LEGAL FRAMEWORKS FOR PROTECTING AI INNOVATIONS. PATENT STRATEGIES FOR TECH COMPANIES

Liviu BEJENARU[1]

SUMMARY

The dawn of the "age of AI" is steadily approaching and, evidently, today's society is lured into choosing between the ethical component of artificial intelligence (AI) innovations and reaping its benefits for the greater good. Although both discussions are centred around bettering the status quo of modern life, it raises the question: "Is AI worth protecting?" And if so, how? This paper investigates the legal frameworks and patent strategies critical for safeguarding AI innovations from a global perspective. As AI technology evolves, tech companies face complex challenges regarding intellectual property law, which require careful navigation in order to protect their competitive advantage. This study aims for a clear understanding of the applicability of patents, trade secrets, copyrights, and trademarks in AI, emphasising the stringent patentability requirements under EU Law. By analysing key provisions, this paper clarifies essential criteria for AI patent eligibility, including the need for technical character, technical effect, and inventive step. Furthermore, it explores strategic approaches for managing patent portfolios, and addressing unique challenges such as patent fencing in the context of antitrust legislation. Finally, recommended practices are being highlighted to further support the legislator's aid in the matter, whilst providing a few recommendations, which have been drafted after a careful analysis of specialised literature and official reports.

KEYWORDS: ***artificial intelligence, intellectual property law, patent strategies, patent portfolios, patentability requirements, machine learning***

1. INTRODUCTION

1.1. UNDERSTANDING AI INTELLECTUAL PROPERTY PROTECTION

Artificial intelligence (AI), refers to a computer system designed to perform tasks which would normally require the use of human intelligence. In other words, AI aims to serve as an "assistant" for cognitive processes in order to successfully perform day-to-day tasks and functions in a timely fashion. Such tasks could encompass anything from mimicking human behaviour, to processing and interpreting various data. A few examples of *what AI can do* are actually normal occurrences in our everyday life, like using software such as Siri, Gemini or Cortana, or even self-driving vehicles. On a larger scale, AI plays an essential role in facial or voice recognition software, chatbots, personalised recommendations for internet browsing or product testing.

[1] Student, Fourth Year, The Bucharest University of Economic Studies, Faculty of Law, bejenaruliviu20@stud.ase.ro

A detrimental component of AI is *machine learning*, which focuses on creating algorithms and models in order to enable computers to learn from data and enhance their performance on certain tasks without the need for explicit programming. The 1990s saw the emergence of statistical techniques including *machine learning*. This immediately took over as the most common strategy, and it's just as prevalent 30 years later. Statistical approaches compute probabilities of possible outcomes based on the current input, as opposed to explicit logic or rule-based reasoning. The system then selects the event that has the highest likelihood of occurring or samples the possible outcomes based on their probability, selecting the more likely outcomes[2].

As AI systems become increasingly sophisticated, they generate a wealth of innovations that are vital to the competitive edge of tech companies. Given AI technologies' rich background, the legislator quickly realised that a strong legal foundation is necessary in order to safeguard such emerging technologies. Intellectual property protection plays a central role by securing exclusive rights to inventions, designs, and creative works. Furthermore, IP law provides the necessary legal framework to prevent unauthorised use, plagiarism, or exploitation by competitors. This protection is essential for encouraging investment in AI technologies, facilitating collaboration between stakeholders, and ensuring that inventors can benefit from their creations.

In the AI technology sector, the threat of new entrants is mitigated by substantial barriers to entry, including significant investment requirements for research and development, stringent regulatory standards, and the necessity for advanced computational resources and specialised talent. These factors create a relatively high entry threshold, thereby protecting the market position of established firms. The bargaining power of suppliers in this industry is notably high due to the reliance on specialised hardware and access to proprietary datasets. The reduced number of skilled AI professionals further amplifies supplier leverage. Conversely, buyers, particularly those with extensive or customised needs can exert influence, although high switching costs and integration challenges may reduce their bargaining power.

The threat of substitutes includes alternative technological advancements, such as quantum computing, and the increasing availability of open-source AI frameworks. Additionally, some organisations may opt for internal development of AI solutions, thereby diminishing their dependency on external technology providers. Competitiveness within the AI sector is pronounced, driven by rapid technological innovation and a dense market presence of both established technology leaders and emerging startups, seeing as companies strive to offer superior technological solutions and maintain a competitive edge.

