Analysis of the EU and US Legal Frameworks of Anti-Competitive Practices in Merger and Acquisitions Where Patents Remain Unutilized

Doctoral Ph.D. Dissertation

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Abstract

The legal fields of Mergers and Acquisitions, Competition Law, and Intellectual Property are all well-researched areas with a long history of case law as well. However, at the intersection of these legal fields, there are some important areas that are studied less extensively, although they impose a significant practical effect on the economical and scientific progress of society.

One such area lies at an intersection of Mergers and Acquisitions, Antitrust Laws on anti-competitive practices, and Patents, specifically the case when important patents remain unutilized by the companies after the merger or acquisition happens. This scenario may occur for many reasons, from negligence or inability to thoroughly consider the potential of each item in the patent portfolio of all companies involved in the merger and acquisition, all the way to deliberate action taken to acquire companies solely for their patent portfolios, because they are perceived to pose a future risk to the acquiring company's current business lines.

In this dissertation, I will attempt to prove that even though the scenarios where patents remain unutilized after the merger or acquisition happens are not desirable for the economy and society, as many national and international legal frameworks on anti-competitive behavior clearly state, the current national and international organizations do not currently have effective operative measures in place to prevent such scenarios, identify the companies involved and hold them accountable.

The methodology I will use is the following:

I will first examine the three different legal fields, their definitions, the objectives of the legislator, some of their most important practical implications in the fields where they intersect from the perspective of our study: Mergers and Acquisitions, Antitrust Laws and Patents. I will pay attention that I describe not only the theory, but the practice of these legal fields as well, by investigating the current laws, treaties and case law. Understanding that these legal fields each present a wide topic, I will focus my investigation on the European Union and United States laws and practices, with occasionally some other international examples as well.

In the following chapters, I will investigate the practical implications of the scenario where patents remain unutilized after certain mergers and acquisitions, to be able to show the magnitude of the issue by interpolating the relatively scarce economic data available on this subject. The scarcity of data is understandable if we think about the fact that it will not be in the interest of the companies involved to publish such data, and since the problem has not yet been recognized as a major study subject, there are not enough secondary sources where this data could be gathered either. However, for the purposes of my argument, it is enough to prove the existence of the problem, prove that it is not covered by effective measures of the EU and US institutions to prevent these scenarios, identify the companies involved and hold them accountable. This will already show that the objectives of the legislator are not met in the scenarios when patents remain unutilized after certain mergers and acquisitions. My attempts to illustrate the magnitude of the problem will only serve as an emphasizing factor that it needs urgent and operative action from national and international policymakers.

In order to make my dissertation as practical as possible, I have decided to include a detailed case study from the European merger control case law where a patent with great importance was left unutilized after a merger. The patent in question was about Gallium Nitride RF Power Transistors, and - as we will discuss - it was fundamental in the development of today's 4G and 5G telecom network infrastructure. In fact, in this case, the competition authority's sole focus on market concentration may have been the cause of the acquiring company's decision to leave the patent unutilized. The fact that development in this area hasn't stalled was entirely due to

other companies taking over and developing their own patents, own technology, and own production facilities.

I will also establish an operational framework for a new office of national or international competition authorities, which I am calling the Innovation Protection Office. The proposed operational framework is intended to establish some practical solutions to protect customer access to the officially recognized innovative advantage of patents and ensuring their utilization. I will review the current legal framework for applicable laws and procedures by which this goal can be achieved. There could be many other operational guidelines, processes, or organizational structures that would achieve the same result. Therefore, my main goal in establishing and describing this operational framework is to offer future legislators interested in the problem and the solution some useful tools to govern public policy.

Finally, I will draw my conclusions on the research I have presented in this dissertation and identify some areas for further research.

Chapter One

1. Fields of Study

"The value of an idea lies in the Using of it" - Thomas Edison.

This chapter presents a discussion on the meaning, scope, and relevant areas of study. It includes a brief discussion of the need for merger control along with the statement of the problem, the objective of the study, research methodology, and hypothesis. It examines the comparative historical study of mergers along with other legal fields.

The legal fields covered include Mergers and Acquisitions in Corporate Law, Anti-Competitive Practices in Antitrust Law, and Patents in Intellectual Property Law.

The main laws in the European Union to govern such anti-competitive practices are defined in Article 102 (b) (former Article 82) of the Treaty on the Functioning of the European Union.[1]

Through an analysis of current regulations in the fields of Mergers and Acquisitions, Antitrust Law and Intellectual Property, and an analysis of the current practices and operation of law enforcement agencies responsible for competition and intellectual property (competition authorities and patent offices) in the EU and the US, as well as through case studies of company acquisitions when important patents remained unutilized, I will attempt to investigate the following hypotheses:

1. Acquisitions where patents remain unutilized are *undesirable* and present a *significant* issue.
2. Current national/international organizations *do not have effective measures* to prevent or mitigate them.
3. There is *sufficient legal basis* to prevent or mitigate them.

Afterwards I will propose a solution by presenting an operational framework for a new office of the competition authority (prior & post-Merger and Acquisitions).

[1] Eur-lex.europa. (2008, May 09). Consolidated version of the Treaty on the Functioning of the European Union - PART THREE: UNION POLICIES AND INTERNAL ACTIONS - TITLE VII: COMMON RULES ON COMPETITION, TAXATION AND APPROXIMATION OF LAWS - Chapter 1: Rules on competition - Section 1: Rules. Eur-Lex.europa.eu. Retrieved October 20, 2020, from https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E102:EN:HTML

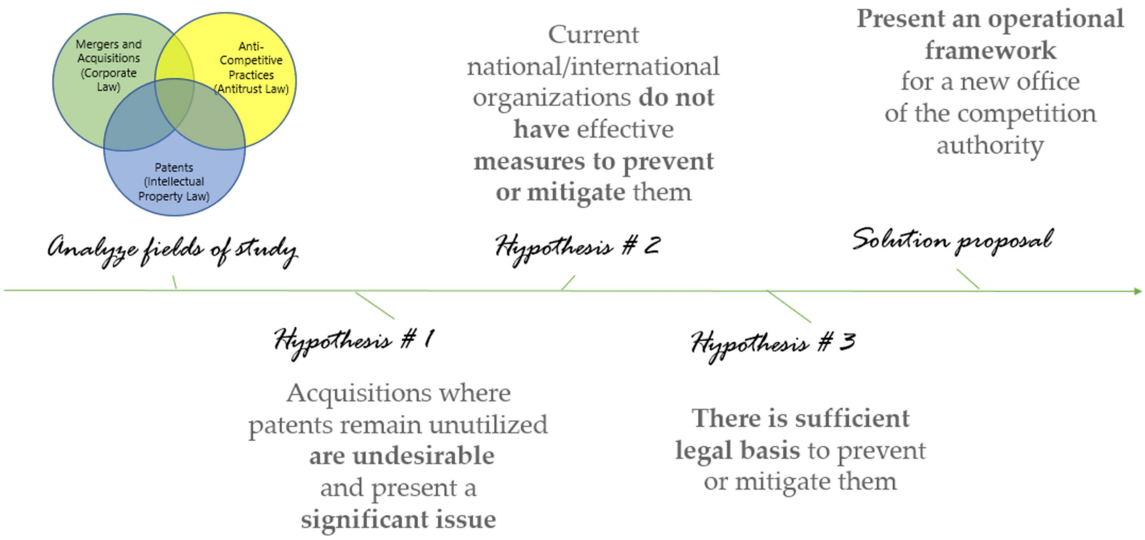

Figure 1 Research Tasks

The structure of this thesis will follow the research tasks as described above. In this current chapter (Chapter One) I am presenting the fields of study to provide a solid foundation of not only the legal theory of each legal field (Mergers and Acquisitions, Antitrust Law and Intellectual Property), but will observe the practice as well, especially in the EU and US context.

In the second chapter I will focus on the first hypothesis, and investigate the scenario of acquisitions where patents remain unutilized, including the existence, significance and effects of the issue.

In the third chapter I will focus on the second hypothesis, the EU and US institutions responsible for competition and intellectual property, the competition authorities and patent offices, and investigate their organizational structures and processes.

In the fourth chapter I will focus on the third hypothesis and the solution proposal. I will investigate the current laws and procedures that could form the legal basis of the proposed new office of the competition authority. Then I will design the new organization, including its organizational structure and procedures.

1.1. Mergers and Acquisitions Laws and Regulations

This chapter makes a modest attempt to glimpse into the vast domain of mergers and acquisitions vis-à-vis the regulatory authorities' role. The subject area is undoubtedly quite vast. But the endeavor has been made to assess the volatility of the situations within different regulations around the world.

In this chapter I will investigate the legal field of Mergers and Acquisitions, both from the theoretical and from the practical point of view. In the first subchapter I will look at the theory, definitions, and types of mergers and acquisitions, the benefits of mergers, especially at the intersection of mergers and intellectual property. This overview will serve as a theoretical foundation of the legal field. In the second subchapter I will look at the recent mergers and acquisitions trends, laws and regulations around the globe. This overview will serve as a practical foundation of the legal field.

Merger control regimes across the globe have a common concern. It is, how does one ensure that the merger proposal evaluation is stringent on all qualitative parameters, and that has been the case. Once the process is complete, the merged entity's future remains stable, and the market is not rendered less competitive. This apart, there are socio-economic concerns that are supposed to be satisfactorily addressed in the evaluation processes from a more extensive sustainability perspective by the concerned regulator.

In the international economic state of affairs, our corporations and business companies are within recent formations and restructurings for survival and growth. On the one hand, we tend to view international corporations to sustain our identity within world economic forces' teeth. Such a scenario has propelled the countries worldwide to review our existing laws, especially antitrust laws, to tackle misuse of innovative ideas and monopoly.

The global economic turmoil presented a variety of new challenges. Company entities across the planet were forced to require aggressive steps to decrease payments and scale back liabilities and closely examine business restructuring to survive and grow. Merger and Acquisitions are researched for many decades in educational fields like finance, economics, law, and alternative thoughts.

The business world is extremely challenging. Hence it is volatile. It constitutes the very fabric of a country's economic health. Even the political spectrum of a country is often described as

merely applied economics. The area of Merger control regulation is vast as well as multi-layered. Its regulatory complexity is intertwined with the problem of the creation of a robust merger control regulation. Multidimensional analysis of the potential impact centers of any merger or acquisition requires a detailed understanding of the process of Mergers and Acquisitions from a systems perspective.

The creation of state-specific regulatory guidelines is aimed at preventing the abuse of the rights of these specific impact centers indirectly owing to the adverse impact of mergers and acquisitions. The goal of the present research is to identify the effect.

Although it is technically imprecise to use the term mergers, acquisitions, and Merger and Acquisition interchangeably, for our investigation purposes, I will use them as synonymous phrases since the protection of customer access to innovation concerns all these areas.

1.1.1. Definition

"Mergers are like marriages. They are the bringing together of two individuals. If you wouldn't marry someone for the 'operational efficiencies' they offer in the running of a household, then why would you combine two companies with unique cultures and identities for that reason?" - Simon Sinek[2]

In this chapter, I will first investigate the theory of mergers and acquisitions by reviewing the definitions of mergers and acquisitions, and the different types of mergers and acquisitions. This is fundamental to understand this legal area.

Then I will take a look at the advantages that companies can achieve with mergers or acquisitions, to understand the benefits and motivations of the companies involved. This will be important to be able to grasp the incentives of the corporate behaviors that can be seen in the scenario of my thesis, acquisitions where patents remain unutilized.

In the discussion of the benefits of mergers and acquisitions, I will focus especially on the intersection of two legal areas, Mergers and Acquisitions and Intellectual Property. I believe it is essential to understand the interplay of the two legal fields, because that is exactly where the scenario of my thesis lies.

[2] Graves, S. (2020, September 15). The Five Stoplights of Business Deals. Retrieved October 20, 2020, from https://stephenrgraves.com/articles/read/the-five-stoplights-of-business-deals/.

The terms mergers and acquisitions might usually be confused and appear similar. However, the two of them have different meanings.

Mergers could also be of assorted sorts, and so will acquisitions be. There are a few terms like "demerger," "spin out," and "spin-off" that an area unit wants to denote the method by which an organization separates into totally different firms.[3] The term "Mergers associated Acquisitions" is an expression of a technique referring to the company sector. When one company purchases associates from other similar size companies, both the firms move to become one.[4] The two firms sometimes proceed to merge once they feel that they will be able to do something they cannot do independently. They are combining two different firms, typically by giving the stockholders of one company securities, with the acquired/merged company surrendering their stock.[5]

A merger is primarily a technique of inorganic growth. The acquisition is a method of an organization that acquires management power over another company referred to as a target company. Mergers and acquisitions are unit actions through which firms look for economies of scale, efficiencies, and increased market visibility. Mergers and Acquisitions may involve one firm buying another – in this case, there is no stock or consolidation exchange as a replacement company. Acquisitions are usually friendly, and all parties feel glad about the deal, whereas sometimes acquisitions are more hostile.[6]

Hence, Merger and Acquisition (M&A) refers to the process of merging or acquiring all or parts of other companies' property rights under certain conditions to have the controlling rights and is a critical business behaviour to pursue complementarity between companies from different dimensions such as resource, channel, brand, and technology. Proper Merger and Acquisition behavior has the benefit of changing the market structure and increasing market power, generating economies of scale and other synergies, having tax advantage, or serving managerial ambitions. Merger and Acquisition plays an increasingly important role in the

[3] Investopedia Mergers and Acquisitions. (2020, April 21). De-Merger Definition. investopedia.com. Retrieved October 20, 2020, from https://www.investopedia.com/terms/d/demerger.asp.

[4] Roberts, A., Moles, P., Wallace, W. (2003). Merger and Acquisitions. Retrieved October 20, 2020, from https://ebs.online.hw.ac.uk/EBS/media/EBS/PDFs/Mergers-Acquisitions-Course-Taster.pdf

[5] Black Law Dictionary. (2007). (Centennial Edition ed., Vol. 6th Edition). West Publication.

