# STRATEGIC USE OF INTELLECTUAL PROPERTY RIGHTS IN INNOVATION ECOSYSTEMS: LEGAL FOUNDATIONS, BUSINESS MODELS, AND EMERGING CHALLENGES

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Master of Business Administration

Submitted to: Dr. Daniel Dan

Student: Ljaura Bajrami

Student No. 62405759

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# AFFIDAVIT

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# ABSTRACT

Intellectual property (IP) has become an important strategic asset in contemporary innovation ecosystems, particularly under conditions shaped by numerous changes, among them artificial intelligence (AI), cross-border collaboration, and growing uncertainty of enforcement. Although there is substantial legal analysis of IP rights within current literature, little attention has been paid to the practical implementation of IP as a strategic asset within most organizations. This is especially prominent in the case of small and medium-sized enterprises (SMEs) that have limited resources and face uncertainties regarding IP enforcement.

This thesis addresses this gap by examining how firms convert IP from a legal resource into a strategic asset via protection, licensing, secrecy, and ecosystem positioning. The study adopts a qualitative research approach that consists of three methodological components: (1) a doctrinal literature review of European IP frameworks; (2) nine semi-structured interviews with professionals in technology-intensive, creative, and SME-driven sectors; and (3) a focused case study of Tesla's Open Patent Pledge as an example of an ecosystem-oriented IP strategy.

The findings indicate that firms rarely use patents as standalone instruments, instead they adopt multifaceted IP strategies that combine formal rights with know-how, trade secrets, and contractual safeguards. Challenges of AI-supported innovations increase uncertainty around inventorship and ownership, consequently encouraging companies to rely more heavily on secrecy and other internal forms of protecting knowledge. Furthermore, the costs of enforcing IP rights and the fragmented nature of international IP laws create significant challenges for SMEs in terms of how they choose their strategies around intellectual property.

This thesis provides meaningful insights for managers, policymakers, and lawyers as it helps to understand how ecosystems foster changes in IP strategies over time. It indicates the importance to develop adaptive governance systems for IP that create a proper balance between protection, collaboration, and innovation encouragement particularly in light of rapid changes brough by AI and the increasing level of enforcement uncertainty.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| AI | Artificial Intelligence |
| EC | European Commission |
| EPO | European Patent Office |
| EU | European Union |
| EUIPO | European Union Intellectual Property Office |
| GATT | General Agreement on Tariffs and Trade |
| IP | Intellectual Property |
| IPO | Initial Public Offering |
| JPO | Japan Patent Office |
| NDA | Non-Disclosure Agreement |
| OECD | Organization for Economic Co-operation and Development |
| PCT | Patent Cooperation Treaty |
| R&D | Research and Development |
| SMEs | Small and Medium Enterprises |
| TRIPS | Agreement on Trade-Related Aspects of Intellectual Property Rights |
| UKIPO | United Kingdom Intellectual Property Office |
| UNCTAD | United Nations Conference on Trade and Development |
| UNECE | United Nations Economic Commission for Europe |
| US | United States |
| WIPO | World Intellectual Property Organization |
| WTO | World Trade Organization |

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# 1 Introduction

## 1.1 Background and Context

Advanced technological processes, digital transformation, and the surge of intangible assets have significantly influenced the global economy today (Organisation for Economic Co-operation and Development [OECD], 2019a; World Intellectual Property Organization [WIPO], 2022b). Innovation is not a harvest that comes from scientific progress only, but it also includes interactions between companies, knowledge transfer, and intellectual property (IP) systems (Etzkowitz & Leydesdorff, 2000). As markets expand and grow, and the competition becomes more aggressive, firms tend to use more patents, trade secrets, proprietary data, and organizational knowledge to maintain their unique value proposition in the market (Posner, 2005; OECD, 2011).

In the contemporary global economy, the generation of new knowledge and its transformation into new products and services is of great importance in maintaining and strengthening competitiveness not only for the EU but also for the Republic of Macedonia as a EU candidate country. Increasing the share of knowledge in newly acquired values is the main hallmark of the new economy, also known as the knowledge economy. In the knowledge economy, the economic resources for achieving competitive advantage are no longer capital, natural resources, or labor, but the knowledge and intellectual capital associated with it (WIPO, 2020a; Drahos & Braithwaite, 2002). Survival and success in the world market will be ensured only by those companies that will be able to produce, manage, and continuously increase their own intellectual capital (Teece, 2007; OECD, 2021c; WIPO, 2019a, WIPO, 2022b).

These observations are even more critical to businesses today. As digitalization has continued to grow rapidly along with the use of platform-based models, AI has been integrated into the business processes of many organizations around the world, and the way companies are creating their strategic schemes has changed profoundly (WIPO, 2019b; WIPO, 2020d). In this context, the role of intellectual property (IP) has evolved from being a technical legal tool to a central intellectual asset that determines the firm's investment strategy, the way the firm innovates, and the overall global value chains (European Commission [EC], 2020). The firm that can successfully use its intellectual

assets can therefore gain power in negotiations, build external partnerships, and increase the firm's presence in innovation ecosystems (Hsu, 2004).

Although strategic use of intellectual property is very important, the manner in which a firm uses IP as an intangible asset is significantly different. Technology-based firms develop complex intellectual property portfolios and use them in the long-term growth of their organizations. On the other hand, there are many small and medium-sized enterprises (SMEs) that cannot afford access to IP systems because of their inability to pay for the costs associated with using IP frameworks, lack of legal knowledge, or limited internal capabilities (OECD, 2011; WIPO, 2022b). These differences result in the creation of different dynamics within innovation ecosystems, which determine which companies will ultimately gain the most benefit from the technological advancements made in the given environment (Etzkowitz & Leydesdorff, 2000).

Lately, AI has advanced extensively, and this development has resulted in significant issues for the intellectual property systems that they never faced before. As such, AI has capabilities to create original and creative content, to design new products or new services, to optimize business operations, and to simplify algorithms and inventive solutions. Besides the eminent progression of AI, current IP rules are still based on the traditional definition of authorship and inventorship, and highlight human responsibility, accountability, and intention as their main characteristics, elements that AI lacks (Abbott, 2016; Gervais, 2020). Globalization and modern information technologies have led to a situation where, on the one hand, new technologies allow for easier creative and innovative creation, but on the other hand, they have become a tool for increasing the degree of abuse of intellectual property rights and the expansion of counterfeiting and piracy (Organisation for Economic Co-operation and Development & European Union Intellectual Property Office [OECD & EUIPO], 2019). The ability of AI to create new products further widens this gap and challenges ownership, responsibility, and adaptability of current IP doctrines (WIPO, 2020b).

In this given situation, the question of how businesses will enforce their IP rights presents a major challenge. The biggest burden from this situation is put on SMEs because they do not have the necessary financial resources to pursue legal procedures across borders. Because of these reasons, adding here the uncertainty about the effectiveness and costs of

enforcing IP rights as well, these firms substitute law enforcement by using informal, tacit knowledge, internal processes, strategic secrecy, and collaborative relationships to protect their competitive position in the ecosystem in which they operate (Nonaka & Takeuchi, 1995; Polanyi, 1966).

Considering all these dynamics, this study explores how businesses view IP strategy, how they see the challenges created by the growth of AI related to the issues of inventorship, and how they find ways to protect their knowledge and minimize risks of enforcement in the innovation ecosystem.

## 1.2 Problem Statement

With the growing importance of intangible assets in business strategy, some gaps emerged around the understanding of how companies from different industrial backgrounds make use of IP strategically. Large companies in the tech sectors incorporate patents and trade secrets into their broader business grand strategy. In contrast, SMEs rely more on informal methods of protection, like brand recognition, customer loyalty, or do not incorporate IP into their plan at all. At the same time, as the AI innovation advances rapidly, it confounds assumptions of the IP law. Many businesses that continuously use AI tools to grow or to bring disruptive solutions do not have clear guidelines about the issues of ownership and inventorship. Enforcement of IP, on the other hand, presents a challenge itself, since it is closely related to high costs and inconsistent jurisdictions. Together, all these challenges make room for further investigations into how businesses respond and behave in the evolving intellectual property field.

Under these circumstances, this thesis embraces a focused analytical perspective, and it shows the way firms convert IP from a legal right into a strategic asset under ecosystem conditions. It demonstrates how AI and enforcement uncertainty change that strategy, especially in the case of SMEs.

## 1.3 Research Aim and Questions

This study aims to understand the role of IP as part of the business strategy of companies. In addition, an area for exploration is the identification of how businesses interpret and respond to current global issues which involve AI and enforcement of IP rights across

borders and in the online world as well. The study is structured around three main research questions:

**1.** How do organizations implement IP as part of their business strategy in the innovation ecosystems?

**2.** What are the perspectives and challenges of organizations for innovations supported by AI, with an emphasis on the questions of inventorship and ownership?

**3.** How does legal and practical uncertainty associated with enforcement and transnational protection affect the choices of firms toward knowledge protection mechanisms and intellectual property strategy, especially for SMEs?

## 1.4 Research Significance

This research enriches the existing academic literature because it provides empirical evidence of how companies develop and implement IP strategies, how firms handle outputs from artificial intelligence, and the way organizations use both formal and informal approaches to protect their intellectual property (Bader, 2008; Dalkir, 2017). Exploring Tesla's Open Patent Pledge as a case study, this thesis provides a real-life example of an IP strategy that blends the concept of openness, competitive advantage, ecosystem development, and the use of tacit knowledge. This sets out a strong foundation for illustrating the complexity and flexibility that is required in the modern innovation environment by offering meaningful insights relevant to managers, legal practitioners, and policymakers.

## 1.5 Thesis Structure

The thesis is divided into nine chapters and each of the chapters contributes to address how firms use IP not merely as a legal asset but as a strategic resource under innovation ecosystem and how challenges related to AI and enforcement ambiguity impact firm decisions and strategy, particularly for small and medium-sized enterprises.

Chapter 1 – Introduction explains the objectives of the thesis, defines the problem, sets the research aim and three research questions, and highlights the importance of the study related to innovation ecosystems and changes introduced by AI. This chapter provides the analytical perspective of the strategic use of IP and explains how the thesis further explores approaches firms use in the context of AI and enforcement uncertainty.

Chapter 2 – Literature review contains an overview of academic, legal, and policy literature around intellectual property, creative and cultural industries, innovation ecosystems, patent models, and challenges related to AI. It establishes the conceptual framework for the thesis and identifies the gaps present in the current literature that serve as motivators for the development of the three research questions.

Chapter 3 – Foundations of patent law and related intellectual property rights provides definitions of key terms including patents, utility models, and other related IP rights, and describes legal or economic functions they have. In this chapter, it is demonstrated how the legal frameworks affect the ability of firms to use IP as a strategic resource and serves as a basis for analysis of the way organizations include IP as part of their broader business strategy (RQ1).

Chapter 4 – International trade and enforcement of patent rights explore how patent systems and enforcement frameworks influence strategic decisions of firms in innovation ecosystems, including the value assigned to those assets and know-how. This chapter provides insights into how international enforcement and valuation problems support the choices of firms between formal and informal IP protection (RQ1 and RQ3).

Chapter 5 – Methodology provides details on the methods used to conduct qualitative research, the design of the study, the strategy for selecting participants, and the methods used to collect the data, including semi-structured interviews and the Tesla case study. It outlines the analytical approach used extract themes related to each research questions and ethical considerations and the limitations of the research.

Chapter 6 – Findings present four main themes that emerged from the analysis of interviews: (1) strategic use of IP in business settings (RQ1); (2) challenges posed by AI and the ongoing debate around inventorship (RQ2); (3) knowledge protection, know-how, and procedural expertise (RQ3); and (4) international enforcement constraints and global risks that influence IP strategies of firms (RQ3).

Chapter 7 – Results and Discussion: Strategic use of IP in innovation ecosystems provides an overview from interviews with the Tesla Open Patent Pledge case, integrating these into the conceptual frameworks described in previous chapters. It explains how the IP strategy utilized by Tesla and findings from the interviews provide insight into how firms

use IP as a strategic asset, how firms respond to uncertainty associated with AI and enforcement barriers in innovation ecosystems (RQ1 – RQ3).

Chapter 8 – Conclusion provides a summary of the key findings of the research, highlights the contributions made to the literature on IP strategy, AI, and innovation ecosystems, and discusses the implications for management and policy. The chapter also includes a discussion of the limitations of the research and offers suggestions for future research related to strategic IP management, AI inventorship, and enforcement practices.

Chapter 9 – Bibliography and Appendix contain the complete list of sources used in the research, as well as the interview guide created for data collection. These comprehensive detailed materials further demonstrate the transparency of the research design.

# 2 Literature Review

## 2.1 Introduction to the Literature Review

*"A literature review is a structured and critical synthesis of existing scholarly work on a given subject, providing a foundation for conceptualizing research and identifying knowledge gaps." (Kiteley & Stogdon, 2014).* In contrast to descriptive summaries or isolated book reviews, literature reviews perform a critical analysis of different perspectives on a topic, with the aim of showing their evolution in a given research area (Boote & Beile, 2005).

This review adopts a methodology that is rather qualitative and conceptual and will synthesize and evaluate the theoretical and empirical evidence that is available on the notion of intellectual property (IP), especially regarding its use as a strategic advantage in innovation ecosystems.

The core aim of this review is to go beyond just analyzing the existing literature, but to evaluate in a critical manner existing agreements and disagreements and present actual conceptual and empirical gaps. By following this pattern, we will use an analytical approach, based on which, in detail, we will examine where the intellectual property stands in the broader debates around innovation, knowledge distribution, and global competitiveness.

The existing literature greatly covers how intellectual property rights have evolved, on the one hand, as tools to protect creativity, and on the other hand, as strategic resources that

take the role of the engine in the modern innovation ecosystem. Scholars especially pay attention to the effective synthesis of law (IPR) and business practices, pointing out that without this great combination, it would be hopeless for intellectual property to succeed in achieving its full potential for fostering innovation, sharing technology, and driving inclusive development (Kapczynski, 2012; Fisher III & Oberholzer-Gee, 2013).

The dual role of literature review explained beforehand is proof that it not only serves as a great foundation to conceptualize and showcase the ongoing debates, but even more, it has the role of a critical platform to call for some future reforms, transformation, and empirical research, in the areas where it is mostly needed.

Thanks to the rich literature, we can address the central questions of this thesis: how intellectual property rights are strategically incorporated into innovation ecosystems, what kinds of challenges AI has posed to businesses and how do they respond, and how legal frameworks must adapt to meet the quickly developing technologies like AI.

## 2.2 The Evolution of Intellectual Property in Academic Discourse

Intellectual property, as an area, in fact, was born authentically as a legal mechanism to guarantee exclusive rights to all humans who come up with new ideas and inventions. Its core objective was achieved with the establishment of governing patents, copyrights, and trademarks (WIPO, 2020d). Its purpose was utilitarian, rooted in legal traditions of Anglo-Americans, which promoted creativity and innovation only through short-term monopolies (Kapczynski, 2012). Gradually, the concept of IP continued to grow, and today, in economic and business management literature, it is described as a strategic asset that affects value creation, competitive advantage, and growth-based knowledge.

The central part of the many academic debates taking place in the mid-20$^{th}$ century was the balance between public access and private rewards. However, by the late 1990s and early 2000s, the principal things of these discussions were intellectual property as a navigator and driver of innovation strategy. In this context, scholars like Bently et al. (2022) and Fisher III & Oberholzer-Gee (2013), in their frameworks, established IPRs as more than just legal protectors, but as inputs that are critical for the business models of rapid growth of companies. This business perspective of IPRs was also acknowledged by the Open Innovation theory, which positioned IP as a mechanism that supports collaboration, licensing, and co-development (Chesbrough, 2003).

With the rise of intangible assets, the pivotal role of IP in global capital markets has been validated. The existing data from Planes-Satorra & Paunov (2019) and WIPO (2020a) reveal that companies today are more dependent on brands, algorithms, patents, and proprietary knowledge, rather than on their physical infrastructure. As a result, the academic literature started to incorporate some elements from finance, marketing, law, and information systems to analyze IPRs as cross-disciplinary constructs.

Lately, IP in the literature has been described as a cornerstone and the main driver of the knowledge economy and is closely interconnected with globalization, digitalization, and technological convergence. Scholars have examined that there is a rising trend of financializing IPRs with patents and trademarks. They are treated more as intangible assets that can be valued, securitized, traded, or even used as collateral in capital markets (WIPO, 2021a). Viewing IPRs from a financial point of view confirms that IP is no longer a static legal protection, but rather a dynamic strategic source that shapes global competition.

Taken together, the cycle of intellectual property in the academic literature has changed from IP as a strictly formal instrument that rewards creativity, to IP as a multi-dimensional strategic tool that exists at the same time in the legal, economic, and financial areas. This path of IP in literature is very important to understand the function it has today in innovation ecosystems and serves as a base to subsequently examine its role in creative industries, global patent systems, and issues raised by AI. Especially, the transformation of IP into a multidimensional strategic tool can be found in creative and cultural industries, where IP rights have a dual role, not only a protective one, but they also act as economic drivers.

This change in the way academics discuss their work mirrors the switch in the way businesses approach intellectual property as well. Today, most academics describe intellectual property not only as a legal method, but as an important strategic asset that firms use to create value, drive innovation, show their capability for technological development, and position under the innovation ecosystem. This different framing of IP is important to understand how firms behave in a world with technological unpredictability, globalization, and multitudinous approaches toward enforcement of IP rights.

## 2.3 Intellectual Property in Creative and Cultural Industries

One of the most intensive sectors of IP in modern economies is the creative and cultural industries. These sectors are made of film, music, publishing, design, architecture, and digital content. All these heavily depend on copyright, trademark, and design rights for protection and commercialization (EC, 2021).

Some scholars highlight that IP has two functions in creative and cultural industries; it is considered a legal tool to protect creators' rights and works as an economic mechanism to generate income from cultural products (Jelinčič, 2008). The utilitarian approach usually prevails here, while suggesting that exclusive rights are needed to incentivize investments in the creative process (Idris, 2004). On the other hand, some critics point out that IP regimes that favour extensive enforcement can sometimes limit access to culture and creativity, and thereby hinder the collaboration and creativity that some measures of informal economies promote (Kapczynski, 2012; De Beer, Fu, & Wunsch-Vincent, 2013).

Empirical research from WIPO (2019a) and EC (2021) explains that creative and cultural industries leverage their IP portfolios to enter into global markets. For example, in the music industry, participants use standard licensing models to share content across different platforms, while designing firms utilize brand identity and trademark protection to maximize their potential. However, the literature also highlights the issues of piracy, problems with distributing content, and the grey area of derivative works, which remain outside of the scope of conventional forms of IP regulation.

From a strategic standpoint, cultural and creative industries are important, because they are characterized by SMEs as main players. In such industries, enforcement costs are high and technological dissemination is rapid, influencing SMEs to choose formal IP rights and other methods of informal protection like branding and contracting.

Therefore, creative and cultural industries provide basis for examining how firms have shifted the role of IP from legal to strategical under innovation ecosystems, informing in this way research question 1.