Historically, AI protection has been subject to multiple debates among member states and other international organisations due to its expansion from a global perspective. For instance, German authorities expressed concerns regarding the use of facial recognition software in law

[2] World Intellectual Property Organization (WIPO) (2024). *Getting the Innovation Ecosystem Ready for AI: An IP policy toolkit*. Geneva: WIPO. DOI: 10.34667/tind.48978, p. 7.

enforcement, as the systems used could potentially function inconsistently[3]. Meanwhile, other states such as Finland insisted on the need for ethical standards in order to provide transparent practices and trustworthy data protection for citizens[4]. From this point of view, we can now witness a long list of legislative approaches which seek to justify AI's significance and its need for protection from a social, legal and economic perspective.

The legislator's tendency to adapt his approach according to social trends and innovation paved the way for the protection of AI innovations through legal mechanisms specific to intellectual property law. In this regard, patents offer exclusive rights to inventors, allowing them to exclude competitors from manufacturing, utilising or selling the patented invention. Traditionally, AI systems rely on algorithms in order to make decisions and process data. With that being said, in accordance with Article 52 of the European Patent Convention, "*schemes, rules and methods for performing mental acts, playing games or doing business, programs for computers"* as well as "*mathematical methods"*[5] are typically excluded from patent protection. However, if the AI algorithm is applied in a technical context, for instance to aid in the user experience and functionality of a self-driving vehicle, it may be eligible for patent protection as it could demonstrate *technical effect*, meaning it provides a solution or addresses a technical problem.

Trade secrets protect confidential business information that offers economic value by virtue of being unknown to competitors[6]. This can include a wide range of proprietary information, from algorithms and machine learning models to business strategies and customer data. In the context of AI, developers tend to protect their algorithms as trade secrets rather than patents because once a patent is granted, the invention must be disclosed publicly. In contrast, trade secrets can protect the inner workings of AI systems without requiring disclosure, keeping competitors from accessing key elements of the innovation.

Other means through which AI innovation can benefit from protection include copyrights (covers the source code used) and trademarks in order to safeguard the product's name and overall branding while enhancing market recognition.

1.2. SCOPE OF THE STUDY

This study aims to shed light on the legal frameworks applicable for protecting AI innovations, focusing on patent protection in the European Union context. Additionally, the research covers an extensive analysis of the strategies and tools available for companies in order to secure their competitive advantage, as well as key insights on the matter which have

---

[3] European Union Agency for Fundamental Rights, *Facial recognition technology: fundamental rights considerations in the context of law enforcement,* 2020, p. 22, available at https://fra.europa.eu/sites/default/files/fra_uploads/fra-2019-facial-recognition-technology-focus-paper-1_en.pdf , p. 22.

[4] Finnish Ministry of Finance, Government report on information policy and artificial intelligence, 5 December 2018, VM/2527/00.01.00.01/2017, available at https://vm.fi/en/information-policy-report, p. 14.

[5] Article 52 of the European Patent Convention.

[6] Article 2(1) of the Directive (EU) 2016/943 Of The European Parliament And Of The Council of 8 June 2016 on The Protection Of Undisclosed Know-How And Business Information (Trade Secrets) Against Their Unlawful Acquisition, Use And Disclosure, *OJ L 157, 15.6.2016, p. 1–18*.

been supported by ample case studies, in order to provide a practical analysis of the matter. Interdisciplinarity is secured by covering aspects and interpretations from an IP law perspective, as well as EU and competition law.

1.3. METHODOLOGY AND STRUCTURE

This study employs a qualitative research approach, focusing on the analysis of legal frameworks and intellectual property (IP) strategies for protecting AI innovations. It's debut is marked by highlighting relevant legislation applicable, followed by an in-depth analysis of the key provisions in hopes of creating a short, but comprehensive synthesis of the key-aspects pointed out by the legal and regulatory background of the matter.