[6] Coyle, B. (2000). Finance Risk Management; Corporate Finance, M&A. CIB Publication.

highly competitive business environment and is a useful tool that companies adopt to sustain or even extend their competitive advantages.[7]

"A merger or an acquisition in a company can be defined as the blend of two or more companies into one new company or corporation. The main difference between the above mentioned lies in the manner in which the combination of the companies is carried out."[8] Just like us, even a company, throughout its journey, passes through many phases and may acquire another company for its expansion or even to handle competition in the market.

In summary, there are four basic forms of acquiring another firm:

1. Merger or consolidation
2. Acquiring stocks
3. Acquiring assets
4. Total Cash Deal acquisition [9]

A merger is the foremost common way of acquiring another firm. In general, a merger is the absorption of one company by another company, including all its assets and liability. There could also be several reasons for a corporation to go for a merger, like market access, finance, resources, productivity, or a rise of the shareholder's belt, etc.

Although mergers are generally beneficial to the shareholders, some mergers might have a negative impact, i.e., they will not augment the earnings per share of the merged company. This might happen when the mergers are undertaken to expand the capitalization and customer base of the corporate as per one of the Indian case study examples in the merger of Bank of Punjab with Centurion Bank.[10] However, by merging with major competitors, an organization is in a position to dominate the market they compete in, giving them freedom concerning pricing and buyer incentives.

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[7] (Roberts et al., 2003)

[8] Moskovicz, Abraham. (2018). Mergers and Acquisitions: A Complete and Updated Overview. International Journal of Economics & Management Sciences. 07. 10.4172/2162-6359.1000540.

[9] Jain, S. (2010). Mergers & Acquisitions & the IPR Issues Involved. http://www.legalservicesindia.com. Retrieved October 20, 2020, from http://www.legalservicesindia.com/article/503/Mergers-&-Acquisitions-&-the-IPR-Issues-Involved.html

[10] Financial Express. (2005). Centurion Bank and Bank of Punjab to consider merger. Financial Express. Retrieved October 20, 2020, from https://financialexpress.com/archive/centurion-bank-and-bank-of-punjab-to-consider-merger/143364/

In another case, a merger brings together two companies that make different but complementary products. This might also involve purchasing an organization that controls an asset an organization utilizes somewhere in its supply chain.

Any business or corporation may enter into a merger in order to combine an extremely profitable company with a less profitable/loss-making company so as to use the losses of the loss-making company as a tax write-off to cover its profits while expanding the company as a whole, as seen in the merger of Skipton's construction company with Chesham's loss-making. Skipton, Britain's fourth-largest construction firm, is believed to be one of the stronger construction firms by the Financial Services Authority. The acquisition of Skipton resulted in a rise in pre-tax earnings of £63.5 million in 2009, compared with £22.5 million in 2008. The goal of the merger was to boost Skipton's capital base.[11]

Acquisition

While a merger is joining one firm with another firm, an acquisition is the purchase of another firm. In order to execute a sale deed, one firm purchases the other firm. In an acquisition, either a few or all the assets and liabilities of another firm are purchased or assumed. It deals with another company's purchased shares. The understanding of Merger, Acquisition, or even the term Takeover, depends on its own specific factor and the use of these terms tends to imbricate.[12]

Some advantages of Mergers over Acquisitions are discussed below:

1. No cash requirement in mergers.
2. Accomplished tax-free for both parties.
3. Allows the target company to realize the potential of the merged entity.
4. Allows shareholders of smaller entities to own a smaller piece of a larger pie, increasing their overall net worth.

[11] Reuters Staff. (2010, February 24). Skipton to take over rival Chesham. Retrieved October 20, 2020, from https://uk.reuters.com/article/skipton-chesham-idUKLNE61N01N20100224

[12] Corporate Finance Institute. (2020). Acquisition. Corporate Finance Institute. Retrieved October 20, 2020, from https://corporatefinanceinstitute.com/resources/knowledge/deals/acquisition/

5. Privately held company mergers allow the target company shareholders to receive a public company's stock.[13]

Kinds of Mergers

Mergers are grouped into three categories depending on the characteristics and nature of the companies. Collectively, globalization and global financial changes have contributed greatly to the case of multinational mergers and acquisitions. Global mergers and acquisitions take various forms, such as horizontal mergers, vertical mergers, conglomerate mergers, congeneric mergers, reverse mergers, dilutive mergers, accretive mergers, and others.[14] The differences of each merger are elaborated, taking various case studies. "Mergers between competitors are considered 'horizontal,' between suppliers and customers as 'vertical', and between other firms as 'conglomerate'. "[15] Nagy (2016) differentiates between three types of non-horizontal mergers: "Non-horizontal effects may be vertical, portfolio or conglomerate." [16]

1. Horizontal

The term horizontal, it denotes the merger of same line business entities, i.e., companies manufacturing, rendering, producing, or engaged in the same kind of products or services. For instance, companies engaged in similar lines of business merged together to consolidate the market share, and to ward off competition. "For horizontal mergers, the theory of exploitative competitive harm is either based on coordinated or on unilateral effects."[17]

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[13] Sridhar, N. (2004). Strategic Financial Management for CA Final (4th ed.). Shroff Publishers & Distributors pvt. Ltd.: Mumbai. page 1100

[14] Mittal, R. (2011, December 11). Methods of Financing International Mergers and Acquisitions. scribd.com. Retrieved October 20, 2020, from https://www.scribd.com/document/76563542/About-International-Mergers-and-Acquisitions

[15] Langenfeld, J. (2018, 08). The need to revise the U.S. non-horizontal merger guidelines. Retrieved October 20, 2020, from https://www.ftc.gov/system/files/documents/public_comments/2018/08/ftc-2018-0053-d-0015-154987.pdf

[16] Nagy, Cs.I. (2016, 06). 'Hungary'. International Encyclopaedia of Laws: Competition Law. Edited by Francesco Denozza, Alberto Toffoletto. Alphen aan den Rijn, NL: Kluwer Law International. ISBN 978-90-411-3368-7 page 240

[17] Kaiser, H. F. (2009, 1). A Primer in Antitrust Law and Policy. Berkeley Law. Retrieved October 20, 2020, from https://www.law.berkeley.edu/php-programs/courses/fileDL.php?fID=381 page 22

The merger between Exxon and Mobile in 1998 allowed both the companies a larger share of the global oil and gas market. "Exxon and Mobil megamerger of the oil industry reunited the major disintegrated divisions of Standard Oil which had once controlled approximately 90% of oil production in the United States. In 1998, Exxon and Mobil merged in a deal valued at $81 billion. The merged entity became the third-largest company in the world at the time of announcement. The merged company was called ExxonMobil Corp. The merger created one of the world's preeminent oil companies with revenues of $200 billion and worldwide production of 2.5 million barrels of oil a day. The combined ExxonMobil with a market capitalization of $237.53 billion became the third-largest company in the world behind General Electric and Microsoft."[18]

From the Indian perspective of mergers, the case of Tata Oil Mills Company (Tomco) with Hindustan Lever Ltd (HLL) in India on 28th December 1994. HLL issued over 28 lakh shares to Tomco shareholders that leveraged Tomco's distribution network in favor of HLL. Similarly, with the merger of Electrolux India and Intron with Electrolux Kelvinator, the company emerged as a market leader in washing machines and refrigerators.[19]

2. Vertical

The term vertical, it denotes "merger of companies engaged in different stages of production in an industry, being complementary to each other. The merger could be either up-stream when the distributing company merges with a manufacturing company or down-stream when a manufacturer merges with a distributor."[20] The merger of Reliance Petrochemicals Limited (RPL) with Reliance Industries Limited (RIL), a large-scale merger in India's corporate history, is an example of a downstream merger where the producer has merged with the supplier. The cumulative production of the new company amounted to 1.24 million barrels of oil per day,

[18] Kumar, B. (2019) ExxonMobil Merger. In: Wealth Creation in the World's Largest Mergers and Acquisitions. Management for Professionals. Springer, Cham. https://doi.org/10.1007/978-3-030-02363-8_9.

[19] Business Standards. (2013, June 14). Hind Lever pegs Tomco merger duty at Rs 6 crore. Business Standards. Retrieved October 20, 2020, from https://www.business-standard.com/article/companies/hind-lever-pegs-tomco-merger-duty-at-rs-6-crore-103112201041_1.html

[20] (Jain, 2010)

making Reliance the top 10 non-state refineries in the world at the time of the merger.[21] RPL's special economic zone refinery does not have any such restriction and can sell in the domestic markets. Thus, the merger allowed RIL to sell products in the domestic market while claiming the tax benefits at the same time. Hence vertical mergers are often employed as a way to gain a competitive advantage within the marketplace.

3. *Conglomerate*

"In this business move, two companies from different industries or geographic locations join forces. In a pure conglomerate merger, the companies are completely unrelated in their product offerings. In a mixed conglomerate merger, the companies are looking to expand their product offerings or market reach by joining with another company."[22]

Conglomerate mergers are used as a method of smoothing out significant swings in earnings and maintaining greater continuity in long-term growth. Usually, businesses in established markets with low growth opportunities would aim to diversify their business through mergers and acquisitions. For example, General Electric Company (GE) is an American international company that now operates through a variety of sectors, such as Oil and Gas, Healthcare, Aviation, and Software Development. The group diversified its market through mergers and acquisitions, allowing (GE) to participate in a range of business operations, ranging from jet engine manufacturing to power generation, medical imaging to news and intelligence, and financial services to plastics.[23]

4. Portfolio

"Portfolio effects may accrue from the circumstance that due to the concentration the new undertaking's product portfolio expands, in particular if these products are complementary." [24]

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[21] Airy, A. (2009, February 28). Reliance Petroleum to merge with RIL. https://www.hindustantimes.com. Retrieved Sep 16, 2020, from https://www.hindustantimes.com/business/reliance-petroleum-to-merge-with-ril/story-MDsW025PtR2yPFroBHVl5M.html

[22] Meritt, C. (2019, January 31). What Are the Three Different Types of Corporate Mergers & What Is the Rationale for Each Type?. https://smallbusiness.chron.com. Retrieved October 20, 2020, from https://smallbusiness.chron.com/three-different-types-corporate-mergers-rationale-type-74109.html

[23] Dua & Associates, S. (2006). Joint Ventures & Mergers and Acquisitions in India : Legal And Tax Aspects (1st ed.). Lexis Nexis. ISBN-13 : 978-8180381249 page 224

[24] Nagy, Cs.I. (2016) page 240

Companies with complementary products merging may provide effects related to the product portfolio, such as increased potential for product bundling, forced tying etc. These effects may restrict buyer choice but could also reduce market price.

Hence mergers between companies occur depending on their nature and course of business.
Benefits of mergers for the acquiring firm: merger of two entities or firms may bring various beneficial impact in both short-term as well as long-term development.[25]

Few crucial advantages observed are discussed below:

1. Taxation Advantages

Mergers may take place to take advantage of tax laws, and companies having accumulated losses may merge with a profit-earning company that will shield the income from taxation.
In the merger of Reliance Petrochemicals Limited (RPL) with Reliance Industries Limited (RIL) in India to create a petroleum and refining giant in the private sector, the motive behind the merger was to use the extensive tax advantage.[26]

2. Provides a readymade market share platform with faster growth opportunities

Businesses like cement industries and most capital-intensive industries often adopt this route for the growth of opportunities. If the demand for the product increases, the companies usually merge with similar industries instead of building a new plant to exploit the current large demand for products, then this mode is most beneficial and shortcuts to bring more opportunities.

3. Eliminate a competitor in the market by buying it out

Facebook was buying out Instagram and WhatsApp as well as Blackberry messenger, to eliminate competitors.[27] Google's merger with several companies not only eliminated

[25] Id.. page 224
[26] (Airy, 2009)
[27] Lordan, B. (2020, December 9). FTC Sues Facebook for Illegal Monopolization. Federal Trade Commission Press Releases. Retrieved December 20, 2020, from https://www.ftc.gov/news-events/press-releases/2020/12/ftc-sues-facebook-illegal-monopolization

competition but also got a readymade market share leading to search monopoly.[28] Merger and Acquisition may act as an advantage tactic that leads to monopoly and practice of anti-competition activities.

4. Third Party takeover

This is a tactic adopted by target companies that refuse to get merged with that group that is planning to acquire it. By adopting this, the target companies deter acquiring companies.

5. Intellectual Property Issue

In a merger, all the assets and liabilities get transferred to the acquiring company (both tangible and intangible). How much it is easy to value tangible assets, it becomes equally difficult to value the intangible assets like a trademark, copyright, patent, and designs vested in the transferee company. Hence another beneficial factor of merging or acquiring is to enjoy the Intellectual property rights, and sometimes it leads to misuse or trolling.[29]

Merger & Acquisition and Valuation of Intellectual Property Rights:

Hence as discussed above, merger and acquisition make it clear that there is no standard formula for the valuation of intellectual property rights, i.e., copyright, patent, and trademark. Before such property valuation, various factors must be taken into consideration; the most common factors, according to my analysis, are:[30]

1. Extent of statutory protection that the Intellectual Property Right (IPR) enjoys;
2. Value of each Intellectual Property Right (when viewed separately or as a whole);
3. Intellectual Property rights risk, such as infringement of third-party rights or infringement of Intellectual Property rights by others.

There are various approaches to valuation, like income approach, cost approach, market approach, etc. No universal formula exists for all businesses. Any expert needs to elaborate why they chose a specific method (or methods) over all the possible options.

[28] Rivero, N. (2020, October 20). The acquisitions that made Google a search monopoly. https://qz.com. Retrieved November 10, 2020, from https://qz.com/1920334/the-acquisitions-that-built-googles-monopoly-on-search/

[29] Skultetyova, I. (2012, June). Intellectual Property in Mergers and Acquisitions: Deal Maker or Deal Breaker? A Substantive Analyses of Due Diligence in IP Driven Mergers and Acquisitions. Tilburg University. Retrieved October 20, 2020, from https://arno.uvt.nl/show.cgi?fid=129082

[30] (Dua & Associates, 2006, page 300)

The related sample clause of the European Union Intellectual Property Protection arrangement for the redistribution of properties held by the transferor corporation in favour of the transferee company, including intellectual property assets, would be generally worded as follows:

"*The assignment of intellectual property rights can be made as a separate transaction of intangible assets, or it may occur as part of much larger acquisitions of assets such as sales of business assets, mergers, or stock purchases. However, ownership of intangible assets is not affected by the mere acquisition of shares in a company."*[31]

Transfer of Patent Rights

The transferor company's patent rights and the other assets can also be transferred to the transferee company under the scheme of a merger.

