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*Si vis pacem,
para bellum*

Patent Country Selection Strategy for Global Automotive OEMs

Master's thesis in the Master Degree Program Management and Economics of Innovation

ANTON THORSLUND
IDA OLSSON

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENTREPRENEURSHIP AND STRATEGY

CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2025
www.chalmers.se

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A case study exploring international patenting decisions in the context of technological transformation

ANTON THORSLUND
IDA OLSSON

Department of Technology Management and Economics
Division of Entrepreneurship and Strategy
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IDA OLSSON

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Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Gothenburg
Sweden
Telephone + 46 (0)31-772 1000

Cover:
Si vis pacem, para bellum is a famous quote that dates to ancient Rome and translates to
“If you want peace, prepare for war”.

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SUMMARY

In knowledge-based economies, patents play a central role in protecting innovation and enabling strategic positioning. In the automotive sector, characterized by complex products, concentrated innovation clusters, and profound technological transformation, deciding where to file patents is a growing strategic challenge. This thesis explores how a global automotive original equipment manufacturer (OEM) can approach patent country selection in a way that supports the firm's broader intellectual property (IP) strategy and responds to changes in the competitive and technological landscape.

Using a qualitative case study method, data was collected through sixteen semi-structured interviews with internal stakeholders and external IP professionals, complemented by professional literature and practitioner insights. The analysis was guided by Somaya's (2012) framework of generic patent strategies, proprietary, defensive, and leveraging, along with theories on technological change, innovation ecosystems, and patent strategy.

The findings show that market relevance and third-party exposure are the most critical factors in country selection, while legal system quality is treated as a baseline requirement. The strategic intent of the patent portfolio significantly shapes which factors are prioritized. For proprietary strategies, filings focus on key markets; defensive strategies target both own and competitors' key regions; and leveraging strategies emphasize collaborators' and suppliers' geographies. The study also highlights the need for OEMs to dynamically assess IP assertion risk, especially as new technologies attract non-traditional actors into the ecosystem.

This thesis contributes to the limited academic literature on patent country selection by offering a strategy oriented approach applicable to automotive OEMs. It emphasizes that country selection decisions should be aligned with the strategic role of each patent portfolio, rather than treated as an isolated administrative task.

Keywords: patent strategy, country selection, international patenting, automotive industry, intellectual property

Acknowledgement

First, we would like to thank our supervisor at Chalmers University, Thomas Ewing, for his enthusiasm and excellent support throughout the research.

Moreover, we would like to express our gratitude to the case company for their cooperation and support throughout this research. A special acknowledgement goes to our supervisor at the company and to the project team for their engagement, expertise and valuable insights.

We are also grateful to the external interviewees who generously shared their input and expertise during interviews.

Also, our examiner, Marcus Holgersson, deserves our gratitude for the support he has given us.

Anton Thorslund & Ida Olsson
Gothenburg, May 2025

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1. Introduction

This introductory chapter provides an overview of the research area and the problem under investigation, establishing the foundation for this master's thesis conducted as the final part of the master's program in Management and Economics of Innovation at Chalmers University of Technology. The chapter presents the background, research aim, delimitations, and specifications of the issue being investigated in this study.

1.1 Background

Invention can broadly be interpreted as the creation of new knowledge, and the process of research and development (R&D) is dedicated to producing such knowledge (Arrow, 1962). In increasingly knowledge-based economies, firms are under pressure to protect and capture value from their invention in the face of imitation, spillover, and rapid technological change (Teece, 2000; Cohen et al., 2000; Arora et al., 2001). To support this, intellectual property rights (IPR), such as patents, offer firms legal rights to exclude others from using or commercializing their inventions within specified jurisdictions (Granstrand, 1999). While patents were originally designed to protect innovators from imitation, they are also used to support broader strategic aims such as deterring litigation, facilitating licensing, and strengthening firms' positions in negotiations and collaborations (Somaya, 2012; Blind et al., 2009; Reitzig et al., 2007).

In the automotive industry, patenting is extensive with incumbent OEMs and suppliers holding dominant patent positions. The industry has long been characterized by high R&D intensity, cumulative innovation, and strong appropriability conditions, features consistent with a Schumpeter Mark II regime (Breschi et al., 2000; Malerba & Orsenigo, 1997). Recently, sustainability policies and technological developments have created opportunities for new technological trajectories to emerge in the industry, including electrification, automation, and connectivity (LexisNexis PatentSight, 2020; WIPO, 2025).

With the emerging technologies, new types of actors and interdependencies are introduced to the automotive industry, increasing the complexity in managing patent portfolios (Holgerson et al., 2018). Firms from adjacent industries, particularly software and electronics, are establishing strong IP positions in areas relevant to automotive systems (Jacobides et al., 2023). This development challenges incumbents to rethink not only how patents are used for imitation protection, but also how they contribute to securing freedom to operate, enabling strategic collaborations, and sustaining negotiation power in a changing competitive landscape.

Because patent rights are territorial, firms must decide in which countries to seek protection. This decision involves a trade-off between cost and expected value, as filing in more countries increases both coverage and expense (Gassmann et al., 2021; Alcácer et al., 2015; Sharma et al., 2021). Historically, automotive OEMs have shared similar key markets and to some degree also production countries, making patent country selection confined to a limited set of countries. However, the emergence of new technologies and competitors that do not necessarily align with these key patenting countries, introduces complexity to the country selection.

Patent country selection is one dimension of patent strategy and the broader patent management process. While traditionally treated as an internal and operational task, Agostini et al. (2023) show that effective patent management depends on aligning patent activities, including country selection, with the business strategy and the organizational capabilities. This includes balancing costs with long-term positioning, as IP departments often operate under strict budget constraints. Firms are increasingly taking a forward-looking view, selecting countries based on expected future relevance rather than current operations (Granstrand & Holgersson, 2012). Combined with cost considerations, this has contributed to convergence in global patenting patterns, where filings are concentrated to a limited set of countries with strong markets, enforceable legal systems, and key ecosystem actors (Granstrand & Holgersson, 2014). These developments suggest that country selection plays a more central and strategic role than traditionally assumed.

Patent country selection remains a relatively unexplored area in academic literature, with only a few studies exploring general country selection considerations and, to the researchers' knowledge, none within the automotive industry. This thesis addresses the outlined gap by investigating how a global automotive OEM can approach its patent country selection strategy to ensure it contributes to overarching strategic intents of the patent portfolio, and accounts for the shifting dynamics of the industry's ecosystem.

1.2 Research aim

The aim of this study is to explore how a global automotive OEM should approach the patent country selection. Specifically, the study investigates how the underlying strategic intent of a patent portfolio influences the relative importance of factors taken into consideration in the patent country selection. In doing so, the study also examines how automotive firms can identify and evaluate relevant actors in their ecosystem when pursuing defensive strategies, especially in response to technological and industrial changes. The overarching goal is to

develop insights that contribute to more deliberate, strategy-informed patenting decisions that reflect the evolving nature of ecosystems in the automotive industry.

1.3 Delimitations

This study is centered around a single case company operating as a global original equipment manufacturer (OEM) within the automotive industry. The primary analysis is based on data collected from this firm's internal processes and strategic considerations regarding patent country selection. Specifics on segments within the automotive industry have been asked to be held secret in the report to maintain the anonymity of the case company. To complement and contrast these insights, a limited number of external interviews were conducted with IP professionals from other industries. These external perspectives are included to strengthen analytical depth and relevance but do not represent additional case studies. The research is focused exclusively on patents, and other forms of IPRs are excluded. Moreover, the scope excludes automotive aftermarket products due to significant differences from automotive products. Further, the scope is limited to the strategic dimension of patent country selection. Procedural, legal, and administrative aspects of patent filing, as well as broader patent portfolio management issues such as pruning, valuation, or quality assessment, are outside the scope of this study.

1.4 Specification of the issue being investigated

To fulfil the aim of the study, it is essential to first understand what factors a global automotive OEM should consider when selecting countries for patent protection. Then, it is necessary to explore how the strategic intent of a patent portfolio shapes the importance of those factors. Lastly, when pursuing defensive strategies, firms must be able to identify which actors in the ecosystem to defend oneself against. These aspects form the foundation of the study's research and are addressed through a qualitative case study combined with external expert interviews. The study is guided by the following research questions:

RQ1: What factors should a global automotive OEM consider in its patent country selection strategy?

RQ2: How can the strategic intent of a patent portfolio influence the importance of the identified country selection factors?

RQ3: What actors should a global automotive OEM consider in their patent country selection when pursuing defensive strategic intents?

2. Theoretical Framework

This chapter presents the theoretical framework that forms the foundation for this study, outlining key concepts and perspectives relevant to patent country selection strategy. Section 2.1 introduces the role of intellectual property and patents in knowledge-based economies, including the strategic functions patents can serve and considerations for where to seek protection. Section 2.2 describes three generic patent strategies, proprietary, defensive, and leveraging. Section 2.3 explores the dynamics of innovation and industry structure, including technological regimes and ecosystem interdependencies, to contextualize how external conditions influence strategic patenting decisions.

2.1 Intellectual Property and Patents

In knowledge-based economies, intangible assets such as intellectual property have become fundamental to both firm-level competitiveness and broader economic performance (Teece, 2000). As firms increasingly rely on knowledge and innovation to differentiate themselves, the ability to capture returns from these investments is critical. Intellectual property rights (IPRs) offer a legal mechanism to appropriate the outcomes of innovative activity, helping firms maintain control over their technological advancements (Arora et al., 2001).

Patents are a central component of IPRs, offering time-limited exclusive rights over technical inventions that meet the criteria of novelty, inventive step, and industrial applicability (Granstrand, 1999). Patents are negative rights, hence, giving the owner the right to block other actors from making, using, or selling an invention, but not an exclusive right to use the invention himself (Grube 2009). These rights enable firms to reduce imitation risks and enhance their ability to profit from R&D-intensive activities (Cohen et al., 2000). Patents are, as mentioned, time-limited, and have a lifetime of 20 years from the application date (Law, 2009). In exchange for this temporary exclusivity the inventor must publicly disclose how the invention works in sufficient detail to allow replication by a person skilled in the art (Jaffe & Lerner, 2004). The requirement for disclosure also contributes to the cumulative nature of technological progress by expanding the publicly available knowledge base (Scotchmer, 1991).

Patent protection is territorial, and inventors must therefore apply for patents in each jurisdiction, referred to as country in the rest of the report, where protection is wanted. The scope, validity, and enforceability of a patent are governed by national laws, which vary across

countries (Guellec & van Pottelsberghe de la Potterie, 2007). International agreements such as the Patent Cooperation Treaty (PCT) and the European Patent Convention (EPC) simplify aspects of the application process, but enforcement remains in the hands of national courts and is far from harmonized (Organisation for Economic Co-operation and Development [OECD], 2004).

Patents of large firms are generally organized in patent portfolios, which is a collection of patents related to a technological field (Parchomovsky & Wagner, 2005). Commonly, patent portfolios contain patents focused on a specific problem, or around a specific product. Exactly how patent portfolios are divided depends on the knowledge of the patent holders, and the aim the portfolio is intended to fulfill. Parchomovsky and Wagner (2005) go as far as to say that in the modern patenting environment, the filing of individual patents is best seen as a means to achieve the strategic business aim of the portfolio. In line with this, Blind et al. (2009) emphasize that the structure and characteristics of patent portfolios are shaped by the strategic motives that firms pursue, such as protecting key inventions, blocking competitors, or enabling collaboration. These motives influence how firms construct and deploy their portfolios, further reinforcing the view that patents are filed and organized not in isolation, but as part of a deliberate and strategically aligned IP strategy. Such strategic aims or motives are elaborated on in Chapter 2.2 Generic Patent Strategies.

2.1.1 The Functions of a Patent

Patents are intended to provide legal protection against imitation and allow inventors to get a return from their R&D investments (Teece, 1986). However, in practice, patents often fail to provide perfect appropriability. Legal scholars have shown that patents can be designed around at relatively low cost and are frequently subject to legal uncertainty, particularly in enforcement (Lemley & Shapiro, 2007). Enforcing patent rights through litigation is costly, outcomes are unpredictable, and there is always a risk that the patent may be found invalid during legal proceedings (Hall & Harhoff, 2012). As a result, many disputes are settled out of court, and firms often use the threat of litigation as a strategic bargaining tool. The likelihood of litigation also varies by technology sector, with higher rates observed in electronics, software, and biotechnology due to the density of overlapping patents (Ziedonis, 2004). Patent enforcement also depends heavily on national legal institutions, as patents are territorial. Countries differ in terms of judicial expertise, remedies available, burden of proof, and the effectiveness of injunctions (Guellec & van Pottelsberghe de la Potterie, 2007; OECD, 2004).

2.1.2 Patent Country Selection

Firm's *patent country selection strategy* aims at optimizing territorial coverage for the commercial and strategic value of each invention (Fernandez-Riba, 2010), and the decision is therefore a central part of patent strategy. Each additional country increases costs and adds administrative complexity (Gassmann et al., 2021) and IP departments often operate under budget restrictions and need to meet their goals within these limited resources (Agostini et al., 2022). While multinational protection may be necessary to safeguard innovation and market access, it also carries legal and administrative risks, particularly when enforcement becomes necessary across countries (Guellec & van Pottelsberghe de la Potterie, 2007; Fernandez-Riba, 2010).

Grandstrand and Holgersson (2012) show that firms increasingly base country selection on forward-looking market relevance rather than solely on current sales or production locations, emphasizing countries where patent protection supports future competitive positioning. In combination with budget restrictions, the result is global convergence in patenting, with many firms selecting a similar set of countries that combine market size, legal robustness, and ecosystem importance (Granstrand & Holgersson, 2014). Such convergence in international patenting reflects the increasing need for strategic patent country selection, making it a key issue for both corporate practice and policy discussions (Granstrand & Holgersson, 2012).

Notably, firms' patent country selection strategies are not a deeply explored topic in academia. Cuellar et al. (2022) argue that this might be due to its strategic value and that disclosure could benefit competitors. However, some existing literature gives guidance in terms of what strategic considerations should be made when doing country selection.

Market importance is among the most significant. Firms prioritize countries with large or strategically relevant markets, where the risk of revenue loss from infringement is high and where patent protection supports monopoly rents (Alcácer et al., 2015; Manning, 2007). Given that patents are valid for up to twenty years, country selection also requires a forward-looking perspective that considers future market relevance (Storz, 2011; Dachs & Pyka, 2010). These decisions reflect the broader economic role of patents as tools for securing value that might otherwise be lost due to imitation (Alcácer et al., 2015).

Competitor presence is another guiding factor. Firms commonly patent in countries where rivals operate, manufacture, or hold patents themselves, using filing as both a defensive and offensive tool (Manning, 2007; Fernandez-Riba, 2010; Cuellar et al., 2022).