The paper continues by focusing on patent strategies in order to provide a practical view of the matter, emphasising specific challenges tech companies faced when they sought to protect their AI inventions. The research findings are supported by an important theoretical background, reflected through the sources used, including, but not being limited to academic literature, legal texts and official reports to further show how current laws are applied in practice and how courts interpret the patentability of AI technologies.

2. BRIEF ANALYSIS OF THE LEGAL FRAMEWORK

The protection of AI innovations represents a complex and evolving frontier within the domain of intellectual property law. As AI technologies advance with unprecedented velocity, traditional IP frameworks are being rigorously reexamined and adapted to address the novel and multifaceted challenges that these innovations present. This adaptation process involves not only the refinement of existing legal doctrines but also the development of innovative legal principles and interpretations tailored to the unique attributes of AI. These attributes include the technology's inherent complexity, its capacity for continuous self-improvement, and its rapid rate of evolution.

Consequently, the legal landscape governing AI protection is becoming increasingly sophisticated, necessitating a nuanced understanding of both established IP mechanisms and emerging legal considerations. Furthermore, the following analysis of the relevant legislation aims to discover how the legislator's approach tackles every aspect of AI technology, from the legal protection granted to the invention itself, to patentability requirements and the enforcement of secondary legislation in order to potentially achieve uniform application.

2.1. THE EUROPEAN PATENT CONVENTION

2.1.1 INTRODUCTORY REMARKS

Contextually, in 1973 the Convention on the Grant of European Patents (European Patent Convention) entered into force and through it, the European Patent Office had been established. The system brought forth by the EPC, complementary to national patent systems,

proposed the means for an inventor to secure the grant of a patent for his invention in each of the territories he has designated through a single file application[7].

Some of the advantages proposed by the ETC system stem from its cost-effectiveness, given that the inventor is able to secure patent protection in multiple member states through a single application which can be redacted in one of the three official languages of the European Patent Office[8].

However, the EPC system, while foundational, exhibits several notable shortcomings. The patentee ultimately holds a collection of national patents, necessitating enforcement through the courts of various member states. This approach can be expensive and may lead to inconsistent judicial outcomes. Furthermore, it risks fragmenting the market by creating barriers to intra-community trade. The patent granting process itself also presents some inconveniences, seeing as patentees are required to provide translations of the claims into the two other official languages of the EPO.

In lieu of these drawbacks, the necessity for a unified patent system and streamlined enforcement across Europe has been well-recognised. Key milestones in this journey include the signing of the Community Patent Convention in Luxembourg (1975). This was followed by the European Commission's proposal for a Community Patent in 2000. However, efforts to finalise this framework faltered in 2003. Renewed negotiations began in 2007, but language-related disputes presented major obstacles. In December 2010, 25 member states expressed their desire for "*enhanced cooperation*", asking the Commission to address the Council in this regard. Ultimately, the Council's response was favourable and on 10 March 2011 it laid the foundation for what is now known as the "*unitary patent package*", containing two Regulations covering the unitary patent system[9] and the language regime applicable[10], as well as an agreement for establishing the Unified Patent Court (UPC)[11].

Once a European patent is granted under the EPC, it requires validation in each of the designated EPC member states, resulting in a set of individual national patents. These patents are subject to the specific legal and regulatory frameworks of each country which leads to a notable limitation of this system - its fragmented enforcement mechanism - where separate litigation must be pursued in each jurisdiction. This decentralisation increases the complexity

---

[7] D. Kitchin, *Introductory Remarks: A Judicial Perspective*, published in J. Pila, C. Waldow (eds.) *The Unitary EU Patent System,* Hart Publishing 2015, p. 1.
[8] *Ibidem.*
[9] Regulation (EU) No 1257/2012 of The European Parliament and of The Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection, *JO L 361, 31.12.2012, p. 1–8.*
[10] Council Regulation (EU) No 1260/2012 of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements, *JO L 361, 31.12.2012, p. 89–92.*
[11] D. Kitchin, *Introductory Remarks: A Judicial Perspective*, published in J. Pila, C. Waldow (eds.) *The Unitary EU Patent System,* Hart Publishing 2015, p. 1.

and cost of enforcement while also creating the possibility of divergent legal interpretations and outcomes, as courts in different countries may handle the same patent inconsistently[12].