## 2.4 Innovation Ecosystems and Knowledge Models

The simplest, and at the same time appropriate definition of innovation ecosystem would be that it is a network of actors, institutions, and processes that create, share, and

commercialize knowledge. However, this definition in the literature is conceptualized through two systems: the Triple Helix and the Open Innovation.

The Triple Helix model introduced by Etzkowitz and Leydesdorff (2000) places the trinity connection between university, industry, and governments at the heart of the innovation system. Etzkowitz and Leydesdorff further affirm that at the core of these three pillars grow hybrid organizations and public-private partnerships, which empower knowledge flow and collective IP creation. According to these authors, institutional incentives and shared ownership of IP are the most significant parts of the innovation process that further simplify collaboration and interaction within it.

The Open Innovation model, which was introduced by Chesbrough (2003), questions the paradigms of the closed R&D in the 20$^{th}$ century. According to Chesbrough, firms can extract more value from their innovation activity by licensing IP from the external environment, forming strategic partnerships, capitalizing on unused internal patents, and developing commercialization plans. This study is supported by literature, which cites two case studies of IBM and P&G as examples of two firms that have developed their entire innovation models on sharing IP and ecosystem engagement for new product development (Fisher III & Oberholzer-Gee, 2013).

The contributions of tacit knowledge, procedural know-how, and trade secrets in innovation should not be underestimated. Polanyi (1966) and Nonaka & Takeuchi (1995) remind us that it is impossible to codify all knowledge, and that a great part of innovation comes from unarticulated routines and team learning.

Through comparative studies, we can understand how innovation ecosystems operate in different ways across regions. Thus, in the case of Silicon Valley, the main driver of the commercialization of IP is the entrepreneurial culture and spirit, and strong networks with venture capitalists. In Europe, for instance, IP is driven mainly through public funding and EU frameworks, which foster collaborative approaches to innovation. In developing economies, the limited number of resources usually results in informal protection IP practices, further enabling hybrid models that provide some forms of formal rights but often rely upon informal protection practices and contractual clauses (WIPO, 2007). These differences highlight the urge for adaptation of the IP management to specific institutional, cultural, and economic requirements of each system.

Lately a good portion of the literature discusses the interconnection between IP strategies and platform-based ecosystems, because statutory law, private contracts, technology standards, and licensing are used as IP instruments to manage these platforms (Dolata, 2017; Schreieck et al., 2020; Özmen, Heikkilä, Karvonen, & Ojanen, 2024). To illustrate, some of the best platforms, like Google, Apple, and Amazon, combine different IP tools like patents, trade secrets, and proprietary licenses to stay innovative and maintain their competitive advantage.

The presence of IP in these ecosystems models is treated not only legally as a protection, but strategically as a mechanism used by entities to interact with each other, set respective boundaries, and distribute their power. However, the decision of companies of whether to utilize patents, licenses, or trade secrets depends on the position they have in the ecosystem, their ability to enforce the protection of their IP, and ultimately their strategic objectives.

These models of ecosystems explain the role of IP as a strategic coordination mechanism and not only as legal protector, supporting the analysis of behavior of firms addresses in research question 1.

## 2.5 Patent Systems and Global Protection Mechanisms

The global patent system, for a long time, was widely discussed in academia because of its relationship with jurisdictional limitations, its harmonization, and efficiency in promoting innovation. The two most important global agreements that regulate patent protection administered by the World Intellectual Property Organization (WIPO) are the Paris Convention and the Patent Cooperation Treaty (PCT) (WIPO, 2020c).

The Paris Convention, which was adopted in 1883 and has changed many times with amendments, welcomed the principle of national treatment and the framework of priority rights. It serves as a basis for international acceptance of patents while respecting the sovereignty of national systems. Since no patents were filed internationally, the PCT, which was established in 1970, simplifies the whole process for obtaining patent protection in multiple jurisdictions.

Additionally, the literature also contains an explanation of the economic aspect of patents. Primarily, patents are viewed as tools that provide exclusive rights that help companies to get a return on their invested capital in R&D. However, the empirical literature has raised

some questions about the matters surrounding patent thickets and strategic litigation (Bessen & Meurer, 2008) and the rent-seeking behaviors of certain firms. These concerns are becoming more critical in high-tech and pharmaceutical industries, where patent strategies are used more as defensive tools rather than tools that should promote innovation.

The process of evaluating patents has gained importance for connecting law, economics, and finance. There are different methods for valuation, such as cost-based and market-based, but there are also more complex income-based methods like the relief-from-royalty method and real options analysis (Scheffer & Zieger, 2005; United Nations Economic Commission for Europe [UNECE], 2011; von Scheffer, 2009). Understanding patent value is very important for licensing, mergers, acquisitions, and financing using patents as collateral.

The role of the WTO through the TRIPS Agreements is also mentioned in the literature. While TRIPS establishes the minimum standards that must be respected for IP protection, the literature also contains critiques that it favors developed nations and does not adequately consider local innovation systems in developing countries (Maskus, 2012). The debate over the tension between strong IP rights and access to essential technologies takes center attention.

Overall, while the literature says that patent systems continue to dominate global IP protection, yet these systems remain in contested spaces. The continuous debates about compulsory licensing, and regional harmonization remind us that the patent system is not static but rather dynamic, shaped and reshaped by technological, political, and social forces. This dynamism makes patents an excellent mechanism for analyzing their strategic use in innovation ecosystems.

These insights underline why firms and mostly SMEs usually use patents, secrecy, and contractual protection in a balanced way, informing research question 3 about the enforcement uncertainty and strategic decisions on IP.

## 2.6 Artificial Intelligence and Intellectual Property

One of the most interesting and at the same time urgent areas of IP contemporary scholarship is the one where artificial intelligence (AI) and intellectual property rights (IPRs) collide. Technologies developed by AI have raised some fundamental questions

concerning existing legal rules of authorship, inventorship, and protection. The traditional IP system, which was human focused today, is being challenged and faces pressure from machines that increasingly generate creative works and propose interesting technical solutions.

Different jurisdictions have employed different approaches regarding the issue of AI inventorship. In the UK, for example, in the case of Thaler v. Comptroller-General of Patents, Designs and Trade Marks UKSC 49, the Supreme Court has decided that only natural humans can be inventors and did not recognize patent rights to inventions generated by AI. However, some academics have raised their voices that there must be some reforms of the existing framework regarding AI inventorship. Thus, they believe that new rights must be established, which will acknowledge machines as contributors, especially those that are operated by AI autonomously (Duan, 2023). These proposals were not accepted and employed because they were considered controversial.

Furthermore, in literature, three main challenges can be identified: (1) the challenge of defining the legal status of AI as creator or inventor; (2) the challenge of determining attribution and accountability measures; and (3) the challenge of the ethical issues posed by granting monopolies for machine content. Even more complicated is the fact that AI machines rely on extensive datasets, many of which contain copyrighted or protected content (WIPO, 2020b; OECD, 2025).

As part of the company's strategy, many firms today protect AI-generated insights with trade secrets instead of patents, especially in cases where disclosure would limit their competitive advantage. McKinsey & Company (2023b), in its reports, has highlighted that leading corporations or firms utilize hybrid models that include both open source and proprietary elements. In some especially salient areas, like biomedicine, where AI is being used extensively for drug discovery, scholars suggest that some adaptive frameworks must be established to balance public interest alongside innovation.

Besides the questions of inventorship, which have gained significant attention lately, there is an increasingly great number of debates in the literature on the copyright protection of AI-generated creative works. In some jurisdictions, like the US, the Copyright Office (2025) maintains a strict viewpoint toward authorship, requiring only humans as creators, and denies protecting work created by AI solely (U.S. Copyright Office, 2025).

This legal environment characterized as highly heterogeneous presents strategic uncertainty for firms and makes them depend more on secrecy, control through contracts, and mixed protection models.

## 2.7 Gaps and Future Research Directions

Even though substantial progress has been made, there are still some gaps in the literature that require a deeper academic exploration. These gaps are correlated with the core research question of this thesis: how intellectual property rights can be used strategically in different innovation ecosystems, and how legal frameworks change to adapt to emerging technology advancements.

First, there is an urgent need for more empirical research on how SMEs and startups at an early stage, with a special emphasis on those in developing countries like South-East Europe and comparable emerging contexts, function in the landscape of intellectual property, taking into account the fact that they have to deal with constrained resources. A large portion of the literature discusses large multinational corporations and pays little attention to challenges faced by smaller firms regarding the pragmatic IP choices they make, such as trade secrecy vs. formal registration or later adoption of patent strategies. Qualitative interviews or survey-based research for startup accelerators and IP clinics in these regions could address this gap. All of this is directly related to the first research question: the way firms, including SMEs and startups, use intellectual property as a strategic asset in innovation ecosystems.

Second, the different practices of IP are also not well explored. A great part of studies focuses on practices used in the US, EU, and Japan, and give less attention to covering the emerging economies. This imbalance has resulted in less research on informal IP rules, localized initiatives, and localized innovation systems in regions like India, Brazil, and ASEAN countries. A comparison of formal patent procedures and informal strategies, in this context, can offer valuable insights into the connection between legal systems and inventive behavior, particularly to what extent legal rules influence inventiveness and how. Additionally, this gap also highlights a need for comparative and regional IP studies, which require a combination of studies using data from innovation indices and policy evaluations.

Third, there has been increased interest in inventions generated by AI and digital transformation, but the legal doctrine has remained reactive. It just describes outcomes of disputes instead of anticipating them. Critics argue that there is a need for interdisciplinary paradigms that combine law, ethics, and technical architecture to design IP policies that are "future-proof". A fruitful area for research could be scenario-building or legal foresight research, which would anticipate possible models for AI inventorship, algorithm transparency, and adaptive models of mechanical licensing. This gap is correlated to the thesis's second research question, that is, how IP law should evolve to be efficacious in the face of AI and rapid technological change.

Moreover, there is also a significant gap in the literature regarding the analysis of enforcement practices. While the main focus of many studies is to examine how to create and value IP, only a small part of the studies examines how differences in enforcement from one jurisdiction to another can delay or even ruin innovation. Some barriers, like the varied interpretations by courts, huge costs of litigation, and weak enforcement in developing countries, require a more systematic approach by academics (WIPO, 2012).

As well, the identified gaps contribute to guiding the second and third research questions of this thesis: what kind of legal reforms or institutional changes must be made to adapt IP systems to the altered circumstances of AI-led innovation (RQ2), and how the legal unpredictability or uncertainty in real-world settings around enforcement and international protection shapes decisions of firms to use IP strategically and influences mechanisms to protect knowledge, especially for SMEs (RQ3).

These existing gaps in the literature validate the focus of the thesis on the strategic behavior of the firms under ecosystem conditions, with an emphasis on SMEs, enforcement unpredictability, and legal uncertainty related to AI.

## 2.8 Conceptual Framework for IP Strategy in Innovation Ecosystems

To ensure consistency of the literature and translate it into a more concrete framework, this thesis uses a conceptual framework which blends insights from Open Innovation, the Triple Helix, and knowledge-based views of innovation (Chesbrough, 2003; Etzkowitz & Leydesdorff, 2000; Polanyi, 1996; Nonaka & Takeuchi, 1995). The framework presented

in Figure 1 divides the behavior of firms into four interconnected levels: (1) IP instruments; (2) strategic aims; (3) constraints; and (4) outcomes.

The first layer regarding IP instruments makes a clear distinction between formal rights like patents, utility models, trademarks from non-formal protection of knowledge like trade secrets, know-how, and procedural expertise. This distinction is important since it provides insights into the types of tools that firms commonly use for knowledge and the type of knowledge that needs to be protected, whether it can be codified or it is embedded in operations and experiences of a firm.

The strategic layer explains the objectives that firms want to achieve via IP. Besides exclusivity in the market, some important goals that companies accomplish through IP are to support the licensing process, indicate credibility to other business players and investors, influence relations in the ecosystem, and create opportunities for collaboration.

The third layer, constraints, addresses practical limitations that affect strategy, such as resource restrictions for SMEs, high costs of enforcement internationally, and ambiguity created by AI, especially regarding inventorship and ownership. These constraints usually dictate the reasons why companies rely on patents, secrecy, contracts, or multifaceted approaches for protection.

The outcomes layer focuses on how businesses have performed under innovation ecosystem and the results they have achieved in the context of their competitive advantage, ability to form partnerships, and investment opportunities.

This framework acts more as tool to support analysis and is not intended to predict the future. It facilitates the interpretation of chapter 6 and chapter 7 and ensures that each empirical statement appropriately contains at least one layer from the framework.

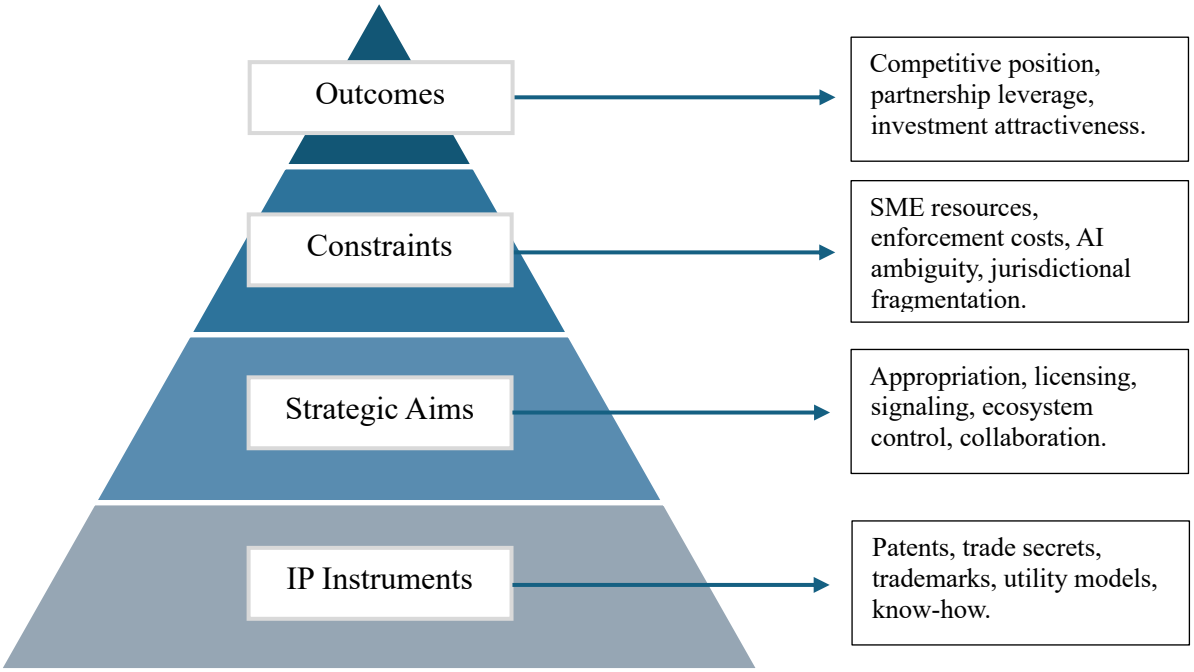


**Figure 1:** Conceptual Framework for IP Strategy in Innovation Ecosystems

*Source: Author's elaboration based on Chesbrough (2003), Etzkowitz & Leydesdorff (2000), Polanyi (1996), and Nonaka & Takeuchi (1995).*

This framework will be applied to analyze the empirical interview data from chapter 6 and Tesla case in chapter 7 to provide a consistent interpretation of strategic IP activity in different business environments.

# 3 Foundations of Patent Law and Related Intellectual Property Rights

## 3.1 Defining Creative and Cultural Industries

Creative and cultural industries present business sectors characterized with rapid innovation. In these industries intellectual property shifted from a legal instrument into a strategic asset, making them valuable for exploration in this thesis.

In modern business practice, intellectual property is no longer treated as a legal right; instead, it is regarded more as a strategic source. Companies, as the main players in the business field, use the same methods and techniques of managing financial and human capital, looking for maximum returns, minimum risks, and making the most of their rights

in negotiations or competitive positioning when managing their IP portfolios (Idris, 2004; OECD, 2019a). In this context, creative industries are not only cultural expressions, but even more, they make up the fundamental drivers in sparking the innovation-based growth we seek (WIPO, 2019a).

Creative talent in today's innovation-led marketplace is extremely augmented by the increasing technological advancements, especially artificial intelligence. Some recent research highlight that creative experts extensively use artificial intelligence to develop new technical innovations as well as new designs, new content, and new music (McKinsey & Company, 2023a; McKinsey & Company, 2023c). This strong dependence of humans on AI to come up with creative solutions, raises important ethical and legal questions about authorship, originality, and ownership of these works, besides the fact that it presents a great opportunity for companies to maximize their creative output (Ray, 2023). This relation between creative output, AI, and ownership indicates the uncertainty that firms encounter when they design IP strategies in rapidly changing technological circumstances.

Creative professions include a wide range of fields such as writing, art, design, theater, television, radio, film, and related trades, as well as marketing, strategic planning, and some aspects of scientific research. The focus of these sectors is to generate new ideas, artistic expression, and innovation (UNCTAD, UNDP, UNESCO, & WIPO [UNCTAD et al.], 2010; Department for Digital, Culture, Media, & Sport, 2021). Despite such different etymological and content meanings, creativity and culture are connected with each other because they rely on intellectual property rights, which transform creative activities into commercially valuable industries.

To conclude, the literature shows that the definitions of creative and cultural industries go beyond their terminology. They reflect the continuous connection between cultural values and economic imperatives, a point where intellectual property plays the main role. They act simultaneously in each of their roles as cultural policy areas, economic sectors, and legal jurisdictions. Therefore, these industries become prominent in exploring how intellectual property functions strategically in the innovation ecosystems.

## 3.2 System of Legal Protection of Intellectual Property and Utility Models

Following the previous section on what drives the economy, in this section, we are going to give more attention to the legal mechanisms that are used in creative industries to create value and manage risk. As we have already pointed out, the established system of legal protection of intellectual property is a prerequisite for the development of creative industries. Author-creatives and companies investing in the sector need to know which creations enjoy the protection of intellectual property rights, how long this protection lasts, when the holders acquire protection, and how rights may be enforced, elements usually contained in substantive provisions on intellectual property rights in national laws and international treaties (Dabović-Anastasovska & Pepeljugoski, 2012; WIPO, 1886).

However, the system of legal protection also consists of norms that allow authors and creators to enforce rights, to prevent the abuse of intellectual property rights, to punish those who infringe them, as well as ways to compensate for the damage suffered by such actions (World Trade Organization [WTO], 1994). Legal regulation also includes provisions relating to contracts that author-creators and rights holders enter into with other entities to ensure advantage and commercial exploitation of substantive rights (Idris, 2003).

From a business point of view, these enforcement mechanisms are not only theoretical safeguards, but they also serve as a basis for making strategic decisions, managing risk, and attracting investors. Companies in this era use legal IP law not only for the protection of their assets but also as a tool for generating income, negotiating partnerships, and drawing in investors, especially in IP-heavy industries, like pharmaceuticals, technology, and AI (Chesbrough, 2003; McKinsey & Company, 2023a).

In this context, legal protection frameworks have the role of facilitator which enables firms to convert intellectual property from legal rights into strategic assets.