Legal factors, the strength of the patent protection regimes in terms of law and enforcement, are also mentioned as important considerations in literature, as patent protection in different countries varies (Fernandez-Riba, 2010; Storz 2011). Manning (2007) explain that patent laws of most industrialized countries are similar to a large extent, but there are differences that can affect the ability to obtain a patent. For example, there are local restrictions to what is patentable, why the same patent filed in multiple countries could get different scope of protection. Also, enforcement mechanisms, e.g., in terms of judicial efficiency, procedural transparency, and the predictability of legal outcomes can affect the country selection (Guellec & van Pottelsberghe de la Potterie, 2007).

Alcácer et al. (2015) argue that for firms competing in several markets, the number of countries that need patent protection is reduced. The argument builds on multimarket contact theory, which say that competitive intensity among rivals is reduced when competing in multiple markets (Gimeno & Woo, 1999). That is because it allows firms to fight back attacks in any of the other shared markets, not only in the one where the attack may occur. Alcacer et al. (2015) extend this argument to patents, stating that the risk of being challenged or blocked in another market can act as a deterrent for potential asserters. A similar consideration is mentioned by Storz (2011), that country selection strategies neglecting countries with smaller markets or low IP enforceability is reasonable, as it often does not make sense for competitors to develop and market their own product only in these markets.

Alcácer et al. (2015) suggest that the country selection has become more complex for several reasons: firms sell in more markets (directly and through third parties), their value chains are more geographically diversified, and IP protection has become a more common method of competing across markets. Moreover, firms need to predict countries of interest for their business for the next 20 years to ensure that the IP they apply for today will cover their main markets in the future. Deciding what to protect where thus becomes an increasingly difficult exercise, with the risk of leaving firms exposed in some markets.

Recent research further emphasizes that patent country selection should not be treated as an isolated administrative decision, but rather as an integrated part of a firm's broader patent strategy and organizational capabilities. Agostini et al. (2023) demonstrate that firms exhibiting deliberate and well-articulated patent strategies tend to have more sophisticated management of patent core processes, including patent generation, portfolio maintenance, and enforcement. These processes are further enabled by a strong internal patent organization characterized by clear decision-making structures, interdepartmental collaboration, top management

involvement, and employee incentives. The interplay between strategy and organization has been empirically shown to reinforce the strategic coherence and execution of patent management. While the studies do not directly examine country selection, their findings suggest that such decisions are most effectively made when embedded within a coherent patent strategy and supported by organizational structures that align IP decisions with broader business objectives (Agostini et al., 2023).

2.2 Generic Patent Strategies

The original intent with the patent system was to incentivize innovative activities by providing a means for the inventor to prevent imitation, so that they could cover their cost by enjoying a limited monopolistic situation. However, as we have seen, a patent does not give an automatic market monopoly, only the right to exclude others from using the invention (Somaya, 2012). This right introduces opportunities to use patents for other purposes than obtaining exclusivity, which in turn introduces strategies for using patents to create and sustain competitive advantage. In a literature review, Somaya (2012) synthesizes research across economics, law, and management, and proposes three generic patent strategies, proprietary, defensive, and leveraging, to explain strategy centric links between patent and competitive advantage. Large companies often pursue patent strategies related to more than one of these. Within such hybrid strategies, Gassman et al. (2021) highlight that there is always at least one component related to minimizing the effect of third parties on one's own operations.

While the following framework provided by Somaya (2012) should not be seen as exhaustive in terms of explaining the relation between patents, competitive advantage, and business strategy, it offers a comprehensive analysis of existing literature, making it a relevant framework for this work.

2.2.1 Proprietary Strategy

The generic proprietary patent strategy defined by Somaya (2012) highlights the conventional logic of using patents to protect the firm's competitive advantage from imitation. It is built on the legal aspect of patents, that firms can enforce their exclusive right of an invention, to prevent others from using it. As such, firm aims at gaining an exclusive and watertight patent position in the technological domain. Somaya (2012) highlights that detecting imitation and enforcing patents on infringers is part of the strategy, as it is what secures the exclusive position.

It is argued that employing proprietary strategies, firms are less likely to license out the technology, instead focusing on commercializing them internally or through partners. It may also include building overlapping and complementary patent position to an individual patent, to reduce the risk of it being invented around or overturned. Such tactics are used to strengthen the exclusive patent position, and Somaya (2012) highlight that all tactics that aim at hindering other actors from developing technologies that achieve the same practical result are a part of proprietary strategies.

A make or buy argument is made, describing that the proprietary strategy rests on the premise that a higher value is gained from owning the patent right(s) rather than licensing it from another actor. This is the case when it is difficult to create and enforce licensing agreements that keep the full benefits of using the technology. Somaya (2012) argues that this holds for patents that are related to the company's core technologies, which are important for its current and future competitive advantage. This also applies to inventions that create significant market opportunities or offer a distinct market position due to a lack of close substitutes. In such cases, firms are more likely to rely on a proprietary strategy, especially when the technologies involved carry high strategic importance.

2.2.2 Defensive Strategy

Defensive strategies aim to minimize the impact of third-party patents on the focal firm's business. Because a patent gives the right to exclude others from an invention, not the right to use the patented invention, there is a risk of infringing on complementary patents held by other actors. The risk of this is higher the larger the set of technologies needed to commercialize a product is, as it increases potential exposure to third-party patents. The threat of legal remedies, such as injunctions or costly litigation, can then be used by patent holders to extract rents, which is referred to as holdup (Lemley & Shapiro, 2007). The goal of defensive strategies is thus to avoid this, i.e., keep the freedom to operate and commercialize inventions without being interfered by other patent holders (Somaya, 2012). As such, purely defensive patent strategies accumulate patents not for their inventive contribution, but to use as tools to neutralize infringement claims from other actors (Subramanian, 2008).

One of the most significant purposes of a defensive strategy is to ensure freedom to operate, without knowing which patents will be needed to achieve this. Therefore, the sheer size of the defensive portfolio is of importance to establish a credible threat of counteraction if the firm is threatened by another firm. Through a defensive portfolio, the firm can threaten back, creating

a mutual holdup with the aim of solving the situation without legal action being sought. Cross-licensing, a mutual exchange of the right to specific patents, is often an outcome defensive strategy (Somaya, 2012).

Defensive strategies that are built on size are argued to have limits, introducing uncertainty of their effectiveness. For example, cross-licensing is only viable if the threatening firm has any interest in the focal firm's patents. Hold-up, in turn, is most effective against actors who have commercial activities that can be held up (Somaya, 2012). Siebrasse (2011) argues that a situation occurs as a result of defensive strategies, in which no company can afford to be without its defensive portfolio, if everyone else holds a defensive portfolio, although each would be better off if they did not. This supports an important argument from Holgersson et al. (2018), that the ability to obtain freedom to operate is impacted by both the firm's own IP strategy as well as other firms' IP strategies.

A study by Okuda and Tanaka (2011) on 200 Japanese firms found multiple reasons for defensive patenting. Notably, this study took place before Somaya (2012) published his generic strategies, and Okuda and Tanaka acknowledge that multiple definitions for defensive patenting existed at the time. However, their study still can bring some clarity in addition to the academical views reflected by Somaya (2012).

According to the study, Japanese firms used defensive patents to protect their core technologies, especially during market growth when many companies are developing similar innovations. It was noted that such patents not necessarily were used commercially, nor was the uniqueness of the invention important. Instead, the focus was on maintaining a significant patent position within highly contested technological spaces. Defensive patenting also helped mitigate business uncertainty by covering technologies that may be important later, allowing for multiple future business directions. Defensive patents were also found to serve as a deterrent function. Although rarely enforced through litigation, defensive patents hold a strategic value in making potential infringement costly or legally risky for competitors. Characteristics such as broad claim scope, difficulty of evasion, and ease of identifying infringement increase the strategic weight of these patents (Okuda & Tanaka, 2011).

2.2.3 Leveraging Strategy

Leveraging strategies, as defined by Somaya (2012), identifies patents as tools to generate rent. The core idea in leveraging strategies is that the exclusive rights granted by patents create bargaining power, enabling firms to capitalize on both direct and indirect profit opportunities.

Such opportunities may appear through direct patent licensing, but also through asserting patents in negotiations to influence the outcome of cross-licensing, supplier contracts, and cross-firm collaborations, to gain more favorable conditions.

Using this strategy, firms do not need watertight protection, but sufficient coverage within technologies that other firms will use. This, combined with the costs and risk related to inventing around the patent will create opportunities to obtain rent from other actors. The bargaining power can further be strengthened by affecting the expected cost and risk of potential litigation, as it affects the willingness of other parties to agree on negotiated terms. Lemly & Shapiro (2007) emphasize that negotiation power is further strengthened in cases where the patent covers one component of a complex, profitable, and popular product.

Somaya (2012) further emphasizes that indirect patent leveraging may occur in various business contexts. For example, suppliers can win contracts, and counteract other actors from taking over them, by holding important patent positions and directly or indirectly threatening to sue if the contract is given to someone else.

Blind et al. (2009) suggest that patents are becoming more important in horizontal collaboration because the increasing complexity of products requires a mix of technologies that even large multinational firms struggle to create and manage alone. As discussed earlier in the context of defensive portfolios, having a large patent portfolio can also be useful in collaborative settings, as it helps firms demonstrate their value and attract partnerships (Blind et al., 2009).

2.3 Dynamics of Innovation and Industries

The dynamics of innovation and technological change are marked by shifts in the locus of competition, evolving firm competencies, and the emergence of new industrial structures. A central insight across the literature is that innovation does not unfold in a uniform or continuous manner, rather, it is characterized by transformations that affect both technological trajectories and organizational responses.

2.3.1 The Cyclic Model of Technological Change

Tushman and Anderson (1986) propose a cyclic model of technological change in which eras of incremental innovations are disrupted by technological discontinuous breakthroughs, introducing new knowledge and technical principles that make existing trajectories obsolete. The cycle involves an initial phase during which firms experiment with alternative designs.

This is followed by the emergence of a dominant design and a subsequent era of incremental change until a new discontinuity initiates the next cycle. The cyclical nature of technological change challenges linear models and emphasizes the episodic restructuring of both technologies and industries.

During the periods of incremental change, technological advances are characterized by refinements and extensions of existing technologies. Incremental innovations are consistent with the prevailing technological trajectory and the existing competencies of firms (Tushman & Anderson, 1986). Competition is based on price and manufacturing excellence, rather than product innovations (Utterback & Suarez, 1993). These improvements are typically competence-enhancing and enable firms to exploit learning-by-doing and economies of scale (Tushman & Anderson, 1986). The process is path-dependent in nature and favors firms that have accumulated specialized knowledge and routines over time.

In the cyclic model, a period of incremental change follows by a technological discontinuity, representing a distinct change from prior knowledge and accumulated learning in an industry. Tushman and Anderson (1986) define a technological discontinuity as an innovation that is both based on a different technical paradigm and introduces significant improvements in performance, unreachable by incremental innovations. These innovations disrupt the current technological trajectories and introduce high levels of uncertainty regarding technical feasibility, user preferences, and complementary innovations.

Tushman and Anderson (1986) further distinguish between competence-enhancing and competence-destroying innovations, depending on their impact on the existing knowledge base. Competence-enhancing innovations reinforce the skills, routines, and investments of incumbent firms by building on familiar knowledge and technical trajectories. In contrast, competence-destroying innovations undermine existing capabilities, making prior investments in knowledge and processes less valuable or even obsolete. Such innovations often originate from outside the dominant incumbent group and realign industry leadership, especially in environments where new competencies are not readily developed from existing ones (Tushman & Anderson, 1986)

The era of ferment follows the introduction of technological discontinuity. As described by Utterback and Suarez (1993), this era is marked by intense experimentation, a high rate of product innovation, and uncertainty regarding both technological and market directions. Multiple firms pursue alternative technological paths, and the competitive environment is fluid and unstable. During this period, there is no dominant product architecture, and competition is

primarily based on performance attributes as firms attempt to establish technical superiority (Utterback & Suarez, 1993).

Lastly, the era of ferment ends with the establishment of a dominant design. A dominant design emerges when one product configuration becomes widely accepted as the standard, reducing technological uncertainty and enabling the development of complementary innovations and infrastructure (Utterback & Suarez, 1993). The dominant design is not necessarily the most technologically advanced option but represents a synthesis of features that achieves market consensus. Once established, it redefines the basis of competition and channels subsequent innovations along a stabilized trajectory.

The influence of the different eras of the cyclic model on firms is substantial. In the ferment era, firms face uncertainty and are required to invest in exploratory R&D to remain viable. This period is associated with increased entry, but also high exit rates as many firms fail to align with the eventual dominant technological configuration (Utterback & Suarez, 1993). Once a dominant design emerges, firms must transition from flexible, adaptive innovation strategies to capabilities in scale, integration, and efficiency. The shift from a design competition to a process competition influences which firms survive and which exit the industry (Utterback & Suarez, 1993).

2.3.2 Technological Regimes

These transitions are not uniform across sectors. Malerba and Orsenigo (1997) propose that the structure and rate of innovative activity are shaped by underlying technological regimes, defined by opportunity, appropriability, cumulateness, and the nature of the knowledge base. High opportunity conditions indicate a strong potential for technological advancement, while appropriability affects the extent to which firms can capture the returns on innovation. Cumulateness determines whether past innovation contributes significantly to future efforts, and the characteristics of the knowledge base influence how innovation is organized and transmitted. Together, these dimensions give rise to distinct sectoral patterns of innovation.

Malerba and Orsenigo (1997) identify two broad innovation patterns: Schumpeter Mark I and Schumpeter Mark II. The Mark I pattern is characterized by frequent technological opportunities, high firm entry, and a turbulent competitive environment where new entrants play a central role in the innovation activities. This regime is typically associated with weak appropriability, low cumulateness, and a knowledge base that is more accessible and widely

distributed. As a result, innovation leadership is unstable, and industrial dynamics are shaped by a process of creative destruction, where firms frequently enter and exit the market.

In contrast, the Mark II pattern reflects a regime of creative accumulation. Innovation is dominated by a few large firms that maintain leadership over time through systematic R&D efforts and the exploitation of cumulative technological knowledge. This regime is marked by strong appropriability conditions, high degrees of cumulateness, and a knowledge base that is more complex and firm specific. The result is a more stable industrial structure with lower entry rates and a greater persistence of innovation leadership. These sectoral patterns are remarkably stable across countries, suggesting that the technological regime exerts a more consistent influence on innovation dynamics than national institutional differences (Malerba & Orsenigo, 1997).

In examining the shift from internal combustion engine vehicles (ICEVs) to battery electric vehicles (BEVs), Jacobides et al. (2023) suggests a third regime dubbed Mark III. This regime is characterized by tight linkages between incumbents and innovators. The authors argue that there is a dominant narrative that the BEVs are technological discontinuities, which should, according to Tushman and Andersson's (1986) cyclic model, trigger an era of ferment. However, instead of displacing incumbents, new entrants and technology providers have become embedded as complementors within OEM-led ecosystems. Hence, the automotive illustrates the persistence of incumbents even after significant technological change, which Jacobides et al. (2023) argue is a pattern that does not align with either of the traditional Schumpeterian models.

