention, the inventor's motivation has to derive from the patent system, while the reward theory does not consider the motivation behind an invention to be an important factor.[924] Although this theory is considered to be the dominant one and receives the most support from economists, researchers and politicians, it does not explain the cases where inventions are created for reasons that are not related to the patent granting system.[925]

The disclosure theory, which F. Machlup describes as a bargain between the inventor and society when the former discloses secret information in exchange for the protection of exclusive industrial use,[926] is one of the most widespread patent law theories in economic scholarship.[927] Due to exclusive patent rights granted to the inventor, the information that can be used to create new inventions[928] is disclosed quickly and extensively, preventing the technological knowledge which would otherwise become a commercial secret from 'dying with the inventor',[929] and avoiding duplication of research.[930]

However, the disadvantages of this theory become apparent in certain situations. For example, it may be difficult to keep important information about an invention private for an extended period of time. Thus, it is doubtful whether commercial secrets can be kept even if the patent system does not exist. Due to this fact, there is a probability that, even without granting exclusive rights to an invention, important technological knowledge would nonetheless be disclosed to society, and therefore, if the patent system did not exist, little or nothing would be lost.[931] Meanwhile, an inventor who knows that the information about his/her innovation will not be disclosed

924 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 199-200.
925 ibid 200.
926 Machlup, 'An Economic Review of the Patent System' (n 913) 21.
927 Hall and Harhoff, 'Recent Research on the Economics of Patents' (n 56) 549.
928 Williams, 'How Do Patents Affect Research Investments?' (n 915) 445.
929 Machlup, 'An Economic Review of the Patent System' (n 913) 21.
930 Ko, An Economic Analysis of Biotechnology Patent Protection (n 922) 792 citing FREDERICK M. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 440 (2nd ed. 1980); WARDS. BOWMAN, JR., PATENT AND ANTTRUST LAW 12-13 (1973).
931 Machlup, 'An Economic Review of the Patent System' (n 913) 24.

to society will not attempt to register a patent.[932] In this case, a patent application will most likely only be filed when the inventor understands that important information may be disclosed and used by competitors when products based on the invention begin to be sold. Another problem is that patents can be granted without the applicants providing sufficient information that could be applied by a specialist in a corresponding field.[933]

Commercialisation theory can be relevant for patenting inventions in their early development stages, when it is evident that further research is needed in order to make the invention applicable in practice.[934] Patents granted in these early stages guarantee economic prosperity for the patent owner, provided that further development of an invention is successful.[935] In such cases, patents can either be licensed to other subjects who will further develop or commercialise the invention, or used to attract venture capital investment – which is especially relevant for small businesses attempting to develop and commercialise their inventions independently.[936] However, according to F. Machlup, if an invention cannot be industrially applied, the invention development can be the stage in which the patent system may encourage the protection of information rather than its disclosure.[937] Therefore, commercialisation theory is not always suitable.

The scholarly literature indicates that patent granting theories, including those discussed above, often overlap or complement each other.[938] Therefore, it may be difficult to completely separate them from each other. Although each of them, formed in different circumstances and in different historical periods, has both advantages and disadvantages, as well as differently reflecting the peculiarities of research in specific sectors of technology, all of them have influenced the development of a patent system. Therefore,

932 Machlup, 'An Economic Review of the Patent System' (n 913) 24.

933 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 203 citing MACHLUP, F, An Economic Review of the Patent System, Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary United States Senate, 1958, 85th Cong., 2nd Sess., *Study No. 15*, Washington, U.S. Government Printing Office, 32.

934 ibid 203.

935 ibid.

936 ibid 203-204.