### 3.2.1 The Concept of Intellectual Property Rights

Intellectual property rights are defined internationally by the Convention Establishing the World Intellectual Property Organization of July 14, 1967. This convention establishes that intellectual property encompasses rights relating to: literary, artistic and scientific works, performances by performing artists, phonograms, and radio-television stations;

inventions in all fields of human activity; scientific discoveries; industrial design; trademarks, service marks, trade names and designations; protection against unfair competition, as well as all other rights related to intellectual activity in the industrial, scientific, literary and artistic fields (WIPO, 1967).

Intellectual property is generally divided into two broad groups: industrial property and copyright and related (neighboring) rights. More recently, the right to unfair competition has been added to these two large groups (WIPO, 1883/1979).

Related rights include the rights of performing artists over their performances and the rights of phonogram and film producers, radio and television broadcasting organizations, and publishers of their phonograms, videograms, stage works, shows, or publications, etc (Dabović-Anastasovska & Pepeljugoski, 2012).

Modern doctrine and practice define industrial property as a set of rights outlined in Article 1 of the Paris Convention for the Protection of Industrial Property (the Paris Convention for the Protection of Industrial Property was adopted in 1883 in Paris, amended multiple times, including in Stockholm in 1967 and 1979) (World Intellectual Property Organization, 1883/1979). Patents, utility models, industrial designs, trade marks, service marks, trade names, indications of geographical origin, and the prevention of unfair competition are objects of protection.

At the same time, the term industrial property is understood in its broadest sense, so it does not apply only to industry and commerce in the literal sense of the word. More recently, industrial property has also incorporated *know-how*, i.e., knowledge and experience, which is not protected by exclusive law, since the possessor of that knowledge and experience disposes of it only until he cedes it to others (WIPO, 2004a).

In this thesis, know-how refers to confidential technical, commercial, or organizational knowledge and experience that may not be protected, but offers a competitive advantage, procedural knowledge, which will be used to explain specific expertise and methods for accomplishing tasks that improve effectiveness, and trade secrets referring to secured confidential business information.

In commercial settings, trade secrets and know-how have become increasingly important, particularly in environments developing quickly like artificial intelligence, biotechnology, and algorithmic trading. Usually, companies do not want to make public their sensitive

information, and for that, they choose trade secrets over patents and make structural innovation strategies based on them (WIPO, 2020b; McKinsey & Company, 2023a). This trend mirrors that the enforcement uncertainty and rapid technological changes affect firms' decisions around IP. This influence is even more evident in innovation ecosystems which are characterized by highly competitive pressure.

All of the rights mentioned in the World Intellectual Property Organization's Founding Convention, while very heterogeneous, share two common denominators: object matter and economic function from an analytical point of view. The object matter of intellectual property rights is the social relations arising from the intangible (intellectual) spiritual creations as a result of creative activity in industry, science, literature, and the arts (Dabović-Anastasovska & Pepeljugoski, 2012).

The economic function of intellectual property law is to ensure the appropriation of these types of intellectual property to a certain circle of persons. That appropriation is reflected in the exclusive power granted to rightholders to exploit the goods that are object matter of intellectual property (Idris, 2004).

## 3.3 Enforcement of Intellectual Property Rights Protection

Since companies operate in an era where the economy is globally and digitally connected, the enforcement of intellectual property rights has become a critical issue, especially for innovation-focused businesses and national economies. International standards for enforcement are established by TRIPS (WTO, 1994), which was concluded during the Uruguay Round of GATT negotiations. It proposed formulating a system of global economic coercion based on the principle of reciprocity and linking IP protection with international trade disciplines (Dabović-Anastasovska & Pepeljugoski, 2012).

The establishment of the World Trade Organization (WTO) and the inclusion of TRIPS as its Annex 1C mark the beginning of global harmonization in the field of IP enforcement. The result was coherent legal protection with international trade rules. However, in order to reserve a spot in international trade frameworks, one must guarantee the protection of IP (WTO, 1995). Nevertheless, with TRIPS, a shift was made; IP was no longer an absolute legal structure, but rather a strategic economic asset protecting which is essential for driving innovation and fair competition.

In its preamble, the TRIPS Agreement states that the main reason for its adoption was to ensure that enforcement measures do not themselves become an obstacle to legitimate trade, and Article 7 mainly aims to establish a balance between technological progress and economic welfare.

Anyway, in real-world settings, provisions from enforcement go further than just being legal features. They play a significant role in designing the business and risk strategy, and affect all important business decisions, such as whether to license a technology, expand into a new market, or launch a new product. Multinational companies, before making any strategic decision, carefully consider the enforcement of IP rights. The environments that provide weak protection of IP rights are often considered high-risk landscapes for intellectual property theft and counterfeiting (McKinsey & Company, 2023a; WIPO, 2019b; European Commission, 2020).

The issues displayed above, within the European Union, culminated in the adoption of Directive 2004/48/EC for the enforcement of intellectual property rights. The preamble to this Directive states that "without effective means of enforcing intellectual property rights, invention and creativity are discouraged and investment is reduced". This Directive is based on TRIPS and its objective is to harmonize enforcement standards across the EU (European Union, 2004). For business players within the EU, this ensures predictability and uniformity, making EU markets attractive for IP.

These enforcement frameworks showcase that firms' decisions around commercialization, collaboration, and knowledge protection are vulnerable on the level of effectiveness and costs of legal protection. This vulnerability is even more pronounced for SMEs since they operate with lower amounts of resources to invest in protection.

For the companies whose main driver is innovation and which operate in the EU, the uniform enforcement procedures brought about by this Directive provide two aspects that are fundamental to the decision of whether to commercialize IP globally in markets of interest – predictability and efficiency. When assessing the "ease of doing business", strong, quick, and low-cost enforcement is becoming more and more important for tech companies and startups that focus heavily on intellectual property (McKinsey & Company, 2023b; WIPO, 2020a).

These mechanisms have grown from traditional to non-traditional assets such as AI algorithms, digital platforms, and trade secrets. In this context, companies develop litigation strategies. For instance, they choose selective litigation in key jurisdictions in order to create legal precedents that will strengthen their future licensing power (Scheffer & Zieger, 2005).

When it comes to creative industries, this is especially relevant, since they usually rely on the commercialization and licensing of intangible assets. Without robust enforcement, the legal substantive rules will be reduced to simple declarations with little practical benefit, and the global creative economy will no longer serve as a tool for monetization.

However, this enforcement is being challenged and complicated due to the rise of digital platforms and AI. The European Commission responded to these challenges with initiatives for supporting startups and SMEs in these digital environments. In this era, many questions raised need to be answered, like: *who is the owner of machine-generated works?,* or *who is going to take the responsibility when someone else's legally protected rights are violated by AI?* These questions call for a wider regulatory innovation by regulators, lawyers, and business executives (United Kingdom Intellectual Property Office [UKIPO], 2022; WIPO, 2019b).

Therefore, enforcement is about creating a fair, innovative, and competitive market, and it's not merely a punishment. Establishing clear enforcement standards, aligning internationally, and setting flexible procedures can serve for legal certainty and business interests, guaranteeing that IP holders can return their investments, minimize risks, and follow sustainable innovation.

# 4 International Trade and Enforcement of Patent Rights

## 4.1 Discoveries in the History of Mankind

The basis of the international intellectual property systems we have today has been shaped thanks to the evolution of inventions and innovations. Inventions have been transformed from discrete acts of creativity to instruments for economic growth, technological collaboration, and competitive strategic planning. This development is objectively established in the foundational international treaties, including the Paris Convention (1883), Patent Cooperation Treaty (1970), and the TRIPS Agreement (1994). All these

codified documents set minimum standards for the protection, registration, and enforcement of patents in different legal jurisdictions. Thanks to codified law, inventions are protected and commercialized in global frames and have remodeled IP into a core strategic asset in modern innovation ecosystems.

Historically inventions emerged as individual solutions to practical problems; in modern economies this inventive activity it is not a standalone entity, but a part of organized innovation ecosystems, and protected through formal mechanism of intellectual property law.

To design an invention, inventors first identify an existing need or problem. Then, they come up with a creative way to solve the problem and work hard to make that solution possible (Dabović-Anastasovska & Pepeljugoski, 2012; Cornell University, INSEAD, & World Intellectual Property Organization, 2020).

These same motivators (necessity, empathy, and curiosity) are codified nowadays in our modern business and innovation environment with the help of design thinking, user-focused development, and iterative prototyping, and all of them are usually protected with the help of intellectual property strategies including patents, designs, and trade secrets (Planes-Satorra & Paunov, 2019; Chesbrough, 2003; Cornell University, INSEAD, & World Intellectual Property Organization, 2020).

In contemporary business settings, converting inventive ideas into economic value depends on the ability of firms to manage disclosure, how they protect inventions, and how they get their inventions in the market. There are many aspects that companies must consider before deciding whether inventions should be protected through patents, kept secret or shared within collaborative arrangements such as costs, differences between jurisdictions, and risks related to disclosure globally and digitally.

These decisions are especially important for small and medium-sized enterprises because they do not have sufficient resources to pursue exclusive patent strategy. Therefore, they may use mixed protection strategies that include some aspects of patenting along with secrecy and contractual arrangements.

### 4.1.1 From Individual Invention to Strategic Use of Patents

In theory, Barney (1991) argues that international trade with patent rights is based on the principle of the resource-based view. According to this principle, IP presents a core

intangible asset for companies to maintain their competitive advantage across different countries. More recent studies also reinforce this viewpoint and acknowledge the crucial role patents play in global strategy, especially in some sectors like biotechnology, AI, and semiconductors. In such industries, firms utilize IP to raise their value and attract investors, while blocking competitors (McKinsey & Company, 2025a; Bindal, 2022).

However, in innovation ecosystems, patents have a dual role to play; they are the input and output of collaborative R&D, and as such, they facilitate the process of exporting knowledge without the need to expand physically (Chesbrough, 2003).

As an illustration, we can take the case of IBM, a company that utilizes its immense patent portfolio not only to profit from licensing but also to form alliances outside the borders and impact standards in the global technology market (Teresko, 2004).

When talking about IP portfolios, we must mention that firms must use them not only for legal protection, but also to unlock new ways for trading and expanding. Firms in the technology industry, through a great strategic trade with patents, are able to extract value even from peripheral innovations, mitigate risks when entering new markets, and form long-lasting collaborations globally, all of which as such are the basis of a contemporary innovation ecosystem.

Thus, this showcases the main logic of the thesis that patents are not only legal protection tools, but instruments which are used by companies to strategically position themselves in innovation ecosystems and their value is highly determined by the costs of protection across jurisdictions.

## 4.2 The Strategic Role of Patents in Innovation Ecosystems

A patent is a universally accepted legal form of protection for an invention. The invention is a new solution to a technical problem, which, compared to other solutions, has the highest degree of inventiveness and innovation that can be applied in a business activity. A patent protects an invention that satisfies the statutory requirements. A patent is a subjective right that belongs to a natural or legal person, provided that the substantive and formal requirements of law are met (Dabović-Anastasovska & Pepeljugoski, 2012; Cornell University, INSEAD, & World Intellectual Property Organization, 2020; Bently et al., 2022).

A patent-protected invention is a tangible and utilized result of the research work of an individual or a group of people. An invention could not enjoy legal protection through a patent if it is related to abstract research. It can be granted solely for outcomes that have application in a practical setting, whether it is commercial or industrial. The subject matter of a patent-protected invention may be a product, a process, a new application of a known product, or a new application of a known process. This division is found in most national laws as well as international conventions (World Intellectual Property Organization, 1883/1979; WTO, 1994; Cook, 2019).

This invention may be a physical product, a method, and with the latest advancements, even biological material or genetically modified organism, as long as the required ethical and technical standards are respected (European Union, 1998; Bently et al., 2022).

The inventor has the right to protect the invention. Legally, the main right-holder is the inventor who came up with the new idea, and he can also transfer his rights to companies or other third parties via employment contracts, assignments, or licensing agreements (Idris, 2003; Cook, 2019).

During the most recent scientific and technological revolution, the entire economy and society began to consciously engage in inventive activities. Inventive activity began to lose its characteristics of individual work and began to transform into an organized and institutionalized process. Thus, it is noted that over time, the attitude of economics to inventive activity has changed; the modern economy now is the main initiator, organizer, and consumer of the results of innovative labor. In this context, the biggest number of patents comes from the R&D corporations since they view protection as the crucial factor for monetization and competitive positioning (OECD, 2021a; WIPO, 2020a).

The protection of inventions arising in the course of an employment relationship gains momentum today. In labor law, the employer appropriates all the results of the labor of the worker who receives a certain compensation for it, while industrial property law is governed by the principle that the inventor is the original owner of the right to his invention and that only by his will can the right pass to another person. Because of these divergent legal viewpoints, there is a mass of complex active patent disputes in many large corporations. (Bently et al., 2022; WIPO, 2004b).

Looking at patents from a business perspective, organizations nowadays use them as a roadmap to profitability and growth, and less as a simple legal tool. They are widely used to raise stock prices, to draw in investors, to create obstacles for market entry, and to negotiate a deal for a joint venture in another country (Chesbrough, 2003; OECD, 2021a). For instance, Tesla's open patent process wasn't just a legal strategy, but far more; it was part of a broader strategy, a potential branding move to reaffirm that its leadership in sustainable innovation is clear. In a similar way, IBM has maintained its market dominance by obtaining licensing fees from other rivals through its wide patent portfolio (McKinsey & Company, 2025b; WIPO, 2020a).

Modern patent strategy includes managing patent portfolio to gain a competitive advantage, patent filing for emerging markets (i.e., China, India, Brazil), and combining patents with other intellectual property rights like trademarks or trade secrets for platform ecosystems. It also involves aggressive litigation or defensive publishing in order to obtain research and development outcomes (OECD, 2021b; Bently et al., 2022).

All these noted strategies reaffirm the previously referenced resource-based view of Barney (1991), which clearly links patents to the sustainable competitive advantage of companies. According to Chesbrough (2003), patents have the role of the mediator as well, and help companies to share their knowledge, license, and collaborate.

Companies that participate in industries with intensive R&D, like pharmaceuticals, semiconductors, and AI, must create their business strategies primarily based on IP management. Firms that fail to do so can quickly lose their competitive advantage and market position (OECD, 2021a).

**Table 1:** Main Types of Intellectual Property Rights

| IP Type | Protects | Example | Strategic Role |
|---|---|---|---|
| **Patent** | Invention | Pharmaceutical formula | Barrier to entry, licensing revenue |
| **Industrial design** | Appearance | Shape of smartphone | Brand differentiation |
| **Trademark** | Distinctive sign | Coca-Cola logo | Market recognition, loyalty |
| **Copyright** | Artistic/literary works | A novel or a painting | Content monetization, cultural IP |

*Source: Adapted from WIPO (2020d); OECD (2021a).*

## 4.3 Modern Patent Law

Current patent laws protect an inventor for a specified period of time (usually 20 years) during which, in general, it is illegal for anyone else to copy, use, distribute, or sell the invention without the inventor's prior approval. In return for this protection, inventors, in their patent application, disclose the technical details of how their inventions work so that other people can learn from them (WTO, 1994; Cornell University, INSEAD, & World Intellectual Property Organization, 2020; Dabović-Anastasovska & Pepeljugoski, 2012).

Once inventors receive patent protection, they can make a profit because they are the only ones allowed to create, distribute, and sell their invention. In reality, some inventors are too busy working on their next invention and therefore do not have time to sell their previous inventions. In such cases, inventors may prefer to license their inventions (Idris, 2003).

When an inventor licenses a patented invention, it authorizes another person or company (the licensee) to manufacture, sell, or distribute the invention as long as that person or company pays the inventor a license fee. This license fee is a reward for their work and allows the licensee to “commercialize” the invention for the benefit of consumers (OECD, 2021a; Chesbrough, 2003).

If others copy, distribute, or sell a patented invention without the permission of the patent holder, they are infringing on the patent. A patent holder can file a lawsuit against an

infringer who has infringed his or her patent (Bently et al., 2022). Once a patent expires, the invention enters the public domain and can then be commercialized without seeking the inventor's permission (WIPO, 2016).

Modern patent law plays a huge role in today's global economy, which is becoming more IP-intensive. Firstly, its core function is to offer protection and exclusivity, and secondly, it acts as an assistant for companies in their way to create value, reputation, and negotiation. Startups and research-driven firms view patent protection as a way to progress strategically, improve fundraising, IPO preparation, and maintain their market credibility. (McKinsey & Company, 2025a).

### 4.3.1 How Do Inventors Get Patents?

Inventors obtain patents for their inventions by filing a patent application with their country's patent office. A patent application contains a detailed description and diagram of the invention and how it works (European Patent Office [EPO], 2022).

Patent application forms and other patent-granting procedures can be complicated, so many inventors hire a patent-specializing attorney to assist them in the entire process.[1]

Inventions can be very simple, such as a paper clip, or very complicated, such as a robot, but all must meet certain conditions for a patent to be granted (Dabović-Anastasovska & Pepeljugoski, 2012; EPO, 2022).

For firms, especially for SMEs, the complex procedures and high costs of protection present an initial strategic obstacle which influences their decisions whether to opt for formal patent protection or rely on alternative protection mechanisms.

### 4.3.2 Requirements for Patent Protection

Requirements that must be respected to obtain a patent set an equilibrium between innovation motivation and public benefit, and these are as follows:

**A. Industrial applicability (utility)**

This means that the invention can be manufactured or used in any kind of industry, or should have practical application. It cannot just be an idea or a theory. If it's an invention for a particular product, someone has to be able to create that product. If it is an invention for a particular process, it must be possible to perform that process (Dabović-

[1] The procedure of application is thoroughly explained at www.wipo.int (WIPO, 2020c; WIPO, 2020d).

Anastasovska & Pepeljugoski, 2012; WIPO, 2016; EPO, 2025; Swedish Patent and Registration Office, 2025).

As part of their corporate strategy, companies use this first condition to be able to capitalize on the outcomes of their R&D investments, to be attractive to investors, and to transfer technology.

**B. Novelty**

This means that the invention must possess some new characteristic that is not part of current knowledge in its technical field.

In a patent application, the inventor must describe the invention in detail and compare it with previous existing technologies in the same field to prove that the invention is a novelty (EPO, 2022; WTO, 1994). Before inventors apply for a patent, they are encouraged to conduct research in the technical areas of their inventions to check if someone else has already applied for a patent for the same invention (Cook, 2019; WIPO, 2016).

The patent's originality also acts as a gatekeeper for corporate investment choices in addition to being a legal prerequisite. Therefore, ventures almost always search whether a patent is original and fundable (WIPO, Cornell University, INSEAD, & World Intellectual Property Organization, 2023).

**C. Inventiveness (non-obviousness)**

This means that an inference about a new feature of your invention could not have been easily drawn up by a person with average knowledge of that particular technical area (Bently et al., 2022; OECD, 2021b). Looking at things from a strategic angle, inventiveness increases the value of patents and plays a huge role in risk litigation. Some research studies show that patents that are very creative can easily get past legal challenges and generate a larger amount of profit (Allison et al., 2014; Bessen & Meurer, 2008).