Further, the authors extend their framework by incorporating the concept of disruption through complements. In the mobility ecosystem, digital service providers, software firms, and platform players are shaping new forms of value creation. Yet OEMs retain a central role in the profit distribution, often through investment, data-sharing arrangements, or co-development. Jacobides et al. (2023) argue that while new actors have entered, they do so as collaborators rather than rivals, and value migration has been more limited than anticipated. The Mark III regime emphasizes co-evolution, alliance-building, and incumbent coordination, leading to an alternative pathway that reconfigures value and capabilities without dismantling the existing industrial order (Jacobides et al., 2023)

2.3.3 Innovation Ecosystems

Holgersson et al. (2018) provide an extension of the appropriability literature by emphasizing that innovation increasingly occurs within dynamic and interdependent innovation ecosystem, defined as a system of interconnected innovating actors, resources, activities, connected by organizational and market relations. Relationships in the defined innovation ecosystems are neither symmetrical nor static, and technological development, business model changes, and new entrants may alter the relationship over time.

A key insight from the paper is to extend beyond the focal appropriability regime to include complementary and substitute appropriability regimes. In complex, multi-technology innovation systems, firms are rarely self-sufficient, they rely on access to external technologies to generate and capture value. The ability to appropriate returns from innovation depends not only on the firm's own technological assets but also on how effectively it can access and leverage complementary technologies held by other actors. Thus, firms must simultaneously navigate both collaborative and competitive relationships within the ecosystem.

Further the authors argue that IP strategy should not primarily aim to maximize profits from single innovations but be a tool to claim long-term competitive advantage within the ecosystem. Hence, profiting from innovation in ecosystem contexts is not only a matter of internal capability or IP strength. It depends on a firm's ability to manage interdependencies, predict shifts in technological and competitive landscapes, and strategically govern how value is distributed in the innovation ecosystem. Holgersson et al. (2018) argue that appropriability is thus systemic, it must be understood, managed, and enacted within the broader of innovation ecosystems. Further, the authors emphasize the need for an IP strategy with an increased focus on the larger innovation ecosystem, including both collaborative and competitive actor relations.

3. Methodology

This chapter outlines the research structure, detailing the study's strategy and design, workflow, and the methods employed for data collection and analysis. Additionally, it includes a section introducing the case company studied. Ethical considerations relevant to the research are also discussed, highlighting their role throughout the study.

3.1 Research Strategy and Design

According to Bell et al. (2022), qualitative research emphasizes the use of words to develop a deeper understanding of human experiences, prioritizing qualitative data over numerical data in both data collection and analysis. Given the nature of the research questions in this study, an in-depth investigation beyond statistical data is required. Therefore, this study employs a qualitative research approach. The research design follows a case study methodology, a well-established approach in business research that involves a comprehensive and detailed examination of a specific case (Bell et al., 2022). This methodology is particularly suitable for exploring complex phenomena, as it allows for a flexible and iterative research process, enabling the study to evolve as new insights emerge. Further, case study methodology allows for comparing and contrasting findings from multiple cases, as a way of gaining multiple sources of evidence (Bell et al., 2022). For these reasons, the case study design was selected as the most appropriate for this research.

Further, Bell et al. (2022) discuss the logic of inquiry in business research, which concerns the relationship between theory and research and the process of theory-building. The two primary approaches in business research are deductive and inductive reasoning. A deductive approach follows a structured process of testing existing theories and falsifying hypotheses, whereas an inductive approach involves developing new theories based on empirical observations (Bell et al., 2022).

This study employs an abductive approach, which seeks to identify the most plausible explanation for a given set of observations while allowing for adjustments based on emerging evidence. In recent years, abductive reasoning has become increasingly prominent, particularly for developing explanatory models or theories derived from observed patterns. This approach provides flexibility in exploring complex phenomena by considering multiple explanations and selecting the most reasonable one based on the available evidence (Bell et al., 2022).

The research process began with a review of academic literature on IP strategy and country selections strategies for IPRs relevant to the study's objectives. Then, professional literature relating to country selection was gathered and initial interviews with key stakeholders at the case company were held. During the study, additional literature was included as new findings and observations emerged, reflecting the research's use of abductive reasoning.

3.2. The Case Company

The case company operates globally within the automotive industry. It is an original equipment manufacturing (OEM) company, with a commitment to innovation and technological excellence, delivering high-quality products and services. The company views R&D activities highly important to staying competitive in the industry currently undergoing technological transformations from mechanical engineering to electrification, automation and connectivity. Consequently, they recognize the importance of the IP function for protecting such R&D efforts through different IP strategies and IPRs. In recent years the company has increased both its R&D and IP budget every year. As of the past 5 years, the company has increased its patent filings significantly, leading to a present need for cost management of its patent portfolio. One major cost driver of the company's patent portfolio is the patent country selection, where the associated costs of a patent in a specific country must be compared to the estimated associated value. The company's dedication to innovation and IP and interest in investigating the country selection process makes it suitable both for sampling and as well as to answer the research questions. The research is conducted within the company's IP department, which purpose, amongst others, is to manage the company's patent portfolios, including the decision-making process of where to file patent applications.

3.3 Data Collection

Data collection is a crucial component of research projects (Bell et al., 2022). This study obtained the necessary data primarily from interviews and professional literature. A total of 16 interviews were conducted, 8 with employees from the case company and 8 with external experts. Interviews at the case company provided insights into the company's practices, priorities, and reasoning behind strategic decisions. The external interviewees were selected for their subject matter expertise in areas relevant to automotive and emerging technologies. Most had a direct or indirect link to the automotive sector and extensive experience in intellectual property. Their input helped broaden the data collection by bringing in perspectives on IP

strategies across the automotive value chain and to some extent also other industries, which supported a more comprehensive understanding of the research area. An overview of interviewees is found in Table 1. Due to the sensitive nature of the field of IP, all information about interviewees is masked, while some characteristics are described Chapter 5 Empirical Findings in order to contextualize the findings.

A semi-structured interview approach was used for all interviews. The semi-structured style is appropriate for qualitative studies, as it allows for in-dept perspectives of the interviewees and allows for follow-up questions (Bell et al., 2022). To support the interviews, interview guides with predefined questions were created. The use of an interview guide ensures consistency in the data collected while allowing for flexibility to adapt to relevant insights during the interview (Bell et al., 2022). Different interview guides were used depending on the objective of the interview and field of expertise of the interviewee. In broad terms, two interview guides were used, found in Appendix A and Appendix B, although some changes were made as the study progressed to incorporate new themes and insights that emerged during earlier interviews, to refine the focus and relevance of later interviews.

The data collection process started with semi-structured interviews with employees at the case company identified as possessing significant expertise in the company's patent country selection strategy. In this round of interviews, a purposive sampling approach was used to ensure that respondents have relevant knowledge to contribute to the research questions (Bell et al., 2022). The participants in the internal interviews almost all held the same work title, for different technological areas, and were responsible for making patent country selection decisions at the case company.

In parallel with the internal interviews, an initial search for professional literature on country selection strategies was performed. The purpose of the internal interviews and professional literature review was to collect data on how companies, and particularly the case company, being an automotive OEM, perform country selection decisions.

For the interviews following this, a theoretical sampling approach was employed, meaning that new participants were selected based on insights gained as the research progressed (Bell et al., 2022). Of course, a criterion was that selected participants still needed to have relevant knowledge and be able to contribute to the research questions. In line with the theoretical sampling approach, interviews continued until a satisfactory level of knowledge and understanding were reached and theoretical saturation was perceived (Bell et al., 2022).

Participants included people from other organizations with direct or indirect relations to the automotive industry, identified as having expertise relevant to the research questions. Participants also included a few interviewees from organizations not related to the automotive industry, which was perceived relevant to contrast the findings from the automotive industry.

To preserve insights accurately and allow for direct quoting, all interviews were recorded with the consent of participants and transcribed. Interviews were held through online Teams meetings to enable live transcribing through the Teams software.

Table 1. Overview of interviewees

Interviewee	Case Company or External	Relation to the Automotive industry	Duration
I1	Case company	Direct	60 min
I2	Case company	Direct	60 min
I3	Case company	Direct	60 min
I4	Case company	Direct	60 min
I5	Case company	Direct	60 min
I6	Case company	Direct	60 min
I7	Case company	Direct	60 min
I8	Case company	Direct	60 min
E1	External	Indirect	60 min
E2	External	Non-related	45 min
E3	External	Indirect	60 min
E4	External	Non-related	45 min
E5	External	Indirect	60 min
E6	External	Indirect	60 min
E7	External	Indirect	30 min
E8	External	Indirect	45 min

3.4 Data Analysis

Qualitative research generates a large set of data and finding the analytical pathway in this a challenge (Bell et al., 2022). Further, qualitative data obtained from interviews often consists of unstructured textual material, making it more complex to analyze than quantitative data. As Bell et al. (2022) explains, to systematically process qualitative data, the study employed a thematic analysis, a widely recognized approach for identifying and analyzing patterns within textual data. This method was suitable for structuring qualitative findings by focusing on recurring topics and concepts. As recommended by Bell et al. (2022), repetitions and frequently mentioned themes served as guiding criteria for identifying key patterns in the data.

The first stage of the analysis involved going through transcripts and interview notes, in which all findings relevant to the research questions were highlighted. As a next step, these findings were categorized into themes which were put into a spreadsheet in Microsoft Excel. In the spreadsheet, relevant findings from each interviewee were organized as to their relation to the theme. This was an iterative process, to account for the risk of fragmentation of data, i.e., as described by Bell et al., (2019), that the narrative flow of what is actually being said is lost. By utilizing an iterative approach, findings are related to identified themes but also guide further refinement of themes. Additionally, listening to the interview recordings while reviewing the transcriptions allowed for notes on how things were said, which further helped preserve the context and reduced the risk of fragmentation.

3.5 Ethical Considerations

Ethical awareness is an important aspect of business research. Bell et al. (2022) highlight four ethical areas that researchers need to consider: harm to participants, lack of informed consent, invasion of privacy, and deception. Participants in this study were not exposed to any physical risk. However, the potential risk of confidential information being disclosed required attention. Release of sensitive data could have impact on the interviewees' reputation and disturbed the trust of business partners. Anonymity was maintained by using pseudonyms and avoiding interviewee specific terminology in the report, to make sure that both the case company, internal participants, and external interviewees remained anonymous. Further, researchers were careful to avoid discussions of sensitive information in open environments.

Participation in the study was fully voluntary, and interviews were only recorded with consent. This approach supported informed consent and protected participants' privacy. All respondents were provided with clear and accessible information regarding the research purpose (Bell et al., 2022). Participants were also informed about the anonymization process and the confidentiality measures in place to protect their personal information. Further, all participants, prior to publication of the report, were given the opportunity to review what findings from the specific interview were included in the study.

Additionally, the contact person at the case company had the opportunity to review the report before publication to verify the accuracy of the findings. To minimize the risk of deception, this study adhered to established ethical guidelines and principles (Bell et al., 2022). Transparent communication was prioritized throughout the research process, making sure all participants, both internal and external, fully understood the study's scope and objectives.

4. Automotive Industry

In this section, a brief introduction is given to the automotive industry, including what actors it involves, its geographic clusters, and how patents are used within the industry. Further, it describes the ongoing technological transformation as well as how, as a result, the ecosystem is changing.

4.1 Industry Overview

The automotive industry is a global industry defined by the production, distribution, and sales of automobile products. Revenue from the industry accounts for over 7% of EU's GDP and employs around 13,8 million people in EU (European commission, 2025). The term automobile products include a broad range of vehicle types, including passenger cars, light commercial vehicles, heavy trucks, and buses. Modern vehicles integrate tens of thousands of components, forming a complex product system. The industry's organization can be described in a pyramidal structure, with OEMs on top coordinating a large network of suppliers and sub-suppliers producing components and integrated subsystems (Perri et al., 2020).

Historically, the automotive industry has been characterized by cumulative and incremental innovation following a trajectory of continuous refinement around the dominant design of the internal combustion engine (ICE) (Malerba & Orsenigo, 1997; Abernathy & Utterback, 1978; Zapata & Nieuwenhuis, 2010). This incremental innovative pattern is common in scale-intensive industries where product complexity is high (Malerba, 2005). These characteristics resemble the Mark II regime in which the automotive industry has been defined for a long time (Abernathy & Utterback, 1978).

In recent years, the automotive industry has started to experience significant technological change. These changes are driven by growing environmental concerns, stricter regulatory demands, and advances in digital technology. Innovations such as electric drivetrains, autonomous driving systems, and connected vehicle technologies are becoming increasingly important, as we will further elaborate on in Chapter 4.2. As a result, the traditional model of incremental improvement is being challenged by newer forms of innovation that may lead to more disruptive innovations, introducing multiple potential technological trajectories (Braidy et al., 2025). This evolution is driving incumbent OEMs to invest heavily in R&D to broaden their technological competencies (Pisano & Teece, 2007).

4.1.1 Actors

The industry is structured as a tiered supply chain led by OEMs. In this model, OEMs control vehicle design, branding and commercialization, and take on the integration of components and subsystems sourced from suppliers (Fixson, 2005). Still, OEMs often maintain large in-house R&D capabilities and file patents on complete systems, architectures, process innovations, and vehicle features (Schilling et al., 2016). As seen in Figure 1, out of the top 10 automotive patent holders, 8 are OEMs, which shows their dominance in innovative output.

Suppliers, especially so-called Tier 1 suppliers supplying parts directly to the OEM, play an important role in developing and patenting components and subsystems for the industry. These firms invest heavily in R&D and are directly involved in the development of new technology (Perri et al., 2020). For the OEMs, this is a means of outsourcing innovation, also within technologies close to their core competencies. Figure 1 shows that 2 out of the top 10 automotive patent holders are Tier 1 suppliers (in Bosch and Denso).

Technology specialists have become important actors and suppliers as vehicles have become more connected and autonomous. Tech companies such as Google, Apple, and Microsoft have entered the automotive ecosystem, contributing innovations in operating systems, AI, and cloud services. Startups and tech entrants also play a role in development within specific emerging technology domains. For example, autonomous driving companies like Waymo and Mobileye maintain extensive patent portfolios on perception, localization, and decision-making systems (IPlytics, 2021).

Public research institutions also play a significant role in technological contributions, especially for foundational research and technologies (Sarasini, 2014). There is also an agenda driven by national economic performance, where policymakers commonly aim to improve industry-academia collaboration by promoting translational research, bridging basic and applied research.