"The Patents Act 1977 (PA 1977) treats patents and patent applications as personal property rights. Rights in inventions, patents, and patent applications can be transferred by various methods, including assignment or licensing; they can also be used as security to raise funds. Transfer of rights can occur at any stage from prior to the making of the invention to the expiry of the patent. Any dealing with a patent should also take account of any non-patented know-how related to the invention, as there may be considerable value in such technical knowledge."[32] Thus, Intellectual Property Rights are transferable as any other property with certain formalities.

Transfer of Intellectual Property Rights In Acquisition

Intellectual property owned by a company, in case of an acquisition, specifically acquisition by way of purchase of shares of the target company, the acquirer would generally have the right to use the existing Intellectual Property Rights, such as the trademark of the targeted company.[33] When the selling shareholder owns the Intellectual Property Right, it does not stand transferred automatically. It is transferred when the selling shareholder permits such Intellectual Property Rights under a license or transfers the same.[34]

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[31] European IPR Desk. (2020, November 16). Assignment of intellectual property rights. iprhelpdesk.eu. Retrieved November 20, 2020, from https://www.iprhelpdesk.eu/node/2570

[32] LexisNexis Guidance. (2020). Transferring patent rights. lexisnexis.co.uk/legal/guidance. Retrieved October 20, 2020, from https://www.lexisnexis.co.uk/legal/guidance/transferring-patent-rights

[33] (Dua & Associates, 2006, page 304)

After reviewing the principle of mergers and acquisitions, the basic concept and its relation with other areas of law, and the beneficial reasons that may either be misused or even contribute to growth, we conclude that in order to maintain industry and competitive market practices, fast-growing companies often must combine and acquire other businesses as well. Around the same moment, though, total risk planning is needed in the event of a difference. Especially in the current economy and a tight competitive environment, where so many private companies are developing, it is a challenge to maintain one's company in the market.
Here, Charles Darwin's theory of survival of the fittest is absolutely applicable.
Hence the merger and acquisition practices need a separate platform of regulations and authorities to control and keep in check as a legislative body for fairer competitive practices promoting sustainability.

1.1.1. Mergers and Acquisitions Laws and Regulations around the globe

In this chapter, the discussion has been made on the global context regarding merger and acquisition regulations and the understanding of the merger waves. It even discusses the corporate sector's experiments and experiences and the regulations/laws introduced by them to handle the situation arising out of mergers. Mergers may lead to any other irretrievable situations and issues discussed in this chapter. A further attempt has been devoted to concluding remarks on the problem of merger control regulation concerning the competition.
Merger and acquisition trends give inspiration concerning the market movements. These trends have influenced the worldwide economy's product market, financial market, and labor market. Merger and Acquisition is a giant part of the company finance world. In today's international, competitive atmosphere, mergers are sometimes considered as the tools ensuring long-term survival.[35] In other cases, like Cisco Systems, mergers are a strategic part of generating long-term growth to boot; several entrepreneurs now are not building corporations for the long-term; they build corporations for the short run, hoping to sell the corporation for large profits.[36] It is

[34] Id.. page 304
[35] Moschieri, C., & Campa, J. (2014). New Trends in Mergers and Acquisitions: Idiosyncrasies of the European Market. Journal of Business Research, 67, 1478–1485. 10.1016/j.jbusres.2013.07.018
[36] Chatman, J., O'Reilly, C., & Chang, V. (2005). Cisco Systems: Developing a Human Capital Strategy. http://faculty.haas.berkeley.edu. Retrieved October 20, 2020, from http://faculty.haas.berkeley.edu/chatman/papers/16_humancapitalcisco.pdf

usually aforesaid that the right equation for a merger or a buying deal is one plus one makes three. The key principle behind acquiring an organization is to generate additional wealth for the shareholders.

Global mergers and acquisitions are carried out in order to achieve some competitive incentives within the respective national markets. With the aid of international mergers and acquisitions, multinational companies will benefit from a range of opportunities, including economies of scale and market domination. As a result, international corporations often take advantage of loopholes in antitrust laws, or even combine or merge each other to achieve monopoly control.

International merger and acquisition deals or transactions help an outsized number of companies penetrate into new markets fast and attain economies of scale. They also stimulate foreign direct investment (FDI).

To understand the concept from broader aspects, Merger and Acquisition trends provide a concept about the market movements. These trends are seen to affect an economy's product market, the securities industry, and labour market. Global markets also are considerably influenced by the merger and acquisition trends. The concept of merger and acquisition got more widely practiced from the year 2006-2007 and the structural imbalances that drove the 2007-2009 global financial crisis. It was marked by a spate of mergers and acquisitions everywhere both in developing and developed countries. The overall trend was that there was a decline within the number of public sector undertakings together with a hike within the number of private sector enterprises. This was happening because of the fact that a lot of public sector organizations worldwide were either acquired by large private sector enterprises or merged with them. The explanation to the merger and acquisition trend, as observed in 2006-2007, lay within the robust growth recorded by the Private Equity Funds.

The opposite factors propelling this trend were the stress on short-term earnings growth and, therefore, the strict regulatory structure of public sector enterprises. This merger and acquisition trend towards increased privatization of public sector holdings was observed in Europe, Brazil, North America, and China. Europe in this period hosted a powerful investment market, which catered to the general public to the private sector transition of companies.[37] Private equity transactions had been the buzzword for a global economy since 2007.

[37] (Moschieri & Campa, 2014)

For China, mergers and acquisitions from the general public to non-public business enterprises got government approval in 2006. Private equity firms were working overnight to augment proprietary deal flows. China was a novel case in point. There, a robust trend towards mergers and acquisitions involving private equity dealings comprised lots of policy and regional diversity. A good amount of equity capital flowed into China from the United States, Japan, Israel, and Europe as retail sector investments. This was primarily aimed toward tapping China's heightened domestic demand.[38]

As these forms of funds usually possessed a timeframe of three to five years for putting the new investment capital to figure, they were expected by the analysts to power heightened merger and acquisition activities across major global markets for the approaching decade.

For Europe, the overall prediction was that of a high transactional demand associated with private equity. Analysts observed that certain European markets were characterized by different financial advantages and tax structures. Western European nations possessed well-oiled legal machinery and conducive investment climates. Specifically, Britain exhibited a robust marketplace for the public to private investments. After the accession of countries like Hungary, the Czech Republic, and Poland into the European Union, few European funds for private equity were seen to be abstaining from applying the 'emerging market discount', for investment in those nations.[39] Equity investment in Brazil turned attractive with a program called Novo Mercado.[40] Brazilian pension funds are clothed to be a major investment force. Free market structure was the sole focus thereafter. The domestic dealings in Merger and Acquisition executed by private equity investors of the USA displayed a strong international component.

Study shows that a majority of the funds want to secure offshore partners for distribution, contract manufacturing, reduce tax burden or joint ventures. This kind of cross-border

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[38] Woetzel, J., Seong, J., Leung, N., Ngai, J., Manyika, J., Madgavka, A., Lund, S., & Mironenko, A. (2019, July). China and the world: Inside the dynamics of a changing relationship. https://www.mckinsey.com. Retrieved October 20, 2020, from https://www.mckinsey.com/~/media/mckinsey/featured%20insights/china/china%20and%20the%20world%20inside%20the%20dynamics%20of%20a%20changing%20relationship/mgi-china-and-the-world-full-report-june-2019-vf.ashx

[39] Neville, L. (2009, May 13). Features : Europe in Crisis. Global Finance Magazine (https://www.gfmag.com). Retrieved October 20, 2020, from https://www.gfmag.com/magazine/may-2009/features-europe-in-crisis

[40] Chinese Merger and Acquisition Legal Expert. (2010, 10 20). Merger and Acquisition Trends, Global Trends for Merger and Acquisition. M&A Factory. Retrieved September 15, 2020, from http://www.clds.cn/english/news/show.aspx?newsID=3537

transaction entailed careful planning for tax obligations arising out of fund repatriation. “Some reasons have nothing to do with tax, such as achieving or expanding an international platform or more readily accessing the international capital markets or simply expanding in search of growth.” [41] Global buyout figures for 2006 were above US$ 800 billion. This was more than twice the comparable figure for 2005. It constituted around 30% of United States international mergers and acquisitions.[42] However, even then, it was not a big component of the global equity and debt market. In 2006 North America saw vigorous buyout activities, which amounted to half of the global activity in this field.[43]

Within the arena of leveraged buyouts, Europe saw a comparatively increased activity, while Asia had a relatively slow rise. The biggest European buyout markets in 2006 were France, the Netherlands and Germany. There is no doubt that private equity was an important part of the stock market in the twenty-first century.[44]

Recently a new incentive for mergers and acquisitions emerged, with significant political support in the European Union: the threat of international competition, especially from the so-called “Chinese champion” companies. Csorba (2020) analyzed the Siemens-Alstom merger case, which the European Commission investigated as well, and says the following about the subsequent public policy debate[45]:

“Both the French and the German government lobbied intensely for the Commission to approve the merger. German chancellor Angela Merkel and French president Emmanuel Macron both publicly stated that Europe needs ‘super champions’ and ‘industrial giants’ that can succeed in global competition – especially against Asian, and specifically state-sponsored Chinese competitors, and can protect European jobs. According to the politicians, competition policy should support such European industrial policy endeavours. Criticism mounted after the

[41] Levitsky, J., & Rearick, A. (2014, Fall). Three’s Company: An Evolving Market in Private Equity Add-On Transactions. Debevoise & Plimpton Private Equity Report, 14(2). Retrieved October 20, 2020, from https://privateequityreport.debevoise.com/per_fall-2014-vol-14-number-2

[42] Institute for Mergers, Acquisitions and Alliances IMAA. (2018). M&A in the United States. IMAA Institute. Retrieved October 20, 2020, from https://imaa-institute.org/m-and-a-us-united-states/

[43] Martin, R. (2016, June). M&A: The One Thing You Need to Get Right. Harvard Business Review. Retrieved October 20, 2020, from https://hbr.org/2016/06/ma-the-one-thing-you-need-to-get-right

[44] Renneboog, L., Simons, T., Scholes, L. (2006). Leveraged Buyouts in the U.K. and Continental Europe: Retrospect and Prospect. Journal of Applied Corporate Finance. 18. 38-55. 10.1111/j.1745-6622.2006.00097.x

[45] Csorba, G. (2020). Should European Competition Policy Change in Reaction to Global Challenges? Lessons from the Siemens–Alstom merger and its impact. Competition and Regulation 2020. Institute of Economics Centre for Economic and Regional Studies. ISSN 1789-9702

prohibition, and culminated in the French and the German economic ministries issuing the document known in competition circles simply as the Manifesto, which briefly outlines how European industrial policy should change to successfully face the challenges of the 21st century (Manifesto [2019]). This likely intentionally provocative proposal makes several recommendations for the major overhaul of the institutional framework of European competition policy. A couple of months later, in the framework of the Weimar Triangle, the Polish economics ministry joined its German and French counterparts, and they issued their proposals for the modernisation of competition policy together." [46]

This merger case is a good example where the industrial goals of companies and even national industrial policy may come into conflict with the competition authority, and its goal of protecting customer interests. In other words, it is an example of an intersection of two legal fields of Mergers and Acquisitions, and Anti-trust Law, where the interests of the two are not aligned.

In this chapter, I have reviewed the legal field of Mergers and Acquisitions, both from the theoretical and from the practical point of view. The understanding of the different definitions, types of mergers, and the benefits of such transactions, as well as the investigation of the practical aspects of the merger waves and trends, laws and regulations, the possible conflicts between industrial policy and competition policy will help in a thorough understanding of the corporate behavior in the scenario of my thesis, acquisitions where patents remain unutilized.

1.2. Anti-Trust Laws on anti-competitive practices

In this chapter, I am reviewing the field of Antitrust Laws on anti-competitive practices, both from the theoretical and the practical standpoints. As a theoretical foundation I am reviewing the concepts, and the recent laws in both the EU and the US. As a practical overview I am performing a comparative study, by examining the differences and commonalities of the United States and European Union Antitrust policies and regulations[47]. I have also decided to include relevant anti-trust case studies at the intersection of anti-competitive practices and intellectual

[46] Id.. page 44

[47] European Commission Antitrust and Cartels. (2020, August 29). Antitrust: Publications on antitrust and cartels. Retrieved 20 October, 2020 from https://ec.europa.eu/competition/antitrust/publications_en.html

property, especially around patent misuse, to understand the motives and typical corporate behavior that characterizes these cases.

1.2.1. Definition

"Antitrust laws are regulations that encourage competition by limiting the market power of any particular firm. This often involves ensuring that mergers and acquisitions don't overly concentrate market power or form monopolies, as well as breaking up firms that have become monopolies."[48] "Antitrust laws are the broad group of state and federal laws that are designed to make sure businesses are competing fairly."[49] "The antitrust laws prescribe unlawful mergers and business practices in general terms, leaving courts to decide which ones are illegal based on the facts of each case."[50] There is mixed opinion regarding the implementation of antitrust laws. The supporting groups encourage it for open marketplace necessity, healthy competition among sellers giving customers lower prices, higher-quality products and services, more choices, and more significant innovation.