These principal conditions ensure that patent law corresponds with legal integrity and public benefit, while also harmonizing private profit and public access to knowledge.

### 4.3.3 When Should an Invention be Patented?

When an inventor decides whether or not to patent his invention, the first thing he or she should do is determine whether his invention satisfies the preceding conditions for granting a patent.

After this, the inventor should try to determine how interested others are in his invention and whether consumers would like to buy it. Strategic timing plays a crucial role in the whole process, especially in some countries, where if a patent has been made available to the public before finishing the filing process, it can destroy its novelty.

In this context, the European Patent Office states that the principle of absolute novelty (no public disclosure) must be respected at all costs (EPO, 2022). Therefore, if an invention has been revealed to the public before the filing date, then it cannot later be protected as a patent.

However, this principle provides two exceptions that cannot affect the invention's patentability; if the disclosure has been made less than six months before filing as a result of evident abuse against the applicant, and if the disclosure has been made during an international exhibition covered by the Paris Convention.

Different from Europe, some jurisdictions like the United States and Japan offer to inventors the so-called grace period, which usually lasts no more than 12 months, when they can disclose the invention to the public and afterwards patent it (EPO, 2022; WIPO, 2016; Japan Patent Office, [JPO], n.d.; United States Patent and Trademark Office [USPTO], n.d.-c).

Different rules in timing increase legal unpredictability for firms which operate internationally and impact their strategic decisions of patent filing, especially for SMEs which cannot afford filing procedures in many jurisdictions at the same time (WTO, 1994; Taubman et al., 2012).

### 4.3.4 What Happens if the Invention is not Patented?

Non-patentable inventions may be copied, sold, and distributed by anyone. This means that, without a patent, it may happen that an inventor misses the opportunity to get a benefit from their invention. If the invention is successful and if many are willing to buy it, there will be nothing to stop the competitors from replicating the invention. Such competition would reduce the sales and profits that the inventor could make from his invention (Bessen & Meurer, 2008; WIPO, 2016).

Moreover, without a patent, it is more difficult for an invention to license investors, manufacturers, or distributors. This means that, if an inventor wants to make money from his unlicensed invention, he will have to pay all the costs of investment, production,

distribution, and sales. This is not an easy task (Chesbrough, 2003; Maskus, 2012; OECD, 2011; Cook, 2019)!

The risk gets high measurements in the era of rapid digitalization and AI development, since rapid replication of unprotected ideas can happen really quickly within hours. Protecting IP formally today is especially important for maintaining market advantage because unprotected software, designs, or algorithms can be quickly scraped or copied across borders (McKinsey & Company, 2025b; WIPO, Cornell University, INSEAD, & World Intellectual Property Organization, 2023).

Simultaneously, patenting means revealing; thus, firms often assess risks of creating a product like theirs and any loss of benefit due to disclosure. This is why, when faced with uncertainty regarding enforcement, many businesses use trade secrets and layered protection.

## 4.4 Patent Rights in International Law

In addition to trade in goods and services, a new, increasingly relevant area has emerged in international economic relations: trade in intellectual property rights. Its most important and prevalent form is the trade in patent rights, which takes a central place in today's innovation ecosystems, investment attraction, and cross-border partnerships.

Patent ownership is a crucially important factor that shapes the competitiveness of firms and states. Since it affects equally the same to more industries like the legal, economic, and touches the strategic dimensions, it has become one of the most dynamic fields to regulate (WIPO, 2017; WIPO, 2020c; Dabović-Anastasovska & Pepeljugoski, 2012).

The most important conventions governing international patent protection are: The Paris Convention for the Protection of Industrial Property (1883, revised in 1979), The Patent Cooperation Treaty (PCT) (June 19, 1970), The Strasbourg Agreement on the International Classification of Patents (March 24, 1971), The Budapest Treaty on the International Recognition of Microorganism Deposits (1977), and the European Patent Convention (EPC) (October 5, 1973). This legal framework sets the minimum requirements for patentability, methods for global cooperation, and guarantees homogeneous global patent protection (Idris, 2003; WIPO, 2020c).

The Strasbourg Agreement on the International Classification of Patents establishes a mandatory, uniform system of classification of patents, necessary in the procedure for examining the novelty of a reported invention (WIPO, 2020c).

The Patent Cooperation Agreement (PCA) establishes a system aimed at simplifying, making cheaper, and making more efficient the provision of patent protection for the same invention in multiple countries in the interests of users of the patent system and national patent administrations. It does not provide for the issuance of international patents. On the contrary, the obligation and responsibility for granting patents rest exclusively with the national patent offices (Idris, 2003; WIPO, 2022a).

Even though these methods, in their nature, are legal, businesses are using them today extensively in their strategic planning. For example, companies are frequently using EPO submissions to “save” their marketplace in major EU economies before launching their products. Also, filing through the PCT might “buy time” to evaluate whether they have commercialization possibilities or if there is interest from investors (Chesbrough, 2003; Maskus, 2012; OECD, 2011; Cook, 2019).

Patents are also deeply rooted in the trend of globalization. If a patent for a particular invention is granted in Germany, it has a national character; however, its impact on the whole world and the same idea can be patented anywhere.

The scope of patent protection expands each year and it includes software, AI models, biotechnology, and even green technologies (WIPO, 2022b; WIPO, 2019b).

The phenomenon of “strategic patenting” becomes more prominent today, where companies seek protection not only for existing inventions but for “future planned inventions”. They act so as order to monopolize their ideas and eliminate competition. An example is IBM, which receives 10 patents every working day, reflecting further its commitment to strategic IP accumulation (WIPO, 2020a; McKinsey & Company, 2025b).

In this way, the revenues of companies are also increased by the revocation of licenses. In 1994, IBM's revenue from patent licensing grew from approximately $500 million to 1.5$ billion in 1999. This amount is one-fifth of the company's total profits for that period (Murtha, 2000; Teresko, 2004).

This case showcases that patents can function as a tradeable financial tool widely used in litigation, M&A negotiations, and balance sheet valuation, besides their function as a legal instrument (OECD, 2011; Duan, 2023).

Therefore, patent rights are quickly changing their position these days, from being traditional tools for legal guarantee to resources that are more than essential for business expansion, innovation, cooperation, and competitive positioning in international markets (Chesbrough, 2003; OECD, 2011; Maskus, 2012).

## 4.5 Strategic Value of Related IP Rights and Know-How

In this passage, we are going to explore intellectual property in a broader context, particularly through complementary rights known as know-how, trade secrets, and procedural knowledge. All these categories present intangible assets for companies that are essential for understanding how they are utilized strategically in business settings.

Looking at the large framework of intellectual property rights, besides patent rights, we can also enumerate related rights: know-how, trade secrets, and procedural rights. These intangible assets are of great importance for companies that operate in dynamic tech environments characterized by a high level of innovation. The focus of this section is how firms, particularly SMEs, in order to manage legal uncertainty and administer enforcement costs in innovation ecosystems depend on non-registered IP.

### 4.5.1 Know-how: Knowledge and Experience

In addition to inventions, creative or inventive labor may result in certain knowledge and experiences that can be applied to industrial or craft production and economic life in general. It is customary, and generally accepted, that the sum of this knowledge and experience has a common denominator and is called know-how, a vital intangible asset in modern innovation ecosystems (Dabović-Anastasovska & Pepeljugoski, 2012; WIPO, 2004a).

Know-how refers to technical and commercial knowledge that is not publicly recognized and usually can be considered as an informal type of intellectual capital.

From the perspective of corporate strategy, know-how is a type of intellectual property advantage that can be shared via license or protected by confidentiality agreements. For this reason, in situations led by tacit knowledge, it tends to be a valuable asset, like joint

ventures, franchising arrangements, and M&A transactions (OECD, 2021a; Chesbrough, 2003).

### 4.5.2 Definition of Know-how in Industry

Know-how can be defined as confidential or, better said, “closely maintained” information in the form of non-proprietary inventions, formulas, designs, drawings, procedures, and methods, along with accumulated skills. It is valuable, since it can assist licensees to gain operational and competitive advantage (Idris, 2003; Bently et al., 2022).

The inherent commercial value of know-how lies embedded in the legal uncertainty and practical exclusivity. Even though it may not be officially registered, it can still be protected via contracts. Global legal systems, such as WIPO and TRIPS, recognize know-how as part of trade secrets law.

### 4.5.3 Contractual Provisions and Disclosure

There are two main sets of agreements that support the commercialization of know-how: (a) disclosure agreements and (b) non-disclosure agreements (NDAs), which are not always a formal part of the master knowledge or technology transfer agreement.

The initial need for “disclosure” is due to the requirement of the licensor’s firm to know what the specific, unique, or general “content” of the know-how is, so that the licensor's firm possesses the licensor's promised value when entering into the contract. The disclosure also assists the prospective licensee in selecting competitive offers, if any.

Non-disclosure agreements (NDAs) are undertaken by those who receive confidential information from the licensee, about licensed know-how, in order to perform their tasks (WIPO, n.d.).

These instruments, which prevent valuable commercial information from outflowing before its monetization, are very common in startup accelerators, R&D consortia, and cross-border technological partnerships (Hannah, 2005; WIPO, n.d.).

SMEs often cannot afford costs and jurisdictional barriers associated with formal protection of IP and usually replace it with contractual protection (NDAs, licensing clauses), which may not always provide the same level of protection across different jurisdictions.

### 4.5.4 Procedural Knowledge and Its Strategic Role

Procedural knowledge, also known as imperative or tacit knowledge, is knowledge that is acquired in the performance of a task (Polanyi, 1966).

Usually, such procedural knowledge tends to be less general than declarative knowledge. Thus, it is considered the intellectual property of a company, and it is hard to articulate and even harder to copy (WIPO, 2004a).

In IP strategy frameworks, procedural knowledge is viewed more as a strategic asset that facilitates scalable innovation, especially when it is organized and recorded in employee training programs, machine learning datasets, or proprietary instructions (Clayton et al., 2023).

Proprietary algorithms, coding frameworks, or automated workflows, as some forms of procedural knowledge, help companies that operate in sectors like fintech, deep-tech, finance, or AI verticals to keep their first spot in the global market list (Chesbrough, 2003). Furthermore, as the innovation economy today becomes more reliant on intangible assets, the successful management and protection of procedural knowledge becomes more important to maintain competitive advantage and enhance long-term growth.

### 4.5.5 Artificial Intelligence

The overlap of procedural knowledge with AI developments presents new opportunities as well as new challenges for IP protection. Currently, Artificial Intelligence systems can do everything that was traditionally done by human expertise. Tasks that were performed by humans and their tacit skills, these systems can easily perform, replicate, and even optimize them. All these changes present a novel and also opportunity to reinforce legal protection, strategic use of AI, and their valuation in business operations.

Traditionally, as we all know, only humans can be the legal rights holders. This belief is reaffirmed and applied in most jurisdictions. However, this statement is being challenged by the quick advent of AI. In this context, a new issue has emerged: who has the ownership of inventions generated by AI? Cases like *Thaler v. Comptroller-General of Patents*, in which the courts concluded that only natural people can protect their inventions under patent law (Thaler v. Comptroller-General of Patents, Designs and Trade Marks, 2023), confirm the once accepted principle that only natural persons can be inventors.

Procedural knowledge produced by AI machines strategically helps companies and today stands as the backbone of their competitive positioning. Pharmaceuticals, design technology, and other firms that heavily rely on AI usually protect their outputs with the help of trade secrets or layered IP strategies. For instance, they combine copyright for code or trade secret protection for algorithms. This situation is familiar in such jurisdictions where patentability remains completely unregulated, or the legal benefits compared to the risk of disclosures are low (OECD, 2025; Chesbrough, 2003).

Partially, this part of the thesis provides the answer to the third research question: how legal and practical uncertainty around enforcement and cross border protection affects the decisions firms make to protect their knowledge. This impact is especially evident for SMEs.

### 4.5.6 Employee Knowledge in the Context of IP Strategy and Mobility

In English law, as well as in many other legal systems, as long as employees are employed, they must have a duty of good faith and fidelity (Bently et al., 2022). But the way the knowledge that the employee has gained during his employment period can be protected remains an incredibly complex area. This question gains more relevance in industries that rely heavily on innovations, where the extreme staff mobility can result in unintentional knowledge leakage (Gera, Laryea, & Songsakul, 2005).

The main issue for organizations at this point is to find a balance between employees' rights and employers' rights to protect sensitive know-how. Some organizations tend to "stop" their employees from revealing confidential obligations, especially sensitive information protected with formal IP rights, by defining "grace periods" in employment contracts (WIPO, 2024).

Courts often find it difficult to support these clauses because they believe that a person must be able to use the skills and knowledge they learned to get employment elsewhere (Bently et al., 2022).

Because of all this, companies have established a practice of adopting customized IP strategies within their HR practices. This habit is more common in sectors that are characterized by fast innovation cycles and where talent movement is high (Clayton et al., 2023).

### 4.5.7 Tribal Knowledge

Tribal knowledge is information or knowledge that is known within a tribe but often unknown outside of it. A tribe, in this sense, can be a group or subgroup of people who have such common knowledge. From a corporate point of view, "tribal knowledge or tribal know-how" is the collective wisdom of the organization. It is the sum total of all people's knowledge and abilities that may not be documented in formal acts but have a huge impact on everyday operations (Dalkir, 2017; Nonaka & Takeuchi, 1995).

Since it is considered a really important strategic source, organizations try to document tribal knowledge in documentation programs, mentorship, or different knowledge-based management systems. With its documentation, businesses tend to ensure their continuity, scalability, and resilience (Dalkir, 2017). In sectors where knowledge and innovation prevail, the codification of tribal knowledge can help companies maintain their competitive positioning in the market (Reber, 1989).

Tribal knowledge is one more example of how firms in situations when formal enforcement is uncertain or not practical protect their competitive advantage by relying on internal controls or other informal protection methods.

## 4.6 Legal Protection of Know-how

Contrary to patent rights, national industrial property regulations and international laws do not provide legal protection for know-how (WIPO, 2004a; Dabović-Anastasovska & Pepeljugoski, 2012). As a result, know-how does not constitute a formal legal monopoly like other industrial property rights, but it has great economic, technical, and strategic value in innovation-driven sectors (Planes-Satorra & Paunov, 2019; Risch, 2007). The know-how is protected primarily through confidentiality and contractual safeguards (WIPO, 2004a; OECD, 2021a).

Essential elements of know-how are considered to be a de facto industrial property right, are its secrecy, exclusivity, and transferability, which means that the knowledge and experiences that constitute it are transferable from one organizational setting to another under defined contractual conditions (Idris, 2003; WIPO, 2004a). The know-how holder possesses the knowledge and experience that allows them to develop faster and more

efficiently than competitors who do not. As a result, he enjoys a quasi-monopolistic position in the market (Dabović-Anastasovska & Pepeljugoski, 2012; Risch, 2007).

From a strategic business point of view, know-how is protected through a layered approach, which includes contractual mechanisms such as non-disclosure agreements (NDAs), non-compete clauses, and customized employment contracts (WIPO, 2004a); statutory protection under trade secret laws, like the Defend Trade Secrets Act of the U.S. or the Trade Secrets Directive of the EU, which state that companies must take some "reasonable steps" if they want to keep confidentiality (Risch, 2007; Clayton et al., 2023); and tort law provisions that solve unfair competition or the misuse of confidential business information (Dabović-Anastasovska & Pepeljugoski, 2012).

The scope of know-how may include knowledge for the industrial implementation of a patent, technical processes, knowledge applicable in manufacturing, or undisclosed industrial techniques (WIPO, 2004a). Know-how may be transmitted through a contract, usually a license agreement, on its own or in a package with a protected right (e.g., patent, model, or trademark) (Idris, 2003; Risch, 2007).

Businesses or manufacturers who do not have the resources or do not want to invest in research tend to license know-how from those who already have it. Hence, the transfer of know-how becomes equally important as the trade of goods and services is (Risch, 2007). The financial value of know-how is evidenced by the fact that millions of dollars are paid each year for access to proprietary techniques, production processes, or industrial expertise (Risch, 2007; McKinsey & Company, 2023e).

However, the question of applying NDAs and confidential clauses in different jurisdictions remains an issue yet. In cases when employees move to competitors or companies establish foreign partnerships, national legal systems and courts decide about the enforcement of NDAs, which are usually distinct in terms of protections and procedures across different territories. This so-called legal ambiguity results in less effective know-how protection in global operations.

Since a great number of companies have been converted into knowledge-based ones, they have a great interest in protecting and monetizing internal expertise that is not documented or protected through IP as a prerequisite for maintaining their sustainable innovation leadership (McKinsey & Company, 2023e; Risch, 2007). This makes evident why firms,

specifically SMEs, in circumstances when enforcements costs and international uncertainty affect the effectiveness of formal IP protection use secrecy and contracts.

## 4.7 Utility Models: Bridging Innovation and Accessibility

Utility models in the environment of intellectual property protection bridge the informal innovation with the formal one. Practice has shown that there are a significant number of inventions that result from the creative work of individuals or groups of people who do not have the inventive level necessary to obtain a patent. Therefore, the national laws of developed countries, including Germany, China, Japan, etc, provide an alternative form of legal protection for inventions at a lower inventive level in addition to patents, known as utility models, which are often referred to as “petty patents” or “innovation patents” (WIPO, 2016).

This kind of IP protection is especially important for small or medium-sized enterprises (SMEs), startups, and independent investors who do not have many resources for great inventions. Utility model, often seen as quicker, simpler, and cost-effective legal protection, is particularly important to normalize access to IP rights in environments where innovation is high but the resources are constrained.

Recognition of utility models can be found in international conventions, namely in the Paris Convention in Article 1(2); in Article 2(1) of the Patent Cooperation Treaty (PCT); and in Article 40 of the European Patent Convention (WIPO, 2020d). These legal frameworks offer an additional layer of protection for innovations with a lower level of invention, making the IPR system flexible.

The adoption of the utility model and its protection is both legal and economic. It is based on the social justification to stimulate technological progress by enabling a faster, easier, and cheaper protection of innovations. In addition, utility model protection prevents the patent from being devalued if it is used for lower-inventive inventions (Polenak-Ačimovska et al., 2000).

The eligible subject matter of a utility model protection varies but typically includes: inventions with a distinct spatial form, inventions that appear in such particular spatial forms, and inventions that do not necessarily appear in a particular spatial form.

The conditions for acquiring patent protection for a utility model are similar to those for acquiring a patent and require novelty, technical nature, and economic applicability, with

the difference that for utility models it is required a lower inventive level is required (WIPO, 2016).

Legally, the utility model right holder has the same rights as the patent holder, which are the exclusive right of production and trade, with the difference that the duration is generally shortened to half the duration of the patent protection (JPO, 2017).

Utility models are a powerful strategic tool within intellectual property portfolios. In industries that are prone to rapid changes or regions where patent enforcement is not completely regulated, they provide rapid protection when entering the market. Organizations often use them to reach further or block their rivals, build mixed-layered IP strategies, or verify whether an innovation has commercial value in early stages before investing a significant amount of money in it (OECD, 2021b).