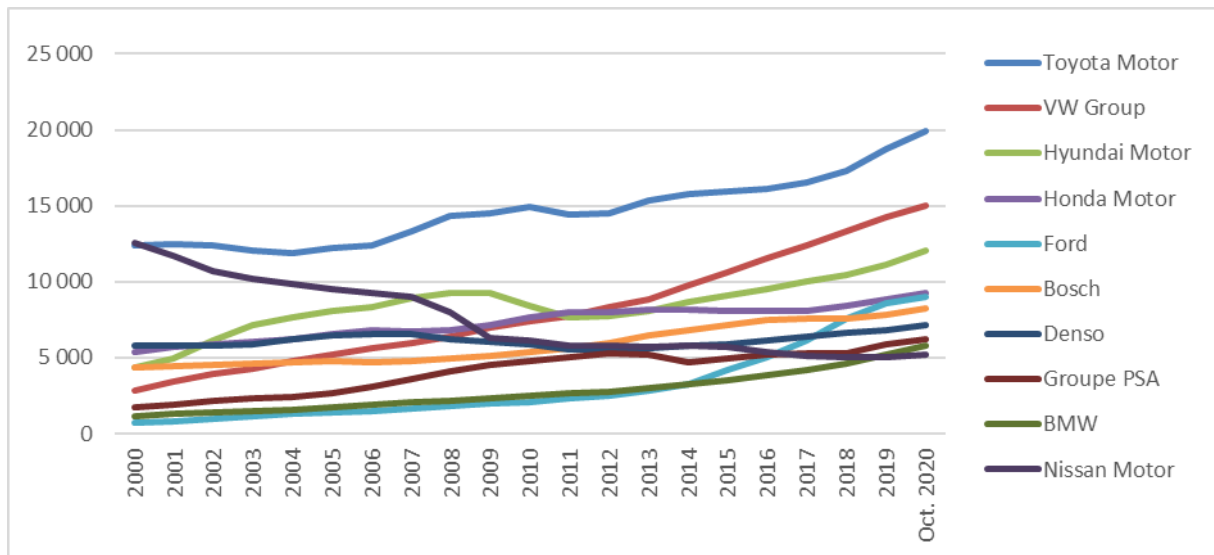


Figure 1. Largest automobile patent owners worldwide from 2000 to October 2020, by number of active patent families. Source: LexisNexis PatentSight (2020)

4.1.2 Geographical Clusters

The automotive industry is highly concentrated in specific regional clusters that combine manufacturing, R&D, and supplier networks. Cluster theory suggests that co-location of OEMs, suppliers, research institutes, and government support mechanisms fosters innovation through knowledge spillovers and collaboration (Porter, 1998). Empirical studies of regional innovation systems have confirmed that such clustering effects lead to greater patenting activity and more efficient knowledge transfer in the automotive industry (Gertler, 2003; Agostini & Caviggioli, 2015).

Europe hosts several clusters, primarily in Germany, France, Italy, Spain, and Sweden. Germany is traditionally seen as the most stable and central core in the European cluster (Pavlínek, 2022). This is also shown in patent data, where German firms in 2016 alone accounted for one-third of global automotive patent output. (Friedrich Ebert Stiftung, 2018). USA has both traditional hubs, such as Detroit and Michigan, as well as newly rising clusters such as California, which have become a center for autonomous vehicle innovation. Canada also hosts automotive R&D and manufacturing activities, while Mexico serves as a manufacturing hub.

Asia has a strong automotive industry as well, in which China, Japan, and South Korea hosts the region's most advanced OEMs. China has emerged as the global leader in automotive patent filings, accounting for approximately 35% of all applications in 2020 (Zhang & Fujii, 2023).

This reflects strong state support for technological development, including subsidies, R&D funding, and intellectual property incentives.

Other regions, including India and Brazil are emerging locations with growing automotive sectors. Brazil has a developed automotive industry, led by foreign OEMs and foreign and domestic suppliers. Although most activity is from foreign actors, there is significant R&D activities in Brazil (Lema et al., 2024).

4.1.3 Use of Patents

Automotive OEMs use patents extensively and allocate substantial resources to maintain and renew their patent portfolios (Cohen et al., 2000). Patents are used for several complementary purposes, including protecting key features, and avoid litigation through strategic portfolio building, managing suppliers and external collaborators, and signal investment in specific technology domains (Henkel et al., 2013; Hall et al., 2014; Perri et al., 2020).

4.2 Emerging Technologies

The emergence of new technological trajectories is expanding the range of technological domains that automotive OEMs must master. The general trend in the literature is describing these in terms of; electrification, autonomous driving, and connectivity (Moser et al., 2021; Krzywdzinski et al., 2025). Although specific technologies are not at the core of this work, elaboration on the named trajectories will follow as they have implications for how innovative activities are distributed in the industry.

4.2.1 Sustainable Propulsion

One of the most significant technological transitions is the shift from the dominant design of the ICE towards sustainable propulsion technologies. This shift is driven by environmental policy, regulatory pressure, and evolving consumer preferences (IEA, 2023). Sustainable propulsion includes battery electric propulsion, but also hydrogen fuel cells, and alternative fuels. Technological developments in battery chemistry, power electronics, electric drivetrains, and charging infrastructure have facilitated this trajectory. This has led to technology specialists such as electronics firms, battery manufacturers, and infrastructure providers having gained strategic positions in the automotive ecosystem (Llopis-Albert et al., 2021). As can be seen in Figure 2, patenting related to sustainable propulsion has increased rapidly in the last 10 years.

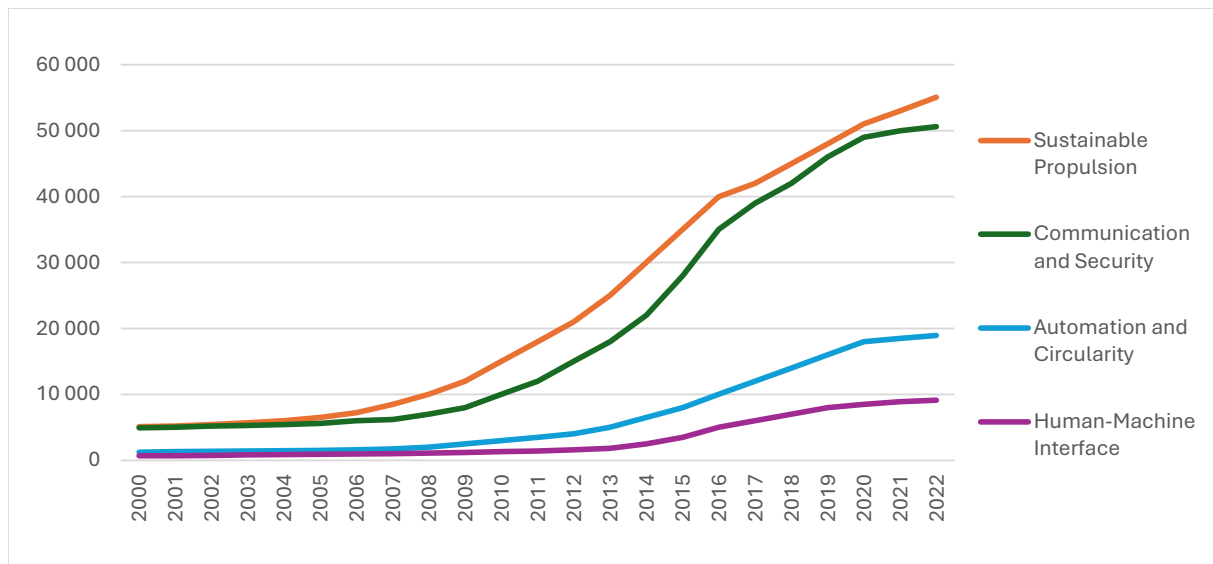


Figure 2. Patent publications in four patenting trends in automotive. Source: WIPO (2025)

4.2.2 Connectivity

New vehicles feature a wide range of embedded connectivity, turning mechanical vehicles into connected vehicles exchanging data with external systems, including other vehicles and traffic, infrastructure, and cloud services (Deloitte, 2020). This shift has invited another set of technological specialist companies into the automotive ecosystem, particularly telecommunications providers, software firms, and cloud service providers. While actors with these capabilities entering the automotive industry are not expected to disrupt OEMs, there is a clear opportunity for them to gain a significant share of the value creation of vehicles (Martínez de Aragón et al., 2018).

4.2.3 Autonomous Driving

Progress in artificial intelligence (AI), high-precision sensor technology, and high-performance computing is driving the development of advanced driver assistance systems (ADAS) (Litman, 2021). Further, development of ADAS has attracted investment from both traditional OEMs, suppliers and technology specialists such as tech companies. Companies such as Waymo and Mobileye have become leaders in autonomous driving innovation, while OEMs have developed internal programs or partnered with tech firms to accelerate progress (McKinsey & Company, 2023). Autonomous driving technology is identified as an opportunity for new entrants, including entrants from other industries such as Big Tech, to disrupt the industry, thus challenging incumbents (Bardt, 2017).

4.2.4 Implications on the Ecosystem

According to Porter and Heppelmann (2014), the type of technological change happening in the automotive industry generally leads to widened competitive boundaries of industries. That is because the performance of one product becomes more dependent on others' products and services, in the automotive context putting the OEM in a system where they are dependent on an increasing range of actors. This has led to a dynamic of competition and collaboration within the automotive industry, sometimes termed "coopetition", within the ecosystem (Brandenburger & Nalebuff, 1996; Attias & Mira-Bonnardel, 2017). This means that OEMs collaborate with other OEMs, suppliers, new entrants, and research institutions in research, joint development projects, and standard-setting, while simultaneously competing in the commercial markets.

Jacobides et al. (2023), as presented in the theoretical framework, argue that incumbents are enforcing their position in the automotive industry, rather than being disrupted by new entrants, despite a dominant narrative that the type of technological change taking place inevitably triggers industrial disruption. It is argued that OEMs are responding to technological change by forming alliances that help share costs, manage uncertainty, and access specialized knowledge. These collaborations extend beyond traditional supplier relationships and increasingly involve non-automotive tech firms. While some expected digital technologies to shift power to new entrants, the industry remains integrated, with OEMs maintaining control through partnerships and internal development. This suggests that incumbents are adapting strategically rather than being displaced (Jacobides et al., 2023).

Carillo et al. (2024) found in a study of 309 automotive-related alliances between 253 actors that the main motivations for such collaboration was creation of new knowledge, improve capabilities in green manufacturing, reduce supply chain risk, and exploring new services.

Strategic alliances among OEMs were found to be common, particularly when addressing high-cost and high-uncertainty technologies. Their main benefits include developing shared knowledge and expertise, which contributes to creating new knowledge within the firm and bringing in outside knowledge. The economic reasonings includes sharing risks and costs involved in developing new technologies (Carillo et al., 2024). Collaboration between OEMs and suppliers has also deepened, particularly in domains requiring specialized expertise, e.g., electrification (Perri et al., 2020). Suppliers are not seen as

The rise of emerging technologies in the industry has led to the entrance of new actors, which has led to new forms of collaboration between OEMs and previously non-automotive

technology firms. The study by Carillo et al. (2024) showed that almost 45% of alliances were between automotive and ICT-sector. A notable consideration, brought up by Carillo et al. (2024), is that alliances and intra-industry collaboration are part of a survival strategy during the ongoing transformational period in the industry.

5. Empirical Findings

In the following sections, findings from the data collection will be presented. First, findings from interviews with the case company are presented, followed by findings from external interviews. Lastly, findings from secondary data sources will be presented. Findings from the interviews are presented based on the coding from thematic analysis.

5.1 Patent Country Selection at Case Company

The case company divides their patents into portfolios, mainly based on the patent's technological application. The patent portfolios constitute an important part of the company's overarching IP strategy, which, in broad terms, includes protecting their R&D investments, ensuring freedom to operate, and facilitating business directions, both future and near-term. The portfolios have defined strategic intents in terms of how they should contribute both to the goal of the technology, from a product perspective, and to the IP strategy. I1 emphasized that regarding the country selection: *“There is a purpose for what the portfolio is meant to achieve, so the choice of countries should be adjusted accordingly. That's essentially what the strategy work is about here.”*

During the interviews at the case company, multiple respondents said that if it is possible, they would like to gain exclusivity advantages through their portfolios. Partly to protect unique selling points, but also to strengthen their perceived position as the industry leader in innovation. The feasibility of obtaining such a position is, however, dependent on many aspects, including how mature the technology is, how well-patented the domain is, and how well positioned the case company is within the technology. Because of this, and because patents and patent portfolios can serve more purposes, the strategic intent of specific portfolios varies. Some interviewees at the case company also described that based on its strategic intent, and country selection factors presented below, some portfolios have developed a standard country selection consisting of a few defined countries.

5.1.1 Country Selection Factors

The case company has, over the last 10 years, gradually developed its approach to choosing countries for patents, but the factors considered seem quite unchanged. The change in approach has been due to its multifactorial nature, where changes in patent filing rates, changing legal environments, and rapidly evolving technological landscape can be seen as a few key reasons.

Interviewee I6 exemplifies that when the filing rate was significantly lower, it was easier to justify a broader choice of countries for patenting.

Key Markets

During the interviews at the case company, all interviewees from the case company articulated that patenting within key markets is of highest importance. I3 said: “*Market is probably the biggest and most significant part*”, and highlighted that patents in key markets hold the highest value. Key markets were commonly explained to be countries with the most important markets, i.e., which have the highest commercial impact, to protect the business interest of the firm. I6 further explained that given the importance of economies of scale, automotive OEMs have a very limited ability to create country specific solutions to bypass other actors’ patents, and as such filing patents in one or a few countries within a market gives strong exclusive protection. I2 argued that this is especially true for mechanical components that are an integrated part of the vehicle, but that it may not hold for smaller components or software that are more interchangeable. In regard to this, interviewees pointed out that the number of countries within a region where patents are filed has been subject to change, but the most recent reasoning is that filing in just one country is considered to provide sufficient protection. For example, protection in Europe, one of the case company’s commercial regions, is sought in mainly one country. I6 added: “*I’ve gradually come around to it and am actually quite satisfied with a narrower country filing strategy than what we had before. I’m fully on board with it and think it’s good.*”

However, patenting in one’s key markets will only cover a part of the infringement in the case of enforcement, explained by I7. That is explained to be due to the nature of the patent right, it is a territorial right to exclude others from manufacturing, marketing or selling an invention. As such, enforcing an infringer that manufactures in another location only stops them from selling in the country where the patent is held. The same interviewee emphasized that because of this, the reason for patenting, i.e., the strategic intent of the portfolio, becomes important for the country selection. This will be further covered below, under chapter 5.1.2.

Another factor related to market was potential and emerging markets. Interviewees noted that the 20-year patent term is relatively long, so potential markets should be considered when selecting patent countries. For example, the case company filed patents in one or a few countries seen as having future market potential, but due to current deglobalization and trade tensions,

entering new markets in the next 5–10 years is seen as less likely, reducing the perceived value of those countries in the country selection.

Third Parties

The second factor that emerged is the presence and activity of third parties. The interviews at the case company highlighted the strategic importance of filing patents in countries where competing OEMs have key markets and production operations, as this maximizes the negotiation position. I7 emphasized that the value of a patent is the strongest when filed in the country in which the largest part of an infringement takes place, which would likely be where the manufacturing takes place. I3 argued that it is valuable to be able to hit infringers on “their home turf”. I4 experienced less focus on countries where competitors have production, and more attention to countries where competitors’ commercial focus is. When elaborating, that was because the case company’s key markets and competing OEM’s key markets strongly correlate, and as such, patenting in countries relevant to these markets is more cost-effective than patenting in countries related to both one owns key markets and competitors’ production locations as it leads to a narrower country selection.