937 Machlup, 'An Economic Review of the Patent System' (n 913) 24-25.

938 Mazzoleni and Nelson, 'Economic Theories about the Benefits and Costs of Patents' (n 60) 1034.

even those theories that have a context of emergence very different from the current one should not be ignored.[939]

However, in the context of the aforementioned theories, it can be stated that all of the patent systems share the common goal of promoting the emergence of innovation and the dissemination of the newest scientific and technological information, ensuring both private and public interests. Nevertheless, despite this objective, theoretical and empirical analysis presents ambiguous findings, both on the effectiveness of a patent system in encouraging the creation and development of inventions and on the disclosure of the latest scientific and technological information related to it.[940] Thus, as indicated by D. Burk and M. Lemley, although there is 'virtually unanimous agreement' that the aim of granting patents as exclusive rights is to encourage the development of innovation, opinions in the debate about the success of a patent system differ.[941]

Despite the above-mentioned discussions, there is a consensus in the scholarly literature that there is a causal link between patent granting and innovation in the field of biomedical sciences.[942] Therefore, unlike in other scientific and technological fields, the granting or the rejection of a patent application can influence the development of the field in question or the

939 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 224.

940 Hall and Harhoff, 'Recent Research on the Economics of Patents' (n 56) 559.

941 Mark A Lemley and Dan L Burk, 'Policy Levers in Patent Law' (2003) 89 Virginia Law Review 1575, 1580-1581; Peukert, 'Intellectual property and development – narratives and their empirical validity' (n 49) 9.

942 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 201 citing J.E. Bessen & M.J. Meurer (2008), Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk, Princeton University Press, at pp. 89 and 106–9, 112–118; P. Belleflamme (2008), 'How Efficient is the Patent System? A General Appraisal and an Application to the Pharmaceutical Sector', in: A. Gosseries, A. Marciano & A. Strowel (eds), Intellectual Property and Theories of Justice, New York, Palgrave MacMillan, 210-229, at pp. 219–20; W.M. Cohen et al. (2001), 'R&D spillovers, patents and the incentives to innovate in Japan and the United States', 31 Res. Pol'y, 1349–67; A. Arora, A. Fosfuri & A. Gambardella (2001), Markets for Technology: The Economics of Innovation and Corporate Strategy, Cambridge, MIT Press; R.C. Levin et al. (1987), 'Appropriating the returns from industrial research and development', 3 Brookings Papers on Economic Activity, 783-831 and E. Mansfield (1986), 'Patents and Innovation: An Empirical Study', 32 Management Science, 173–81. See also Guellec and van Pottelsberghe de la Potterie, *The Economics of the European Patent System* (n 7) 67.

emergence of innovation in that field. Taking this into account, it must be held that Art. 53(a) EPC, which, as discussed before, is most often used to analyse the development of the patentability of biotechnological inventions, can influence further growth of the biomedical sciences as well as the related fields of science and technology. In view of this situation, in this study it is necessary to discuss the consequences of application of this particular provision of the Convention.

5.2. The Consequences of the Application of Article 53(a) of the European Patent Convention

According to the scholarly literature, the European patent system was one of the elements to embody a vision of a closer union between the European countries that were devastated after the Second World War.[943] This union was seen as a primary instrument in achieving the development of a single market and economic growth on the Old Continent.[944] Initially, the EPO operated as an institution, which, by granting patents, encouraged innovation and economic growth and, in this way, performed a market-shaping function.[945] However, later, due to scientific and technological progress, the Office started identifying situations in which the application of market forces to certain inventions could be harmful to the public,[946] and thus identifying inventions for which patents should not be issued. This can be illustrated by the intensified application of Art. 53(a) EPC with regard to biotechnological inventions in the 1980s.

Although, as discussed in this study,[947] the creation of a patent system serves as a means for disseminating the latest scientific and technological knowledge, in turn encouraging innovation by providing an economic benefit to the inventors, according to the EPO Guidelines and the case

943 Plomer, 'A Unitary Patent for a (Dis)United Europe: The Long Shadow of History' (n 137) 510.

944 ibid.

945 Parthasarathy, 'Co-producing knowledge and political legitimacy. Comparing life form patent controversies in Europe and the United States' (n 17) 76.

946 ibid.