For SMEs, utility models can reduce barriers to enter markets, since it offers faster and cheaper formal protection when patent filing and enforcement are costly.

## 4.8 Patent Protection of Confidential Inventions

For competitiveness and innovation, some of the inventions are not created to be immediately revealed to the public or to be openly used for commercial purposes. These inventions are strategically kept confidential, especially when they are also relevant to national security or defence objectives. Even though these inventions fulfill the requirements to be technically protected as patents, they still undergo a special process regulated by special legal frameworks that protect public interest and proprietary rights (USPTO, n.d.-a; Zimmerman, 2023).

A confidential invention is an invention that is significant for the defense and security of a country. Among the applications for inventions, which are submitted to the competent state authority for the protection of intellectual property by domestic legal entities and natural persons, some are marked as “classified” or “sensitive” and go through restricted examination procedures (USPTO, n.d.-b; WIPO, 2020a).

For all such applications, it is necessary to conduct a specific multi-examination procedure in order to conclude whether they meet the requirements for legal patent protection. The examination process consists of several stages, where the realization of the next stage is conditioned by the end of the previous one. Depending on the results of the examination

obtained in the procedure for examining the application of the invention, a decision is made on the scope and type of patent protection (Zimmerman, 2023; USPTO, n.d.-b).

This whole process is established to balance national interests and private inventorship in IP regimes. Through this process, we can answer the question of the way confidential technologies are incentivized, protected, and commercialized in closed innovation ecosystems.

Viewing confidential inventions from a legal standpoint, they are part of a broader framework of intangible assets protected by intellectual property law (Cunningham & Kapacinskaite, 2025).

In a military or defense context, patent protection extends beyond being a motivator, and it is viewed as a national security mechanism. Even some technical improvements that cannot be truly patented are valuable and integrated through formal methods of innovation within defense institutions (USPTO, n.d.-a).

The research question about the legal and strategic adaptation of IP frameworks, especially in areas where transparency must be balanced against national interests, is supported in this section. It also addresses the question about the management of intellectual property rights in complex, high-level innovation ecosystems like the defense sector.

## 4.9 Evaluation of Patents

Patent management is a complex process important for innovation strategy and intellectual property (IP) governance. For businesses, which form the main team players in competitive and technologically dynamic markets, the process of evaluating patents helps them to prioritize, license, protect, or give up on their IP assets strategically. This process of patent evaluation consists of four stages, as follows:

- Phase 1: Innovation Monitoring.
- Phase 2: Innovation Assessment.
- Stage 3: Patentability and Jurisdictional Planning.
- Stage 4: Patent Valuation.


**Figure 2:** Schematic Representation of Stages in Patent Evaluation

*Source: Author, 2026.*

As noted above, patent management begins with an observation of innovations and ends with an assessment of monetary value. The first stage encompasses the introduction to innovation and inventors. The second stage determines what type of patent is in question in terms of its technological area, product protection, procedure for obtaining, application, and which geographical areas would be important for protection (Clayton et al., 2023; Dabović-Anastasovska & Pepeljugoski, 2012). The third phase evaluates the legal viability and the importance of patenting in different jurisdictions, defining the patent strategy, and the fourth stage involves assessing the value of the patent and deciding on further business activities for international use or commercialization (WIPO, Cornell University, INSEAD, & World Intellectual Property Organization, 2023).

However, not all innovations pass these four stages. A company may judge that the innovation is interesting, but that the road to realization is long, requires large investments, and will not provide a profitable product. Alternatively, a company may estimate that the cost of protection is extremely high and that protection cannot be provided in the required number of states, so it is better to keep innovation as know-how (Idris, 2003; The Economist Intelligence Unit, 2021).

Moreover, understanding existing patent rights is important in making various economic decisions, as well as in preventing infringement of others' rights, because the damage is high (Lemley, 2005). In the table below, I will list the ten high-profile infringement cases in 2006 worldwide (OECD, 2011; McKinsey & Company, 2023d; WIPO, 2022b).

**Table 2:** Indemnification for Patent Infringement

| Compensation (USD million) | Winner of the dispute | Loser in the Dispute |
|---|---|---|
| **307.0** | Rambus | Hynix Semiconductor |
| **133.0** | Z4 Technologies | Microsoft, Autodesk |
| **112.0** | Texas Instruments | Globespan Virata |
| **78.9** | Finistar | Direct TV Group |
| **74.0** | TiVo | EchoStar |
| **65.2** | Ariad Pharmaceuticals | Eli Lilly |
| **53.4** | LG Philips LCD | Tatung |
| **52.5** | LG Philips LCD | Tatung |
| **38.5** | MuniAuction Inc | Thomson |
| **34.0** | Power Integrations | Fairchild Semiconductor |

*Source: Adapted from OECD (2011); McKinsey & Company (2023d); WIPO (2022b).*

It is estimated that there are over 7 million valid patents worldwide, with annual increases of 12% to 14%. Annual patent licensing revenue is growing by 25% to 35% to over $150 billion (WIPO, 2020a; WIPO, 2022b).

Patent evaluation methods (cost, market, income approaches) enable firms to treat IP as a financial asset which supports their decisions especially when dealing with resource constraints in the cases of SMEs (WIPO, 2021a).

### 4.9.1 Methods of Patent Evaluation

Experts suggest a number of different methods for evaluating patents, some of which have been introduced into practice. Methods used for business purposes can be broadly divided into two groups: qualitative and quantitative evaluation (Scheffer & Zieger, 2005; Bader, 2008).

#### *4.9.1.1 Qualitative Methods*

Qualitative patent evaluation methods attempt to rank patents on the basis of their legal and technological strength, length, and commercial readiness (Chesbrough, 2003; OECD, 2011). Such methods are often used by internal patent management because they are

relatively simpler than quantitative methods, but they are also an important prerequisite for important strategic business decisions and portfolio management (The Economist Intelligence Unit, 2021; WIPO, 2021a).

Around the world, some institutions offer patent evaluation services, such as the Japan Patent Office (JPO) or the Danish Patent and Trademark Office (DKPTO), that offer qualitative evaluation to encourage the evaluation and exploitation of patents. In addition to state institutions, there are private enterprises that develop methods for evaluating intellectual property. For example, QED Intellectual Property offers online management and commercial services in the field of intellectual property. The firm developed an evaluation method called PRISM, which classifies patents into four basic management models:

**1.** Monopoly (high-value internal exploitation patents).

**2.** Defensive (low-value internal exploitation).

**3.** Licensing (high-value external exploitation).

**4.** "Joint Venture" (low-value external exploitation) (WIPO, 2010).

*4.9.1.2 Quantitative Methods*

Classical quantitative methods, based on cost, market access, and income, have been developed for decades, and today multiple methods can be used to represent variations in relation to them (Scheffer & Zieger, 2005; WIPO, 2021a).

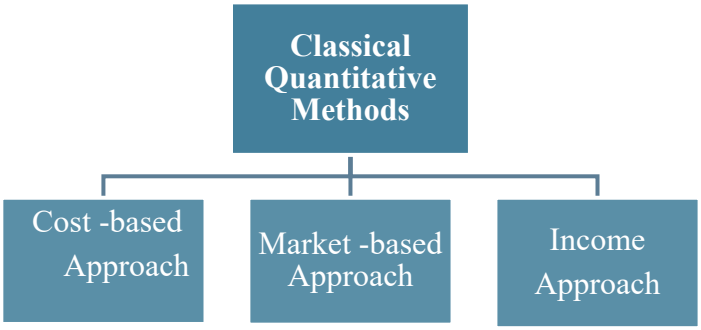


**Figure 3:** Schematic Diagram of Classical Quantitative Methods

*Source: Author's elaboration based on Scheffer and Zieger (2005); WIPO (2021a).*

#### 4.9.1.2.1 Cost-based Method

The cost approach is based on the cost of obtaining an innovation that is patented by internal development or by external acquisition. This approach is unbiased and consistent (Scheffer & Zieger, 2005; WIPO, 2021a).

**Advantages:** Unbiased, consistent, and reliable with recent cost data.

**Disadvantages:** There is no correlation between the cost of goods, difficulty in distinguishing "normal" operating costs from the costs of investing in a patent, and subjective estimation of reimbursement costs (WIPO, 2021a).

#### 4.9.1.2.2 Market-based Method

The market approach employs comparative transactions of patents in the market (Scheffer & Zieger, 2005; WIPO, 2021a).

**Advantages:** Practical method with a diversity of market core approaches and a multi-pronged approach allowing for comparisons.

**Disadvantages**: Limited data for patent comparison, transaction terms are opaque (WIPO, 2021a).

#### 4.9.1.2.3 Income (Yield) Method

The yield approach attempts to calculate present value by projecting the future growth rate of the income of the patent in question over its lifetime. It is theoretically superior to the other approaches listed because it focuses on the future earnings or cash flows made in realizing a patent or product based on the patent (Scheffer & Zieger, 2005; WIPO, 2021a).

**Advantage:** Future and cash flow focused, widely accepted in a business context.

**Disadvantages:** Requires high-quality forecasts, issues in early-stage innovations.

### 4.9.2 Variations of "Classical Method"

With the development of theory and practice in the field of patent evaluation, the "classical method", i.e., traditional methods, has been supplemented by the following variations (WIPO, 2021a; WIPO, 2022b):

**1. The 25% rule**: Where the licensor receives 25% of the licensee's profit.

**2. Industry Benchmarks**: These are based on average royalty rates by industry.

**3. Ranking Method:** Internal IP scoring.

**4. Surrogate Criteria**: Investor-relevant information is used as an indicator.

**5. Allocation Method**: Where the value of the firm is divided into tangible and IP components.

**6. Monte Carlo Simulation**: Which adds variability into forecast models.

**7. Option Method:** Where patent developments are seen as a strategic investment option.

**8. Comparative Advantage**: This is used when valuing IP while taking into account tangible product performance.

**Table 3:** Summary of Patent Valuation Methods

| Method | Description | Use Case |
|---|---|---|
| **Cost Approach** | Based on R&D investment | Internal accounting, tax |
| **Market Approach** | Based on comparable licenses/sales | IP transactions, litigation |
| **Income/Revenue Approach** | Based on expected cash flows | Licensing, M&A |
| **25% Rule** | A royalty benchmark (e.g., 25% of profit) | Negotiations |
| **Ranking Method** | Qualitative comparison | Portfolio triage |
| **Monte Carlo/Option** | Financial modeling of scenarios | Risk-based valuation |

*Source: Author, 2026.*

### 4.9.3 Most Valuable Patents

There is a huge number of high-value patents in today's innovative economy. According to the Patent Value Predictor Model, the most valuable patents have been in the fields of pharmaceuticals and biotechnology (Moro-Visconti, 2025; van Zeebroeck, 2009). Through these patents, organizations not only legally protect their inventions but also view patents as valuable business sources to enhance their financial performance, competitive advantage, and market position (Poege et al., 2019). The following table represents the ten most valuable patents in this field around 2004.

**Table 4:** Top 10 Most Valued Patents in Pharmaceuticals and Biotechnology (2004).

| Patent No. | Publication Date | Estimated Current Value (USD) | Right holder |
|---|---|---|---|
| **US 6517866** | 11.02.2003 | 1.797.722.689 | Pfizer Inc. |
| **US 6500987** | 31.12.2002 | 1.570.968.527 | Teva Pharm. Ind. |
| **US 6566344** | 20.05.2003 | 1.481.848.538 | Idenix Pharm. Inc. |
| **US 6465496** | 15.10.2002 | 1.408.931.126 | Teva Pharm. Ind. |
| **US 6452054** | 17.09.2002 | 1.220.308.695 | Teva Pharm. Ind. |
| **US 6221640** | 24.04.2001 | 1.194.927.644 | Cubist Pharm. |
| **US 6071970** | 06.06.2000 | 1.107.879.324 | NPS Pharm. |
| **US 6319919** | 20.11.2001 | 1.081.784.546 | Davis; Bonnie |
| **US 5610034** | 11.03.2001 | 1.071.288.984 | Alko Group |
| **US 6022716** | 08.02.2000 | 1.069.310.287 | Genset SA |

*Source: Author's elaboration based on Patent Value Predictor Model; see Moro Visconti (2025) and van Zeebroeck (2009).*

In this section, we comprehend the legal, financial, and strategic perspectives of patents being examined with the help of valuation and management methods. Current literature has many qualitative and quantitative tools for the valuation of patents, but generally they offer patent assessment from a technical and financial aspect. Thus, there remains a vacuum of how these valuation tools can be incorporated into innovation ecosystems strategically and can also be integrated into companies' objectives. This gap pertains to the research questions of the thesis of how firms take the most strategic value from intellectual property, and how legal and valuation models, which shape the IP landscape, are improving to meet the needs of innovation ecosystems (Moro-Visconti, 2025; Poege et al., 2019). In this context, this study will fill this identified gap by connecting patent valuation practices with companies strategic decision-making process and the overall innovation ecosystem.

# 5 Methodology

## 5.1 Research Design

This study employs a qualitative, explanatory research approach that was appropriate to successfully understand how intellectual property operates as a strategic asset in innovation ecosystems, how organizations address know-how and procedural knowledge that is not officially documented, and how inventions supported by AI disrupt the once-established traditional legal and business frameworks (Creswell, 2014; Saunders, Lewis & Thornhill, 2019). Qualitative methods especially fit with this research well because they allow a nuanced understanding of process, perceptions, and the strategic making of decisions that cannot be fully understood if using quantitative research tools (Patton, 2015).

Since the innovations generated by AI are considered a novelty, there is variation in practices across different industries, and the way they strategically use IP not only as a legal tool but as an integral part of their processes, an exploratory method is suitable due to its allowance for flexibility, openness, and depth of interpretation (Bryman, 2016). In order to gain valuable insights from individuals who are directly engaged in IP management, innovation, technology development, and SME decision-making, the semi-structured expert interviews proved to be the most appropriate tool (Kallio, et al., 2016).

The chosen methodological approach corresponds to the research questions, which aim to understand properly: (1) how IP is strategically used beyond a solely legal tool, (2) how AI poses unique challenges to legacy systems when managing IP, and (3) how do firms behave when they deal with tacit knowledge which is not documented, in the form of, for example, know-how in situations when there is legal and practical uncertainty about enforcement and international protection. The qualitative interviews offer space for the research to examine these issues from the perspective of professionals coming from different sectors, ultimately leading to an enriched understanding of existing practices and posed challenges.

## 5.2 Research Approach and Rationale

The research is positioned within an interpretivist paradigm, which acknowledges that strategic choices of the firms, the way IP is perceived, and the understanding of the risks

posed by AI are constructed and hugely influenced by professional experience, organizational culture, and regulatory contexts (Willis, 2007). Indirectly, this paradigm accepts the fact that multiple realities exist, and therefore, the insights provided by SMEs, technological firms, and IP professionals are all relevant and important in order to build a comprehensive viewpoint about the problem.

The study also applies the concept of inductive reasoning. In this context, since the literature is already rich, containing the core conceptual framework for understanding IP tools, innovation ecosystems, and challenges related to AI, the analysis of the data gathered from the interviews provides space for themes to be developed according to the participants' interpretations correlated to their own experiences. Afterwards, these generated themes are considered in relation to the literature, which creates an opportunity to co-create knowledge using the existing literature and the findings from this research.

## 5.3 Methods for Data Collection

The data for this study were collected through semi-structured interviews with industry experts within the timeframe of November 10 and November 18, 2025. The decision to choose semi-structured interviews as the primary data collection method relied on the fact that this technique offers consistency on one hand, meaning that every participant can contribute to the research problem by answering the core questions, and flexibility on the other hand, meaning that by answering the questions, interviewees can freely express issues correlated with their own experience (Kallio, et al., 2016).

Overall, nine interviews were conducted. Seven out of nine were completed using the Microsoft Teams platform, and they were recorded after the interviewees gave their consent to record prior to the interview. Two out of nine were completed by using the written format and sent via email, since participants were not available for direct interviews. All of the interviews were conducted by respecting the approved Interview Guide, which was beforehand reviewed and validated by the supervisor.

The time needed to conduct the interviews varied between 20 and 30 minutes, and it consisted of 11 open-ended questions, and some questions regarding the demographic background of the participants in the end. Four main themes were covered in these 11 questions: strategic uses of IP tools, including patents, utility models, trade secrets, and trademarks; innovations supported by AI and debate around the inventorship; protection

of know-how and procedural knowledge; and enforcement of IP, risks at the international level, and trends in the ecosystem. The full interview guide and the questions can be found at the end of the thesis in Appendix.

This method made sure that the data remained in line with the research questions of the study while leaving space for variation in expertise, industry, and experience.

To enrich the interviews and doctrinal review, the case study of Tesla's Open Patent Pledge was added as the third methodological component. This case was chosen because it serves as a great example of a company that employs an innovative ecosystem-oriented IP strategy. It uses a large patent portfolio mainly as a signal to other firms, to collaborate with other business players, and to increase the number of participants in the ecosystem instead of using the patents for defensive exclusion (RQ1, RQ3).

## 5.4 Sampling Strategy

The sampling method was purposive. People who participated in the interview process as interviewees were chosen because they were professionally relevant to the topic, engaged with IP law, innovation management, technology advancement, business start-ups, product design, and business strategy, and they were able to provide valuable information (Patton, 2015).

To enrich and develop data heterogeneity, the sample intentionally included: IP and legal experts, technology and design managers, directors and founders of SMEs, innovators in the creative sectors, and professionals who use AI tools or are somehow affected by them. The final sample included nine participants from either a small to medium enterprise (SME) experience or a technologically advanced organization experience. The diversity in the sampling approach ultimately offered a broader understanding of strategic IP behaviors and the way they differ in industries and maturity.

Table 5 presents an overview of how responses are covered in the sample, as well as the industrial background of participants.

**Table 5:** Interview Sample Overview

| Industry | Interview number |
|---|---|
| **Renewable energy and clean technology** | Interview 7 |
| **Technology and design** | Interview 8 |
| **Real estate or innovations in architecture** | Interview 9 |
| **Handmade goods and creative industries** | Interviews 3, 4, 6 |
| **Food innovation and artisanal production** | Interview 5 |
| **Business environments related to IP** | Interviews 1 and 2 |

*Source: Author, 2026.*

The great level of heterogeneity provides more capacity to do comparisons across sectors characterized by high technological intensity and those sectors that depend mainly on craftsmanship and branding.

Participants were approached to participate in the interview either through direct communication or by sending an email invitation. All of the participants who consented to participate in the interview were first provided with the interview guide and a short explanation of the purpose of the study, then the reason why they were selected to participate, the consent form, which was part of the guide, and, at the end, information about the ethics and how the insights they will provide will be kept confidential (Creswell, 2014).

At the beginning of each interview session, every participant first reaffirmed their will to participate in the interview process, and they provided their consent for the interview to be recorded.

During the process, I followed the approved semi-structured guide of questions, but also formulated some supporting questions in situations where participants demonstrated

confusion or were having difficulty understanding or answering the given question. This technique allowed for gathering rich information from interviewees while still keeping some level of comparability of interviews.