In addition to automotive OEMs, technology-level firms were also referred to as competitors in the interviews. For technology-level competitors, filing patents in their home countries in terms of production and key markets was considered important, especially when the two parties do not have any direct commercial overlap. I1 exemplified: “*There are certain cases where we know there are strong players based, for example, in Korea or somewhere else, who are very skilled in a specific type of technology where we’re also trying to be a global leader. In those cases, it can make sense to have IP protection in their home market.*”. The same reasoning is used in relation to competing OEMs who currently do not have commercial activities in the case company’s key markets.

According to multiple interviewees at the case company, locations of suppliers’ operations need to be considered in the country selection as, for example, patents can influence bargaining power in supplier negotiations. Interviewees, including I3, I4, I5, I7, also noted that suppliers may develop a strong position within a technological domain, which can create dependencies and lock-in for the OEM, that have a negative effect on flexibility and cost.

Legal Aspects

Legal considerations are included in the country selection decision but are by most interviewees described as a hygiene factor. Countries without a functioning patent system are not considered.

As noted by I5, the patent system must be sufficiently fast, and provide reasonable expectations for the outcome of an enforcement process. Once this is in place, legal factors are not a key part of the country selection.

5.1.2 Country Selection Contextual Aspects

At the case company, patents are filed in numerous technological domains, with protected inventions ranging from conceptual and futuristic to incremental improvements. Further, patents are filed to contribute to varying strategic intents of portfolios, as described previously. Interviewees highlighted that such contextual aspects are important to guide the country selection, as they can affect the rationale behind where patents are filed.

“A country selection strategy should be based on the specific characteristics of the relevant technology domain, as well as the strategic intent for that domain. A critical part of this assessment involves evaluating the patent threat landscape within that domain. Where are these patent threats originating from? Are they posed by our competitors, or do they stem from other market players?” (I5).

Strategic Intent of the Patent Portfolio

Patents are internally rated based on their contribution to the strategic intent of the portfolio. These intents can broadly be categorized as freedom to operate, exclusivity, and leverage, and as such also patents serve different purposes. They are in turn based on the characteristics of the technology domain, and the firm’s aim with the technological domain. I7 emphasized that one must separate in what cases patents are used to protect unique technological inventions and when patents are used as a lever for leveraging opportunities and freedom to operate. I7 further elaborated that you can not have the same country selection strategy for these intents, as how the rights are used differs. I1 and I6 argued that individual patents should be seen as strategic tools to support the overall strategic intent of the portfolio, rather than being individually optimized. I6 also said that a firm does not need the broadest or best possible patent protection, it’s enough to be slightly ahead of your competitors.

When patents are filed as contributors to exclusivity, interviewees coherently stated that market is the most important factor to consider in the country selection, as you want protection in the key markets where your product is sold. Some interviewees also argued that it makes little sense to seek protection in countries where you do not intend to sell the product in such cases. Patents filed with this purpose protect inventions that could create a unique selling point and, as described by multiple interviewees, to gain from the patent right you must be willing to enforce

it in cases of detected infringement. Therefore, as described by I3, you must consider what countries you want to run enforcement processes in. This interviewee worked with portfolios covering mostly emerging technologies and further argued that as you might need to enforce your right, you'd want to cover more countries, "...to secure protection in multiple countries to hit the right targets" (I3). I5 also elaborated on this track, that in the case of enforcement, you want your patent in countries that create the strongest negotiation position. This means that one must look at competitors' key markets and production locations, although one owns key market is the top priority.

Although exclusivity is stated as an important lever for patenting, a majority of the interviewees at the case company argue that the main purpose of filing patents in most portfolios is to gain freedom to operate. The interviewees described two different aspects of freedom to operate. One is simply disclosing inventions so that no one else can patent them, the other is building a defensive portfolio to discourage others from attacking you or to use for cross-licensing, to make sure products and solutions can be brought to the market without costs for overcoming IP barriers.

As for exclusivity, interviewees claimed that protecting the own key markets is important also for freedom to operate. To develop a strong defensive portfolio, I5 mentioned that there might be a growing importance of monitoring actors with threatening portfolios rather than direct competitors, and where they file patents. I7 discussed that it is difficult to know to what extent the patent portfolios generate freedom to operate, highlighting the complexity of measuring freedom to operate. Several interviewees also pointed out that without knowing which third parties you might need to negotiate with, filing patents to strengthen freedom to operate becomes more of a guess than a deliberate strategy.

As discussed by multiple interviewees, this includes both other OEMs and competitors within specific technology domains. I3 argued that if you see that a patent only contributes to freedom to operate, then it is sufficient to file in just one country. This was based on the reasoning that a patent whose sole purpose is defensive, i.e., to keep your own R&D and products from being blocked, one does not need a broad enforceable exclusivity. I4 observed that building defensive portfolios to have freedom to operate is important within heavily patented fields, for example within in connectivity, where multiple actors have been patenting long before the automotive industry included such solutions in their products.

Having portfolios that create leverage is also a valuable aspect of patent portfolios, underscored by all interviewees. By building strong patent positions on component level, multiple interviewees highlight that patents help in negotiations with suppliers. For country selection, a higher focus is discussed around the key market and manufacturing locations of the suppliers. Also, leverage is discussed in relation to joint projects with other OEMs or technology-based firms. I5 explained that having a clear patent position within a technological domain helps define what the company brings to the collaboration. The geographical scope of such patents has historically not been a key aspect, but it is argued that if, for example, working with an Asian actor, it would likely be better to have patent positions that include Asian countries. It was also argued by one interviewee that leverage is obtained by just considering one owns key markets, with the reasoning that those are the end market of technologies going into automotive products.

Although leverage is a company-stated strategic intent of patent portfolios, some interviewees call the concept “*a bit fuzzy*”, “*not very important*”, or “*not fully understood*”, but all agree that patents can strengthen the case company’s position when supplier relationships or joint ventures become complex. I3, however, argued that this is very important for some portfolios, and that internal feedback from the R&D department had highlighted that know-how and patents strengthened their position in discussion with suppliers within a specific technology domain.

Several interviewees pointed out that patents and portfolios are not usually tied to just one strategic intent. Instead, patents are likely to contribute to more than one of the strategic intent of a portfolio. I4 exemplified that for a feature that could provide a unique selling point but is developed in a technological domain which is already heavily patented, it’s also important to have patents that can be used for cross-licensing. “*Just as we have patented our solutions, others have patented theirs. When it's time to negotiate licenses, which is sometimes necessary, it's much better to enter those discussions with a strong patent portfolio.*” (I4).

Technological Domain

A common aspect that affects strategic intents of portfolios and as such also the patent country selection is the portfolio’s technology domain. All interviewees at the case company argued that a country selection strategy should be based on the landscape within the specific technology-domain and the firm’s goal with that technology. A general distinction was often made between traditional technologies and emerging technologies, where most interviewees mentioned that it

is risky to have a “one size fits all” country selection for both types. I6 said: “*I believe that it is necessary to allow for different strategies, as we are not doing the same things.*”, referring to the differences between the patent portfolios.

I7 reasoned that in technological domains where the automotive OEMs have long experience and already a strong position, there is a clear understanding of IP-related risk, so less leverage is needed, and the focus should instead be on protecting price premium features in key markets. I8 added that traditionally within the automotive industry, patent enforcement has been quite rare. Multiple interviewees agreed that for traditional technology domains, the country selection should focus on key markets, but also consider competitor’s key markets and potentially manufacturing locations. Within such domains are mainly other OEMs which patenting behavior is known.

I7 further elaborated that it is different with emerging technologies and technologies that are new for the automotive industry but already patented. “*Where are the technology owners one wants to gain leverage against? The aim should be to build a portfolio that can act as a potential threat.*” (I7). I8 reasoned that the more emerging technology that is developed in-house, the number of competing actors increases. I3 argued that for new technology domains, in which uncertainty is high, it would be good to file not only in key markets but consider more factors and file in more countries to accommodate for the high uncertainty. The same interviewee said that when there is an opportunity to gain exclusivity within a new technology domain, it makes sense to file patents in more countries to create a strong position and potentially abandon some countries at a later stage when more information is available. This argument was mentioned by more interviewees, and I4 added that this is also guided based on the granted scope of the patent. If the patentability assessment is very positive, then filing in more countries is relevant. I2 highlighted that in new technology domains with a lot of patenting activity, it would be relevant to better understand how competitors and actors file, to guide the own country selection.

The size of the Patent Portfolio

Another aspect affecting country selection, mentioned by I1, is the value of spreading the portfolio across multiple countries. “*It might be good to mix in other countries as well, so that you on a company-level have presence and tools in place in other countries too, otherwise it all becomes a bit one-sided. There's a big difference between having a few tools and having none at all in certain markets.*”(I1). However, interviewees’ perspective on this differed. I3 mentioned this type of approach but was uncertain if it gives the wanted protection. I4

acknowledged a signaling value in this approach but discussed that it might be better to go with the countries identified as most important.

5.2 Patent Country Selection in Other Industries

In the following section results from interviews with people outside of the case company will be presented. The external interviewees all assessed have a high level of expertise within IP strategy and are active within a wide range of organizations of varying sizes and within different industries. First a brief introduction to the interviewees will be given for context.

5.2.1 Country Selection Factors

Interviewees were asked about how they decide which countries to file patents in and which aspects they take into consideration. All interviewees described that filing in one's own key markets, both current and expected future markets, is one of the most important aspects. Further, all interviewees described that filing in countries out of scope of one's own key markets to build a defense against a 3rd party is another important aspect. However, the interviewees differed in which 3rd to consider, both depending on IP strategy and the context of the companies the interviewees work for. Lastly, the legal aspect was described by some of the interviewees as a consideration when performing the country selection. The following sections present elaborations of all three of these aspects, and insights regarding the process of filing patents which might affect the country selection.

Key Markets

A strong consensus among all external interviewees, E1, E2, E3, E4, E5, E6, E7, and E8, was that one's own key markets are one of, or the one, most crucial factor in deciding where to file patents. E3 elaborated on why through describing the purpose of patenting, distinguishing between exclusivity and defense. For exclusivity purposes, the market perspective dominates the decision; when aiming for defense, third-party presence becomes equally important. This market-driven perspective was echoed by E7, who elaborated by describing that there is an advantage associated with seeking market exclusivity for complex products. *“It's an effective approach. I can cover an entire region (Europe) because this (Germany) is the main market. And without that market, it does not pay off for anybody to develop a car and then not sell it in Germany.”* Highlighting that given the complexity of automotive products, and the production of them, they are not feasible to adapt on a country level. E6 aligned and stated that the complexity of products makes the country selection simpler.

The exclusivity perspective was strongly emphasized by E4 working within the pharmaceutical sector. For E4, the investment of filing a patent in a market where the patented medicine is sold will almost certainly give an economic return, due to the strong ability in pharma to prove infringement and thereby protect exclusivity. Due to this, E4 did not take the additional cost of filing a patent in several countries into consideration and files patents in over 100 countries for product innovations, covering all their important markets. *“I usually file in the same number of countries; the cost aspect is not really something we take into account here”*. It was also noted by E4 that broad market coverage incidentally captures competitor presence as well.

E5, working for a scaleup company with a limited budget, emphasized a need to be selective in the country selection and prioritize patents in current, and expected future, key sales markets. He noted that with a larger budget, competitor presence would also be factored into the country selection, stating that: *“They (the patents) must have a fairly direct impact on the product we are developing. We could apply for patents on a lot of things, but it would not be of any use to us, so we have to be very selective. It’s important to choose carefully because there are quite significant costs involved in the entire process going forward.”*

Several interviewees stressed the importance of considering not only one’s own markets today, but also future ones, given that a patent lasts 20 years. E7 stressed the necessity of maintaining an outlook for future market developments by exemplifying: *“China is a growing market, which is not so settled. A lot of local, small competitors are coming up. A huge industry of Chinese OEMs with EV cars has been built up in the past years. They are growing, and they are expanding. And I think these are the main challenge that we have to take on.”*

Third Parties

As previously mentioned, E3 emphasized that while market perspective is important when seeking exclusivity, maintaining patents in 3rd parties’ countries is more crucial for defensive purposes. All interviewees emphasized the importance of considering third-party presence, however, which 3rd party to consider, and which aspect of their presence differs.

E3 argued that the 3rd party to consider in the defensive country selection should be based with whom potential IP conflicts are likely to arise. Building on this, E3 further argued that it is important to consider competitors on the technology level rather than at the end-product level. The perspective of including more actors into consideration than direct customers, competitors or suppliers, was emphasized by E1, arguing that technology exhibits "stickiness," meaning that

innovation tends to flourish and be adopted where it originates. Thus, broadening the perspective to include also universities and research labs can provide early signals of emerging markets: *“Another reflection we’ve made based on our experience with technological development so far is that it often leads to convergence between different products and different industries. So, what is considered an industry today might not be an industry at all in ten years.”*

Three interviewees worked for companies acting as suppliers to the automotive industry: E6, E7, and E8. These interviewees extended the market perspective beyond their own sales to also include their customers', or the end products', key markets. As E7 explained, securing patents in a customer's key market is important as it binds the customer to the supplier's technology: *“We have different opportunities to leverage it to say, OK, buy from us with a premium because you cannot buy somewhere else.”*, emphasizing a leveraging strategy driving the country selection.

This perspective was echoed by E8 also employing a leveraging strategy through collecting licensing fees. E8 elaborated that adopting a broad ecosystem perspective is necessary since their patented technologies are often utilized by many actors across various industries and geographies, and their direct customers are not always the end product. The need to consider the end-products' markets was emphasized through stating: *“That’s where we want to have patents, so it’s not really linked to where our company has products, but rather to where the end-consumers' products are.”*

When targeting customers, all three suppliers emphasized targeting their key sales markets, rather than their production countries. Three main reasons were presented: infringement is easier to prove in countries where the technology is sold rather than produced (E6 and E8), legal systems in key sales countries tend to be more favorable (E7 and E8) and competitor sales data is more accessible than production data (E8). E7 argued: *“So what's the value of a Mexican patent? Because our competitor has a has a factory there? How to enforce it when we do not even know what they manufacture there?”*. This further reinforced the focus on protecting sales markets rather than production hubs.

Several interviewees also raised the importance of considering competitors. Regarding competitors, E6, operating within an emerging technology field, argued that when defending oneself against competitors, there is little strategic value in being significantly better, being

marginally better is enough. Reflecting on this approach, he noted that since his competitors had adopted a narrow country selection strategy, his company followed the same strategy.

E5, who primarily focus on their own market due to budget restrictions, stressed the importance of monitoring technological developments across countries to detect future markets, and competitors. Given that E5 is planning on extending the country selection beyond own key markets in the future, they shared an example of an Asian country heavily investing in green transportation, arguing that early patenting in this country will be essential to protect against future competitive threats: *"They will look at the technology we publish in other countries and use it to build up a business based on it. That's why the country is very important to us."*

E2 supported the defensive perspective described by E3, emphasizing that patenting in customers' and clients' markets is crucial for defensive strategies. E3 added: *"We want to patent things that we believe our competitors and customers are interested in today, tomorrow, in three years, and in five years (...) It's also about thinking: where will the competitors be? What will the ecosystem look like, and how will it develop within what we are doing?"*, aligning with E8 on the importance of an ecosystem perspective and how such ecosystems evolve over time.