947 See '5.1. The Utilitarian Patent Law Theories and their Occurrence in the Field of Biomedical Sciences'.

law of the EPO Boards of Appeal,[948] when interpreting and applying Art. 53(a) EPC, '[t]he EPO has not been vested with the task of taking into account the economic effects of the grant of patents in specific areas of technology and of restricting the field of patentable subject-matter accordingly'.[949] In addition, the said Guidelines and the case law of the EPO indicate that '[t]he standard to apply for an exception under Art. 53(a) is whether the commercial exploitation of the invention is contrary to "ordre public" or morality'.[950] For example, according to the case law of the EPO Boards of Appeal, in the context of Art. 53(a) of the Convention, 'negative social and economic effects' on patients[951] or farmers and traditional plant breeders are not evaluated as part of invention's commercial exploitation in accordance with *ordre public* and morality.[952] Therefore, when analysing whether an invention's commercial exploitation is in line with Art. 53(a) EPC, the EPO does not consider the economic effects of the granting of a patent.

Despite this rejection of the influence of economic arguments for the interpretation of Art. 53(a) EPC, as it has been discussed, in the field of biomedical sciences, the evaluation of the exploitation of an invention from the perspective of *ordre public* and morality may have an economic effect on the stakeholders who have a direct interest in a particular patent. This is confirmed by the scholarly literature[953] as well as by the fact that the Office

948 See e.g. Enlarged Board of Appeal (European Patent Office), *Transgenic plant/NOVARTIS II*, Decision of 20 December 1999, Case No. G 0001/98, ECLI:EP:BA:1999:G000198.19991220, para 3.9; *Breast and Ovarian Cancer/UNIVERSITY OF UTAH* (n 22), para 53.

949 Guidelines for Examination, March 2023 (n 63), pt G-II, 4.1.3.

950 *Transgenic plant/NOVARTIS II* (n 948), para X; *Breast and Ovarian Cancer/UNIVERSITY OF UTAH* (n 22), para 53; Guidelines for Examination, March 2023 (n 63), pt G-II, 4.1.3.

951 *Breast and Ovarian Cancer/UNIVERSITY OF UTAH* (n 22), para 52.

952 *Transgenic plant/NOVARTIS II* (n 948), para X, 13.

953 van Zimmeren, 'Towards a New Patent Paradigm in the Biomedical Sector? Facilitating Access, Open Innovation and Social Responsibility in Patent Law in the US, Europe and Japan' (n 523) 201 citing J.E. Bessen & M.J. Meurer (2008), Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk, Princeton University Press, at pp. 89 and 106–9, 112–118; P. Belleflamme (2008), 'How Efficient is the Patent System? A General Appraisal and an Application to the Pharmaceutical Sector', in: A. Gosseries, A. Marciano & A. Strowel (eds), Intellectual Property and Theories of Justice, New York, Palgrave MacMillan, 210-229, at pp. 219–20; W.M. Cohen et al. (2001), 'R&D spillovers, patents and the incentives to innovate in Japan and the United States', 31 Res. Pol'y, 1349–67; A. Arora, A. Fosfuri & A. Gambardella (2001), Markets for Technology: The Economics of Innovation and Corporate Strategy, Cambridge, MIT Press; R.C. Levin et al. (1987), 'Appropriating the returns from

included the provisions of the Biotech Directive in the EPC Implementing Regulations in order to promote economic growth in Europe.[954] Taking this into account, the economic effect of the commercial exploitation of an invention must be considered in accordance with Art. 53(a) EPC.

A patent confers on its owner a temporary exclusive right to prevent third parties from exploiting the invention without the owner's permission. This potentially provides the patent owner, or other entities financially involved in the creation of an invention, with the opportunity to recover the investments incurred in its research and development.[955] Without the exclusive right to an invention, the owner of the patent would soon face competitors who could copy and sell the invention at a lower price, thus weakening the owner's position in the market.[956] In that case, inventors would have less incentive to invest in the development of new products or processes, or would simply keep the results secret,[957] which would have a negative impact on one of the most important aims of patenting, i.e. scientific and technological advancement. In Europe, this is especially relevant for small and medium-sized start-up companies, which are currently conducting the majority of research in the field of biotechnology. For them, patents are an important means of recovering their investment in research and development of innovations.[958]

The above-mentioned exclusive intellectual property rights, which strengthen the patent owners' position against their competitors and thus help innovators to stay on the market, are not the only reason why having patents is important. In the scholarly literature, another significant function

industrial research and development', 3 Brookings Papers on Economic Activity, 783-831 and E. Mansfield (1986), 'Patents and Innovation: An Empirical Study', 32 Management Science, 173–81.