The unitary patent package (UPP) and the ETC stand as two distinct, but complementary legislative initiatives. The UPP is viewed as a strategic initiative aimed at rectifying the deficiencies inherent in the EPC. It introduces a more streamlined approach to patent protection by enabling a single European patent with unitary effect, which ensures uniform legal protection across participating EU member states, thereby eliminating the need for separate national validations in each state. As mentioned, a core component of the UPP is the establishment of the UPC, a specialised judicial body which centralises the settlement of patent disputes[13]. This consolidated enforcement framework addresses one of the major criticisms of the EPC, namely its reliance on national courts for the enforcement of European patents.

2.1.2. PATENTABILITY REQUIREMENTS

For an invention to be eligible for patent protection, it must satisfy three essential criteria: it must be *novel*, demonstrate an *inventive step*, and be capable of *industrial application*. These requirements delineate the fundamental criteria for patentability under the EPC[14].

Article 52 states that mathematical methods cannot be considered an invention according to the patentability criterias mentioned above. However, this exclusion is applied narrowly, meaning that, for instance, if the claim does specify technical means, such as a computer system for carrying out the method, this constitutes technical character and does not fit into the scope of the exclusion. This is especially relevant for AI innovations because they serve a specific technical purpose through application in a field of technology, such as a car braking system[15].

As mentioned, *novelty* constitutes a criteria of great significance for the patentability of AI innovations. For an AI invention to be patentable, it must not be part of the "*state of the art*", which includes all publicly available knowledge before the patent application's filing date. This means the invention must introduce something that has not been previously disclosed or anticipated in existing literature, patents, or other forms of documentation[16].

For AI-related inventions, this entails demonstrating that the invention presents a new and inventive approach or method, such as an original algorithm, a novel machine learning technique, or a unique integration of AI with other technologies. The novelty requirement ensures that the invention is not a mere incremental improvement or an obvious extension of

---

[12] R. Sikorski, *Is The Unitary Patent Truly a Harmonised Right?,* published in L. Desaunettes-Barbero, F. de Visscher, A. Strowel, V. Cassiers (eds), *The Unitary Patent Package & Unified Patent Court. Problems, Possible Improvements and Alternatives*, First edition, Ledizioni 2023, p. 220.

[13] J.-C. Galloux, *Some Shortcomings Of The UPC System,* published in L. Desaunettes-Barbero, F. de Visscher, A. Strowel, V. Cassiers (eds.), *The Unitary Patent Package & Unified Patent Court. Problems, Possible Improvements and Alternatives*, First edition, Ledizioni 2023, p. 149.

[14] Article 52 of the European Patent Convention.

[15] D. Visser, *Visser's Annotated European Patent Convention,* Kluwer Law International, 2020.

[16] F. Banterle, *Ownership of Inventions Created by Artificial Intelligence* (November 1, 2018), AIDA (2018), p. 8, available at SSRN: https://ssrn.com/abstract=3276702.

what is already known. Given the fast-evolving nature of AI technology and the vast amount of existing research, establishing novelty can be complex and it requires a comprehensive review of pre-existing technology to confirm that the invention is indeed new and offers a significant advancement in the field.

Subsequently, novelty presents itself as an important component of the next criteria - *inventive step.* At first glance, the two notions seem interchangeable, however, in the evaluation of novelty, each element of prior knowledge is considered independently. In contrast, the assessment of inventive step necessitates the examination of a combination of prior knowledge to determine whether such a combination would be an obvious progression for a *skilled person*. An inventive step is recognized if the invention surpasses what a skilled person could reasonably deduce or achieve based on the existing body of knowledge. Furthermore, the EPO has developed a rigorous methodology, commonly referred to as the problem-solution approach, which provides a structured framework for determining the presence of an inventive step by considering the invention from the perspective of a skilled individual[17]. From a technical field viewpoint, the skilled person does not refer to an individual who is well-versed in technology as a general subject, but someone who has extensive knowledge on the specific field of technology the invention is catered towards[18].