Legal Aspects

Three interviewees E2, E4 and E8 raised the influence of legal systems on the country selection strategy. E8 pointed out that certain countries, such as the United States, offer more favorable legal environments for enforcing patents: *"You could take the U.S. as an example. It might seem like we have a disproportionately large number of patents there, because from a market perspective, they might not actually be that big. But on the other hand, there's the legal system to consider"*.

E4, with a broad filing strategy covering over 100 countries, confirmed that legal frameworks become more critical when filing on a wide scale, and that it is an important aspect in country selection. Similarly, E2 stressed that a patent is only valuable if it can be effectively enforced, making the legal environment an important factor to consider.

5.2.2 Country Selection Contextual Aspects

The country selection strategies described in the interviewees are not created in isolation but are dependent on several aspects. Interviewees emphasize different aspects as more or less relevant and collectively harmonized around three contextual aspects that are important to take

into account when performing the country selection: strategic intent of the patent portfolio, emerging technologies, and the size of the portfolio. These contextual aspects are elaborated below.

Strategic Intent of the Patent Portfolio

All interviewees agreed on the fact that patents can be filed for several different reasons. Extending on previously described exclusivity and defensive purposes by E3, E6 highlighted the importance of IP for collaborations and leverage against suppliers. Further, E6 emphasized that this importance is increasing as the complexity of automotive products is increasing, enforcing OEMs to share technical knowledge with suppliers to ensure correct component designs: *“We transfer quite a lot of knowledge today to enable them to meet our needs. That’s also why we aim to build some IP, so that we can recover the investment we’ve made when transferring this knowledge to someone else”*

E8 explained that portfolios intended for leveraging licensing are an essential consideration when selecting countries for patent protection. E1 also emphasized that when the purpose of the patents is licensing, it affects the country selection by stating: *“I might not personally be interested in operating on the market. But if I have patents, I can sell licenses to that market. If I do not have patents, I also can not sell licenses.”*

E6 also mentioned patents as signaling mechanisms. For E6 working in software, patent infringement can be hard to detect, limiting the use of patents for exclusivity purposes. Instead E6 summarized: *“We work in an extremely competitive field with many different types of collaboration partners who sometimes have quite similar ambitions to our own, and it’s important for us to make sure we stay relevant to them over time.”*, emphasizing that patents are mostly valuable for negotiation and signaling strategic positioning to other parties. E5 aligned with E6 on this and states: *“It’s kind of a negative right, but it also gives you something to negotiate with when you enter these collaborations and start comparing piles.”*

E7 pointed out that it is a misconception to believe that a patent itself provides value by stating: *“I think it is a typical misconception of IP that our own patent is enabling us to do anything on the market with our products, it (the patent) has no influence on our products, it only has value against our competitors, our customers, so they cannot act without speaking to us.”* Highlighting that patents are a tool to achieve a strategic intent, not an asset itself.

Technological Domain

Emerging technologies and industry transformations were recurring themes in the interviews. The technological change was described both as affecting the interviewees' industries and/or the interviewees' elaborated on their effect on the automotive industry.

E6 highlighted that the automotive industry has historically had few IP conflicts, but that the transformation towards new technology fields introduces new actors with different IP behaviors, which may increase conflicts in the future. However, he notes that no significant change has been observed yet.

E5, also working within an emerging technology field, stressed the volatility of technological importance. *"In two years, it might actually be the case that things have changed, and done a complete 360, and suddenly we're back to using the same technology, just for another application. That's why it's good to still have their support, and that's why I do not want to let anything go"*. As a result, E5's company retained all patents rather than pruning or abandoning them.

E4, working in the pharmaceutical sector, noted that even for them, new technology developments have enforced a need to reshape the IP strategy. Exemplifying that AI tools make it easier to find weaknesses in companies' patent portfolios, increasing their vulnerability to assertion, and that data is becoming a competitive edge in pharma.

E3 explained that mechanical products in automotive have historically been easily reverse-engineered, making patents effective, but that the shift towards software-based innovation reduces detectability, aligning with E6. Relating to this, E3 said: *"As we move more and more toward software, patents become less important, and trade secrets become more important instead"*, emphasizing that the value of patents might decrease, and therefore increase the relevance of other appropriability mechanisms such as trade secrets.

E2 also stressed how the change of automotive products, as they become more integrated, force a need to change the IP strategy. E2 stated that: *"when the entire landscape shifts (...) the ecosystem and business models have changed, and as a result, one should also adapt their IP strategies, and, consequently, reconsider their country selection as one aspect of that strategy."* Emphasizing how the country selection needs to align with the IP strategy, which needs to align with the overarching business strategy. E1 further elaborated that technological convergence

can reshape entire industries, requiring all actors to be flexible and adaptive. E1 added that electrification and connectivity developments may lead to the emergence of standard essential patents in the automotive sector.

The size of the Patent Portfolio

Several interviewees emphasized the strategic importance of the total portfolio size in patent strategy.

E8 highlighted the value of having a large patent portfolio, stating that the mass of patents can provide strategic strength during negotiations, even if individual patents are not particularly strong. E8 further explained that their strategy involves spreading patents across many countries to achieve portfolio-level protection rather than relying on individual patents. E6 aligned with this view, stating that building patent clusters in important technological areas makes it harder for others to invent around their patents. E1 supported this by suggesting that creating clusters will become an increasingly important strategy in the future. E3 and E4 highlighted the risks of individual patent invalidation, with E3 suggesting that broader portfolios reduce reliance on any single patent.

5.3 Secondary data

The following section presents insights from practitioner-oriented articles authored by individuals with expertise in intellectual property and patent strategy. While these sources are not peer-reviewed academic publications, they offer empirically grounded perspectives derived from industry experience and practical engagement with the subject matter. Similar to interview data, these contributions provide valuable contextual understanding and real-world applicability and are therefore treated as empirical findings.

5.3.1 Calculating the counter-assertion value of patents

Richardson and Oliver (2015) present a structured approach to patent portfolio strategy aimed at addressing the risks companies face from patent assertions in high-tech markets. Central to their argument is the observation that many companies struggle to articulate the return on investment from patenting activities. Instead of clear answers, decisions are often shaped by precedent or peer behavior. The approach only considers patents aimed at countering assertion threats, and excludes patents filed for proprietary intents. The authors suggest analyzing the

ecosystem of patent holders surrounding them and understanding the strategic role their patents can play in mitigating assertion risks.

A central feature of the framework is the deterrent value of the portfolio, defined as the expected cost savings that result from the presence of patents, even in cases where no explicit enforcement action is taken. This value is derived by estimating the expected balancing payments that would have been made if the company held no patents in a given technology area, scaled by the likelihood of assertion. The estimation of assertion probability is described as one of the more complex aspects of the model.

Richardson and Oliver (2015) encourage firms to consider how well their portfolio supports the business rationale of deterring assertions, enabling negotiation leverage, or supporting cross-licensing opportunities. A “winning” patent portfolio, as they describe it, is not necessarily one that guarantees courtroom success, but one that can alter the dynamics of negotiation and reduce vulnerability without litigation.

A key concept introduced in their framework is assertion risk, defined by the potential threat that another entity may enforce its patents against the company. Richardson and Oliver (2015) emphasize that this risk must be treated as a variable that can be assessed, quantified, and actively managed. By mapping out the network of potential asserters, including not only direct competitors but also suppliers, partners, and customers, they suggest that companies can begin to identify where patent threats are likely to emerge and how significant they might be. Further, the approach considers potential patent threats from corporate asserters as well.

Following the analysis of potential asserters in the ecosystem is the analysis of technological overlap. By identifying technological areas where multiple potential asserters generate revenue, companies can strategically target their patent investments to cover shared risk zones. Hence, patents in technological overlapping areas will have a higher counter-assertion value. Further, the geographical aspect should be considered when creating counter-assertion. Given that patents are territorial, it is crucial to understand which countries are most important to potential asserters to optimize the patent portfolio.

In building what they term a “counter-assertion ready” portfolio, Richardson and Oliver argue that the goal is not comprehensive coverage of all threats, but sufficient coverage to pose a credible counter-threat. A portfolio that touches on enough of an assenter’s strategic market segments can serve as an effective deterrent.

Finally, the authors suggest that once the assertion threats, technological overlaps and geographies are identified, firms must turn to risk mitigation planning. This includes analyzing gaps in current coverage, considering whether to buy or develop patents, and defining the extent of risk the firm is willing to invest in offsetting. The authors estimate monetary values throughout their approach with the goal of presenting a return of investments for patents aimed for counter-assertion, and to identify gaps in current coverage. The values are based on revenue streams from potential asserters, adjusted in relation to technological areas, and to which extent the firm wants to offset the risk.

Their model encourages internal alignment by making risk and ROI tangible, providing a basis for cross-functional dialogue among legal, engineering, finance, and executive teams. On top of pushing companies to motivate their patenting activities the model explains which patents are more likely to be valuable, which asserters pose the greatest risk and how much risk you are willing to mitigate. Richardson and Oliver (2015) emphasize that what they contribute is not a universal blueprint but a method for organizing strategic discussions around patent investment. Their framework offers a language and a structure through which companies can align patent activities with broader business objectives, navigate the uncertainties of assertion risk, and make informed decisions about portfolio development.

5.3.2 Country selection method

Honeywell Inc filed a patent application in December 2005 (Piasecki et.al, 2007) covering a patent filing invention, including a method for making the country selection. The invention consists of a computer display system with the purpose of visualizing several aspects of an IP portfolio on a display, to support making optimized rather than siloed decisions. The process of country selection is one of the features covered by the invention in the patent application. The inventors suggest considering three factors for country selection: market value, competition assessment, legal system assessment. Market and competition assessments are preferably performed by business managers, and legal assessment by legal advisor. Scoring 1-10 for each factor is multiplied into Filing interest value for the specific patent in the specific region, resulting in a summarized score per region which can be ranked. Depending on the budget or wanted number of countries, the user can then file in the x number of countries with the highest score.

6. Analysis

This chapter provides an analysis of the empirical findings and the theoretical framework, with the aim to elaborate on and answer the Research Questions presented in section 1.4.

RQ1: What factors should a global automotive OEM consider in its patent country selection strategy?

RQ2: How can the strategic intent of a patent portfolio influence the importance of the identified country selection factors?

RQ3: What actors should a global automotive OEM consider in their patent country selection when pursuing defensive strategic intents?

Chapter 6.1 addresses Research Question 1 by examining what factors automotive OEMs should consider when choosing countries for patent filings. Sections 6.1.1 to 6.1.3 addresses Research Question 2 by investigating how the importance of identified factors differ depending on the strategic intent of the underlying patent portfolio. The analysis is structured after Somaya (2012)'s generic patent strategies, proprietary, defensive, and leveraging strategies, aiming to show how they influence the country selection factors.

Chapter 6.2 addresses Research Question 3 by exploring what actors a global automotive OEM should consider in defensive patent strategies. Section 6.2.1 an identification process of potential asserters in the automotive ecosystem by taking the impact of new technologies and cross-industry patenting into consideration. Section 6.2.2 explores how to assess the risk of being asserted by the identified potential asserters by investigating how technological regimes affect such risk. The analysis is built on the assumption that for the factor third parties in defensive strategies, country selection should aim to build protection against the most high-risk asserters.

6.1 Country Selection Factors and Strategic Intent of the Portfolio

The empirical findings show a consistent view on which factors to prioritize in country selection for patent filing. Protecting key markets, current and future, and accounting for third parties, particularly competitors, suppliers and customers, were found to be the most important considerations, aligning well with existing literature (Manning, 2007; Alcácer et al., 2015; Storz, 2011; Dachs & Pyka, 2010; Fernandez-Riba, 2010; Cuellar et al., 2022). These shared priorities also reflect broader industry patterns, as prior research shows that firms across sectors

tend to converge around a limited set of countries that combine market relevance, legal enforceability, and ecosystem importance (Granstrand & Holgersson, 2014).

Meanwhile, empirical findings, especially from the case company, show that legal considerations were treated more as a baseline requirement rather than a decisive factor, provided that the system was functional and enforceable. This somewhat contrasts with the professional literature from Piasecki et al. (2007) and presented theory where legal considerations are described as more central to country selection (Fernandez-Riba, 2010; Storz, 2011; Guellec & van Pottelsberghe de la Potterie, 2007). As we have seen in chapter 4, automotive OEMs with innovative capabilities are mainly clustered in a limited set of countries, all which can be said to fulfil the legal consideration. Thus, automotive OEMs seem to have a clear understanding of which countries offer reliable and predictable patent systems, and as a result, legal factors tend to act more as a basic condition that needs to be fulfilled rather than as a strategic differentiator in decision-making.

Findings from both the case company and external actors indicate that country selection should be a result of, and therefore not isolated from, the strategic intent of the patent portfolio. Such a strategic intent of the portfolio reflects what a firm aims to achieve with the technological domain covered by the portfolio in combination with technology specific characteristics i.e., the current patent landscape. For example, a firm might aim to create a competitive advantage within a technological domain and therefore has the strategic intent to create exclusivity with the patent portfolio. However, if current patent landscape is heavily patented, such exclusivity position might not be feasible, and the strategic intent necessitating a revision of the portfolio's strategic intent consequently. This emphasizes the relation between overarching strategy of a technological domain and the strategic intent of the patent portfolio covering such technological domain.

These findings align with recent literature showing that deliberate and well-articulated patent strategies lead to more sophisticated and coherent patent management processes, including decisions such as country selection (Agostini et al., 2023). A strong internal patent organization reinforces this alignment by supporting structured decision-making, cross-functional coordination, and shared responsibility for how IP contributes to strategic goals. While the literature does not explicitly model country selection, it clearly emphasizes that such decisions are most effective when embedded in the broader strategic and organizational logic of the firm. This supports the empirical observation that country selection is improved when guided by the

strategic intent of the patent portfolio rather than being treated as a standalone or operational task.

As mentioned, findings show that the strategic intent of the patent portfolio influences the country selection. This is due to the inherent importance of the identified country selection factors depending on the strategic intent of the patent portfolio. The case company's way of describing its portfolio's strategic intent aligns rather well with the generic patent strategies framework suggested by Somaya (2012). This suggests that, even if terminology differs, the underlying strategic logic proposed in Somaya (2012)'s framework is well reflected in practice within the automotive industry. The findings further show that the case company acknowledged the resource intensity of patent related activities, as in the literature (Fernandez-Riba, 2010; Somaya, 2012; Gassman et al., 2020), and that the geographical scope must be carefully evaluated.

It can thus be proposed that a structured approach to country selection is needed, and that such an approach should be based on the strategic intent of the patent portfolio, supported by both empirical findings and recent literature by Agostini et al. (2023). As the strategic intents identified in the empirical findings align with Somaya's (2012) framework of generic patent strategies, this framework will be used to analyze how the inherent importance of country selection factors differs depending on the strategies.