954 Parthasarathy, 'Co-producing knowledge and political legitimacy. Comparing life form patent controversies in Europe and the United States' (n 17) 78.

955 Gitter, 'Led Astray by the Moral Compass: Incorporating Morality into European Union Biotechnology Patent Law' (n 95) 7.

956 ibid.

957 ibid 7-8.

958 ibid citing ERNST & YOUNG, EUROPEAN LIFE SCIENCES 98, at 11, tbl. 3 (1998); Third Report of the Committee on Legal Affairs and Citizens' Rights on the Commission Proposal for a Council Directive on the Legal Protection of Biotechnological Inventions, EUR. PARL. Doc. (COM 88 0496 final-C3-0036/89- SYN 159) 27 (1992).

that these rights perform is referred to as 'patent signalling'[959] or 'informational function'.[960] Two key elements of the 'patent signalling' function can be discerned: (1) dissemination of information related to technological aspects of an invention and its innovativeness that can help to identify its commercial potential; and (2) dissemination of information about the prospect of a certain invention becoming an economic good in a certain legal system.

The first element means that patents, as intellectual property rights, should be interpreted not only as providing legal protection against competitors and binding the inventor to disclose the relevant information to the public, but also as a means of attracting potential investors.[961] Empirical studies indicate that businesses that are patent owners or patent applicants are more likely to receive venture capital investments, and that they will receive such investments more quickly.[962]

This patent signalling aspect is considered to be especially important for start-ups as well as small and medium-sized businesses[963] operating in knowledge-intensive industry fields, which tend to have long research cycles and face unforeseeable, often difficult-to-solve scientific, technical and regulatory challenges[964] hindering the achievement of quick and defin-

959 See e.g. David H Hsu and Rosemarie H Ziedonis, 'Patents as quality signals for entrepreneurial ventures' [2008] Academy of Management Best Paper Proceedings 1, 6; Long, 'Patent signals' (n 915) 625; Mark Schankerman, 'Introduction' (2013) 61 Journal of Industrial Economics 471; Stefano Comino and Clara Graziano, 'How many patents does it take to signal innovation quality?' (2015) 43 International Journal of Industrial Organization 66, 66-68.

960 Dietmar Harhoff, 'The role of patents and licenses in securing external finance for innovation' (2009) 14 EIB Papers 74, 85.

961 Long, 'Patent signals' (n 915) 626.

962 See e.g. Ian C Macmillan, Robin Siegel and PN Subba Narasimha, 'Criteria Used by Venture Capitalists to Evaluate New Venture Proposals' (1985) 1 Journal of Business Venturing 119, 121-122; Comino and Graziano, 'How many patents does it take to signal innovation quality?' (n 959) 66-67 and 74.

963 Patent signalling function is more important to companies with less than 50 employees and with fewer financing restrictions (Dirk Czarnitzki, Bronwyn H Hall and Hanna Hottenrott, 'Patents as quality signals? The Implications for Financing Constraints on R&D' (2014) DICE DISCUSSION PAPER No 133 <https://www.dice.hhu.de/fileadmin/redaktion/Fakultaeten/Wirtschaftswissenschaftliche_Fakultaet/DICE/Discussion_Paper/133_Czarnitzki_Hall_Hottenrott.pdf> accessed 30 May 2023). See also Comino and Graziano, 'How many patents does it take to signal innovation quality?' (n 959) 66-67 and 74.