1.2.2. Anti-Trust Laws on anti-competitive practices in the EU and US

United States Context and developments on Antitrust in Summary:

In the United States, the Sherman Act, the Federal Trade Commission Act, and the Clayton Act form the basis for antitrust legislation. However, the oldest reference to antitrust appears in the form of the Interstate Commerce Act (1887). This act intended to deregulate railroads; the Interstate Commerce Act provided that railroads must charge travelers a reasonable fee and, among other provisions, must make those charges public.[51]

"The Sherman Act was designed to be a comprehensive charter of economic liberty aimed at preserving free and unfettered competition as the rule of trade. It rests on the premise that the unrestrained competitive forces will yield the best allocation of our economic resources, the lowest prices, the highest quality and the greatest material progress, while at the same time

[48] Twin, A. (2020, December 22). What Is Antitrust?. investopedia.com. Retrieved December 24, 2020, from https://www.investopedia.com/terms/d/demerger.asp

[49] Id..

[50] Federal Trade Commission Guide to Antitrust. (2020). Guide to Antitrust Laws. https://www.ftc.gov. Retrieved October 20, 2020, from https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/antitrust-laws

[51] Id..

providing an environment conductive to the preservation of our democratic political and social institutions."[52]

The Federal Trade Commission Act (1914) bans unreasonable competition tactics and misleading acts or activities that assume sole responsibility for the enforcement of antitrust laws.[53]

The Clayton Act passed the same year 1914, concerned with particular activities that the Sherman Act would not restrict. For example, the Clayton Act prevented the same person from making business decisions for competing companies.[54]

United States Context: Origins

Before the year 1890, the only "antitrust" law was a common law; there was no clear understanding of business ethic's' competitive factors. "Contracts that allegedly restrained trade, like price-fixing agreements, often were not legally enforceable, and even when enforced, they did not subject the parties to any legal sanctions."[55] During this time, monopolies in business were also within the legal realm of behaviour. In economists' eyes, the source of the problem with monopolies is that they create restraints on trade. This restraint eventually results in reduced total economic output, which affects the well-being of producers and customers alike. The Sherman Act (1890) was not well defined in terms of monopoly while declaring it illegal and eventually there were many loopholes. However, the Sherman Act did not go so far as to delineate unlawful practices. "Under the Sherman Act, it appeared to a congressional committee in 1913 that big business had continued to grow bigger and that the control of money and credit in the country was such that a few men had the power to plunge the nation into a financial panic."[56]

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[52] Kaiser, H. F. (2009, 1). A Primer in Antitrust Law and Policy. Berkeley Law. Retrieved October 20, 2020, from https://www.law.berkeley.edu/php-programs/courses/fileDL.php?fID=381

[53] Federal Trade Commission Authority. (2019, October). A Brief Overview of the Federal Trade Commission's Investigative, Law Enforcement, and Rulemaking Authority. https://www.ftc.gov. Retrieved October 20, 2020, from https://www.ftc.gov/about-ftc/what-we-do/enforcement-authority

[54] (Federal Trade Commission Guide to Antitrust, 2020)

55 McChesney, F. (2017). Antitrust. Retrieved October 20, 2020, from https://www.econlib.org/library/Enc/Antitrust.html.

[56] Encyclopedia Britannica. (2019, October 16). Clayton Antitrust Act United States [1914]. Retrieved October 20, 2020, from https://www.britannica.com/event/Federal-Trade-Commission-Act.

The Clayton Act, enacted in 1914, remedied this to some extent. The Clayton Act also authorized private antitrust lawsuits and triple fines for damages and exempted trade unions from antitrust regulations. The Clayton Act addressed particular activities that are not specifically restricted by the Sherman Act, such as mergers and interlocking directors (that is, the same person making business decisions for companies who are competitors).

The Clayton Act Section 7 prohibited mergers and acquisitions where the result 'can dramatically reduce competition or threaten to create a monopoly'. The Robinson-Patman Act of 1936 amended the Clayton Act, prohibited discriminatory pricing, facilities and allowances in transactions between traders. The Hart-Scott-Rodino Antitrust Improvements Act amended the Clayton Act again in 1976, to mandate corporations undertaking major mergers or acquisitions to alert the government in advance of their proposals.[57] The Clayton Act also permitted individual parties to sue for triple damages if they have been harmed by actions that violate either the Sherman or the Clayton Act and to seek a court order restricting anti-competitive practices in the future.

The credit for regulatory reform in the area of antitrust cannot be given to economists. It has all been the product of external forces such as globalization, investigative journalism, and political pressure. Some of the influential voices of the time included Ida Tarbellan.[58]

One explanation why most economists were oblivious to the legislation was their assumption that the increased prices achieved by the perceived anti-competitive actions were more than compensated by the price-reducing consequences of higher operational performance and reduced costs. Recently, however, economists have started looking at empirical evidence to see whether the antitrust laws were needed.[59]

Anticompetitive Practices

[57] (Federal Trade Commission Guide to Antitrust, 2020)

[58] An American writer, investigative journalist, biographer, and speaker, one of the leading muckrakers of the Revolutionary Era of the late 19th and early 20th centuries, and a pioneer of investigative journalism, which also denounced the supposed power of industrial corporations ("the trusts") to increase prices and exploit customers by reducing production. She was born in Pennsylvania at the height of the oil boom and is best known for her 1904 novel, The History of the Standard Oil Company. The book was published in McClure's Magazine from 1902 to 1904 as a collection of articles. It was labeled the "masterpiece of investigative journalism" as well as the single most influential business book ever published in the United States," among other accolades. The work helped in the abolition of the Standard Oil monopoly and would lead to the adoption of the Hepburn Act of 1906, the Mann-Elkins Act, the creation of the Federal Trade Commission (FTC) and the Clayton Antitrust Act.

[59] (McChesney, 2017)

The demarcation of transparent antitrust practices in reference to contracts in restraint of trade or other arrangements is not well laid out in the statutes. Specifically, how certain actions are directly responsible for adversely affecting competitiveness in the industry are often left to the courts to adjudicate and pronounce judgments when challenges to any market developments between the players are brought in front of them aggrieved parties.

When confronted with questions on the legality of practices, judges sometimes have turned to economists for guidance. Some of the early arrangements that came up before them included analyzing information sharing, resale price maintenance, etc. We have moved from a world of efficient market hypothesis, perfect information, and zero transaction costs assumptions in the analysis.

Economists now are far more pragmatic and look at antitrust practices from a real-world supply chain, market dynamics, and customer behavior perspective. With the advent of technology, we can also leverage sophisticated empirical and computational models for the analysis of anti-competitive activities. We may conclude that per se liability has gradually been superseded by a rule-of-reason analysis representing the activity's pro-competitive potential. Within the rule of law, the courts have become highly sophisticated in their study of the costs of knowledge and transactions and in the ways in which the challenged business activities can minimize them.[60]

Vertical Contracts

Vertical agreements refer to agreements between firms at different levels (upstream/midstream/downstream) in the supply chain of the industry under consideration. For example, a consumer electronics producer can have a vertical agreement with a retailer to market their goods in exchange for cheaper prices.

Vertical agreements can have other forms, including resellers, exclusive distribution partners, franchisees, etc. Whether a vertical agreement genuinely limits competition and whether, in any situation, the gains outweigh the anti-competitive consequences will also depend on the nature of the business. Vertical agreements are prevalent in most sectors as less scrutinized by legal or regulatory authorities as they have a shallow effect on competition compared to horizontal

[60] Id..

agreements.[61] "Potential harm from horizontal restraints is exploitative, and harm from vertical agreements is (mostly) exclusionary."[62] Some of the key benefits or motivations vertical agreements offer/premise include:

- Lowered transaction costs
- Expansion of business interests with relatively low risk
- Eliminate a few of the many market insufficiencies like double marginalization.

The 1950s saw the work of people like Robert Bork (University of Chicago) that showed for the first time that vertical mergers did not lend any special competitive advantage to either party in each other's industries. Instead, it only had a synergistic effect for each of them in terms of business expansion and economic efficiencies.[63]

Later work in the 1960s showed that manufacturers used fair trade reselling market maintenance to create a monopoly at the retail level and encourage non-price competition between retailers. The reason given was that since retailers operating under fair trade agreements could not compete by cutting price, they instead competed by demonstrating the product to uninformed buyers. The resale price depended on the product sophistication as for uninformed buyers, a lot more expense was made on advertising and marketing.[64]

Horizontal Contracts

Changes in the evaluation of horizontal contracts (agreements between rival vendors in the same industry) have been relatively slow. These are contracts where agreements are made between parties at the same level in the supply chain. Generally speaking, economists remain almost unanimous in condemning all horizontal price-fixing.[65] However, some scholars like Donald Dewey have indicated that price-fixing may be pro-competitive in some situations. The empirical research has shown that price-fixers have not earned higher than regular profits. One

[61] Simon Bishop, & Mike Walker. (2010). The Economics of EC Competition Law: Concepts, Application and Measurement (Third (University Edition) ed.). Thomas Reuter (Legal) Limited. ISBN 978-0-421-93190-9

[62] (Kaiser, 2009, page 20)

[63] Langenfeld, J. (2008-2009). Non-horizontal Merger Guidelines In The United States And The European Commission: Time For The United States To Catch Up? In Geo. Mason L. Revision (Vol. 16:4, pp. 851-883). Retrieved October 20, 2020, from https://www.ftc.gov/system/files/documents/public_comments/2018/08/ftc-2018-0053-d-0015-154988.pdf page 857

[64] Id..

[65] (Simon Bishop & Mike Walker, 2010)

can find pre-competitive explanations for a lot of other practices employed by firms, and therefore the premise of price-fixing is not evidenced.

Starting from the work of Joe Bain and George Stigler in the 1950s, economists (and courts) concluded a shortage of competition in the market clearly from the fact that business had a high level of income concentrated among a handful of participants. It has shown empirically that efficiency gains are almost always the primary catalyst of revenue growth and profits from mergers rather than anti-competitive conduct. Eventually, economists and judges softened their assumptions as to the adverse anticompetitive effects of horizontal mergers.[66] The various guidelines promulgated in the late eighties and nineties bore witness to the fact that pure economic concentration effects from such mergers did not necessitate a legal or regulatory challenge.

Non-Merger Monopolization:

Described in terms of the Federal Communications Commission, monopolization activities are any actions by an individual company that unreasonably limits competition by gaining or sustaining monopoly control. “Section 2 of the Sherman Act prohibits efforts to monopolize and conspire. As a first step, the courts question if the firm has "monopoly power" in every market.”[67]

The intent to monopolize even without the explicit act of a merger attempt can also be seen as a reason enough to challenge. However, as has been seen over the decades, these sorts of challenges are often rejected in the courts or are not attainable because of inherent lacunae of self-inflicted harm (government induced entry barriers in some industries, for example national defense in some countries). In recent years, the most publicized monopoly dispute is the government case against Microsoft, that was based on unfounded empirical claims and

[66] Lars-Hendrik, R., Johan, S., Verboven, F. (2000, August). Efficiency gains from mergers. https://ec.europa.eu. Retrieved October 20, 2020, from https://ec.europa.eu/dgs/competition/economist/efficiency_gains.pdf

[67] (Federal Trade Commission Guide to Antitrust, 2020)

eventually resulted in Microsoft's win over most of the government's allegations.[68] The failure of the government case represents a recent general decrease in the value of monopoly cases.[69] Concerns over monopoly have steadily declined with the recognition that different activities previously considered to be monopolizing devices (including vertical contracts, as discussed above) have pro-competitive reasons.[70]

Predatory pricing strategies, condemned in the past to enhance competitiveness, have also gradually lost out of infamy, seen reflected in court proceedings like Matsushita Electric Industrial Co. v. Zenith Radio Corp.[71] In this case, it was strongly noted by the learned court that "there is a consensus among commentators that predatory pricing schemes are rarely tried, and even more rarely successful."[72]

Newer theories of monopolization started seeing the light of day in the 80s, supposedly based on strategic behavior (game-theoretic). Such theories postulated that companies could monopolize markets by raising rivals' costs (termed 'cost predation'). However, it remained unclear as to how raising a rival's costs could be a viable monopolizing strategy. Judicial scrutiny of such claims was at best inconclusive and obtuse.[73]

In today's world, however, economists generally accept that the most effective cartelization and monopoly pricing cases have involved companies that enjoy the security of government price regulation and government entry control from new rivals. What is lost in these cases is that the federal government's monopolies are usually excluded from antitrust regulations. Municipal monopolies are also covered by the statute, even though they may be subject to antitrust provisions.

Antitrust Effects

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[68] Gifford, D. J., & Kudrle, R. T. (2015). The Atlantic Divide in Antitrust: An Examination of US and EU Competition Policy. University of Chicago Press: Chicago and London. 10.7208/chicago/9780226176246.001.0001

[69] Liebowitz, S. J., & Margolis, S. E. (2001, March 1). Winners, Losers & Microsoft: Competition and Antitrust in High Technology (Second Expanded ed.). Independent Institute. ISBN-10 : 0945999844

[70] (McChesney, 2017)

[71] LexisNexis Case Briefs. (2020). Matsushita Elec. Indus. Co. v. Zenith Radio Corp. - 475 U.S. 574, 106 S. Ct. 1348 (1986). Law School Case Brief. Retrieved October 20, 2020, from https://www.lexisnexis.com/community/casebrief/p/casebrief-matsushita-elec-indus-co-v-zenith-radio-corp

[72] 5 FCCR 2639. (1990). United States Government Printing Office, Washington DC. ISBN-13 : 978-0198763291

[73] Edlin, A. S. (2010, 02 01). Predatory Pricing. UC Berkeley: Berkeley Program in Law and Economics. Retrieved October 20, 2020, from https://escholarship.org/uc/item/22k506ds

From a better economic understanding perspective, economists now realize that one undeniable effect of antitrust has been to penalize numerous benign practices. Both horizontal and vertical agreements that are useful, particularly in reducing transaction costs, have been effectively banned for many years. Antitrust almost always increases transaction costs because firms must hire lawyers and often must litigate to avoid antitrust liability.

"The most numerous private actions are brought by parties who are in a vertical arrangement with the defendant (e.g., dealers or franchisees) and who therefore are unlikely to have suffered from any truly anticompetitive offense. Usually, such cases are attempts to convert simple contract disputes (compensable by ordinary damages) into triple-damage payoffs under the Clayton Act."[74]

Case statistics have suggested that anticompetitive costs (for abusers of the law) may exceed any pro-competitive benefits of antitrust laws. The case for antitrust does not even strengthen when economists examine the kinds of antitrust cases brought by the government. A deeper understanding of the subject-matter by economists suggested unanimously that government enforcement of the laws the customer losses incurred from monopoly played absolutely no role or in some cases very nominal contribution.