Ultimately, in terms of *industrial application[19],* in order for this criteria to be satisfied, an invention must demonstrate a clear and reproducible practical use, rather than existing as a purely theoretical or speculative concept. EPO expects patent applications to detail how the invention can be applied in practice, either directly or through an established industrial process. The term "industry" is interpreted broadly to encompass any technical activity that is performed regularly, autonomously, and with a commercial or financial objective, explicitly excluding private or non-commercial uses[20].

Furthermore, the requirement of industrial applicability necessitates that the invention has to be capable of being manufactured, which implies that it must be disclosed in sufficient detail to allow for its practical realisation. Additionally, the invention must conform to the laws of physics, as patents cannot be granted for ideas that violate established physical principles[21].

2.2. EU SECONDARY LEGISLATION

The 96/9/CE Directive of 11 March 1996 focuses on establishing legal safeguards for databases, regardless of the medium in which they are presented[22]. It applies universally to various types of database formats, including both digital and non-digital forms. The core aim is to protect the intellectual property rights of database creators by regulating the extraction

---

[17] D. Visser, *Visser's Annotated European Patent Convention,* Kluwer Law International, 2020.
[18] *Ibidem.*
[19] Article 57 of the European Patent Convention.
[20] D. Visser, *Visser's Annotated European Patent Convention,* Kluwer Law International, 2020.
[21] *Ibidem.*
[22] Article 1 of the Directive 96/9/EC of The European Parliament and of The Council of 11 March 1996 on the legal protection of databases, *OJ L 77, 27.3.1996, p. 20–28.*

and reuse of data[23], while promoting the continued development of data resources. In doing so, the Directive seeks to strike a balance between encouraging innovation in data management and ensuring fair access and usage in different sectors, an objective further supported through the *sui generis* right[24] and *restricted acts*[25]. The Directive serves great significance when it comes to AI systems, since they heavily rely on vast datasets to train their models, refine algorithms, and make informed predictions and the safeguards provided through this legislative text helps secure the substantial investment involved in data collection and processing.

Similarly, the 2009/24/EC Directive[26] preserves the same focus of the European legislator, however, it focuses on computer programs as a whole. In accordance with Article 1, the term "computer program" also includes their preparatory design material. While patents can secure specific technical innovations, copyright protects the actual code. Article 1 also classifies computer programs as literary works[27], granting them automatic copyright protection upon creation. However, Article 5 introduces exceptions, such as reproducing the computer program where necessary for the lawful acquirer to use the computer program as intended, including making corrections for any errors[28].

In today's context, after a careful understanding of AI's rapid advancement, the EU sought to elaborate a comprehensive legislative body of work in order to further support its interest in safeguarding the digital single market. The objective of the 2024/1689 Regulation of The European Parliament and of The Council of 13 June 2024 (the AI Act) is to enhance the functioning of the internal market by establishing a standardised legal framework, particularly concerning the development, marketing, deployment, and use of AI systems within the European Union[29].

The AI Act is emerging as a public law measure focused on ensuring product safety, transparency, and ethical compliance in AI technologies. This approach contrasts with IP laws like copyright and patent law, which are rooted in the protection of private rights. The

---

[23] Consideration (8), Directive 96/9/EC of The European Parliament and of The Council of 11 March 1996 on the legal protection of databases, *OJ L 77, 27.3.1996.*

[24] Articles 7-11 of the Directive 96/9/EC of The European Parliament and of The Council of 11 March 1996 on the legal protection of databases, *OJ L 77, 27.3.1996.*

[25] Articles 5-6 of the Directive 96/9/EC of The European Parliament and of The Council of 11 March 1996 on the legal protection of databases, *OJ L 77, 27.3.1996*

[26] Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, *OJ L 111, 5.5.2009, p. 16–22.*

[27] Article 1(1) of the Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs: "*In accordance with the provisions of this Directive, Member States shall protect computer programs, by copyright, as literary works within the meaning of the Berne Convention for the Protection of Literary and Artistic Works. For the purposes of this Directive, the term 'computer programs' shall include their preparatory design material*".

[28] Article 5(1) of the Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs: "*In the absence of specific contractual provisions, the acts referred to in points (a) and (b) of Article 4(1) shall not require authorisation by the rightsholder where they are necessary for the use of the computer program by the lawful acquirer in accordance with its intended purpose, including for error correction*".