6.1.1 Country selection in proprietary strategies

Proprietary strategies, explained by Somaya (2012) to shield competitive advantage from imitation, were found to primarily be realized by filing patents in the company's own major sales markets. Empirical findings from both the case company and external actors show that when aiming to create unique selling points (USPs) or support price premium through a technological domain, the correlating strategic intent of the patent portfolio is to create an exclusive patent position. The logic behind this country selection is directly tied to the legal structure of patents, providing the right to exclude others from producing or selling patented invention in the granted countries. Thus, the largest sales markets are arguably the countries where patent protection for USP or price premium will create the most value for the company.

Empirical findings show that protecting an exclusive position may also be done by obtaining patents in markets important to potential imitators. The exclusionary effect can be stronger if the potential infringement would be greater in the competitor's key market than in the firm's own key market, creating a higher enforcement threat. This would also give defensive value, as

we will see in the next section, as it discourages the competitor from applying their own patents against the focal firm in the focal firm's market.

The empirical findings show that due to the costs of international patenting, firms limit filings to a selection of countries rather than attempting full coverage in relevant regions. For the automotive industry, by protecting one or a few countries, imitation is expected to be shielded in the whole region as producing local variations of vehicles is not viable. This argument aligns with the reasoning of Storz (2011), that at a certain breadth of protection, it does not make sense for competitors to develop and market their own product only in the remaining markets. Although not explicitly supported in the empirical findings, there exist a reasonable connection to Alcácer et al. (2015)'s claim that patents in fewer countries are needed to deter infringement from rivaling firms if they compete in multiple markets, so called multimarket contact. If a competing firm would be found to infringe in country A on a patent held in country B, threatening with legal consequences in country B would have strong negotiation value if this was also an important market for the infringing firm.

For these reasons, the country selection for proprietary strategies should include one's own, or potential imitators, key sales market, whichever is assessed to ensure exclusivity most effectively. Further, the country selection needs only to include one or a few countries within relevant regions.

6.1.2 Country selection in defensive strategies

The case company uses patents to be able to operate and innovate as wanted without increased costs to overcome IP barriers, aligning with Somaya's (2012) generic defensive strategy. The empirical findings show that to achieve this, patents are used to limit licensing and damages fees through cross-licensing or deterring litigation. For this strategic intent, findings emphasize considering one's own key markets, but also, to a higher degree than for exclusive positions, considering key markets of those potentially creating such IP barriers, such as competitors, suppliers, and technology specialists.

One's own key markets are relevant because that is where the firm needs freedom to operate, and IP disputes with companies targeting the same markets can be solved through cross-licensing. But it is not just the firm's own key markets that are important, the key markets of potential third party competitors also play a role. These may be the very markets where the competitor is the most vulnerable and may therefore hesitate to assert its portfolio in a firm's key market knowing that the firm can countersue where the competitor is most vulnerable. A

defensive patent portfolio offers the greatest value in cross-licensing talks or in deterring legal threats if it covers markets that matter to the other party, e.g., a competitor. If a patent assertion entity, from now on calledasserter, does not operate in the same markets, the risk of them being blocked by the firm's defensive portfolio is low, and the firm's patents in that market lose defensive power. Thus, for country selection in defensive strategies, both one's own key markets and markets where potential asserters are most vulnerable should be considered. As described in the theoretical framework, markets where asserters are most vulnerable include e.g., their sales markets and manufacturing locations (Manning, 2007; Fernandez-Riba, 2010; Cuellar et al., 2022). Fernandez-Riba (2010) further argues that vulnerability can be revealed by where the asserter file patent applications.

An aspect found in the empirical findings is that for a single patent, filed solely for defensive protection, one country may be sufficient. The reasoning around multimarket contact, from Alcácer et al. (2015), is again relevant as it highlights that to defend against actors which the firm competes with in several markets, the risk of being blocked or challenged in one country will act as a deterrent. As such, depending on who the potential asserter is, one country may be sufficient.

Empirical findings related to defensive strategies further show that on individual patent level, geographical coverage does not need to be watertight but rather contribute to the desired geographical coverage on the portfolio level. Richardson and Oliver (2015) reason similarly, that comprehensive coverage of all threats is not viable, but sufficient coverage to hold a credible counter-threat should be strived for. Therefore, existing portfolio's size and geographical coverage should be considered in the country selection for defensive strategies as it helps identify where each new patent can add the most value.

6.1.3 Country selection in leveraging strategies

Somaya's (2012) generic leveraging strategy views patents as strategic instruments to create profit opportunities, either directly or indirectly. For the case company, the main use of leveraging strategies is related to creating indirect profit opportunities through using patents for creating negotiation power in relation to suppliers and other actors in collaborative set-ups. Findings from external actors align with such indirect use, and one firm emphasizes the use of patents for direct income opportunities as well. The case company highlights that leveraging strategies are less prioritized than proprietary and defensive strategies.

Empirical findings show that to gain leverage, key markets and manufacturing locations of suppliers and collaborators are the most important considerations for the country selection. Notably, findings from the case company indicate that the geographical coverage of patents has not been significant in collaborative situations, although it is preferable with patents in the collaborator's main region. Somaya (2012) argues that for the leveraging strategies, firms do not need watertight patent protection, but sufficient coverage within technologies that other firms will use. Thus, findings and theory imply that a slimmer country selection approach may be sufficient in leveraging strategies. However, a slimmer country selection would not necessarily hold true if the end goal is to create licensing opportunities, as empirical results show that in those cases geographic coverage must be aligned with the end market of the technology.

The country selection for leveraging strategies holds the same logic as defensive to some extent, to maintain geographical coverage in the other party's most vulnerable market. For the indirect leveraging strategies employed by the case company, this implies emphasizing markets in which suppliers' and collaborators are the most vulnerable, suggestively their key markets and manufacturing locations. For licensing, which is direct leveraging strategies, all markets in which another actor will have to use the patented invention, either in production or through sales, is relevant. In the automotive industry, suppliers' key sales markets are OEMs manufacturing locations. As argued in the Chapter 4, the industry is highly clustered and therefore only a few markets are relevant to consider.

6.2 Who to Build a Defense against

In increasingly complex ecosystems, targeting asserters in the defensive strategies is a challenge emphasized in empirical findings and theory (Jacobides et al., 2023). To be able to follow suggested country selection for defensive strategies, one must understand who to build a defense against. Due to the complexity of an automotive product, and the OEM's role as the system integrator, the ecosystem surrounding an OEM is large and complex. It is assumed that all firms operate under limited resources and hence building a defense against every potential asserter in such ecosystem is arguably not feasible. Instead, the country selection should aim to build a defense against a wanted range of highest risk asserters. Therefore, the following analysis will draw on Richardson and Oliver (2015)'s counter-assertion approach to contribute with understanding in who to build a defense against in the defensive strategies.

While the counter-assertion approach employs monetary terms to estimate the deterrent value of a portfolio, our analysis is limited to investigating potential asserters and their assertion risk. A suggest approach on how to create the country selection to capture the largest deterrent value of a portfolio is elaborated on in Chapter 9 Managerial Implications.

6.2.1 Identifying the asserters in the ecosystem

The first step in Richardson and Oliver's (2015) approach is to map all potential asserters in the ecosystem, including competitors, suppliers, partners and customers, and potential corporate asserters. The case company emphasizes other competing OEMs as asserters, while other actors in the ecosystem seems to have been assessed to be less important. However, the risk of assertion by other actors could also have, implicitly or explicitly, been assessed as too low to profit from protecting against such, and thus not mentioned in interviews. Despite, given the current profound technological change in the automotive industry and expressed concern about other actors from the case company, there is arguably a need to reconsider both potential asserters and their inherent assertion risk.

That the automotive industry is going through profound changes is evident in patenting activities, literature, and empirical findings. As described in Chapter 4, the emerging technologies in the automotive industry introduce new entrants from other industries, such as Big Tech, into the patenting landscape. The emerging technological areas might be novel to the automotive industry but have been patented by other industries for other applications previously. Hence, the patent landscape in these technological areas generally involves intense patenting by several industries, or types of actors, at the same time. This emphasizes the need to consider potential asserters in the ecosystem not only at the end-product level, but also at a technology/patent level.

As emphasized in internal interviews, the more technology that is developed in-house at the case company, the more competing actors, referring to competitors on the technology-level. Not only are the emerging technologies as separate fields introducing more competitors as described above, but the lack of dominant design between, or within, these technological fields means that there are multiple technological trajectories competing per field. For example, there is yet no obvious dominant design between fuel cells and electrification for buses and trucks within the sustainable propulsion trend. The phenomena is discussed by Utterbeck and Suarez (1993), emphasizing the increase of actors in an industry during the era of ferment. Hence,

technological uncertainty increases trajectories that OEMs research and/or develop, and therefore its number of competitors is multiplied within the emerging technologies.

As Jacobides et al. (2023) describe, the change from ICE as dominant design has increased the width of the ecosystem and opened the possibility for a change of profit distribution between the actors. For example, the change leads to traditional suppliers and OEMs competing within the emerging technological domains, something also indicated in findings from the case company. This implies a need to consider not only new entrants but also changed relationships to established actors in the ecosystem. This aligns with Holgersson et al., (2018)'s insight that relationships in innovation ecosystems are neither symmetrical nor static and technological development and new entrants may alter the relationships over time.

The main challenge the case company described for the country selection was to understand both who the potential asserters in the ecosystem are, and how to assess the assertion risk from them. Hence, the challenge is to understand if the deterrent value deriving from making the country selection based on these potential asserters is bigger than the related costs. Given that the cost of filing a patent is known, an estimation of such deterrent value is made, implicitly or explicitly, every time a patent for defensive strategy is filed. As suggested in empirical findings, if a single patent can deter an asserter from an assertion or if it can be used to offset damages in a litigation, the patent's inherent costs are arguably trivial. However, it is impossible to know in advance which patents will be used as defense, emphasizing the need to understand the assertion risk of the identified potential asserters in the broad, and evolving, ecosystem.

6.2.2 Assessing the assertion risk

After understanding who the potential asserters are in the broader, and changing, ecosystem, Richardson and Oliver's (2015) approach suggests that the next step is to assess their assertion risk. An asserter's choice to claim infringement can have various reasons depending on their patent strategy, as suggested by Somaya (2012), and their understanding of other actors' strategy. For example, collecting licensing fees, ensuring exclusivity or altering the relative profitability between two firm's product offerings. Actors do not act in isolation, which adds another layer of complexity due to understanding relationships between oneself and the actors rather than them in isolation. Further, the introduction of new actors in multiple parts of the ecosystem, and changed relationships, means trying to understand many new actors, and interdependencies between them. The ongoing technological changes further increase this complexity as uncertainty is high, and actors might act unexpectedly. Hence, assessing the risk

is arguably the most complex aspect of the counter-assertion approach, something also emphasized by Richardson and Oliver (2015). One approach to making sense of this risk is to contextualize it using the technological regime of the industry, to make better sense of the behaviors of the actors identified in step one.

The industry has historically been characterized by a Mark II regime, as argued previously in Chapter 4 describing the automotive chapter. The empirical findings show that the case company mainly considers other incumbent OEMs in the defensive strategy. Further, the empirical findings showed that leveraging strategies against suppliers or partners have low priorities compared to defensive and proprietary at the case company, which indicates confidence of their power in negotiation already. Theory shows that in the Mark II technological regime the competitive landscape is stable (Malerba & Orsenigo, 1997), and appropriability regimes are high, which would allow incumbents, with greater confidence, to primarily consider other incumbents in the country selection for defensive strategies. However, the uncertainty indicated by the case company regarding the current country selection, and as the industry dynamics are changing due to emerging technologies and new entrants in the patenting landscape, there is arguably a need to review if this country selection for defensive strategies is still suitable for an incumbent OEM.

With relation to the inherent risk that the asserters pose, the difference of the technological regimes is important. If the automotive industry would move into a Mark I regime, incumbent OEMs is threatened to be replaced by new entrants (Tushman & Anderson, 1986). Consequently, focus should arguably be on competing against new entrants in the technological trajectories of the discontinuous technologies to defend one's market position. The grade of competence enhancing or destroying of the technological discontinuity influences the assertion risk as incumbents would have a higher deterrent value from existing portfolios in competence enhancing discontinuities.

The Mark I regime is characterized by innovative activities distributed among many small and new firms, and the competitive landscape would be dynamic and uncertain (Malerba & Orsenigo, 1997). One argument from empirical findings indicates that the total risk of assertion is lower in the new technological trajectories in the beginning, however when they become saturated with actors the risk increases. This reasoning would imply that the initial assertion risk from new entrants are low. The grade of uncertainty and turbulence in the Mark I regime implies an assertion risk from a wide range of potential asserters, in comparison to in a Mark II regime where the assertion risk is concentrated to incumbents. Further, Mark I implies a higher

need to continuously revisit the assertion mapping and the assertion risk assessment as actors and interdependencies change faster than in Mark II.

For the Mark III regime described by Jacobides et al. (2023), however, the incumbents enforce their position as system integrator by absorbing the knowledge from new entrants through collaboration, rather than competition. Findings from Carillo et al. (2024)'s empirical study indicate that collaboration between incumbents and new entrants is a survival strategy for the incumbents through the transformation of the industry, aligning with Jacobides et al. (2023). Empirical findings from new entrant actor in an emerging technological field in the automotive industry emphasizes the need to collaborate with the OEMs to stay relevant, and that the increased complexity of the automotive products increases the knowledge needed to be transferred between actors. Hence, the technological change has enforced collaboration as suppliers of emerging technologies and OEMs are dependent on each other to stay relevant, nuances Carillo et al. (2024)'s perspective that it is a survival strategy from the OEMs.

The risk for OEMs in the Mark III regime, as described by Jacobides et al. (2023), is a change in the profit distribution in the ecosystem where suppliers of key technology would leverage its position and increase their share of the profit distribution. Holgersson et al. (2018) explain that in complex, multi-technology innovation systems firms' ability to appropriate returns from innovation depends not only on the firm's own technological assets but also on how effectively it can access and leverage complementary technologies held by other actors. This arguably holds for an automotive industry characterized by Jacobides et al. (2023)'s Mark III regime, in which OEMs should use patents to attract collaboration opportunities, and appropriate outcomes, with key technology suppliers to mitigate the risk of them increasing their position in the ecosystem. Further, the main uncertainty found in findings from case company is in understanding the threat from actors within emerging technologies, and it can be argued that this relates to understanding a substitute regime, as sustainable propulsion solutions such as EVs are substituting the traditional dominant design of ICE in automotive products.

As the analysis implies, different technological regimes involve different types of potential asserters and different levels of assertion risk. Further, it is assumed that the highest deterrent value is obtained from building a defense against the actors with the assertion risk. Thus, our analysis shows that for a global automotive OEM pursuing defensive strategies, the highest risk asserters are not static nor certain, and emphasis should be placed on the practice of understanding risk and how it changes rather than understanding who to defend against right now. This is further supported by the long lifetime of a patent and the turbulence of the industry.