Economists examined specific antitrust cases brought by the government to see whether anticompetitive acts in these cases; however, the empirical answer is usually no. In price-fixing cases, the evidence proved that government target companies either were not fixing prices or were unsuccessful. Related findings are taken from acquisition case reports and numerous antitrust remedies sought by the government; in both cases, the results are inconsistent with the anti-trust objective of customer well-being.[75]

It has also been found that antitrust compliance trends are driven and may have political forbearing entirely unconnected with economic realities. For example, in the hands of policymakers, antitrust has been used as a tactic of leverage against prospective companies trying to transfer jobs abroad or elsewhere for solely economic purposes. Particularly among economists, as well known in the work of economists such as Paul Rubin[76], opinions about

[74] (McChesney, 2017)

[75] Id..

[76] **Paul Harold Rubin**, born August 9, 1942, is an American economist and professor of Emeritus Economics at Emory University. In 2012-2013, he was president of the Southern Economic Association. He is also a research associate at the Independent Institute. He argued that the various economic policies advocated by Democrats and

anti-trust cases have often been motivated by a solely productivity point of concern rather than by their desire to make personal gains, in the form of full-time jobs and lucrative part-time jobs as an expert in antitrust.

1.2.3. Antitrust Laws and Regulations on European Union and the United States: Commonalities and Differences

In this chapter, I will investigate the different characteristics of the antitrust decision-making practices of the European Union and United States competition authorities. Namely, the European Commission in the European Union and the Federal Trade Commission in the United States. First, I will look at the historical convergence process between the United States and the European Union in terms of merger control. I will pay special attention to bring relevant examples of the different types of merger control cases and thus examine the process of convergence through some practical examples as well. Afterwards, I will also look at some of the antitrust policies adopted by the European Union and the United States, both in principles and in practice as well. In order to show the practical side, I will also use some examples in this investigation.

For our first topic, let us look at the convergence process between the European Union and the United States in competition law and the merger control practices that has been going on for several years and has recently intensified.

A trend toward convergence can be traced back to European Union competition law's very origins, and indeed of the European Union itself. The work of people like Dean Acheson (then Secretary of State of United States) in the 50s played a seminal role in shaping the Schuman Declaration, which lay the groundwork for what eventually became the European Union (organization of markets under one common theme).[77]

The influence of United States antitrust law was profound during the early years of the development of competition policy in Europe and has continued ever since. One of the cornerstones of both the European Union and United States policy towards competition was the

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Republicans are partially the product of different views of human existence by both sides. He wrote about the evolutionary basis for distrust of markets. His most recent book argues that economies are actually cooperative, and that competition is less important than economic cooperation.

[77] europa.eu - About the EU. (2020, July 5). The Schuman Declaration – 9 May 1950. About the EU - EU symbols - Europe Day - The Schuman Declaration. Retrieved October 20, 2020, from https://europa.eu/european-union/about-eu/symbols/europe-day/schuman-declaration_en

role of sound economics and the protection of customer interest.[78] Though phrased in different language and expression in terms of the specific statutes, both the European Union and the United States merger control laws are underpinned by the same economic rationale.[79] There has been a large body of precedents built up by the European Commission and the European Courts, which have much coincidence of analysis with interpretative precedent in the United States' (Clayton Act).[80]

We now look at three specific categories of Merger and Acquisitions and spell out commonalities in Antitrust laws' applications on both sides of the Atlantic.

We will first examine cases of horizontal mergers. As we have discussed in the previous chapters about Mergers and Acquisitions a merger is horizontal if it involves companies manufacturing, rendering, producing, or engaged in the same kind of products or services.
During investigations, one examines whether the merger would be likely to result in horizontal overlaps, which would strengthen a dominant position due to which effective competition would be significantly impeded.
Analysis in both the European Union and the United States essentially requires examining the same factors, such as overall level of concentration, market characteristics, and market entry potential.[81]
For example, in the case of the Amoco-British Petroleum merger (largest industrial merger in oil and gas in the 90s), the Commission and the Federal Trade Commission co-operated in their respective investigations of the effects of these transactions on the competition.[82]

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[78] Gifford, D. J., & Kudrle, R. T. (2015). The Atlantic Divide in Antitrust: An Examination of US and EU Competition Policy. University of Chicago Press: Chicago and London. 10.7208/chicago/9780226176246.001.0001 Chapter 1

[79] Monti, M. (2001, November 15). Mr Mario Monti European Commissioner for Competition Policy Antitrust in the US and Europe : a History of convergence General Counsel Roundtable American Bar Association Washington DC, 14 November 2001. European Commission Press Corner. Retrieved October 20, 2020, from https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_01_540

[80] Gifford, D. J., & Kudrle, R. T. (2015). The Atlantic Divide in Antitrust: An Examination of US and EU Competition Policy. University of Chicago Press: Chicago and London. 10.7208/chicago/9780226176246.001.0001

[81] (Monti, 2001)

[82] European Commission Case No IV/M.1293. (1998, December 11). European Commission Case No IV/M.1293 - BP / AMOCO. Office for Official Publications of the European Communities. Retrieved October 20, 2020, from https://ec.europa.eu/competition/mergers/cases/decisions/m1293_en.pdf

The European Union and the United States moreover see eye to eye in relation to the assessment of horizontal mergers where the competitive concerns arise from what we term collective or oligopolistic dominance, and where one would have fears that the merger might engender the possibility of what one terms as "coordinated interaction". For example, in the United States, suppose two firms upon merger can engage in coordinated behaviour that harms the customers, thereby diminishing competition, would undoubtedly raise a red flag. This behaviour includes tacit or express collusion and may or may not be lawful.[83]

In the European Union dominance tests are applied as well, to situations of oligopolistic dominance, as in whether it is likely that terms of coordination could be reached by the oligopolists, which would - on the one hand - be profitable to them, and would on the other - enable the detection and punishment of any behaviour deviating from the coordination. [84] Post-merger, specific market factors like the extent of product homogeneity, degree of market-share symmetry between the oligopolists, and the types of transactions that show if situations are being created that result in collective behaviour diminishing competitiveness.[85]

Secondly, I will look at some examples of vertical mergers. Vertical merger cases are not considered as harmful or risky as horizontal ones, but there have been some important cases that involved both the European Union and the United States. The AOC-Time Warner merger is a good example illustrating the approach to such mergers, which both the Commission and FTC examined in 2000.[86] The transaction was approved on both competition authorities only with serious commitments from the merging companies. A common concern of "dominant position" was shared by both the European Union Commission and the Federal Trade Commission. Key issues included:

"The key concern identified by our investigation was the combination of Time Warner's presence in "branded content" (music, news, films, etc..) with AOL's uniquely strong position

[83] (Langenfeld, 2018)

[84] Briones-Alonso, J. F. (1995, November 18). Oligopolistic Dominance: Is There a Common Approach in Different Jurisdictions? A Review of Decisions Adopted by the Commission under the Merger Regulation. European Study Conference - Brussels. Retrieved October 20, 2020, from https://ec.europa.eu/competition/speeches/text/sp1995_036_en.html

[85] (Gifford & Kudrle, 2015, Chapter 2)

[86] History.com Editors. (2020, January 7). AOL-Time Warner formed. HISTORY. Retrieved October 20, 2020, from https://www.history.com/this-day-in-history/aol-time-warner-formed

as the only pan-European internet service provider (In the US, AOL was the leading ISP). Time Warner's position in content was further strengthened by its links with Bertelsmann. This vertical concern was also shared by the FTC, and our close collaboration throughout the investigation period contributed substantially to a better understanding of the potential competition problems which the merger gave rise to, and ultimately to a better understanding of the types of remedies that would be necessary to allay those concerns."[87]
As we can see, even in the infrequent cases of vertical merger investigations the European Union and the United States have aligned their approaches significantly.

Thirdly, there is the case of conglomerate mergers. Large conglomerates in merger cases could be understood (as we have seen in the previous chapters about Mergers and Acquisitions) as businesses in established markets with low growth opportunities that would aim to diversify their business through mergers and acquisitions. There are many commonalities in the approach the European Union Commission and the Federal Trade Commission take towards such deals. In both jurisdictions, it is widely held that except in exceptional cases, conglomerate mergers do not result either in direct horizontal overlaps or in vertical overlaps. They are viewed favorably for competition. Some of these circumstances include merged entities leveraging market power to directly or indirectly foreclose markets from effective competition. In other situations, such mergers may substantially reduce customer choice and ultimately lead to higher prices and a loss of welfare. For example, in the case of the TetraLaval acquisition by Sidel, the Commission vetoed the acquisition. TetraLaval dominated the carton packaging equipment business by 80% (with a market share of around 80% in the European Economic Area). Meanwhile, Sidel was the leading French supplier in the neighbouring market for plastic packaging equipment. "According to the E.C., Tetra dominated carton liquid food packaging while Sidel led the industry in producing plastic liquid food packaging."[88] There were concerns that the merger would have allowed Tetra Laval to leverage its position in the carton packaging market to the plastic packaging market (for instance, through tying of the two products to

[87] (Monti, 2001)
[88] (Langenfeld, 2008-2009, page 865)

clients in need of both plastic and carton) and, therefore, to progressively eliminate competition in the later market." [89]

"The E.C.'s theories are consistent with the economic model where a monopoly of one market (that of Tetra) is able to leverage its market power into a market with imperfect competition (that of Sidel)" [90]

The last part of the merger control where both the European Commission and the United States' Federal Trade Commission, and the Department of Justice shows a lot of convergence is the applicable remedies in merger cases.

In the European Union context, there are guidelines on remedies that must meet certain objectives:

"Remedies proposed by the parties fully resolve the competition concerns raised by the Commission and thus eliminate the creation or the strengthening of a dominant position. Remedies must be clear-cut and entirely remove our competition concerns. The Notice's second aim is to make sure that the remedies accepted by the Commission can be implemented effectively and within a short period. They should not require additional monitoring once they have been implemented. The commitments offered must moreover contain specific details and procedures relating to their implementation. The Commission has also indicated that, in most cases, it is appropriate to appoint a trustee, who will have the responsibility of overseeing the implementation of the commitments. In cases of divestiture, if the parties do not succeed in finding an acceptable purchaser within the time frame set out in the commitments, the trustee must have an irrevocable mandate to dispose of the business within a given time period at no minimum price." [91]

In the European Union the most important requirements in terms of remedies can be summarized as concrete and measurable actions that will reasonably prevent the creation or the strengthening of a dominant market position. A further important requirement is that the European Commission is looking for such actions that will not need any further monitoring

[89] (Monti, 2001)
[90] (Langenfeld, 2008-2009)
[91] (Monti, 2001)

after a measurable implementation.[92] This additional requirement in my opinion severely limits the options available for the European Commission in protecting customer interests.

The issue I am discussing in this thesis is such, where the customer's access to innovation may be limited or may cease entirely without proper supervision at least on some recurring basis. Even though it is not directly the topic of our comparative investigations here, this aspect is worth noting, because it may provide a reasonable explanation on the causes and circumstances of the problem and the proposed solution I have identified in this thesis.

Most recently, the European Union approach to remedies has been strongly influenced by the United States' antitrust authorities (Federal Trade Commission, as well as the Department of Justice) study on the divestiture process. Furthermore, the European Union and the United States antitrust authorities discussed their respective approaches to remedies within the United States-European Union working group's framework on merger control.

As the European Union approach evolved over time, it has embraced in a much broader sense, failing firm defence, a well-established United States standard for mergers. A failing firm in merger control cases is defined by the OECD Glossary of Industrial Organization Economics and Competition Law as follows: "A firm that has been consistently earning negative profits and losing market share to such an extent that it is likely to go out of business. The concept becomes an issue in merger analysis when the acquiring firm argues that the acquisition of such a firm does not result in substantial lessening of competition since it is likely to exit the market anyway. If this is true, the 'current' market share of the failing firm may have no 'future' competitive significance and should be weighted accordingly."[93]

This defense allows a merger to proceed even with competition concerns from such a merger, under the extraordinary circumstances that failing the merger, the company to be acquired might go bankrupt in the event of a failed deal.

The other significant area of study is the antitrust policy of the two agencies. There has been some convergence in this area as well. The typical agreements that are covered in these antitrust investigations are: "vertical and horizontal agreements, such as exclusive dealing,

[92] (Gifford & Kudrle, 2015)

[93] Khemani, R.S. (1993). Glossary of Industrial Organisation Economics and Competition Law - CCEET series. Organisation for Economic Co-operation and Development. Retrieved October 20, 2020, from http://www.oecd.org/regreform/sectors/2376087.pdf page 45

selective distribution, R&D agreements, specialization agreements, purchasing and commercialization agreements and agreements on standards."[94]

Horizontal agreements that are agreements between competitors in the same market are generally considered riskier in terms of anti-competitive effects to the detriment of the customers. In these cases, the European Union guidelines are very similar to the Federal Trade Commission and Department of Justice guidelines on co-operation between competitors. Both regulators adopt a careful investigation of the positive and negative effects of the agreements. Some problematic agreement types, also called 'no-go areas' have been identified: "For horizontal agreements, these are basically price agreements between competitors, output fixing, and market sharing. For vertical agreements, retail price maintenance is the most notable 'hardcore' or 'per se' infringement we have in common. Both agencies have ceased to treat maximum retail price maintenance as a 'no-go'."[95]

In the vertical restraints, however, the European Commission policies treat territorial and customer resale restrictions much more seriously as opposed to their United States counterparts. This difference in approaches can be attributed mainly due to the special attention by the European Commission on trying to establish the single market, identify and prevent anti-competitive measures that would - instead of encouraging the single market - strengthen the national division of the European Union markets. Nagy (2013) explains the commonalities and differences between the EU and US regulatory approaches on territorial vertical constraints:
"US antitrust law treats territorial exclusivities laxly, while in the EU absolute territorial protection is chased with fire and sword, albeit restrictions on active promotion (relative territorial protection) are, similarly, subject to effects analysis. Nonetheless, the purpose of market integration (single market imperative) is said to justify this deviation from sound economics in the EU." [96]

[94] (Monti, 2001)
[95] Id..
[96] Nagy, Cs.I. (2013). EU and US Competition Law: Divided in Unity?. Ashgate Publishing Limited. ISBN 9781409442301, page 1

He further examines the differences between the handling of inter-brand and intra-brand constraints, especially since the latter has been a source of some divergence since the year 2007 Supreme Court decision in the United States on retail price fixing. [97]

Increasing convergence is seen in the area of monopolization otherwise known as abuse of a dominant position. The OECD Glossary of Industrial Organization Economics and Competition Law defines monopolization as follows:

"Attempts by a dominant firm or group of relatively large firms to maintain or increase market control through various anticompetitive practices such as predatory pricing, pre-emption of facilities, and foreclosure of competition. See also discussion under abuse of dominant position."[98]

In some areas in Europe where economic liberalization started late (especially in the former soviet sphere states), many of the former monopolistic companies remained in strong dominant positions. These have been monitored by the Commission carefully, because they are significant risk factors for an abuse of a dominant position, even sometimes in neighboring markets.