[29] Consideration (1) of the Regulation 2024/1689 of The European Parliament and of The Council of 13 June 2024, *OJ L, 2024/1689, 12.7.2024.*

discourse between these legal frameworks can lead to tension, particularly in cases involving trade secrets or proprietary datasets. The AI Act's requirements for transparency, such as the disclosure of training data and algorithmic processes, may risk exposing sensitive business information, thus creating a conflict between regulatory compliance and the protection of intellectual property.

The movement towards a more centralised framework for patent protection and enforcement, exemplified by the Unitary Patent Package (UPP), represents a crucial effort to alleviate the inefficiencies inherent in the European Patent Convention (EPC) system. By streamlining the processes that currently require separate national validations and litigation across multiple jurisdictions, the UPP mitigates the financial and administrative burdens associated with such decentralised systems. This is especially pertinent for industries like AI, where innovations frequently span various jurisdictions, necessitating broad and uniform patent coverage.

Moreover, the focus of both the Database Directive and the AI Act on the protection of large datasets underscores the increasing recognition of data as a key economic asset. These legislative instruments are reflective of a broader regulatory trend, which seeks to balance the encouragement of innovation with the protection of proprietary information. In particular, the safeguards introduced for AI development-related datasets reflect a growing legislative response to the rapid advancements in data-driven technologies, aiming to ensure that legal frameworks keep pace with technological innovations while safeguarding the economic interests of rights holders.

3. PATENT STRATEGIES. OPPORTUNITIES AND CHALLENGES

Developing robust patent strategies is essential for tech companies focused on AI technologies in order to foster growth from a business point of view, as well as offering protection to their inventions to secure a competitive advantage. Thus, tech companies rely on patent strategies[30] in order to secure long-term leadership positions in the field, as well as protecting their inventions from an IP law perspective. Nevertheless, a strong patent portfolio presents itself as a fruitful opportunity to attract investors, leading to potential revenue streams through licensing or direct product sales.

Plainly, an offensive approach in regards to patent-related decisions seek to actively prohibit business competitors from securing a well-established patent portfolio. However, an important question to be raised is: *what outcome does obtaining a patent generate for competitors?* The answer lies upon one of the more frequent tactics used by companies to generate an advantage - *patent fences* - which capitalise on the technological *exclusivity* of the patent[31]. Patents on technologies that are central to a company’s operations are often leveraged to deter competitors from imitating or replicating their innovations. These patents can also safeguard the company's substantial investments in product development, specialised complementary assets, and potentially foster future innovations which further supports why

[30] T. Grzegorczyk, R. Głowiński, *Patent management strategies: A review*, published in Journal of Economics and Management, Vol. 40, 2020, p. 40.
[31] D. Somaya, *Theoretical perspectives on patent strategy*, University of Maryland (2002), p. 9.

patents could constitute a threat for other companies. In order to “build” a patent fence, the patentee focuses on obtaining a strategic collection of patents secured by a company to cover variations or close alternatives to its primary invention. This approach prevents competitors from circumventing the original patent and obtaining their own improvement patents, which could potentially limit the original patent holder's ability to enhance or build upon their initial innovation. By creating such a protective barrier, the patent owner can maintain control over future advancements and block competitors from introducing incremental improvements that might undermine the original technology's market dominance.

Bayer and BASF: a case study

> Bayer and BASF, as pioneers in the dye industry, employed sophisticated patenting strategies to secure their market dominance. They patented isolated components of their dye formulas while keeping the complete compositions undisclosed, ensuring competitors could not fully replicate their products. Additionally, they patented final outcomes of certain processes but omitted crucial details regarding intermediate products. To further complicate matters for competitors, the companies registered numerous patents that obscured the connection between patented inventions and the actual products being released[32].
>
> This multifaceted approach not only protected their innovations but also allowed them to preserve a quasi-monopolistic position in the industry, as rival companies struggled to decipher and replicate their advancements. Through these methods, Bayer and BASF effectively shielded themselves from competition and reinforced their dominance within the market.

It is important to mention that however evident the opportunities generated through patent fencing might be, overuse of such strategies could easily expose companies, in theory, to breaches of antitrust law, even though such practices have not been addressed currently by any provisions in relation to competition law.