After conducting all of the interviews, the audio recordings were transcribed manually in order to preserve the accuracy of every detail and become familiar with the data, which was the subject of investigation. The interviews, which were received in written form via email, were also formatted according to the structure of the oral transcripts, making sure that consistency is maintained among all interviews.

## 5.5 Interview Procedure

Participants were approached to participate in the interview either through direct communication or by sending an email invitation, as the researcher had direct access to the interviewees. All of the participants who consented to participate in the interview were first provided with the interview guide and a short explanation of the purpose of the study, then the reason why they were selected to participate, the consent form, which was part of the guide, and, at the end, information about the ethics and how the insights they will provide will be kept confidential (Creswell, 2014).

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After conducting all of the interviews, the audio recordings were transcribed manually in order to preserve the accuracy of every detail and become familiar with the data, which was the subject of investigation. The interviews, which were received in written form via email, were also formatted according to the structure of the oral transcripts, making sure that consistency is maintained among all interviews.

## 5.6 Analysis of the Data

The data were analyzed and interpreted using a thematic analysis approach, which is based on a six-step framework of Braun and Clarke (2006), as follows (Braun & Clarke, 2006):

**1.** Familiarization with the data: The transcripts of the participants' interviews were meticulously read to identify recurring themes.

**2.** The initial coding stage included the creation of codes for segments that contained meaningful text.

**3.** The generation of themes required the division of the created codes into broader themes, followed by an examination of codes under the themes.

**4.** A comparative analysis of the themes across all interviews was conducted to identify created patterns and establish connections to the research questions.

**5.** The process of defining and naming themes was undertaken to ensure clear internal coherence.

**6.** The report was produced by integrating the findings from the interviews into the study in Chapters 6 and 8.

The process of coding was executed manually in a way that allowed me, as a researcher, to understand every nuance and detail present in participants' responses. The coding scheme was structured around the three questions, culminating in the identification of four overarching themes:

**Theme 1:** Intellectual property (IP) as a strategic asset in business ecosystems.

**Theme 2:** Disruptions that may arise from the rapid integration of artificial intelligence (AI) into the business processes and the debate around the role of inventors in the innovation process.

**Theme 3:** Practices of protection of knowledge, know-how, and tacit procedural expertise.

**Theme 4:** Enforcement of IP in the international frame, global risks that arise, and what the outlook of innovation ecosystems will be like.

The themes that originated from this analysis mirrored both convergence and divergence at the same time. This means that a great number of industries share common challenges, but there are also differences between SMEs and high-end technological companies in the way they operate in the business landscape and how they face the posed challenges.

In order to ensure the accuracy of the analysis and the quality of the interpretation, the themes that resulted from my analysis were compared to the theoretical and conceptual ideas explained in the previous chapters of this research, addressing the strategic use of IP, innovation ecosystems, challenges about the AI inventorship, and mechanisms to protect knowledge.

### 5.6.1 Coding Approach and Manual Analysis Procedure

Data collected from interviews was analyzed manually, without using qualitative data analysis software. Manual analysis proved to be appropriate taken into account smaller sample size (nine participants) and the detailed and broader questions of the research. This kind of analysis facilitated a close engagement with data, iterative interpretation, and coding sensitivity, which ultimately resulted in a better understanding of the decision-making, legal uncertainty and tacit knowledge practices of the participants.

The transcripts of interviews were compiled and coded into a structured document. During the first phase, parts of the text were identified, and they were given descriptive codes based on the content. The information gathered in this phase was stored in a coding table, which contained: (1) the interview number; (2) the coded text; (3) a preliminary code label; and (4) commentary on the codes. The codes recorded were in the coding table to allow transparency and traceability during the analysis.

Codes were not created in advance of the analysis, but they were developed gradually as the data was analyzed. As coding procedure progressed and codes were created, the similar ones were consolidated in groups, and the process of reviewing was done on an iterative basis. This approach allowed the identification of trends and similarities in the strategic practices of organizations across different sectors while retaining the variations within the individual sectors.

This study employed manual coding because it allowed to understand the language of participants, their emphasis, and way each of them framed issues around IP strategy, the challenges presented by AI, and the way businesses enforce their IP rights. Since the data was a manageable size, there was no need for software supported analysis to ensure the level of rigor and consistency.

### 5.6.2 Theme Development and Alignment with Research Questions

After the completion of the stage of initial coding, the identified codes were grouped into broad analytical categories. Each category was continuously compared to all the interviews to identify similarities and differences in the way organizations are handling each of the IP strategies related with issues in their operations. This iterative phase was completed with the establishment of four broad themes.

The thematic structure supported the research questions of the thesis and maintained analytical coherence as follows: (1) the first theme connects to the first research question and examines how businesses utilize IP as a strategic tool in the context of innovation ecosystems; (2) the second theme relates to the second research question and focuses on the challenges presented by AI-supported innovations, specifically to the ongoing debates between the current understanding of inventorship and ownership; and (3) the third and fourth themes address the third research question together by distinguishing between the mechanisms utilized by companies to protect their knowledge internally (know-how, trade secrets, and procedural expertise) and the factors impacting their protection externally.

The structure of the research questions was appropriate and allowed more precise and analytical answers to research question 3, by making a difference between internal and external firm approaches but still treating them as interconnected parts of strategic decision making.

### 5.6.3 Rationale for Saturation and Sample Adequacy

Saturation of the data was completed after the nine interviews conducted for the research. During the subsequent stages of analysis, most of the interviews did not produce new original themes, and responses of participants corresponded with the identified themes in a great extent, especially discussions about enforcement uncertainty, reliance on informal mechanisms to protect IP, and strategic challenges faced by SMEs.

The intent of the study was not to contribute statistically to generalization of any discipline or field of research which was investigated. Its objective was to provide analytical insights into how organizations from diverse organizational structures behave strategically. The sampling method used in this research, known as purposive, provided insights into the strategic behavior of organizations that have touching points with managing IP, innovating, and deploying AI technologies. The inclusion of professionals from

heterogeneous backgrounds, starting from SMEs, technology-intensive companies, to creative sectors, facilitated the comparison of the strategic behaviors of organizations in different sectors.

In summary, because this study has an exploratory and interpretative nature, the sample size was sufficient to develop rigorous qualitative insights.

### 5.6.4 Triangulation and Analytical Rigor

The application of multiple form of triangulation increased the level of analytical rigor as it validated data from multiple perspectives.

First, at the methodological level, triangulation was applied by using semi-structured interviews, the examination of IP laws and policies, as well as a concentrated examination of Tesla's Open Patent Pledge. These served to conduct a research based on at least three data sources and allowed the empirical data to be validated from a legal structure (IP law) and a practical example (Tesla).

Second, data triangulation was applied by comparing data from different sectors, different types and sizes of organizations, and distinct professional roles of respondents. This process allowed to identify patterns of experience that were unique to a particular context compared with pattern of experience that were relevant to a broader context.

Third, the theoretical triangulation was achieved through the interpretation of experiences using theoretical constructs from the disciplines of IP law, innovation ecosystem theory, and strategic management. By doing so, interpretations were not solely based on empirical evidence but also, they were grounded in established academic frameworks.

Combined, these three triangulation strategies improved the credibility of the findings and based the findings on more than a single source of data.

### 5.6.5 Bias Mitigation

The professional background of the researcher in law and intellectual property could have resulted in some degree of bias during the interpretation. To reduce the likelihood of any bias, some precautions were taken. The interview questions were created and developed in an open-ended format that avoided the usage of rigid legal language. Additionally, this format encouraged participants to describe their practice and experience using their own language including the use of non-formal or informal expressions.

During the analysis phase, interpretations were based on direct quotations and were compared against the initial data set and all published literature multiple times. This reflexive approach facilitated gathering conclusions based on empirical evidence for empirical conclusions and not on prior expectations of the researcher.

## 5.7 Ethical Considerations

Ethical rules were respected and maintained at every step of the research process. Before the commencement of the interview, participants were informed about the purpose of the study, how the provided data would be used, the principles of retention of confidentiality, and their rights, including their right to withdraw at any time and not to answer some specific questions (Bryman, 2016).

The interviews were all anonymous. Thus, any identifying or personal information, such as participants' names, the name of their company, or some sensitive information, was deleted or replaced with a generic description, for instance, "Interviewee 7: Director, Clean Technology Sector".

The recordings of the interviews were saved in an encrypted folder, which was only accessible to me as a researcher, and once the transcriptions were complete, the audio recordings were deleted from the protected folder. The written transcripts, on the other hand, were also stored securely to ensure compliance with data protection rules, specifically principles of GDPR.

During the interview process, I took a neutral position, not asking leading questions, while making sure that participants were comfortable with the questions and not responding to any of the questions that they preferred to omit.

## 5.8 Research Limitations

It is important to note that during the interview process, some methodological limitations appeared.

First, qualitative interviews are a subjective reflection of the objective reality of participants, meaning that their responses are shaped and affected by their individual experience, knowledge, or biases (Creswell, 2014). Second, while nine interviews can be sufficient to produce some qualitative conclusions, they still do not represent all industries and sectors or all intellectual property strategies utilized in every country. Third, some

interviewees were not completely familiar and did not possess a qualitative knowledge about some technical aspects of IP and ongoing debates around the law and AI, which consequently led to short and sometimes simple responses. However, these drawbacks can positively contribute to the study, because they identify a knowledge gap in the real world for SMEs. This is an important finding for the research goal.

Interviews were conducted online, and during a few interviews, we faced some minor connection interruptions that lasted for a short time. Nevertheless, these did not affect the overall quality of the data from the interview, but I needed to clarify these points when transcribing the audio recordings.

Even though transparency and triangulation were implemented to reduce bias, results still leave space for different interpretations.

Lastly, as the participants were all professional working and operating mainly within the European regulatory environment, the findings may have limitations and may not be applicable in jurisdictions that have significantly different IP enforcement systems.

This chapter explained the research design, the sampling method, the data gathering process, and the analytic method used to explore how intellectual property is used strategically in innovation ecosystems, and how AI has affected and shaped legal and business systems. With purposive sampling and semi-structured interviews with nine experts from different professional backgrounds, the research collected rich qualitative data, which informs about some findings in the next chapter.

# 6 Findings

In this chapter, the empirical results obtained from semi-structured interviews with nine professional experts from various sectors, including renewable energy, technology and design, real property development, fashion, handmade craft, food innovation, and intellectual property-related businesses, will be discussed (Creswell, 2014). The data from the findings is used to answer the main questions of the thesis by exploring ways organizations strategically engage with intellectual property (IP) (Pisano & Teece, 2007), how they act and respond to challenges posed by artificial intelligence (AI) (Abbott, 2016; Gervais, 2020), and how they behave with knowledge, enforcement challenges, and barriers, and future trends in ecosystems (Taubman et al., 2012; OECD, 2011).

When analyzing data obtained from the interviews, a thematic analysis resulted in four key themes presented in the figure below. Both themes 3 and 4 address research question 3, by differentiating between internal knowledge protection methods used by companies to protect their inventions (such as know-how, trade secrets, procedural expertise) and the external limitations related to enforcement uncertainty and transnational protection.


**Figure 4:** Four Key Themes from Interview Analysis

*Source: Author, 2026.*

Each of the themes that originated from the interviews is discussed below, while anonymized quotations are included and linked to the theoretical concepts outlined previously in the thesis.

Findings can be connected to conceptual framework presented in Figure 1 as each of four identified themes can be related to one of the four layers of the framework. The strategic use of IP, like showcasing credibility, licensing, collaborating, and positioning, is reflected in theme 1. Theme 2 is related to the layer about constraints created by AI uncertainty and its impact on inventor status and ownership. Theme 3 encompasses the first layer about IP instruments that assist with internal protection of corporate knowledge including know-how, trade secrets, and procedural expertise. Theme 4 illustrates the external factors that limit enforcement, jurisdictional limits, and international protection. These themes all together demonstrate how organizations combine instruments and strategic objectives

besides the constraints they face. The intersection of these layers results in outcomes that affect competitiveness, strategic partnerships, and investments. The four themes identified in this study relate to the layers of the conceptual framework illustrated in figure 1.

## 6.1 Theme 1: Strategic Use of IP in Business (RQ1)

The interviews highlight that there is a distinct difference in the way companies familiar with intensive technology use and small creative SMEs engage and utilize intellectual property. For the large firms, especially those that operate in renewable energy and technology, IP presents a key strategic asset that is deeply rooted in their competitiveness, investment decisions, and market growth. On the other hand, SMEs in fashion, handmade products, and food innovation do not prioritize IP and often view it as hard to understand (WIPO, 2021b; OECD, 2011). Thus, they mainly use trademarks for branding or consumer loyalty, instead of relying on IP for business advantage.

### 6.1.1 Strategic Use of IP in Technology-Intensive Sectors

Representatives interviewed from technology and clean energy companies persistently referred to IP portfolios as a vital asset that continuously helps them to gain power during negotiations, to prove credibility in front of investors, and enable partnerships internationally. For example, Interviewee 7, who is a director in a renewable energy company, pointed out that their company does not treat patents only as a simple legal protection mechanism, but they handle them as a significantly important part of their market strategy:

*"We don't see patent only as a form of legal protection. We use them to strengthen our market position and support negotiations with investors and large energy firms." – Interviewee 7.*

Additionally, a manager of a technology and design company based in the EU underlined that the registered rights are a valuable asset for their company when establishing new partnerships or collaborations:

*"Having IP protection helps us in negotiations. It signals that we are serious about innovation and that our work has unique value." – Interviewee 8*

These responses of interviewees correspond with the existing literature about patents. In the literature, patents are stressed as a extremely important asset in business strategy and

operations, helping companies to attract investors, protect their competitive edge in the tech sector, and negotiate licensing arrangements (Somaya, 2012; Pisano & Teece, 2007).

### 6.1.2 SME Viewpoint: Branding, Trust, and Limited Use of Patents

Differently from companies operating in the tech sector, founders or smaller businesses in fashion, handmade goods, and food innovation, besides trademarks, it is not in their business habit to use formal IP rights (Posner, 2005; WIPO, 2021b). They register trademarks mainly to protect their brand identity and build professional legitimacy, not to gain or protect their competitive edge. Interviewee 4, who founded a clothing brand, mentioned:

*"We registered our logo as a trademark. It makes us look more professional when collaborating with stores, but we don't use it as a strategic tool." – Interviewee 4*

Conversely, creators of handmade products emphasize that they rely more on consumer recognition and build visibility through social media, leaving behind the usage of other legal forms of protection:

*"We focus on creativity and word of mouth. I've never used patents or IP in my business." – Interviewee 3*

This division between large tech companies and SMEs confirms the theoretical assumptions that small and medium-sized companies, because of the restricted resources and lack of legal knowledge, cannot afford to engage in complex IP strategies. Consequently, their role and involvement in innovation ecosystems are limited (Posner, 2005; WIPO, 2021b; OECD; 2011).

### 6.1.3 Patent vs. Trade Secrets: Decision-Making Factors

Overall, through interviews, when deciding between whether to choose a patent or trade secrets, some factors play a crucial role for companies. They focus first on the costs, how complex the technical process is, the risk of reverse engineering, and the potential of the company to expand in the market. For example, in the technology company, they patent a new innovative sensor, indicating that it would be easier to reverse engineer after commercialization:

*"We chose a patent because the innovation could be reverse-engineered. Exclusivity was important for entering Scandinavian markets." – Interviewee 7*

A technology manager, in contrast, preferred trade secrets to optimize algorithms:

*"Keeping certain algorithms as trade secrets offered more flexibility and avoided the cost of disclosure." – Interviewee 8*

Overall, the views expressed by the interviewees align with what has previously been explained in the literature on patent-trade selection, where legal fees and reversibility issues, and commercialization tend to be the most significant decisive factors (Posner, 2005).

## 6.2 Theme 2: AI-Driven Challenges and the Debate Around Inventorship (RQ2)

A very strong and consistent standpoint, which was mentioned in all interviews, is that participants consider the existing IP system not ready and not capable of dealing with newly innovative AI-produced outputs (Abbott, 2016; Gervais, 2020; WIPO, 2022b). No matter the level of seniority or the sector they belong to, each participant stressed uncertainty, feeling sceptical and confused about how existing legal principles should or could adapt.

### 6.2.1 IP Systems Are Not Prepared for AI Innovation

Almost every interviewee underlined that AI is evolving at a higher speed than legal systems. This disparity was mentioned by even the two participants with little experience and knowledge of the technical sophistication, who were aware that the existing law systems have little capacity to accommodate these novelties.

In this context, a jewelry founder said:

*"AI-generated designs raise confusion. It's unclear who owns them, the user or the software. The laws don't seem to be ready." – Interviewee 6*

This viewpoint was reinforced by the manager of a technology company, stressing:

*"AI challenges the traditional idea of an inventor. IP systems are still catching up." – Interviewee 8*

This perception about systems' unpreparedness to meet these challenges also coincides with the ongoing DABUS case, renowned globally and also mentioned in Chapter 4 of the thesis (WIPO, 2022b; Abbott, 2016; Thaler v. Comptroller-General of Patents, Designs and Trade Marks**,** 2023).

### 6.2.2 Strong Consensus Against AI as an "Inventor"

All nine of the people interviewed were consistent with each other regarding the belief that AI should not bear the title of an inventor. They identified that inventorship has some unique elements that cannot be found elsewhere, like human creativity, intention, and accountability (Gervais, 2020; Abbott, 2016).

Some of the statements of interviewees include:

*"AI is a tool. The real creative ideas come from the person using it." – Interviewee 6*

*"AI does not possess intention or creativity. Ownership must remain with people or legal entities." – Interviewee 7*

Even small business owners with little experience with AI expressed rejection of AI as an inventor, maybe on an intuitive or subjective basis:

*"No, AI should not be called an inventor. It just does what people program it to do." – Interviewee 3*

### 6.2.3 Legal Reforms Suggested by Interviewees

Participants made a series of recommendations to enhance IP rights in order to better align with innovation supported by AI (recommendations are demonstrated in Figure 5) (Gervais, 2020; Abbott, 2016).

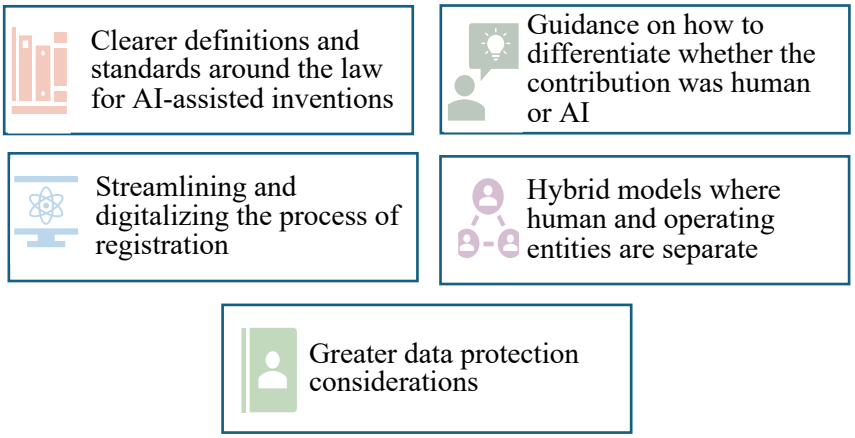


**Figure 5:** Recommendations for AI/IP Legal Reform from Interviewees

*Source: Author, 2026.*

In addition, one participant stated that modernization is necessary:

*"We need clearer standards, digital tools, and harmonized rules. IP has to be made future-proof." – Interviewee 7*

Overall, the interviews strongly converged on one idea: the law is too old-fashioned, human responsibility has to be central, and technological innovation requires systems to adapt the law.