964 Hoenen and others, 'The diminishing signalling value of patents between early rounds of venture capital financing' (n 106) 981.

itive results. Biotechnology is one of these knowledge-intensive fields of industry.[965] Indeed, European patent applications are deemed to be important signals by German and British venture capital investors when considering investments in biotechnology businesses.[966]

Patents can perform this function because they require a considerable amount of time, finance and effort due to the strict substantive and procedural patentability requirements set out in legislation, including the necessity to present the information about the invention in a certain way in patents claims. Moreover, the patent offices' registry information, which is available to the public, is considered as an inexpensive and reliable way to ascertain the technological capabilities and achievements of a company in a certain field.[967] Therefore, potential investors who are familiar with the patenting process are able to evaluate the strengths and weaknesses[968] of a technology and its commercial potential.

Based on the above, it can be stated that patent ownership can indicate a company's potential to provide commercially valuable results[969] to investors, thus helping to tackle the asymmetry of information between patent owners and potential investors when the latter have little knowledge about the work and quality of the former.[970] Consequently, patents assist in filling this information gap, and in this way help in attracting investment which allows companies to continue their research and development.

However, the above-mentioned function of dissemination of information related to technological aspects of an invention cannot be considered as especially important in all cases. For example, despite being essential at the

965 Hoenen and others, 'The diminishing signalling value of patents between early rounds of venture capital financing' (n 106) 959-960.

966 Hall and Harhoff, 'Recent Research on the Economics of Patents' (n 56) 553 citing HAEUSSLER, C., HARHOFF, D., MUELLER, E. (2009) To be financed or not... the role of patents for venture capital financing. Mannheim, Germany: ZEW Discussion Paper, No. 09-003.

967 Hoenen and others, 'The diminishing signalling value of patents between early rounds of venture capital financing' (n 106) 958.

968 Harhoff, 'The role of patents and licenses in securing external finance for innovation' (n 960) 85.

969 Toby E Stuart, Ha Hoang and Ralph C Hybels, 'Interorganizational Endorsements and the Performance of Entrepreneurial Ventures' (1999) 44 Administrative Science Quarterly 315, 317.

970 Jerry X Cao and Po-Hsuan Hsu, 'The Role of Patents in Venture Capital Financing and Performance' <http://www.efmaefm.org/0EFMSYMPOSIUM/2011-Toronto/papers/Hsu.pdf> accessed 30 May 2023.

initial stage of financing a business, the patent signalling function is not as important in the later financing stages, when the information asymmetry between the patent owner and investors decreases.[971]

The second important element of the signalling function is the fact that the grant of a patent discloses information about the acceptance of a particular invention becoming an economic good in a certain legal system. This means that encouragement is not being given to the creation of inventions at any cost and with any resultant consequences. On the contrary, the patent system may strive for inventions to be socially beneficial and consistent 'with fair and just social organisation'.[972] Consequently, a patent is not only a means of disclosure of information about an invention, with potential economic benefits to its owner, but also a source of information about society's attitude towards a certain patented object as a commodity, as well as support for and encouragement of this approach.[973]

During the proceedings in the *Use of embryos/WARF*[974] case, the then-incumbent President of the EPO, A. Pompidou, stated that the European patent system is not morally neutral and emphasised that 'the granting of a patent invention is often perceived to be an official endorsement of or reward for a particular invention'.[975] This indicates that the EPO performs invention control not only from a technical perspective, evaluating an invention's novelty, inventive step and susceptibility to industrial application,[976] but also, in accordance with Art. 53(a) EPC, by considering its social acceptability as a commodity from the perspective of *ordre public* and/or morality. Only after assessing the compatibility of the commercial exploitation of an invention with regard to the aforementioned article does the EPO decide whether to grant a patent, in turn supporting the commercialisation of objects from a certain scientific or technological field.

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971 See e.g. Kuhn, *The Essential Tension: Selected Studies in Scientific Tradition and Change* (n 104) 982; Czarnitzki, Hall and Hottenrott, 'Patents as quality signals? The Implications for Financing Constraints on R&D' (n 963).

972 Liddell, 'Immorality and Patents: The Exclusion of Inventions Contrary To Ordre Public and Morality' (n 134) 141.

973 Mark J Hanson, 'Biotechnology and Commodification within Health Care' (1999) 24 Journal of Medicine and Philosophy 267, 273.