One interesting case in monopolization is the complaint by UPS against Deutsche Post:

"UPS operates in the business parcel sector in Germany, where it competes against the former state-owned monopolist Deutsche Post. UPS claimed that Deutsche Post was using revenues from its profitable letter-mail monopoly to finance a strategy of below-cost selling in business parcel services, which are open to competition. UPS's complaint was ultimately upheld by the Commission. As a result, Deutsche Post will have to create a separate legal entity for its business parcel services. Furthermore, in light of the foreclosure that resulted from a long-standing scheme of fidelity rebates granted by Deutsche Post to all major customers in the mail-order business, the Commission ordered Deutsche Post to abandon its rebate system and imposed on the firm a fine of more than US$ 20 million (€24 million)."[99]

Deutsche Post was in a dominant position and has used its dominant power to undercut and keep from competing UPS. Such practices are very detrimental not only to customers but to the growth and functioning of the single market of the European Union as well.

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[97] Id..

[98] (Khemani, 1993, page 59)

[99] (Monti, 2001)

In conclusion, we can state that even the legal instruments, the court systems are significantly different in both the European Union and the United States, there is a strong emphasis on both sides of the Atlantic to increase the convergence between the procedures and practices, as well as the micro-economic analytical tools of the two competition agencies, the European Commission and the Federal Trade Commission. This is even more necessary considering that many international companies operate both in the United States and European Union markets, and their competitive (or anti-competitive) practices are usually not limited to one jurisdiction. Moreover, there is very substantial value in the predictability of antitrust law enforcement practices in both jurisdictions, since such predictability will reduce the inherent risks in making effective marketing, production and other business strategies. This in turn will increase the efficiencies of the companies operating in these markets.

Over the last decade, numerous antitrust cooperation agreements have been signed between the European Union and the United States, and communications at the staff level have increased as well. One of the more important initiatives has been the establishment of the International Competition Network (ICN), which is a non-governmental cooperation entity of competition agencies.

"The ICN is an informal network of established and newer competition agencies with the common aim of addressing practical antitrust enforcement and policy issues. By enhancing convergence and cooperation, the ICN promotes more efficient and effective antitrust enforcement worldwide for the benefit of consumers and businesses."[100]

This definition by the International Competition Network highlights its informal nature and the practicality of the cooperation between the different members of the network. Such cooperation is aimed at increasing efficiencies and sharing best practices. The procedures of the ICN are described as follows:

"The ICN is a results-based, project-oriented organization, which has grown from 16 competition agencies to 104 competition agencies in 7 years. The ICN is exclusively concerned with competition law. ("It is all competition, all the time"). It operates by consensus. ICN work

[100] International Competition Network. (2009, April). ICN Factsheet and Key Messages. About the International Competition Network. Retrieved October 20, 2020, from https://www.internationalcompetitionnetwork.org/wp-content/uploads/2018/09/Factsheet2009.pdf page 2

takes place in practical working groups, with members and nongovernmental advisors (NGAs) developing materials and conducting discussions, typically via teleconference or e-mail. Members and experts convene at an annual conference to discuss group projects and the implications for competition policy and enforcement. In addition, ICN working groups organize periodic workshops on specific enforcement and policy topics. ICN is not used as a forum to cooperate on specific cases."[101]

The growth of the network from 16 to 104 competition agencies is very impressive and goes to illustrate that there is significant value in standardizing the analytical tools and legal frameworks around the different competition agencies. This is all the more necessary considering that many of today's largest companies, especially the ones that may be the target of antitrust investigations are operating at least on an international, but more often global scale.
"Economic globalization has resulted in an increasing number of investigations and reviews of mergers, cartels and unilateral conduct that transcend jurisdictional boundaries. Agencies need to cooperate with each other on cross-border cases in order to reduce the risk of: (i) sub-optimal enforcement if an agency only has a partial picture of the situation; and (ii) inconsistent outcomes if different jurisdictions reach different conclusions about the same practice. The ICN helps facilitate cooperation and convergence, where appropriate. This is good for competition agencies, governments, businesses, and ultimately consumers."[102]
The value of the cooperation can thus be understood as a multiple win-win for all parties involved. It is beneficial for the competition agencies because they can acquire know-how on the "big picture" and understand the rationale of the companies that are forming their strategies on an international, or even on a global scale. It is beneficial for the governments because they have clear guidelines and references to regulate the often-multinational companies involved in the merger control cases. It is also beneficial for businesses, because they are better able to predict the outcomes of merger control investigations. Finally, it is beneficial for customers, because the ultimate goal of the competition agencies is to protect the customer interests, and a well-functioning competition agency and Antitrust Law framework is paramount to ensure such interests.

[101] Id.. page 2
[102] Id.. page 2

In the following section, I will look at the merger control case of General Electric and Honeywell, a conglomerate merger where the European Union and United States competition agencies have reached a different conclusion. In the previous sections, I have described many of the commonalities, convergence factors and even the international cooperation, but it is also important to examine when they differ.

One of the prime candidates that demonstrate a divergence in the Competition Laws in terms of their interpretation (especially) between the United States (US) and the European Union (European Union) is the case of the General Electric/Honeywell merger. This case was as follows.

Before getting into details, we must understand what a "Conglomerate" is.

"Conglomerates are large parent companies that are made up of many smaller independent entities that may operate across multiple industries. Many conglomerates are thus multinational and multi-industry corporations. Each one of a conglomerate's subsidiary businesses runs independently of the other business divisions; but the subsidiaries' managers report to the senior management of the parent company.

Taking part in many different businesses can help a conglomerate company diversify the risks posed from being in a single market. Doing so may also help the parent lower total operating costs and require fewer resources."[103]

Conglomerates are also large and global, in many cases with more than ten thousand or more workers globally in a variety of countries. Some conglomerates in the European Union include Red Bull GmBH, Carlsberg Group, Maersk, Alstom, Renault, PSA Peugot Citroen, and in the United States include Alphabet Inc, Berkshire Hathaway, Apple Inc, AT&T, Boeing, Proctor and Gamble, Philip Morris International.

Owing to their size and market penetration, any merger and acquisition activities between conglomerates would naturally be of immense impact on the market and stakeholders in general. Therefore, it is essential to apply a high level of scrutiny to such activities in any regulatory jurisdiction, and so was the case with the proposed Honeywell-GE Deal. We look at the Honeywell-GE case for a detailed analysis of the commonalities and divergences through this example.

[103] Investopedia - Conglomerate. (2020, November 13). Conglomerate. Investopedia Business Essentials. Retrieved November 23, 2020, from https://www.investopedia.com/terms/c/conglomerate.asp

In October 2001, it was reported that the General Electric Company (GE), the largest corporation in the world and the number one jet engine maker, will buy Honeywell, the world's largest provider of non-engine aerospace equipment. The CEO of GE, Jack Welch, did not expect any antitrust problems, as the planned acquisition would be a conglomerate, not a horizontal one. The integration would merely tie together similar goods that were components of large jet aircraft. The agreement sailed seamlessly through the United States Department of Justice and the green light was given on 2 May 2001.[104]

However, the European Commission attacked the merger. On 3 July 2001, the merger was prohibited. This development can shed light on the "Divergent" views of the European Union Commission the United States Department of justice and brought out the stark differences.

The European Commission had strong reservations in four aspects:

> "(1) Eliminating competition. The merger would create a horizontal overlap in engines for large regional jets and corporate and small regional jets, strengthening GE's dominant position.
>
> (2) Bundling. The merged firm, having a large line of complementary products including products in which it was dominant or near dominant, would have the incentive to engage in mixed product bundling. Reflecting advantages of economic integration, including the enormous financial resources of GE Capital, the merged company would probably lower the price of the bundle while raising the stand-alone price of the products sold. The competitors, which would face higher costs of capital, would be unable to lower their prices to the same extent. Although they would reduce prices somewhat, they would lose market share and the profits necessary to invest in research and development, which would eventually lead to market exit or to the termination of key market segments. Then, the merged firm would raise its prices, creating or strengthening a dominant position in the manufacture of jet aircraft engines and in avionics and non-avionics products.
>
> (3) Vertical foreclosure of competing engine manufacturers. Honeywell is an important supplier of engine controls, such as starters, to engine manufacturers. Honeywell would have

[104] Fox, E. M. (2002). Mergers in Global Markets: GE/Honeywell and the Future of Merger Control. University of Pennsylvania Journal of International Law, 23(3), 457-468. Retrieved October 20, 2020, from https://www.law.upenn.edu/journals/jil/articles/volume23/issue3/Fox23U.Pa.J.Int'lEcon.L.457(2002).pdf page 457

had the potential to delay or disrupt the supply of engine controls, or to increase rivals' costs, strengthening GE's dominant position in engines.

(4) Reciprocity (using leverage to induce one's suppliers to become loyal customers), foreclosing avionics and non-avionics manufacturers from substantial business they would otherwise have won on their merits. GE Capital provides extensive financial support to its potential customers, the aircraft makers, and uses its and GE's financial power to procure exclusive supply positions for its products. GECAS uses its buying and launching platform leverage to encourage aircraft makers to shift business to GE. After the merger, Honeywell's products would similarly benefit from this financial strength, buying power, and leverage. Since airlines are relatively indifferent to component selection, they would probably shift purchases of avionic and non-avionic products to GE. Competitors would be progressively marginalized and might exit the market, creating a dominant position in avionic and non-avionic products for the merged firm."[105]

The European Commission firmly believed that given the go-ahead, the merger would result in the creation of dominance in the market, bundling, leverage, and cross-subsidization, all hazardous for the competitiveness of the Aerospace Industry in particular. Past precedents also clearly indicated that under the European Union laws, the merger might not find legal ground to sustain.

The arguments of the United States competition agency were based around Cournot efficiency.

"One might view the Americans' conclusion-that the merger was price lowering and therefore efficient and pro-competitive-as a neat trick. Their conclusion was based on the Cournot effect of bringing monopoly ownership of complements under joint control. If premerger GE were dominant in engines, which the United States authorities denied, and if Honeywell were dominant in avionics, which neither United States nor European authorities believed, then GE and Honeywell each would have been charging a supra competitive price before the merger. A merged GE/Honeywell would have avoided double marginalization, stopping its own two-stage supra competitive pricing in order to increase profits. If the theory was that Honeywell was not dominant pre-merger but that the merger would make it dominant (which, again, the Americans did not believe), then the argument would be that there was no need to fear that the merger

[105] Id.. page 461

would create dominance, because the combination would create incentives to curb the exploitative power that dominance confers. In fact, even though neither GE nor Honeywell offered proof of such promised efficiencies, both American and European authorities asserted that GE/Honeywell would lower its prices after the merger. The United States and the European Union simply came to different conclusions. The United States argued that the lower prices would trigger more competition; European authorities insisted that the merger would be price-raising after a siege of low pricing. They argued that prices would rise not in the short-term, but in the medium-term, as the competitive structure of the market weakened, and the less advantaged competitors disengaged from the sectors in which GE/Honeywell had preferential access to customers."[106]

The American authorities therefore believed that the merger would be efficient, and the European authorities believed that the merger would cause prices to rise especially in the medium term. "Moreover, researchers and representatives of the United States antitrust agencies frequently criticize the E.C.'s actions. In the GE-Honeywell case, for instance, then deputy assistant attorney general William J. Kolasky criticized the E.C. for attempting to protect competitors rather than competition."[107]

We can observe their key points of difference in their assessments:

i. Impact on prices: Americans believed the price levels would reduce through Cournot efficiencies coming into play, whereas the European Union felt strong market power would pressure prices and eventual increase in price levels.
ii. Double Marginalization: Pursuant to a price level increase, there would be double marginalization as per European Union. As per the American view, there would not be any mark-up of prices post-merger; we would not see double marginalization.
iii. Dominant Position: Firms, not dominant pre-merger, would both gain dominant positions post-merger (from the European Union point of view). Firms, not dominant pre-merger, would continue to remain in non-dominant positions post-merger as well (from the United States point of view).

[106] Id.. page 465
[107] (Langenfeld, 2008-2009, page 866)

iv. Competitiveness: Competitors (less advantaged) would be eventually forced to exit in the medium term as price levels rise. The merged entity has preferential access to customers (from the European Union point of view). A medium to long-term price drop would occur, incentivizing even less advantaged competitors by triggering more competition (from the United States perspective).

In this chapter, I have investigated the different characteristics of the antitrust decision-making practices of the European Union and United States competition authorities. I have started by looking at the historical convergence process between the United States and the European Union in terms of merger control. Afterwards I have also examined some of the antitrust policies adopted by the European Union and the United States, both in principles and in practice as well. In order to show the practical side, I have used some examples both for convergence and for divergence.