7. Discussion

This study showed that patent country selection is not just a technical or legal exercise, but an outcome of a strategic process shaped by what firms want to achieve with their patent portfolios and their understanding of their ecosystem and the industry. There is limited academic research on how firms choose countries for patent filings, and to our knowledge none within the automotive industry. As argued in one of the few publications on the topic, this may be due to the sensitive nature of the topic (Cuellar et al., 2022). The literature that exists provides high-level guidance in terms of general factors, including market importance, competitors, and legal frameworks. While this contributes to the literature, it does not capture the complexity going into the country selection that we have found in empirical findings nor the specific context of global automotive OEMs.

The decision on where to file patents has become increasingly complex, as argued in existing literature (Fernandez-Riba, 2010; Alcácer et al., 2015). The aim of this study was to contribute to the understanding of patent country selection strategy within the context of automotive OEMs, by studying what factors should be considered and how the strategic intent of a patent portfolio influences the importance of these factors. Additionally, this study aimed to examine how a global automotive OEM can go about understanding what actors to consider when pursuing defensive strategies. In doing so, this master thesis addresses the academic gap previously defined, as country selection strategies have received limited attention within IP strategy literature.

First, our findings show that market importance and competitor presence remain central factors, as noted in previous literature (Alcácer et al., 2015; Fernandez-Riba, 2010), and that legal system is a baseline requirement rather than a decisive factor, in the automotive industry. We extend this understanding by showing that the influence of the factors is not uniform but shaped by the strategic intent of the patent portfolio, whether it aims to be proprietary, defensive, or leveraging.

One challenge for this suggested approach is the need to define the strategic intent of the portfolio prior to filing. It was evident in the empirical findings that portfolios typically aim to fulfill multiple strategies. This challenges our analysis building on Somaya's framework, where strategic categories appear more stable and distinct. In reality, patent portfolios might aim to achieve several strategic intents, which may also shift over time. This is only an issue if the concluded country selection from the different strategies differs, e.g., if identified high risk

asserters do not share the same key markets as the case company. However, there is nothing in our analysis that limits several strategic intents to be applied to the same portfolio. By combining the country selections from multiple strategic intents, geographical coverage on a portfolio level can be optimized to account for multiple strategic intents. Further, given that the country selection in the automotive industry is typically choosing few countries among few countries, country selection overlaps between strategic intents are assumed to be common.

The breadth of geographical coverage is discussed in the analysis but not covered in the suggested country selection approach. That is a deliberate approach as it may affect how factors must be prioritized, but neither theory nor empirical findings gave sufficient guidance on how many countries a patent family or portfolio should cover. Also, the aim of this study was not to determine optimal number of filing countries, but to propose a prioritization approach, to help automotive OEMs assess where to file patents to fulfill their strategic intents.

For the second part of our analysis, we suggest that OEMs should look beyond direct competitors and consider a broader range of actors, including Tier 1 suppliers, technology firms, and non-automotive entrants when pursuing defensive strategic intents. We build on the literature on industry dynamics and technological regimes (Tushman & Anderson, 1986; Malerba & Orsenigo, 1997; Jacobides et al., 2023) to assess which actors are relevant to monitor and understand their assertion risk.

Due to the different technological regimes implying different behaviors from potential asserters, the risk assessment would arguably benefit from understanding the technological regime of today and in the next 20 years. However, given the complexity of today's automotive industry, going through profound technological change, it is not reasonable, within the scope of this study, to definitively classify the current technological regime as either Mark I, Mark II, nor to support or oppose Jacobides et al (2022)'s proposed Mark III regime. As Malerba and Orsenigo (1997) note, regimes are sector-specific but can also shift or coexist within subdomains, especially in complex systems industries like automotive. Similarly, Holgersson et al. (2018) highlight that innovation increasingly occurs across distributed ecosystems, making regime characteristics less uniform. Therefore, rather than relying on a fixed regime classification, our analysis shows that industry change will affect the assertion risk assessment for actors. Thus, for a long-term optimized patent country selection strategy, firms should benefit from gaining predictability of industry dynamics, and flexibility in the country selection strategy.

Further, while our approach builds on established theories, we acknowledge that other theoretical lenses, such as transaction cost economics, and institutional theory, may also offer valuable perspectives on actor relevance and IP threats. Our conclusions should therefore be seen as one possible interpretation rather than a definitive answer.

To fully unlock the potential of our suggested patent country selection strategy, it must be understood not as a standalone tool, but as an extension of a broader strategic alignment between overarching business strategy and characteristics and contexts of the technological domain of patent portfolios. This is achieved through the definition of the strategic intent/s of the patent portfolio, which should be shaped by both the competitive positioning of the firm and the nature of the competitive and patent landscape in the technological domain of the portfolio. In turn, such strategic intent guides the country selection, as our approach suggests. Consequently, if the strategic intent fails to accurately reflect the interdependencies between business strategy and the technology's context, then the country selection approach risks becoming detached from its intended purpose. This logic is supported by Blind et al. (2009), who show that strategic motives for patenting have a clear influence on portfolio characteristics. Similarly, Parchomovsky and Wagner (2005) argue that the true value of patents lies not in their individual worth, but in the strategic aggregation and deployment of related patents within a portfolio. Our analysis rests on the assumption that such alignment is systematically established. Within this context, our study brings both academical and managerial value by emphasizing that patent country selection strategy should be treated as an integral part of IP strategy.

7.1 Limitations and future research

This master's thesis focused mainly on a case study of a global automotive OEM, and insights from other industries have helped paint a broader picture. This approach provides insights into how patent country selection strategy should be approached at the OEM level. This limits generalizability, and further research is needed to develop a more comprehensive understanding of the topic. Future research could benefit from examining actors in other parts of the automotive value chain to provide a more comprehensive view of country selection in the entire automotive industry. In particular, exploring how Tier 1 suppliers, technology specialists, and new entrants to the industry such as Big Tech approach country selection could give comparative insights. These actors often operate under different business strategies, business

models, and organizational designs, which may result in alternative rationales for why and where patents are filed.

Future research could investigate the interdependent relationship between the technological domain, the firm's overarching business and IP strategy, and the strategic intent of its patent portfolios. While the strategic intent may be shaped by both the technological characteristics of an invention and the broader strategic direction of the firm, it can also influence which technological domains are prioritized and how the firm positions itself strategically. Examining these dynamics could expand on the findings of this study.

Further, the scope of this thesis was limited to analyzing the decision-making process and strategic logic behind country selection, rather than assessing the long-term impact of those decisions. Future research could investigate the outcomes of different country selection strategies, such as their role in successful deterrence of patent disputes, cross-licensing, market exclusivity, or collection of licensing fees. Longitudinal studies or cross-case comparisons could help clarify how well current selection strategies perform over time and under varying competitive or technological conditions, particularly in emerging domains where the innovation and patent landscape are evolving still.

8. Conclusions

In order to fulfil the purpose of this study, this master's thesis has explored how a global automotive OEM can approach patent country selection strategy. First, key factors influencing country selection were identified, showing that key markets and exposure to third parties are the most critical considerations, and legal enforceability being a basic requirement. Second, it demonstrated how the strategic intent of a patent portfolio, categorized as proprietary, defensive and leveraging, shapes the relevance and prioritization of these factors. Third, the study examined how OEMs should identify and assess potential IP threats from third parties in defensive strategies, especially within an evolving and complex innovation ecosystem.

The analysis revealed that country selection is not a standardized or purely administrative task but should be context dependent and anchored in strategic intent. For proprietary strategies, patent filings should focus on securing exclusivity in the firm's own key markets or in competitors' most vulnerable markets to support e.g., price premium. In defensive strategies, a firm's own markets and those most critical to likely asserters should be covered to ensure cross-licensing leverage or to deter litigation. Leveraging strategies require coverage in markets relevant to collaborators or suppliers, with wider coverage necessary for licensing.

Furthermore, the study highlights that identifying potential asserters is increasingly challenging due to the convergence of industries and technological change. Potential asserters extend beyond traditional OEM competitors to include suppliers, technology firms, and new entrants from other industries. Defensive strategies, therefore, require a dynamic assessment of assertion risk as the analysis implies, different technological regimes involve different types of potential asserters and different levels of assertion risk. Thus, emphasis should be placed on the practice of understanding risk and how it changes rather than understanding who to defend against right now.

Finally, the study concludes that country selection should not be treated in isolation, but as a strategic outcome shaped by the intent of each patent portfolio. When this intent is grounded in the firm's business strategy and the characteristics of the technological domain, country selection becomes a coherent part of IP strategy.

8.1 Managerial Implications

The findings of our research offer several implications for managers involved in patenting decisions at global automotive OEMs. One of the most important takeaways is that patent country selection should not be viewed as a technical or legal task isolated from broader strategy. Managers need to take an integrated approach that connects patent management with the company's overarching business strategy and innovation goals and the characteristics of the technological domain. The importance of this is exemplified through the strategic intent behind the patent portfolio, the core of our suggested approach. As elaborated in the discussion, such strategic intent must be anchored in the overarching business strategy and characteristics and contexts of the technological domain. Whether that intent is proprietary, defensive or leveraging strategy, the countries selected for patent protection should support that aim. This approach helps ensure that the patent country selection is used as a tool to support broader strategic objectives, rather than treated as a siloed matter.

Another key outcome of our analysis is making the implicit trade-offs in the country selection more explicit. By structuring how different strategic intents imply different approaches to country selection, decision-makers are forced to articulate which strategy or strategies they aim to achieve with their portfolio and commit to it through dedicating the filing costs to the country selection. Further, for defensive strategies, the decision-maker must also argue which asserters they are actively defending against and which they are consciously deprioritizing, providing transparency in the risks a company is willing to take on. This tangibility supports internal alignment and aims to improve resource allocation by streamlining decision-making. Further, by reevaluating the asserters and their inherent assertion risks continuously, firms increase their predictability of potential IP barriers and intelligence of competitive landscapes.

Lastly, the industry's technological change affects several aspects of our country selection approach, and when writing this report, the world is more volatile than before. Hence, trying to understand how markets, ecosystems, and technological trajectories will evolve in the coming 20 years, and draw country selection decisions from that understanding, is a tricky road to walk. Therefore, we believe that true resilience in this turbulence is about balancing predictability and flexibility. Instead of putting effort into making the correct guess, and optimizing the country selection to that guess, emphasis should lay on building a strategy that is effective whatever happens. The country selection should not be an isolated choice between countries,

but an output of strategic choices and intelligent assessments. For these reasons, we suggest the following country selection approach.

First, patent portfolios should be built on technological domains rather than end-products. This is due to the nature of patents, where the patent landscape creates competition on technology level, not end-product. Given that the crucial definition of strategic intent for a portfolio is based on such, the portfolio should be aligned with technological domains as well.

Second, for each portfolio, define the strategic intent(s) based on overarching business strategy and the competitive and patent landscape of the technological domain. Multiple intents can be achieved on a portfolio level, but not always on an individual patent level as the country selection can differ, given the assumption that firms operate under limited resources and several, different, country selections is not an option for single patents.

Third, depending on the defined strategic intent(s), follow the analysis chapter 6.1 to understand which country selection factors should be emphasized. For multiple intents, value countries both per strategic intent and combined to optimize overall selection of the portfolio and keep track of underlying reasoning to efficiently translate changes to intents to country selection.

If the strategic intent is defensive, our approach suggests that an elaborated analysis of potential asserters is required to understand who to defend against, rather than in which countries. A broad ecosystem perspective is required as argued in the analysis. Further, the assertion risk for identified asserters needs to be assessed. As the analysis shows, assertion risk differs in different technological regimes as actors enter, exit and change in industrial dynamics. An additional aspect into the assenter analysis not covered in the analysis is the pain an assenter could cause. Cases might exist where risks of assertion are high, but the consequence of such assertion is negligible. If such pain is assessed to differ significantly between asserters, the combined expected value of risk and pain should be used to rank asserters. By translating asserters to countries, e.g., through their inherent key markets, a map of countries providing the highest deterrent value is derived. Such country selection can then be combined with other strategic intents as suggested previously.

In short, country selection should be the outcome of a clear and well-grounded strategic intent for each patent portfolio. By anchoring the selection in what the portfolio is actually meant to achieve, firms can avoid filing patterns based on habit or outdated assumptions. As technologies, competitors, and collaborative dynamics evolve, staying responsive to those changes becomes more important than aiming for perfect foresight. A flexible, intent-driven

approach ensures that patenting decisions remain both cost-efficient and strategically valuable over time.

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Appendix

Appendix A: Interview template case company interviews

Brief overview of the interview and its purpose

The interview will explore your current approach to country selection, aiming to:

- First – identify the factors and aspects you consider when choosing countries
- Then – understand how you evaluate these different factors, and whether this evaluation varies depending on the context – in other words, are some factors more important than others, and if so, when?

We are interested in your thoughts and knowledge on this, so please respond based on your experience and approach. There are no right or wrong answers.

The interview is semi-structured, meaning we have a set of questions we will ask everyone, but the conversation is open for discussion.

If we go off-topic during the discussion, we will steer back to the questions, so feel free to share any thoughts that come up.

We will record and transcribe the interview to support our analysis, is that okay?

Interviewee introduction

- Describe your role and responsibilities at the company
- How long have you been in this role?
- Given your patent portfolio and the products and technologies it includes, what is the purpose of obtaining patents? – What are you trying to achieve with the patents in your portfolio?

Country selection process

- At what point in the patent filing process is the country selection decision made?
- Are any other people involved in country selection? Who and when?

Factors

- What factors or aspects do you consider when choosing a country? That is, why do you choose the countries you do?

- Are there any factors you would like to consider but are unable to?
- Are there any factors you could consider but choose to exclude?

Evaluation of factors

- Among the factors you consider, do you evaluate them differently for different patents?
- Are there generally any factors you always consider more or less important?
- Are there factors that you weigh more heavily depending on the industry you are in?
- (If applicable) Among the factors you do not consider, how would you rate their importance?

Appendix B: Interview template external interviews

The interview will explore your current approach to country selection, aiming to:

- First – identify the factors and aspects you consider when choosing countries
- Then – understand how you evaluate these different factors, and whether this evaluation varies depending on the context – in other words, are some factors more important than others, and if so, when?

We are interested in your thoughts and knowledge on this, so please respond based on your experience and approach. There are no right or wrong answers.

The interview is semi-structured, meaning we have a set of questions we will ask everyone, but the conversation is open for discussion.

If we go off-topic during the discussion, we will steer back to the questions, so feel free to share any thoughts that come up.

We will record and transcribe the interview to support our analysis, is that okay?

Interviewee introduction

- Describe your role and responsibilities at the company
- How long have you been in this role?
- Given your patent portfolio and the products and technologies it includes, what is the purpose of obtaining patents? – What are you trying to achieve with the patents in your portfolio?

Country selection

- How does your organization use their patent portfolios?
- Is there a mix of purposes for the patents in the portfolio?

- How does the industry affect country selection?
- What factors or aspects do you consider when choosing a country?

- What value does a company gain from patenting in countries where it has no market presence?
- How does the industry your company operate in affect this value?

- How have patent strategy in your industry been affected by technological change?

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENTREPRENEURSHIP AND STRATEGY
CHALMERS UNIVERSITY OF TECHNOLOGY

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