974 *Use of embryos/WARF* (n 80).

975 Parthasarathy, 'Co-producing knowledge and political legitimacy. Comparing life form patent controversies in Europe and the United States' (n 17) 82 citing Pompidou, Alain (2006) "G2/06 Comments by the President of the European Office. EP 96903521.1-2401/0770125".

976 EPC, Art. 52(1).

Thus, even if the EPO does not analyse the economic consequences of the grant of a patent, the evaluation of an invention's commercial exploitation in the light of Art. 53(a) EPC – and, based on the aforementioned legal provision, the grant or rejection of a patent claim – can often carry consequences for inventors affecting the development of certain fields of science and technology, especially the biomedical sciences. This situation arises because the granting of a patent or the rejection of a patent application based on Art. 53(a) EPC indicates to society which subject-matter can be commercialised in the legal system in question by providing exclusive rights and which objects cannot become economic goods, i.e. commodities. Therefore, the granting of a patent signals the company's ability to develop not only innovative but also socially acceptable technologies.

In reference to the case law of the EPO Boards of Appeal analysed in this study[977] and Rule 28(1)(a), (b) and (c) of the EPC Implementing Regulations,[978] it can be concluded that, at least currently, according to Art. 53(a) EPC, inventions encompassing the human body at various stages of its development and formation, as well as actions related to the use of human embryos for commercial or industrial purposes, human cloning or modification of the germ line genetic identity, are not tolerated in the European patent system and should not be encouraged.[979] For the assessment of the commercial exploitation of these inventions, in the EPO case law, the rebuttable presumption test, which is based on deontological ethics and the abhorrence standard, is applied.[980] In this case, the benefits of using such an invention cannot lead to a favourable decision to grant a patent. Also, the EPO will tend to interpret the term 'commercial exploitation' broadly, by including the stages of creation and development of the invention, and in some cases even the fact of patenting itself.[981] Under

977 See '1.4. European Patent Office Case Law on Article 53(a) of the European Patent Convention'.

978 According to r 28(1)(a), (b) and (c), the following are non-patentable: (a) processes for cloning human beings; (b) processes for modifying the germ line genetic identity of human beings; (c) uses of human embryos for industrial or commercial purposes.

979 Kamperman Sanders A and others, 'Final Report of the Expert Group on Patent Law in the Field of Development and Importance of Biotechnology and Gene Technology' (n 58).

980 See '1.4.1. Tests for Application of Article 53(a) of the European Patent Convention', '1.4.2. The Standards for Applying Article 53(a) of the European Patent Convention' and '1.4.3. The Concept and Scope of the Term 'Commercial Exploitation''.

981 See '1.4.3. The Concept and Scope of the Term 'Commercial Exploitation''.

these circumstances, it is practically impossible under Art. 53(a) of the Convention to consider the commercial exploitation of such an invention to be appropriate and to grant a patent.

Nevertheless, the attitude of the Office is much more favourable with regard to the patenting of elements that are isolated from the human body or otherwise technically produced. Although, as analysed earlier in this research,[982] the listed elements are also subject to a deontological approach, Rule 29(2) of the EPC Implementing Regulations explicitly states that these objects, even if they are identical to the structures of natural elements, are patentable.[983] This means that patents granted for objects isolated from the human body, and covered by the aforementioned rule, are regarded favourably by the European patent system. In addition, inventions including animals or plants can also be patentable in the European patent system. In such cases, the Board often applies a weighing test based on utilitarianism and the standard of unacceptability.[984] In both cases, in principle, the term 'commercial exploitation' is interpreted restrictively by the EPO, limiting it to the likely commercial exploitation of the invention as defined in the patent application.[985]

The above-mentioned approach of the EPO illustrates the classification of values into intrinsic and extrinsic[986] which exists in the field of ethics. Certain things can be regarded as having an intrinsic value in themselves without serving a particular purpose, while others can be regarded as having extrinsic value if their use can help to achieve a certain objective.[987]