In conclusion I have seen that there is a very strong movement towards standardizing the different practices between the two jurisdictions (and even internationally). However, due to the different market dynamics of the European Union and the United States, the strong political will in the European Union to create and maintain a single market despite national boundaries, and some different approaches in short-term and long-term thinking, the convergence is far from complete.

1.2.4. Case Studies in Antitrust

In this chapter I will examine case studies specifically at the intersection of Patent Law and Antitrust Law. I have chosen these case studies to illustrate the corporate behaviour around the concept of patent misuse, what arrangements are usually made that harm the customer's interests in order to unlawfully increase monopoly profits, discourage competition etc. These effects were not originally intended under patent law, but they are in the interest of the companies involved. In many cases millions of dollars or euros could be won at the customer's expense that would otherwise be manifested as price reductions and/or quality improvements in a more competitive market environment.

The phenomenon of patent misuse falls on the boundaries of Patent Laws and Antitrust Laws. These two legal fields, since they are fundamentally opposite in their goals, often clash when some companies overreach and use their temporary monopoly rights granted under Patent Laws in such a way that it was not intended by the legislator when originally identifying the cases and frameworks of patents.

The main goal of Patent Law is to encourage innovation and the distribution of knowledge about innovation by granting temporary monopoly rights to the innovator, in exchange for publishing the details of the invention in a generally understandable format, so that anyone reasonably skilled in the field can understand and apply the invention. These rights have clear boundaries both in terms of scope (the specifications of the patent that are published), and in time (with a usual term of 20 years from filing). These well-defined boundaries are necessary to prevent companies from various interpretations of the extent of their rights, which they could use to extend the benefits of their monopolies. However, as we will see a case study below, these boundaries are sometimes not as straightforward as intended, and competition does not simply spring up immediately once the patent terms expire.

The main goal of Antitrust Law is to prevent companies from abusing their power on the market to decrease the threat of competition, to raise prices or decrease quality to the detriment of customers, or to hinder technological progress. All these actions are only examples of abusing market power that ultimately lead to harm in customer interests. These strategies are usually followed by companies to increase profits, especially via monopolies or any measures that could be considered anti-competitive. In essence patents are a form of abuse of market power, but a rare legitimate one.

There is much scholarly debate on whether to apply Patent Law or Antitrust Law principles in cases when patent misuse occurs. Recent court decisions have shown examples that the judicial bodies, especially in the United States should apply Antitrust Law principles in such cases.[108]

Simply using the principles of Antitrust Laws has a certain logical simplicity and appeal when dealing with patent misuse. Since Antitrust Law deals with the misuse of monopoly power, and

[108] Feldman, R. C. (2003). The Insufficiency of Antitrust Analysis for Patent Misuse. HASTINGS LAW JOURNAL and University of California, Hastings College of the Law UC Hastings Scholarship Repository. Retrieved October 20, 2020, from https://repository.uchastings.edu/cgi/viewcontent.cgi?article=1161&context=faculty_scholarship page 399

on the surface Patent Law deals with granting such monopoly powers, it should be perfectly adequate to identify the cases when the patent has been misused, by examining the determining factors when the monopoly rights have been misused.[109] This logic is even more appealing considering the large quantity of legal precedents, investigations and regulations gathered under Antitrust Law over the decades since it has been applied.[110]

However, there are significant reasons why patent misuse is a different phenomenon than a simple misuse of monopoly power. The first and most obvious reason is that the patent holder only has the right to establish a monopoly utilizing a certain invention, but the realities of market dynamics and the necessary investment, customer acquisition costs and procedures may and do provide inhibiting factors in such efforts. The threat of substitute products as a significant market factor could be enough to disqualify under Antitrust Law a patent holder company from having a monopoly position on a certain market. Another prominent example is when the customer acquisition costs are perceived to be prohibitively high, and thus discourage the patent holder from building such monopoly. However, even these cases patent misuse could still harm the original goal of the patent system, which is the technological advancement of society through encouraging innovation and the dissemination of knowledge. Simply put, it is not enough to look at whether a company has monopoly power on the market to determine whether they have misused their patent.[111]

This is the exact reason why I am considering it important to showcase some cases of corporate behavior to look at patent misuse in practice, because focusing on Patent Law or Antitrust Law principles and regulations alone would not give us a clear picture on what manifestations of patent misuse have been happening recently.

According to the United States Supreme Court, patent misuse can be defined "as an impermissible attempt to extend the time or scope of the patent grant."[112]. This definition may be deduced from several cases where the Supreme Court has condemned the companies that attempted to broaden the scope of their monopoly rights, either through trying to broaden the

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[109] Lim, D. (2014). Patent Misuse and Antitrust: Rebirth or False Dawn? n Michigan Telecommunications and Technology Law Review, 20 (2). Retrieved October 20, 2020, from https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1191&context=mttlr

[110] (Feldman, 2003, page 400)

[111] Id.. page 400

[112] Id.. page 402

scope of protection (for example through product bundling, conditional licensing etc.) or the time of the time of protection (for example by signing licensing deals that reach beyond the life of the patent).

One important aspect as per the rulings of the Supreme Court is that patent misuse itself only renders the patent unenforceable but does not invalidate the patent itself. As soon as the patent misuse conditions cease to exist, the patent may be enforceable again. Such abuse of the patent invalidates the patent enforceability for all infringers, not only the ones directly affected by the abuse. For example, in the case of B. Braun Medical, Inc. v. Abbott Laboratories, 124 F.3d 1419 (Fed. Cir. 1997)[113] , the Supreme Court decided to affirm the judgement of a lower court that Abbott did not infringe on Braun Medical's patent right, but at the same time denied that Abbott would be entitled for payment on the damages that the patent misuse of Braun Medical has caused them. This affirmed the above notion that the patent itself was still valid, however not infringed and the misuse simply invalidated any claims Braun Medical would have had if the patent was still enforceable.

In the following case study, I will take a look at a common practice from pharmaceutical companies called "product hopping" and how it was entangled with another anticompetitive behavior of not only the patent holder company, but a potential competitor and licensee as well, in a real-world scenario.

Product hopping happens often in the case of pharmaceutical companies, when a patented pharmaceutical is nearing the lifetime of the patent, and there is a significant threat of a generic drug using the same formula that would enter the marketplace. The threat of generics in this case is highly encouraged by laws and operational practices of the drug administration agency (United States. Food and Drug Administration) in which a generic provider can apply in an easy procedure to produce a generic version of a branded (and previously patented) pharmaceutical. Moreover, pharmacies can also start simply exchanging the branded drug with the generic drug and giving that to the patients as an equivalent.

This so-called automatic substitution in the pharmacy is the most efficient way of distributing a generic drug. The reason why the drug administration agency is encouraging this practice is

[113] B. Braun Medical, Inc. v. Abbott Laboratories, 124 F.3d 1419, Federal Circuit. (1997, September 8). Ravellaw.com. Retrieved November 27, 2019, from https://www.ravellaw.com/opinions/69f885846ea131754cc240bc64c5cf1c

because it usually results in very significant cost reductions for the customers, especially when experiencing competitive pressure between generic providers.

The Federal Trade Commission has issued a brief in 2015 about this practice of product hopping, stating that these can easily be interpreted as a violation of Antitrust Laws. The brief explanation of product hopping as follows:

"If a brand-name manufacturer tweaks its brand-name product shortly before anticipated generic entry and begins eliminating the market for the original formulation, it can impede competition from would-be generic entrants, which have sought FDA approval to sell a generic version only of the original formulation but not the replacement."[114]

The companies may do this tweaking of the product formula to destroy the original brand, and redirect demand to the new drug before the patent expiration, to avoid the automatic substitution.

As the brief describes, this decreases the incentives of the generic drug manufacturers significantly. "The brief explains, however, that the district court's broad ruling effectively embraces a rule of nearly per se legality for product-hopping conduct: 'The district court held that a brand company may with impunity destroy what is often the only means of generic distribution -- automatic substitution -- so long as generics remain hypothetically free to pursue new and more costly distribution alternatives, such as direct advertising to physicians.' That outcome, the brief states, conflicts with the law of the Third Circuit, as well as other circuits."[115]

In the following case of the Federal Trade Commission vs Impax Laboratories, the Federal Trade Commission did not investigate the product hopping strategy itself, but another (indirect) consequence of product hopping, a reverse payment scheme. The reverse payment being the main part of the investigation, the case also involved patent invalidation, infringement lawsuits, at-risk (of infringement) product launch, patent licensing etc. It shows many relevant parts of the patent and antitrust puzzle at play in a real-world business scenario. It is also very

[114] Federal Trade Commission. (2015, October 1). FTC Files Amicus Brief Explaining that Pharmaceutical "Product Hopping" Can Violate the Antitrust Laws. Federal Trade Commission Press Releases. Retrieved October 20, 2020, from https://www.ftc.gov/news-events/press-releases/2015/10/ftc-files-amicus-brief-explaining-pharmaceutical-product-hopping

[115] Id..

educational regarding the process by which these cases are investigated, and the anti-competitive behavior is proven in court.

Federal Trade Commission vs. Impax Laboratories

Endo Pharmaceuticals Inc. and Impax Laboratories were investigated by the Federal Trade Commission between March 2016 and March 2019 for several cases of anticompetitive behavior.

At first, the Federal State Commission sued Endo Pharmaceuticals Inc, Impax Laboratories Inc and Watson Laboratories Inc for blocking customer access to generic versions of branded drugs of Endo Pharmaceuticals. The court cases involved two drugs specifically, Opana ER, an extended-release opioid used as a pain killer, and Lidoderm, a topical patch used also as a pain reliever in cases of post-herpetic neuralgia.

The complaint of the FTC was as follows:

"In 2010, Endo and Impax illegally agreed that until January 2013, Endo would not compete by marketing an authorized generic version of Endo's Opana ER. In exchange, Endo paid Impax more than $112 million, including $10 million under a development and co-promotion agreement signed during the same time period. Endo used this period of delay to transition patients to a new formulation of Opana ER, thereby maintaining its monopoly power even after Impax's generic entry. In 2010, Opana ER sales in the United States exceeded $250 million.

In May 2012, Endo and its partners, Teikoku Seiyaku Co. Ltd. and Teikoku Pharma USA, Inc., illegally agreed with Watson Laboratories, Inc. that until September 2013, Watson would not compete with Endo and Teikoku by marketing a generic version of Endo's Lidoderm patch. In exchange, Endo paid Watson hundreds of millions of dollars, including $96 million of free branded Lidoderm product that Endo and Teikoku gave to Watson. As a result, Endo illegally maintained its monopoly over Lidoderm. In 2012, Lidoderm sales in the United States approached $1 billion.

Endo and Watson illegally agreed that, for 7½ months after September 2013 (including the 180-day first-filer exclusivity period for which Watson was eligible), Endo would not compete by marketing an authorized generic version of Lidoderm. This agreement left Watson as the only generic version of Lidoderm on the market, substantially reducing competition and

increasing prices for generic lidocaine patches. As a result, Watson made hundreds of millions of dollars more in generic Lidoderm sales."[116]

All of the cases above involved a so-called no-AG commitment (no authorized generic commitment), which means that the pharmaceutical company acting as the owner of the branded drug, will not market their own generic version of the branded drug, and thus will leave the generic competitor as the sole provider of the drug for a set period of time. Under said period the generic competitor will therefore enjoy a monopoly and may charge customers higher prices than otherwise would be possible had both companies marketed and sold competing products. These arrangements are especially lucrative due to the Hatch-Waxman Act which was intended to provide the first generic entrant on the market with additional incentives to enter competition by giving them a limited time to be the sole challenger to the branded product. The Federal Trade Commission describes the market and legal situation as follows:

"Under federal law, the first generic applicant to challenge a branded pharmaceutical's patent, referred to as the first filer, may be entitled to 180 days of exclusivity as against any other generic applicant upon final FDA approval. But a branded drug manufacturer is permitted to market an authorized generic version of its own brand product at any time, including during the 180 days after the first generic competitor enters the market. As the FTC has previously argued in amicus briefs, a no-AG commitment can be extremely valuable to the first-filer generic, because it ensures that this company will capture all generic sales and be able to charge higher prices during the exclusivity period."[117]

These no-AG commitments basically are anti-competition commitments whereby the company that could reasonably compete with another as allowed by the current legal frameworks for a certain time period is refraining to do so, in order to share the monopoly profits with a generic entrant. In exchange for refraining from competition the company will get reimbursement from the generic entrant called a reverse payment scheme. These reimbursement in turn will be funded by the monopoly profits the generic entrant may earn during the exclusivity period since thanks to the anti-competition commitment they can enjoy a monopoly position being the only

[116] Federal Trade Commission. (2016, March 31). FTC Sues Endo Pharmaceuticals Inc. and Others for Illegally Blocking Lower-Cost Generic Versions of the Branded Drugs Opana ER and Lidoderm. Federal Trade Commission Press Releases. Retrieved October 20, 2020, from https://www.ftc.gov/news-events/press-releases/2016/03/ftc-sues-endo-pharmaceuticals-inc-others-illegally-blocking-lower

[117] Id..

legal provider of the generic drug. Such anti-competitive commitments and any contracts or agreements containing such commitments are to be handled on Antitrust Law principles. The Federal Trade Commission considers these reverse payment schemes and no-AG commitments very harmful for consumers:

"'Settlements between drug firms that include 'no-AG commitments' harm consumers twice – first by delaying the entry of generic drugs and then by preventing additional generic competition in the market following generic entry,' said FTC Chairwoman Edith Ramirez. 'This lawsuit reflects the FTC's commitment to stopping pay-for-delay agreements that inflate the prices of prescription drugs and harm competition, regardless of the form they take.'"[118]

The double harm comes from the customers not having access to the generic alternatives and the additional delays of other generic competition. These harms are manifested usually in both higher prices and the decreased product choices as well.

However, the relationship and agreements between Impax Laboratories Inc and Endo Pharmaceuticals Inc were much more complicated than just the reverse payment scheme. In the next section, I will attempt to highlight the events that unfolded in this relationship and the subsequent Federal Trade Commission investigation.