## 6.3 Theme 3: Knowledge Protection, Know-How, and Procedural Expertise (Internal Mechanisms - RQ3)

This theme addresses the way firms decide to protect and implement their knowledge mechanisms in settings when there is legal and practical unpredictability, especially for SMEs.

Responses of participants differed based on the size and maturity of their firm (Nonaka & Takeuchi, 1995; Polanyi, 1966).

### 6.3.1 SMEs: Informal, Trust-Based Protection Strategies

Many of the SMEs expressed that they are very much dependent on trust; they use verbal contracts and informal practices when it comes to undocumented knowledge. Several of them specifically said that they do not own documentation of this knowledge:

*"Our know-how stays in our heads. Only we know the details." – Interviewee 5*

*"We keep notebooks and share parts of the process with new staff, but not everything." – Interviewee 6*

These statements align with the literature that some small firms may not have formal structures around knowledge management, making them vulnerable when an employee leaves or, even worse, when they are imitated (Polanyi, 1966; Nonaka & Takeuchi, 1995; Risch, 2007).

### 6.3.2 Larger Companies: Structured Knowledge Management Systems

Different from small companies, medium and large firms, especially those operating in the tech sector, demonstrated protection strategies that were much more formalized:

*"We maintain an internal knowledge management system. Only project members have access, and NDAs are standard." – Interviewee 7*

Other technology firms had built-in mechanisms to systematically document algorithms and testing protocols.

These patterns correspond to the contrast presented in Chapter 3. The larger firms document and protect procedural knowledge as part of an overarching strategic framework for intellectual property strategies (Nonaka &Takeuchi, 1995).

## 6.4 Theme 4: International IP Enforcement, Global Risks, and the Future Innovation Ecosystems (External Constraints - RQ3)

This theme covers the costs, complexity, and jurisdictional differences of enforcing IP, and how these factors can present a barrier in the broader IP strategy of a firm, especially for those operating internationally.

### 6.4.1 Enforcement Costs as a Barrier

Among all participants interviewed virtually, from SMEs and directors alike, they perceived costs as the most significant barrier:

*"The costs are too high. SMEs cannot defend their rights abroad." – Interviewee 4*

*"Even if someone copies us internationally, we cannot afford legal battles." – Interviewee 6*

Similar views were held by larger companies as well, even though they have more capacity compared to small firms:

*"Enforcing patents across jurisdictions is extremely expensive, with different timelines and unpredictable outcomes." – Interviewee 7*

These insights complement the literature, which explains that IP litigation is an economic burden for SMEs and, when coupled with structural disadvantages, makes it even harder for these companies to utilize IP tools (OECD & EUIPO, 2021; Taubman et al., 2012).

### 6.4.2 Jurisdictional Fragmentation

In addition, participants stressed significant differences in legal systems that impact enforcement:

*"What is protected in Austria might not be recognised elsewhere. The laws are so inconsistent." – Interviewee 8*

This supports the discussion in the previous chapter about the fragmentation of legal systems such as the EU, the US, and developing economies (Taubman et al., 2012).

### 6.4.3 Strategic Limitations for SMEs

Finally, several SMEs stated they will not expand internationally, as they fear the loss of their IP without options to enforce rights.

### 6.4.4 The Future of Global Innovation Ecosystems and the Role of SMEs

There was a consensus among participants that the role of IP in global innovation ecosystems is evolving mainly due to technological advancements, digital transformations, and AI integrations, resulting in an increase in competition.

### 6.4.5 IP Becoming More Digital, Dynamic, and Integrated

Interviewees discussed the following emerging trends shown in Figure 6 below. The trends are organized based on the common themes identified in the interviews, and not their significance. which were and it does not indicate a hierarchical ranking.

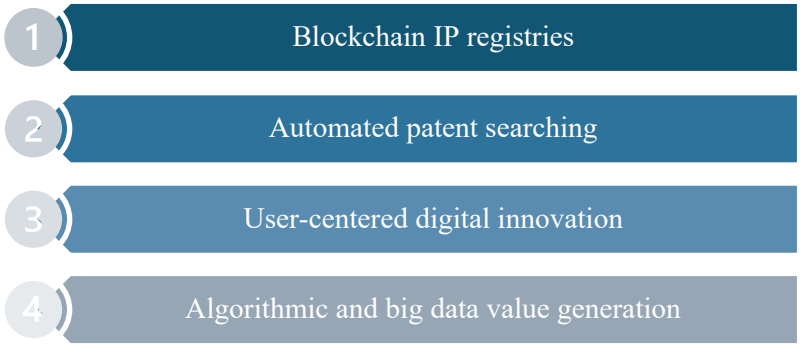


**Figure 6:** Future Trends in Innovation Ecosystems

*Source: Author, 2026.*

One interviewee made a conclusion regarding this shift in IP:

*"IP is becoming more dynamic and integrated into digital platforms." – Interviewee 7*

### 6.4.6 Increasing Role of SMEs and Start-Ups

Participants also noted that the role of SMEs and start-ups is increasingly changing and influencing global innovation ecosystems. While SMEs often need to face structural disadvantages, such as limited funds, no legal knowledge or capacity for enforcement, their creative potential, adaptability, flexibility, and readiness to adopt new technologies support them in uniquely contributing to innovation. Multiple interviewees underlined that SMEs already actively participate in the generation of original designs, niche products,

digital content, and user experiences. Interviewee 6 stated: *"If small businesses learn how to protect their ideas properly, they can grow faster and can collaborate internationally."* The largest number of interviewees agreed upon the fact that SMEs have the power to influence future ecosystems if regulatory systems, education, and access to protection mechanisms are designed more comprehensively (WIPO, 2019b; OECD, 2019b).

Overall, the findings from the interviews indicate that while intellectual property is a driving force of innovation ecosystems, its application, understanding, and effectiveness are distinct across different sectors. Large companies, especially those in the technology area, tend to use patents and trade secrets as part of their firm's strategy, while for SMEs, trademarks and informal forms of knowledge protection remain more important tools.

Data about the demographic characteristics of the interviewees such as their age, gender, and professional experience were also collected. However, these metrics served for providing context to the interview sample because the demographic findings did not reveal any consistent relationship with the themes. The main differences in how organizations use intellectual property as a strategic asset were determined by the size of the organization, industry of operation, and the level of technology usage. Based on this, findings presented in this study are based on themes rather than around demographic relationships, aligning with the nature of the research.

Consistently, all participants perceived that current IP systems are not designed to accommodate inventions supported by AI, and cooperatively are not consenting to accept AI as an "inventor". In terms of protective practices for knowledge, there were a range of approaches from more formalized protections to trust-based methods used by SMEs. High costs, different jurisdictions, and ambiguous procedural processes were referenced as general barriers to the enforcement of IP. Ultimately, the interviewees suggested that the future will be increasingly digital, dynamic, and driven by SMEs, and thus, there is an urgent need for reforms on simplification and modernisation of professional IP systems.

These insights build the basis for the case study and synthesis that follows in the next chapter.

# 7. Results and Discussion: Strategic Use of IP in Innovation Ecosystems

## 7.1 Introduction

This chapter presents the case study of Tesla Inc., which is a renowned company in the electric vehicle (EV) market and a leading technology supplier, demonstrating how does this company uses intellectual property in its corporate strategic planning (Mangram, 2012). The intent of this study is to serve as a comprehensive example of how a patent can be employed for purposes outside its intended core legal function of protecting the innovation of a company and to showcase how a company can strategically utilize IP in a manner that increases its competitiveness, as well as simplifies market entry and growth (Pisano & Teece, 2007).

In this context, it is worth exploring this case and connecting it to this thesis because in 2014, Tesla made a public decision that it would not file any lawsuits against competitors who are using its patented technology in *"good faith"* (Vincent, 2014). The fact that this is something that was not done by others before makes this statement unique and the whole case valuable in demonstrating how organizations can use IP differently, as part of their strategy, and as a mechanism to drive innovation and objective realization.

The strategy Tesla has adopted includes using IP to grow, which in turn creates technology-based innovation ecosystems, and a balance between IP protection and technology dissemination (Mangram, 2012; Vincent, 2014). Thus, the Tesla Open Patent Pledge illustrates a well-developed plan to use IP as part of building a company while driving innovative business strategies.

### 7.1.1 Chapter Structure and Link to Research Questions

In this chapter, results from empirical findings explored in Chapter 6 will be discussed in connection with the theoretical basis in previous chapters of the thesis and the Tesla case study. The main objective of this section is to interpret how the observations answer the three established research questions and what do these findings suggest about the strategic use of IP, the challenges arising from the use of AI, and how practices of protection knowledge and protection unpredictability influence the outlook of the innovation ecosystems, with a special focus on SMEs. Furthermore, the discussion is ordered through

the three research questions, with the final aim of producing a coherent analysis by combining theoretical and empirical data.

The case of Tesla is explored in this thesis as an illustrative one because this company utilizes IP strategically under innovation ecosystem and offers valuable insights for this research. The Open Patent Pledge has relevance and addresses RQ1 regarding the way patents are used not only for exclusive protection, but as facilitators for signaling, encouraging collaboration, and expanding ecosystem. The case has also relevance for RQ3 since the pledge raises questions about enforcement choices and other non-patent protections and illustrates that competitive position can be maintained even when patens are available publicly. Tesla is a great company with substantial amounts of available resources allowing it to make high-level strategic decisions. Most of the SMEs could not afford to act in such a manner, thus, it provides an interesting contrast with SMEs. The case is analyzed based on evidence which includes the public statements of the company and pledge text, official disclosures of the company (SEC filings) and secondary resources discussing about the pledge and the strategic implications of the decision. As such, interview data make a connection between Tesla as an example and other trends identified in other organizations.

## 7.2 Background: The Patent Philosophy of Tesla

Tesla Inc. owns a very rich patent portfolio, including hundreds of patents for innovations in emerging technologies, such as electric motors, powertrains, and charging stations (Tesla, Inc., 2023). Conversely, from other companies, Tesla does not follow the traditional approach of using IP as a way of differentiation and gaining a competitive advantage over competitors. Instead, the company views patents completely differently than the majority of firms, Given this, even the CEO of this company, Elon Musk, on one occasion reaffirmed the patent philosophy of Tesla by stating: *"technology leadership cannot often be defined by patents… but by the ability of a company to attract and motivate the world's most talented engineers"* (Vincent, 2014). Therefore, it can be concluded that this company uses patents not as a standalone factor, but as one of the ways to drive its competitiveness in the ever-changing technology sectors.

Additionally, Tesla protects its competitive position in the market thanks to its innovative spirit, efficient manufacturing processes, excellent supply chain, and trade secrets (Miao, 2025).

Many of the interviewees who were leading a technological company had similar views to Tesla's approach. Their statements highlighted that they use a combination of patents, engineering, and speed in execution in order to achieve success, and are not reliant only on the exclusive protection of IP.

## 7.3 Strategic Rationale of the Open Patent Pledge

There are a number of strategic perspectives for Tesla's decision to open its patents:

### 7.3.1 Foster Broad Adoption of Industry Technologies (RQ1)

In 2014, the electric vehicle market was underdeveloped, with not many competitors. In such a situation, Tesla could not expect to grow until the other participants in the market started to use its technology and develop in this industry, like the suppliers, charging stations, and trust from customers (International Energy Agency, 2023). Therefore, the Open Patent Pledge was established to provide an advantage to new entrants by reducing costs and removing barriers to entering the market and using the electric vehicle technology (Vincent, 2014). Put more simply, Tesla had an indirect benefit from the increasing number of participants in the EV market; thus, the more players that enter the EV space and adopt Tesla's technology, the greater benefit for Tesla.

Similar viewpoints to Tesla were expressed by the interviewees, who stated that IP acts as a tool that oversteps its defensive nature and helps in building ecosystems and communities. Specifically, it is worth noting the response of Interviewee 7, who explained that their company also uses IP *"to support negotiations and strengthen market position"*.

### 7.3.2 Enhancing Tesla's Core Competitive Advantage (RQ1)

Tesla is able to sustain its competitive advantage in the electric industry because of a number of significant advantages, including its great manufacturing capabilities, custom battery chemistry, and internal software systems. Each of these capabilities requires deep, accumulated knowledge and continuous iteration; thus, they are very difficult to replicate by others, even in situations when Tesla's patents are fully accessible for imitation (Miao,

2025; Polanyi, 1966; Nonaka & Takeuchi, 1995). This is consistent with the empirical findings presented in Theme 3, where respondents stated that the competitive advantage of their firms is not simply based on formally using IP; it comes from the tacit and experiential knowledge of the organization.

In such a situation, for Tesla, sharing its patents with others would not risk any of its core competitive advantage.

### 7.3.3 Increasing Demand for Tesla's Supercharger Network (RQ1)

The charging infrastructure of Tesla is the most critical element of its successful business model (Tesla, Inc., n.d.; Mangram, 2012). In this context, if other manufacturers could adopt or invent a similar technology, it would lead to the overall use of Tesla's supercharger network. The result will be a stronger and sustainable network of Tesla, and increased attractiveness of the company in less developed markets. This kind of strategy, meticulously used by Tesla, reflects the positions some of the participants took during the interview process, stating that IP can act as a facilitator and create growth opportunities beyond the tight scope of innovation itself (Interviewees 7 and 8).

### 7.3.4 Strengthening Brand Reputation and Investor Appeal

With its strategy of making its patents accessible to others, Tesla created a perception of its brand not only as a forward-thinking one but as a mission-oriented company dedicated to sustainability and technological innovation. Throughout the interviews, participants often mentioned that IP is extremely important for their company to build credibility and enhance its position when negotiating with investors or partners (WIPO, 2022b). Thus, this approach around patents reveals the dual function IP plays for Tesla, as a strategic and also a reputational instrument.

### 7.3.5 Limitations of the Tesla Case

Tesla as a great corporation based in the US technology sector cannot be used as a general example for all industries, especially for SMEs. Particularly, the pledge case itself also presents a strategic choice the company made given its position in the market, resources, and objectives. Thus, the case is explored in order to mirror mechanisms and strategies well-known corporations use regarding IP, but this case cannot prove that similar strategies can produce the same effect. The basis and overall, the validity of the thesis is grounded

on the interview data collected from participants with different backgrounds. The Tesla case enriches the discussion as it serves as an example of a successful ecosystem-focused IP strategy.

## 7.4 IP Strategy and AI-Supported Innovation (RQ2)

Before AI was used to support business operations, Tesla opened its patents publicly. However, its innovation processes are somehow linked to AI discussions (Tesla, Inc., 2023). In this context, Tesla uses AI-supported technology in its autonomous driving systems, in improving manufacturing processes, and in the development of the features of its vehicles. However, Tesla does not treat AI as the inventor of its products, besides its continuous use in internal processes.

These views towards AI and its capabilities of being an inventor are some of the issues mentioned by the interviewees, who stated that even though many companies use advanced AI technologies, current IP systems are not prepared to handle AI.

Overall, interviewees, scholars, and also Tesla share the same perspectives that existing regimes cannot completely deal with inventive processes generated or supported by AI (Abbott, 2016; Gervais, 2020). Given this, Tesla, besides patents it still uses its own protective mechanisms, like internal data, algorithms, machine learning models, and innovative datasets for training. None of these elements belongs to the scope of traditional IP law.

## 7.5 Knowledge Protection and Know-How (RQ3)

Tesla has a superior position in the market because of its great combination of engineering know-how, internal production processes, and technological absorptive capacity. As highlighted earlier in the thesis, the most important part of the knowledge it uses is tacit and built over time; thus, it is not fully captured in its patents. Consequently, it is extremely hard for competitors to imitate it (Polanyi, 1966; Nonaka & Takeuchi, 1995).

This section aligns with Theme 3 of the empirical findings, where SMEs as well as larger organizations explained that protecting undocumented procedural knowledge is a significantly important part of their success. In this context, participants noted that the biggest contributor to their competitive differentiation is not the legal protection of patents and trademarks. Instead, they mostly benefit from the tacit knowledge, employee know-

how, and internal routines. This same logic is showcased by Tesla's strategic dependence on internal knowledge.

## 7.6 Enforcement, Global Risks, and the Role of Tesla in the Ecosystem (RQ3)

From the empirical findings, a conclusion can be made: enforcing IP presents notable challenges for many companies because of the high costs, complex procedures, and distinct regulations internationally (OECD & EUIPO, 2019; Taubman et al., 2012). Through the Open Patent Pledge, Tesla notably reduced enforcement costs as the company does not initiate court proceedings against others for patent use, except in cases where they are "in bad faith". Thanks to this strategy, because the company owns hundreds of patents, it avoided substantial expenses (Vincent, 2014).

However, Tesla has not completely denied enforcing patent rights legally, as the company, in urgent situations, can initiate legal action, and in this way, it manages risk effectively, avoiding the burden of investing great financial resources in enforcement litigation. The mixed enforcement strategy used by Tesla is reinforced by interviewees, who noted that enforcement procedures have to balance the need to accomplish dual objectives: operational and strategic.

Tesla's open patent pledge illustrates the potential of IP to exist as an active strategic element of business and innovation strategy and not simply as a defensive tool (Pisano & Teece, 2007). The case also reflects many of the themes captured from the empirical data, like the use of IP as a mechanism for credibility and ecosystem-building tools, the constraints of the current IP system regarding innovations supported by AI, the role of tacit knowledge, and the need for more flexible enforcement approaches in global markets. These insights conceptually connect empirical findings explored in Chapter 6 with the discussion of the research questions in this chapter.

### 7.6.1 Framework Mapping: Tesla Case

In this section, the Tesla's strategic behavior is linked to the framework made of four layers presented in Figure 1. The table 6 below shows that every element of the framework in figure 1 is reflected in the Open Patent Pledge case. Moreover, the Tesla case is aligned with patterns detected in the findings from interviews in different sectors.