The above-discussed classification of inventions in the European patent system according to their intrinsic and extrinsic value allows us to accept the idea that values can be divided into market values and non-market values.[988] It is the latter group which can be attributed to a human being in the context of the Western legal tradition, meaning that it is impossible to

982 See '1.4. European Patent Office Case Law on Article 53(a) of the European Patent Convention'.
983 EPC Implementing Regulations, r 29(2).
984 See '1.4.1. Tests for Application of Article 53(a) of the European Patent Convention' and '1.4.2. The Standards for Applying Article 53(a) of the European Patent Convention'.
985 See '1.4.3. The Concept and Scope of the Term 'Commercial Exploitation''.
986 David B Resnik, 'DNA Patents and Human Dignity' (2001) 29 Journal of Law, Medicine and Ethics 152, 155 citation from W. Frankena, *Ethics*, 2d ed. (Englewood Cliffs, New Jersey. Prentice-Hall, 1973).
987 ibid 155.
988 ibid 156.

assign economic value to him/her. However, despite the status of a fundamental value attributed to human beings, the question arises as to whether the said approach can always be maintained in the changing, dynamic and market economy-oriented Western legal tradition.

According to M. Radin, society tends to more or less attribute market terminology to different objects: (1) objects possessing market value are subject to commodification, (2) objects not possessing monetary or market value are regarded as non-commodified,[989] and (3) objects possessing a market value and a different non-monetary value are considered to be incompletely commodified.[990] In the context of the Western legal tradition, it seems that, ideally, every human being should be viewed as having value which cannot be defined using market terminology or assigned a price, i.e. commodified.

However, in Western society, where there is freedom of economic activity and strong market rhetoric, all objects have the potential to become completely or incompletely commodified.[991] For example, in the past, sporting activities were not treated as a commodity as they are nowadays: for a long time, athletes were amateurs and took part in competitions out of sportsmanship and personal enthusiasm, in order to improve their skill level, etc. Today, athletes and their activities are subjected to incomplete commodification.[992] This is illustrated by the fact that the majority are paid a salary for such physical activity, and may also be purchased or sold[993] on the market for athletes. Sports would become completely commodified if athletes and spectators were only interested in the financial compensation and did not place meaning on sportsmanship and other values.[994] Therefore, despite the status of a human being as a fundamental value in the Western legal tradition, in some cases, such as in their professional life, a human being can be considered a commodity.

In order to prevent the total commodification of certain values, including human beings, legislation is adopted through which incompletely commodified objects can be regulated and protected from losing their intrinsic and

989 Margaret Jane Radin, *Contested Commodities* (Harvard University Press 1996) 102-104.
990 ibid.
991 ibid 99.
992 Resnik, 'DNA Patents and Human Dignity' (n 986) 156.
993 ibid.
994 ibid.

non-market value.[995] Regulatory provisions of this type exist in healthcare, education, real estate, life and health insurance, politics, sports and other spheres of human activity where certain important values are incompletely commodified[996] and where, to a certain degree, market economy principles exist. Hence, in the Western legal tradition, a constant balancing between the protection of the status of the fundamental values and the assigning of an economic value to them takes place.

It is stated that, in the process of the development of a free market economy, society attributed a monetary value to more and more objects which were previously not regarded as having any economic value: gradually, such objects as land, domestic labour, nursing care, consultations, sports activities and military service were given economic value.[997] These processes were heavily influenced by scientific and technological advancement, which not only transformed the conventional understanding of the environment, but also allowed the environment to be modified. Just like the changes in the aforementioned fields, similar processes can be observed today in the field of biomedical sciences – which is not only where measures ensuring human well-being are being created and our understanding of the environment is quickly being changed, but which is also a multibillion industry seeking profit for its investors.[998] Thus, for this sector, the ownership of patents, potentially providing an opportunity to receive economic benefits, is of major importance.[999]

Currently, it is feared that too lenient patent granting for biotechnical inventions could turn human beings into commodities. For this reason, based on Art. 53(a) EPC, an *ex ante* control of the social desirability of an invention exists in the European patent system.[1000] Due to this exception, the European patent system shows its views towards the commercialisation of certain inventions by granting a patent or rejecting a patent application. This patentability exception discourages certain research and development in specific technological fields, because without a patent protecting an