In addition, another well-established practice among companies relates to litigation in regards to patent-related issues, a legal strategy employed by firms to protect their intellectual property from unauthorised use or infringement. Beyond serving as a defensive measure, it is also a strategic approach to maintaining and enhancing competitive advantage. Engaging in proactive patent litigation helps companies to counteract competitive threats, project a strong market presence, and mitigate risks from rivals. Additionally, such litigation can promote negotiation and dialogue between firms, support the realisation of business goals such as securing licensing agreements and patent deals, increase investor confidence, and improve market valuation[33].

In spite of the benefits stemming from a positive outcome of the matter, key drawbacks are evident through the potential losses. Engaging in litigation exposes the company to several risk factors, therefore organisational routines present themselves as great measures to assess

---

[32] T. Grzegorczyk, R. Głowiński*, Patent management strategies: A review,* published in Journal of Economics and Management, Vol. 40, 2020, p. 41.

[33] L. Wang, Y. Zhang, Y. Yan, *Offensive patent litigation strategic choice: An organizational routine perspective*, 2023, https://www.sciencedirect.com/science/article/pii/S0166497222002140.

prior knowledge in order to foster good decision making in patent-related issues, as well as proactive litigation strategy.

4. CONCLUSIONS AND RECOMMENDATIONS

As AI technology continues its rapid emergence, tech companies are faced with having to adapt swiftly to new regulatory frameworks, in order to secure the protection of their inventions, while ensuring a constant market presence and a significant competitive advantage against competitors. The multitude of legislative acts in force related to AI demonstrates how swiftly the European legislator responds to change, and how AI does not present itself as a threat, but a vessel for immense opportunities in terms of facilitating outdated processes, human safety and business ventures.

The AI Act which entered into force in 2024 has proven itself to be a valuable piece of legislation, achieving a well-rounded approach to fulfil its purpose in establishing a uniform regulatory framework across the European Union, effectively addressing legal disparities among member states. This harmonisation eases the compliance burden for businesses by providing consistent rules and obligations, particularly for enterprises operating across multiple jurisdictions, thus fostering greater legal certainty and predictability. However, the AI Act's expansive definition of AI, combined with its stringent emphasis on safety, transparency, and compliance, may impose tedious obligations on tech companies, which could particularly hinder innovation within smaller enterprises that might not possess the necessary resources to fulfil these extensive requirements. Moreover, the Act's provisions regarding transparency, specifically the obligation to disclose details of training data and algorithmic processes, raises concerns about the potential exposure of proprietary information. Such disclosures could undermine competitive advantages and weaken the protection of intellectual property.

The 2009/24/EC Directive focuses on protecting proprietary software, however, it does not take into account the intricacies and growing significance of open-source software, detrimental for AI development. *De lege ferenda,* this constitutes as a great opportunity for the Directive to be revised in order to more effectively address the challenges and protection requirements associated with open-source models. Moreover, a revisal of the Database Directive could also be beneficial, seeing as it was introduced nearly 30 years ago and could provide some clarity in order to better satisfy the demands of AI. For instance, it could be argued that the *sui generis* right might eventually monopolise raw data which could otherwise promote further innovation.

Patent strategies are viewed as essential tools to help secure a distinguished economic advantage against competitors, but their problematic resembles a double-edged sword. One one hand they foster protection infringement and provide direction in order to secure capital in a competitive market. On the other hand, some offensive strategies such as *patent fencing* could potentially violate antitrust laws. This is the result of an incoherent approach by the legislator, seeing as this practice resembles a *legal workaround* for companies to act in bad-faith in order to block competitors. *De lege ferenda*, a separate EU Regulation designed to enforce and adapt the patent system to the unlawful use of offensive patent strategies could become a great addition. The choice of instrument is supported by the need for unitary enforcement, with diminished fragmentation among member states. From a legal point of view, this framework would further consolidate the European Union's efforts to protect the single market, as harmony between cross-border IP "interactions" would be strengthened alongside cross-border trade, as a result of the distribution of AI-powered products to clients.

From an economic point of view, this effect would promote innovation in the field, trust among stakeholders and new companies would be better encouraged to enter the market.