**Table 6:** Tesla Case Mapped to the Conceptual Framework

| ***Framework Layer*** | **Tesla Evidence** | **Interview Alignment** |
|---|---|---|
| *IP Instruments* | A great number of patents in electric vehicles, charging systems, and design, use of trade secrets in manufacturing and software processes. | Theme 3: internal knowledge protection methods (know-how, trade secrets). |
| *Strategic Aims* | Patents are used for signaling, collaboration, and ecosystem enhancement through Open Patent Pledge. | Theme 1: IP as a strategic asset for licensing and partnerships (RQ1). |
| *Constraints* | Uses non-litigation commitments to avoid costly enforcement actions, addresses AI challenges through internal monitoring processes. | Theme 2 and 4: constraints from AI ambiguity and international enforcement challenges (RQ2 & RQ3). |
| *Outcomes* | Strengthened brand reputation and loyalty, expanded opportunities for collaboration around the world, and enhanced investor interest. | Data from interviews: competitive advantages from IP, strategic alliances, and investment attractiveness. |

*Source: Author, 2026.*

## 7.7 Discussion Related to Research Question 1

**RQ1: How do organizations in innovation ecosystems strategically use intellectual property?**

A crucial piece of information revealed during the interviews was the significant difference in using the IP strategy between technology-heavy firms and small creative SMEs. For larger companies, specifically those working in the tech sector, renewable energy, and design findings reaffirmed a strategic use of patents when negotiating, to represent credibility to investors, and capacity to expand into other international markets. These highlighted points are also mirrored in the theoretical assumptions about IP by

Pisano and Teece (2007) about IP, who highlight it as a mechanism for gaining competitive advantage. The insights from the interview confirm this argument since participation from the tech industry described patents as a significantly important tool to showcase capacity for innovation, bolster market position, and negotiate partnerships internationally.

On the contrary, SMEs established in the fashion, handmade crafts, and food innovation industries prioritize trademarks, building brand identity, and loyal relationships with customers. These insights correlate with studies about SME (WIPO, 2021b), which explores that smaller firms usually do not have either financial or legal capacity for implementing broader IP strategies. Even though SMEs are aware of the value that protecting their brand has, they are not able to use and include IP as part of their general company strategy.

Findings about patents vs. trade secrets further align with the theoretical viewpoints of Posner (2005). According to this author, when companies make a decision on whether to choose patents or trade secrets, they consider the risk of reverse engineering, costs, and market expansion capacity. Interviewees' thinking was very similar to that, as they suggested that final decision-making for IP protection is based not only on legal concerns but mainly on how this mechanism can benefit their business strategy.

The real-world example provided in Chapter 7 about Tesla serves as an empirical illustration of the earlier findings. The Open Patent Pledge of the company shows that patents can act as mechanisms for building an ecosystem, contributing to brand position, and encouraging market development, surpassing their role of serving exclusivity only. Tesla’s viewpoint of patents resonates with comments made by a number of interviewees about how IP can be leveraged to build credibility, gain interest for investments, and create opportunities for collaboration. Furthermore, the company’s decision to disclose its patents to the public highlights the importance of strong internal knowledge and tacit capabilities that can replace the need for legal protection, without lowering the value of its patents.

Overall, the insights gained about RQ1 indicate that IP can act as an adaptable instrument depending on the context of innovation ecosystems. However, its usage purpose is distinctive and highly variable of the size of the company, its financial power, and the industry of operation. Larger companies tend to use IP as a strategic resource, while, on

the other hand, for smaller and medium-sized firms, it serves the purpose of their identity and legitimacy. Tesla's case once again reaffirmed the outlook of some more experienced interviewees who described IP through the lenses of a strategic and ecosystem-building tool.

## 7.8 Discussion Related to Research Question 2

**RQ2: In what ways do organizations view the challenges brought by AI-generated innovation, specifically in relation to inventorship?**

Across all interviewees, a significant level of agreement was identified: existing IP systems are not ready to deal with AI-generated outputs. Modern legal scholars, such as Abbott (2016) and Gervais (2020), also state that AI questions the fundamental beliefs about inventorship, authorship, or human contribution to creativity. Similarly, even participants who did not belong to the technical sector and with limited knowledge in this area noted that quick AI advances are outperforming and going beyond the systems that govern them.

All interviewees were against the idea that AI should bear the title of an "inventor" because, from their point of view, it does not have the creativity of a human, its intention, and cannot be responsible for its actions. In the same way, courts within several jurisdictions during the global debates about the issues in the DABUS case maintained an identical standpoint: inventions must be human-based (Thaler v. Comptroller-General of Patents, Designs and Trade Marks, 2023). In this context, even though technology is developing at a high speed, empirical findings conclude that legal definitions of inventorship should be applied only to humans, further supporting theoretical arguments.

When mentioning legal definitions, interviewees recognized the urgent need for some legal changes to deal with challenges posed by AI. Thus, standards need to be clearer, jurisdictions have to be harmonized, and additional digital tools need to be developed to simplify documentation and transparency of processes assisted by AI. Similar recommendations have been made by international organizations, like WIPO (2020b). This organization proposed a future reform that will allow innovations assisted by AI as long as human accountability is not weakened.

These issues are further confirmed by Tesla, which prioritizes AI and machine learning in many operational processes, especially in autonomous driving, but it still does not accept

AI as a legal inventor. The most valuable components of Tesla's success can be credited to its proprietary data, internal algorithms, and learning processes. Empirical findings revealed analogous insights: firms often use trade secrets, technological advantages, and internal knowledge to compensate for the poor IP law implementation before the law framework, which is still evolving in recognition of AI's role in innovation.

In this section, overall, findings reinforce the fact that in the industry exists a clear gap between AI innovation and legal acceptance. Regardless of the advanced and sophisticated technology, firms prefer IP frameworks centered around humans, and AI continues to be seen only as a useful tool for simplifying operations – not a legal creator.

## 7.9 Discussion Related to Research Question 3

**RQ3: How does legal and practical uncertainty associated with enforcement and transnational protection affect the choices of firms toward knowledge protection mechanisms and intellectual property strategy, especially for SMEs?**

Through the findings, we can understand that SMEs and larger firms employ significantly different approaches when managing knowledge protection. SMEs, for instance, rely more on informal styles of knowledge protection; they lean towards tacit knowledge and practices based on trust. This practice is consistent with the definition of tacit knowledge given by Polanyi (1966) and Nonaka & Takeuchi's (1995) theory of creating organizational knowledge. Small and medium enterprises keep the knowledge within the circle of the company, between the founder and employees, and almost never document it formally. Thus, they often deal with problems of imitation or turnover in their employees. Larger firms, different from SMEs, rely more on formal systems, internal repositories, and non-disclosure agreements, strictly controlling the accessibility of these structures. This aligns with theoretical premises that, as the organization's size and its technical sophistication increase, in parallel, its codification and formal processes increase.

All of the interviewees agreed that enforcement costs, the existence of various enforcement rules in different jurisdictions, and procedural difficulties in patenting on the part of the investor are major barriers in the pathway of obtaining the legal protection of IP. In this context, we can connect the theoretical assumptions of Taubman et al. (2012) and OECD & EUIPO (2019), which conclude that enforcement is a crucial weakness, especially for smaller companies. Enforcement issues were mentioned by larger and

financially stable companies as well. They pointed out that complicated, expensive legal procedures and the high degree of uncertainty are what set them back from enforcing IP.

In the discourse of future trends, respondents consented that innovation ecosystems are becoming more digital, connected, and dynamic. In these systems, SMEs were seen as a significantly important factor and a driving force, because of their ability to be more flexible, creative, and their talent to take advantage of niche markets. The increasing role of SMEs in digital and knowledge-based sectors is also noted in global innovation reports of WIPO (2022b).

These trends are illustrated again in the case of Tesla. The company adopts an open-patent strategy to reduce the costs of enforcement; however, at the same time, it continues to utilize tacit knowledge and internal processes to maintain its leading position in the market. Similar views are expressed by interviewees regarding their understanding of when and how to balance protection and openness, as well as how to adapt to global ecosystems, and that internal resources are strategic capabilities.

Across the three research questions analyzed, it is evident that IP has evolved from merely being a protective tool for rights to an adaptive, strategic resource that is highly dependent on the characteristics of the organization, industry, and technology. The themes identified key empirical phenomena that also reflect the theoretical literature, and are furthermore supported by Tesla as a real case study. All of these demonstrate the inextricable connection between IP strategy, knowledge practices, AI challenges, and global enforcements in current innovation systems.

# 8 Conclusion

## 8.1 Summary of the Study

The research analyzed how organizations include intellectual property in their strategic business planning in innovation ecosystems. The purpose of the study was to identify and analyze the challenges that firms face with respect to intellectual property due to the emergence of artificial intelligence, how do companies manage knowledge, what their viewpoints are for the enforcement of IP, and future risks that may arise in global business activities. Qualitative research methods were used to gather data through a series of nine semi-structured interviews, supplemented by the renowned case of Tesla, the thesis

determined three main areas: (1) the strategic use of intellectual property by organizations; (2) how are challenges associated with AI as a driver of innovation and inventorship progressing; and (3) the mechanisms used by firms to protect their internal knowledge, enforcement difficulties faced by them, and what will image of future trends that affect innovation ecosystems look like.

The results from the empirical study revealed that organizations do not use IP identically. The differences in interpreting and implementing IP are mainly determined by the size of the company, market position, and integration of technological developments. For large companies that heavily rely on technology, patents and trade secrets perform as effective strategic assets, while smaller and medium-sized companies depend more on trademark protection, building reputation, and informal means for protecting knowledge. The differences in the way in which IP is incorporated in the business operations and strategy of the companies are closely correlated with the amount of available financial resources of the company and its position within a particular ecosystem.

The findings also indicate that all interviewees agree that AI inventions cannot yet be fully incorporated in the existing IP systems, because they are not prepared for this kind of reform. In this context, participants from different industries shared the same opinions on this matter; even though AI is inextricably connected to the design process, manufacturing, and creative systems, unfortunately, legal frameworks cannot regulate AI inventions (Abbott, 2016; Gervais, 2020; WIPO, 2020b; WIPO, 2022b). Most of the interviewees had uniform opinions that inventorship should only belong to humans, and if otherwise, then the current legal systems must undergo significant reforms in order to define the position of AI in produced outputs.

The third theme identified by the respondents was the role of tacit knowledge, enforcement obstacles, and the changing nature of innovation ecosystems. SMEs rely on trust-based and undocumented systems of knowledge. On the other hand, large companies typically have structured and documented ways of managing their knowledge. Additionally, enforcement presented a concern for everyone because it comes with the expenses of litigation, fragmented jurisdictions, and unpredictability of outcomes. All of these themes point toward the necessity for a reformed 21st-century IP infrastructure that will be more

adaptable and will accommodate new business practices that result from the evolution of technology (WIPO, 2022b).

## 8.2 Theoretical Contributions

This thesis contributes to the literature on the strategic use of intellectual property (IP), innovation management, and governance of artificial intelligence (AI) from multiple theoretical perspectives.

First, the research supports the idea that the role of IP has extended beyond simply protecting against infringement, and it has become an opportunity for companies to use IP as a valuable asset for strategic purposes. These findings are mirrored in the theories of Pisano & Teece (2007) and Posner (2005), who explain that IP is a valuable tool in the positioning strategy, showing potential for innovation, attracting investors, and partner negotiations. The study enhances the evidence in this area as it demonstrates the specific ways that businesses implement IP strategically with an emphasis on technological industries.

Further, the study adds value to the ongoing academic discussion regarding AI systems and the question of inventorship, whether those AI systems should be recognized as inventors. The scholars are arguing continuously around the question of accepting AI as an inventor; interviewees almost homogenously rejected the notion that AI should bear the status of an inventor. These insights contribute to and expand the current theoretical debate by adding some examples from the real world that innovations are strictly connected to humans, and that human creativity and accountability are foundational principles of inventorship. In this regard, these arguments are supported by Abbott (2016) and Gervais (2020), who state that firms usually use trade secrets, proprietary databases, and established routines as practical mechanisms to protect AI innovations separately from the formal legal framework.

Third, this current research adds depth to the existing theory that explains tacit knowledge and knowledge management practices, and reaffirms findings of Nonaka & Takeuchi (1995) and Polanyi (1966), which state that tacit knowledge still presents a major source for gaining competitive advantage. However, the study extends these views by showing how tacit knowledge and digital technologies, artificial intelligence, and global collaborations of firms are combined to create new forms of innovation ecosystems.

Ultimately, the case of Tesla provides an example of the real application of these theories. This case shows how a superior firm in technology can successfully integrate both open and closed patent strategies into its business model. Further, the Open Patent Pledge is proof of how companies can use intellectual property not only to protect their inventions, but also to create opportunities for other business players to expand, to return investments, and to enter new markets. This combination of strategies supports theoretical concepts previously explored in the thesis that there is no single approach to successful IP strategy and that fruitful approaches are complex and highly conceptualized.

## 8.3 Managerial Implications

Several valuable implications for the management of intellectual property for all types of organizations this research can suggest.

Small and medium-sized enterprises should have a more formalized and systematic approach to the development and management of their IP. Besides the fact that these kinds of enterprises usually have to deal with constrained resources, there are tangible benefits from developing clear systems for internal documentation, trademark registrations with prudence, and a deeper understanding of the mechanisms of protecting trade secrets. The more they attain in the area of IP, the better they can grow, stimulate investments, and enter new international markets.

For firms engaged in technology-demanding businesses, a smooth blend of innovation and IP strategies is critical to their success. Patent portfolios should be treated more than just legal documents and instruments, but as valuable assets that enrich negotiations, facilitate the building of an ecosystem, and can provide advantages in developing or implementing entrepreneurial strategies. Many of the interviewees in this study, and the experience of firms like Tesla, are evidence of the peaceful coexistence of openness, collaboration, and sharing knowledge with the continual development of competitive advantages through the use of tacit knowledge and innovation processes.

This study suggests that firms that are engaged in developing AI technologies at this stage of the evolution of AI science will need to establish internal standards to keep track of processes where AI assists, how to develop proprietary datasets, and prepare for how future regulation can affect their businesses. At this time, since legal regulations that cover

AI-generated work are not fully established, each firm will need to govern itself and take into account these suggestions to mitigate any risk that can be associated with AI.

Ultimately, the thesis emphasizes the development of strategies of enforcement for all companies worldwide. Since the enforcement costs are high and jurisdictions vary throughout the globe, it is critical for companies to evaluate legal risks, to include IP strategy in their market entry plan, and search for alternative methods of protecting IP, such as contract agreements, joint venture partnerships, and capitalizing on the reputation of the company.

## 8.4 Limitations of the Research

Like every other qualitative research, this one also has its limitations. The interview sample was conducted with interviewees coming from diverse backgrounds, but it was still small and lacked geographical heterogeneity. A characteristic of this study is an investigative approach, which in turn means that insights gathered from it should not be objectively treated as “final results” that can be applied to every industry or jurisdiction. Moreover, some of the insights provided today may change tomorrow, because laws, tools, and industry standards never stop evolving. Nevertheless, the study provides great qualitative data made of different viewpoints, preparing a strong basis for valuable interpretations and a path for future research.

## 8.5 Recommendations for Future Research

The findings detect several pathways for future research.

First, future studies can focus on comparing different countries regarding their challenges and success factors from IP strategies and enforcement, with an emphasis on developing and transitioning nations.

Further, some empirical studies can be centered around the effect of AI technology on inventions, as well as how companies take evidence of human input when processes are supported with AI, and how do they manage accountability from such processes or products.

Third, further empirical studies on the way in which firms codify processes of tacit knowledge. Especially valuable insights can be provided by the companies operating in hybrid work environments and digital ecosystems.

At last, an additional area of future research could include a thorough exploration of open patent models as practiced by Tesla and a comparative study of Tesla's case with other firms embracing open innovation practices to better understand the factors behind these successful models.

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# 10 APPENDIX: Interview Guide

**Interview Guide**

**Introduction**

My name is Ljaura Bajrami, and I am an MBA student at Modul University Vienna. You are warmly invited to participate in my study on "Strategic Use of Intellectual Property Rights in Innovation Ecosystems: Legal Foundations, Business Models, and Emerging Challenges".

**Purpose**

This study aims to understand how organizations, including startups and SMEs, use intellectual property not solely as a tool for legal protection, but as an asset for business strategy and growth. The research questions focus on the way rapid advancement of AI has impacted on the protection of intellectual property and disclosure decisions, and how do business players deal with identifying and protecting know-how/procedural knowledge. You are invited to participate in this interview because you hold a relevant role, for instance, IP law, innovation, research and development, product or strategy maker, manager of a small business, and you can make meaningful contributions to this research. The data obtained from this interview will help me to answer my research questions and suggest some solutions which can be implemented into existing IP law frameworks.

**Process**

The process of the interview will take approximately 20-30 minutes. Your participation is fully voluntary. You are allowed to withdraw at any point, and not to answer specific questions. This study will not reveal any information about your identity or the identity of your organization, and responses will be kept confidential and will be used for research purposes only. To ensure accurate interpretation of the information, with your consent (you can provide it below), I will record an audio of the interview and take some notes if needed. I will delete the audio file after I have transcribed it. I will keep the data gathered from the interview in a secure-encrypted folder that will be accessible only to me.

**Give Your Consent**

☐ I consent to participate.

☐ I consent to an audio recording for transcription.

If you have any further questions, please feel free to contact me via email: bajramilaura@hotmail.com.

Kind regards,

Ljaura Bajrami.

**Interview**

**Q1.** In your current organization or from your experience generally, can you explain how do you use IP tools like patents, utility models, or trade secrets as an asset for business strategy and not only for legal protection? *(For example, to support the organization in negotiating, attract a commercial partner, or enter a new market).*

**Q2.** Can you walk me through a recent decision you made about an innovation, and what were the main technical, commercial, and legal factors that determined your choice of a patent, a utility model, or a trade secret?

**Q3.** Besides patents and trade secrets, how do you deal with the challenge to identify, document, and protect knowledge that is not documented? (For instance, know-how and procedural knowledge).

**Q4.** From your point of view, how well are existing IP systems prepared to deal with inventions generated by AI?

**Q5.** When talking about AI, should AI bear the title of an "inventor"? Why or why not?

**Q6.** What kind of legal reforms or business adaptations do you suggest should be implemented to align IP frameworks to innovations supported by AI?

**Q7.** What do you believe are the main challenges and risks that a company can face at an international level when enforcing IP? *(For example, costs, timeline, different jurisdictions).*

**Q8.** Can you walk me through some situations when IP acted as a facilitator for attracting investors, securing funding, or strengthening the value of your company?

**Q9.** From your perspective, do you believe that the role of IP in global innovation ecosystems will change, and how?

**Q10.** When managing IP in the future, do you believe that SMEs and startups will play a role, and what will it be?

**Q11.** What is the only advice you can give to a business leader or to policymakers to effectively manage IP in the era of AI?

**D1.** Gender:

- Female
- Male
- Non-binary
- Prefer not to say
- Other: _____

**D2.** How long have you been in your current business/sector?

- Less than 1 year
- 1-3 years
- 4-7 years
- 8-12 years
- 13 years or more
-

**D3.** What best describes your current position?

- Legal/IP Counsel

- Specialist (IP, R&D, Innovation)
- Manager
- Director/Head of Department
- C-suite (CEO, CTO, CFO)
- Founder
- Other: _____

**D4.** What is your level of seniority?

- Junior
- Mid-level
- Senior
- Executive

**D5.** What is your primary industry/vertical?

_____

**D6.** Approximately what is your organization's size (number of employees)?

- 1-9
- 10-49
- 50-249
- 250-999
- 1,000+

**D7.** What region does your organization mainly operate in?

- European Union (EU)
- United Kingdom (UK)
- United States (US)
- Other: _____

***Thank you for your precious time and for your participation in this interview. Your response is valuable and appreciated!***