995 Radin, *Contested Commodities* (n 989) 107-110.
996 Resnik, 'DNA Patents and Human Dignity' (n 986) 156.
997 ibid 161.
998 Hanson, 'Biotechnology and Commodification within Health Care' (n 973) 268.
999 See e.g. Hall and Harhoff, 'Recent Research on the Economics of Patents' (n 56) 552-553.
1000 Kamperman Sanders A and others, 'Final Report of the Expert Group on Patent Law in the Field of Development and Importance of Biotechnology and Gene Technology' (n 58).

invention, and having no exclusive right to it, the possibility of obtaining any economic benefit, i.e. a return on the investment in research and development, diminishes significantly.[1001] Hence, Art. 53(a) EPC is deemed to be an indirect tool which allows scientific research to be controlled without, as it is thought, restricting its freedom.[1002]

Due to the patent signalling function discussed above, it can be held that the approach of the EPO, based on the Western legal tradition, of regarding the patentability of the aforementioned biomedical inventions related to human beings and possibly violating their right to life as well as dignity as undesirable in the European patent system, may have significant consequences for this particular scientific field. Such a strict position of the European patent system, based on Art. 53(a) EPC, regarding the patenting of inventions related to the human body at various stages of its development and formation, as well as actions with regard to the use of human embryos for industrial and commercial purposes, human cloning or modification of the germ line genetic identity, resulting in the rejection of patents for such inventions, may reduce the investment in businesses operating in the sphere of biomedical research involving the said subject-matter. Low funding may lead to a decrease or a complete halt in the research in the aforementioned controversial fields in the territory where the European patent system is in force.

Therefore, on the one hand, the rejection of a patent application on the basis of Art. 53(a) EPC lowers the investment in research in the field of biomedical sciences and allows the protection of a human being – as a fundamental value in the Western legal tradition – from his/her transformation into an economic good, and subsequently from his/her full commodification. On the other hand, despite the fact that the rejection of a patent application does not take away the possibility of conducting controversial but not illegal research and development of technology related to it, the reduced potential economic benefits of biomedical research may still have a negative impact on progress in this field of science, which may inhibit the emergence of knowledge concerning human beings, their life and the formation of the whole human body. Thus, although further research is theoretically possible even without a patent, given the previously discussed

1001 Kamperman Sanders A and others, 'Final Report of the Expert Group on Patent Law in the Field of Development and Importance of Biotechnology and Gene Technology' (n 58).

1002 ibid.

importance of patent rights in the field of biomedical sciences, the emergence of new scientific knowledge and the change of attitude towards the human being based on it may be slower in the European patent system belonging to the Western legal tradition.

5.3. Preliminary Conclusion

Despite the discussions about the efficiency of the patent system, it is generally agreed in the scholarly literature that patents provide economic returns and stimulate innovation in the field of biomedical sciences. This means that the non-granting of a patent for an invention in this field of science, based on Art. 53(a) EPC, reduces the possibility of its commercialisation and hence the potential economic advantage for the patent holder. In view of this, there is a possibility that the research and development of inventions that will be regarded as non-patentable in the European patent system in terms of *ordre public* and/or morality will receive less investment. This will lead to slower progress in the biomedical sciences with regard to certain issues and will not encourage the growth of knowledge about the surrounding environment, its objects and the ongoing processes.

The aforementioned situation is likely to occur with regard to inventions encompassing the human body in its various stages of formation and development, actions related to the use of human embryos for commercial and industrial purposes, human cloning or processes for modifying the germ line genetic identity of human beings. Although the rejection of a patent application does not eliminate the right to perform sometimes even controversial but not prohibited research actions or create such technologies, the reduction of the potential economic benefits may decrease the activity in certain areas of biomedical research. Therefore, the emergence of new scientific knowledge – and, based on this knowledge, the change in the approach towards a human being and his/her development in the European patent system within the Western legal tradition – may be slower.