The world of AI compliance is difficult to navigate for an inventor without legal knowledge. In order to better understand the processes, institutions and regulatory frameworks involved in protecting AI-based inventions a better approach would be presented as a designated government institution tasked with elaborating best practice' guides for tech companies, encompassing all the information necessary in a comprehensive format. This approach would encourage companies to assess their patent management practices in order to make informed decisions and have a better understanding about patent strategies and infringement disputes.

This study presented a comprehensive examination of the legal frameworks governing the protection of AI innovations, with a specific focus on patent protection within the European Union. Through an extensive analysis of strategic approaches and tools available to companies, the research highlights effective methods for securing competitive advantage in the rapidly evolving AI sector. Nevertheless, by incorporating an interdisciplinary perspective, the research underscores the need for a nuanced understanding of how the legal protection of AI innovations can be optimised in order to foster innovation while balancing competitive dynamics.

BIBLIOGRAPHY

I. ARTICLES, STUDIES

D. Kitchin, *Introductory Remarks: A Judicial Perspective*, published in J. Pila, C. Waldow (eds.) *The Unitary EU Patent System,* Hart Publishing 2015

J.-C. Galloux, *Some Shortcomings Of The UPC System,* published in L. Desaunettes-Barbero, F. de Visscher, A. Strowel, V. Cassiers (eds.), *The Unitary Patent Package & Unified Patent Court. Problems, Possible Improvements and Alternatives*, First edition, Ledizioni 2023

R. Sikorski, *Is The Unitary Patent Truly a Harmonised Right?,* published in L. Desaunettes-Barbero, F. de Visscher, A. Strowel, V. Cassiers (eds), *The Unitary Patent Package & Unified Patent Court. Problems, Possible Improvements and Alternatives*, First edition, Ledizioni 2023

F. Banterle, *Ownership of Inventions Created by Artificial Intelligence* (November 1, 2018), AIDA (2018)

J.P. Quintais, *Generative AI, Copyright and the AI Act* (August 01, 2024). Available at SSRN: https://ssrn.com/abstract=4912701

D. Somaya, *Theoretical perspectives on patent strategy*, University of Maryland (2002)

T. Grzegorczyk, R. Głowiński*, Patent management strategies: A review,* published in Journal of Economics and Management, Vol. 40, 2020

L. Wang, Y. Zhang, Y. Yan, *Offensive patent litigation strategic choice: An organizational routine perspective*, 2023, https://www.sciencedirect.com/science/article/pii/S0166497222002140.

II. OFFICIAL REPORTS AND INTERNET SOURCES

European Union Agency for Fundamental Rights, *Facial recognition technology: fundamental rights considerations in the context of law enforcement,* 2020

Finnish Ministry of Finance, Government report on information policy and artificial intelligence, 5 December 2018

World Intellectual Property Organization (WIPO) (2024). *Getting the Innovation Ecosystem Ready for AI: An IP policy toolkit*. Geneva: WIPO. DOI: 10.34667/tind.48978

III. TREATIES, COURSES

D. Visser, *Visser's Annotated European Patent Convention,* Kluwer Law International, 2020.

IV. LEGISLATION

Convention on the Grant of European Patents (European Patent Convention)

The Berne Convention for the Protection of Literary and Artistic Works

Regulation 2024/1689 of The European Parliament and of The Council of 13 June 2024, *OJ L, 2024/1689, 12.7.2024*

Directive 96/9/EC of The European Parliament and of The Council of 11 March 1996 on the legal protection of databases, *OJ L 77, 27.3.1996, p. 20–28*

Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, *OJ L 111, 5.5.2009, p. 16–22*

Regulation (EU) No 1257/2012 of The European Parliament and of The Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection, *JO L 361, 31.12.2012, p. 1–8.*

Council Regulation (EU) No 1260/2012 of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements, *JO L 361, 31.12.2012, p. 89–92.*

Directive (EU) 2016/943 Of The European Parliament And Of The Council of 8 June 2016 on The Protection Of Undisclosed Know-How And Business Information (Trade Secrets) Against Their Unlawful Acquisition, Use And Disclosure, *OJ L 157, 15.6.2016, p. 1–18*.