Endo Pharmaceuticals was selling the brand-name drug Opana ER on the United States market with a patented formula. The patent for the formula for Opana ER was going to expire in 2013. After the expiration of the patent, generic competition may enter the market. In the United States, Congress has few acts, most famously the Hatch-Waxman Act, that encourages this generic entry. These acts allow companies to file simplified applications with the United States Food and Drug Administration, where they only must prove that the generic drug has equivalent biological and chemical properties to the original patented drug. When such applications are filed, the company that acquires the first filing date is entitled to a 180-day exclusivity period. This exclusivity in practice means that the United States Food and Drug Administration will not approve another generic to enter the market until after 180 days have passed since the first filer company launched their generic drug on the market. These 180 days

[118] Id..

have immense importance for the first filer since the profits gained during this period are equivalent to or more than the rest of the new generic drug's lifetime. This ease of entry for a generic is made even more prevalent since pharmacists are encouraged to apply automatic substitution at the pharmacy and give the cheaper generic to patients instead of the branded drug. However, the brand-name owner drug company can still compete even in these 180 days with the first filer generic drug company by launching its own generic drug, called an authorized generic.[119]

This legal environment provides strong incentives for generic drug companies to accept so-called reverse payments from the branded name drug owner company since the branded drugs are usually more expensive than their generic counterparts, thus if the branded drug owner can extend their monopoly rights illegally through such a deferred entry of generic players, they can acquire significant amounts of monopoly profits within the period of 180 days as well. On the other hand, as we discussed above, no-AG settlements can also be an option (albeit less profitable for the companies involved) when the generic entrant remains in the monopoly position for the 180-day period since the branded drug owner company will not launch their generic drug and refrain from competition.

In the Impax Laboratories and Endo Pharmaceutical case Impax had an even stronger position than most generic first filer companies. The Food and Drug Administration approved Opana ER in 2006; shortly afterward, in 2007, Impax Laboratories applied and became the first filer, and even stated that the Endo Pharmaceutical patents were invalid, or the Impax Laboratories product did not infringe on them. Even though Endo Pharmaceuticals sued Impax Laboratories for patent infringement immediately, which delayed Impax Laboratories' possible market entry until 2010, Impax Laboratories prepared an at-risk (of infringement) market entry and started to produce a large stock of its generic product for the market launch.[120]

Endo Pharmaceutical had a lot to gain from an anti-competitive arrangement with Impax Laboratories, especially considering that the generic market entry would have come much

[119] Federal Trade Commission. (2019, March 29). FTC Concludes that Impax Entered into Illegal Pay-for-Delay Agreement. Federal Trade Commission Press Releases. Retrieved October 20, 2020, from https://www.ftc.gov/news-events/press-releases/2019/03/ftc-concludes-impax-entered-illegal-pay-delay-agreement

[120] Federal Trade Commission. (2018, May 24). Administrative Law Judge Dismisses FTC Antitrust Complaint against Generic Pharmaceutical Company Impax Laboratories, Inc. Federal Trade Commission Press Releases. Retrieved October 20, 2020, from https://www.ftc.gov/news-events/press-releases/2018/05/administrative-law-judge-dismisses-ftc-antitrust-complaint

sooner than their patent expiration, plus the 180 days extra would also have been available for Impax Laboratories to make money on their generic drug.

Endo Pharmaceutical thus made the following deal with Impax Laboratories:

"Impax received a large and unjustified payment, which included: (1) a "No AG" commitment, i.e., a promise from Endo not to launch an authorized generic during the 180-day exclusivity period that the Hatch-Waxman Act provides to the first generic filer; and (2) an additional credit that Endo would pay Impax in the event the market for Opana ER declined before Impax's entry date."[121]

In the first part of the settlement, the no-AG commitment itself harms customer interests, as we have described above. The second part of the settlement was, in essence, an insurance policy in case Endo Pharmaceuticals would attempt a product hopping strategy that we have described above and thus would destroy the market for Impax Laboratories. There was a third, less consequential part of the settlement granted licenses for the Endo Pharmaceutical patents to Impax Laboratories as well.

Ultimately Endo Pharmaceuticals did employ the product hopping strategy and had to pay the credits promised, but this fact was not important from the overall anti-competition investigation. The investigation went as follows:

"The Commission explained that the U.S. Supreme Court's Actavis decision held that eliminating the risk of competition through a reverse payment settlement itself constitutes anticompetitive harm. The Commission found there was ample evidence of a risk that Impax could have launched a generic product before the agreed-upon date, had it not entered into the reverse payment settlement with Endo. The Commission, therefore, concluded that Complaint Counsel established a prima facie case."[122]

Therefore, the first part of the investigation aimed to prove that reverse payment harmed competition and therefore was detrimental to customer interests. The companies involved in the deal agreed to share the monopoly profits resulting from refraining from the competition. Therefore, the probability of competition and the value of the deal was even stronger considering the facts that show the preparations of Impax Laboratories for an at-risk product launch.

[121] (Federal Trade Commission, 2019)
[122] Id..

"The Commission further determined that Impax failed to show a cognizable procompetitive rationale for its reverse payment. The Commission explained that Impax bore the burden to prove that any alleged benefits were adequately linked to the challenged restraint. Because Impax failed to argue the procompetitive benefits it identified were related to the restraint at issue, rather than the settlement as a whole, it failed to satisfy this burden."[123]
Therefore, in the second part of the investigation, the burden of proof shifted to Impax Laboratories. They would have needed to prove that the payment has produced pro-competitive results (such as the patent license) or was in line with the litigation costs. Failing that, it could be considered reasonably established that the reverse payment was received mainly or solely in exchange for refraining from the competition.
"The Commission found in the alternative that Complaint Counsel had established a viable less restrictive alternative."[124]

In the third part of the investigation, the Federal Trade Commission observed whether the deal the two companies signed could have the same or better implications on the competition with a different arrangement. This step further strengthens the case that their behavior was anti-competitive in nature, and the anti-competitive effects could have been avoided.
In this case study, we could observe an entangled case of a real-world contract between two companies in the same industry, involving patents and competition. The case involved several different strategies, some of them evidently anti-competitive and some regular business or licensing activities. In such Antitrust Law cases, a thorough understanding of the specifics of the company interests, the legal frameworks, and incentives are paramount to be able to draw the correct conclusions. Therefore, in the case studies, when I am going to examine the acquisitions with patent involvement, I will pay special attention to examine the specifics in detail and draw my conclusions accordingly.

European Commission vs. Amazon, Apple
Not only could the principle of Antitrust be recognized in Intellectual Property Rights, but in numerous jurisdictions, even other cases such as fair practice ethics etc., play a crucial role.

[123] Id..
[124] Id..

The task for competition policy is to design a framework in which antitrust authorities play a key role in studying the competitive impact of a merger, and regulators play a vital role in the imposition and compliance of regulatory remedies. A good example is the recent European Union Investigation of Amazon's "Buy Box" and "Amazon Prime" label activities against violation of European Union antitrust laws by misuse of a dominant market position.

It accuses Amazon of misusing the data that it receives on its website from third-party vendors. The European Union argues that very large volumes of non-public seller data are used to help Amazon's retail sector to the detriment of other marketplace sellers in France and Germany.

On 10 November 2020, the Commission of the European Union objected that the use of non-public marketplace seller data would allow Amazon to avoid the typical threats of competition from retailers and to take advantage of its dominance in the market for the provision of marketplace services in France and Germany, the largest markets for Amazon in the European Union.[125] It also anticipates a breach of European Union antitrust laws by distorting competition in the online retail markets. The Commission will carry out its in-depth investigation as a matter of priority. If proven, Amazon's marketing practices can benefit artificially from its retail deals, and market vendor offers that use Amazon's logistics and delivery services (the so-called "fulfillment by Amazon or FBA vendors"). Therefore, the operation under scrutiny may be counter to Article 102 of the Treaty on the Functioning of the European Union (TFEU), which prohibits the abuse of the dominant position.[126]

Two antitrust inquiries emerged by the European Commission into the Apple App Store and Apple Pay policies to ensure the lack of unfair competition practices. It will determine whether the Apple rules for software developers concerning the sale of applications through the App Store break the European Union's antitrust rules. Although companies can put their applications at no cost in the App Store, Apple charges companies for the first year, 30 percent of in-app sales and 30 percent of subscriptions, then 15 percent after that. Spotify, a music app, and Kobo, an e-reader firm, both argue that it is unjust. According to Executive Vice-President

[125] Porter, J. (2020, November 10). Amazon accused of EU antitrust violation over Marketplace data. Verge.com. Retrieved October 20, 2020, from https://www.theverge.com/2020/11/10/21558119/amazon-european-union-antitrust-charges-competition-commission-margrethe-vestager

[126] European Commission Antitrust. (2020, November 10). Antitrust: Commission sends Statement of Objections to Amazon for the use of non-public independent seller data and opens second investigation into its e-commerce business practices. Retrieved October 20, 2020, from https://ec.europa.eu. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2077

Margrethe Vestager, in charge of competition policy, said in a statement: “It appears that Apple obtained a ‘gatekeeper’ role when it comes to the distribution of apps and content to users of Apple’s popular devices. We need to ensure that Apple’s rules do not distort competition in markets where Apple is competing with other app developers, such as its music streaming service Apple Music or with Apple Books. I have, therefore, decided to take a close look at Apple’s App Store rules and their compliance with EU competition rules.”[127] The European Commission will also have a comprehensive Apple App Store investigation to ensure a violation of Article 82 (now Article 102) of the EC Treaty.[128]

High tech companies like Google and Facebook are under investigation by the United Kingdom in a related antitrust infringement case. Government plans to create a Digital Markets Unit (DMU) to enforce a new code to control the actions of market-dominant channels. “The unit will be part of the Competition and Markets Authority (CMA), which has been insisting that massive internet media outlets have more powers to reign in.”[129]

The regulator is worried about how tech companies like Google and Facebook use digital advertising to fuel their business models. Digital Secretary Oliver Dowden said in a statement: “But there is growing consensus in the UK and abroad that the concentration of power among a small number of tech companies is curtailing growth of the sector, reducing innovation and having negative impacts on the people and businesses that rely on them. It’s time to address that and unleash a new age of tech growth,”[130]

Therefore, many case studies recognize that emerging development in technology and corporate ethics needs to be revised with antitrust laws. Most laws, however, are more focused on updating competition policy only when dominant control is violated; in fact, they neglect the competitive definition and lack of society's well-being in the initial process.

“A brief understanding of Article 102 (ex-Article 82) of the European Commission Treaty - Consolidated version of the Treaty on the Functioning of the European Union - PART THREE:

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[127] Shead, S., & Browne, R. (2020, November 26). Google and Facebook to be scrutinized by new U.K. antitrust unit from next year. CNBC. Retrieved October 20, 2020, from https://www.cnbc.com/2020/11/26/google-and-facebook-to-be-scrutinized-by-new-uk-unit-from-next-year.html

[128] Eur-lex: Article 82 EC Treaty. (2009, 02 24). Communication from the Commission — Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings (Text with EEA relevance). Retrieved October 20, 2020, from https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52009XC0224%2801%29

[129] (Shead & Browne, 2020)

[130] Id..

UNION POLICIES AND INTERNAL ACTIONS - TITLE VII: COMMON RULES ON COMPETITION, TAXATION AND APPROXIMATION OF LAWS - Chapter 1: Rules on competition - Section 1: Rules applying to undertakings - Article 102 (ex-Article 82 TEC)

> "Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between the Member States.
>
> Such abuse may, in particular, consist in:
>
> (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
>
> (b) limiting production, markets or technical development to the prejudice of consumers;
>
> (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
>
> (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts."[131]

It is understood quite well that there is no clear concept of "abuse" in Article 102 (ex 82) or even clear concepts of the three different kinds of abuse, exploitation, exclusionary or anti-competitive and discriminatory behavior, as so far been developed by the European Commission, allowing ideas of fairness and protection of small enterprises and competitors to influence competition law.

The phrase, repeated by the Community Courts that dominant companies have "special responsibilities" were misunderstood and implied as unspecified kinds of abuse other than the three well-established categories of exploitation, anticompetitive and discriminatory conduct, until the judgement of Atlantic Container Line AB and Others v Commission of the European Communities, 1998 (Joined Cases T-191/98, T-212/98 to T-214/98).[132]

The competition law tradition in Europe is relatively recent; hence, competition law and competition economics are not clearly understood even by competition authorities or the competition lawyers in Europe. The risk of confusion of regulatory and competition objectives

[131] (Eur-lex.europa, 2008)

[132] Eur-lex. (2003, September 30). Joined Cases T-191/98, T-212/98 to T-214/98. eur-lex.europa.eu. Retrieved October 20, 2020, from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A61998TJ0191

are most significant when a single authority European Commission has both kinds of powers. Hence the power should be distributed.

In this chapter, I have reviewed the field of Antitrust Laws on anti-competitive practices, both from the theoretical and the practical standpoints. I have reviewed the goals of the legislators, both in the EU and US, along with the recent laws and regulations. I have performed a comparative study, by examining both the differences and commonalities of the United States and European Union Antitrust policies and regulation. I have reviewed anti-trust case studies mainly around patent misuse, to understand the motives and typical corporate behavior that characterizes these cases.

These investigations highlight the intent of the often-opposing goals of the legislator and the companies involved in anti-trust cases. I have reviewed some especially interesting and complex cases where the companies have an incentive to circumvent the intentions of the legislator in both Anti-trust and Patent Law, coming up with ingenious ways to do so. It is, therefore, paramount that in my investigation of acquisitions where patents remain unutilized, I will pay attention to understand the incentives and behavior of the companies involved. This is especially important in order to come up with a feasible solution proposal that not only penalizes but incentivizes the companies to ultimately achieve the intents of legislator.

1.3. Intellectual Property Laws

In this chapter, I am investigating the field of Intellectual Property Law, and more narrowly Patent Law, both from the theoretical and the practical standpoints. As a theoretical overview I am examining the definitions of intellectual property and patents, trying to get a solid understand of the legislator. Then I will perform a detailed analysis of the determining factors of patents to be able to thoroughly understand the benefits of them, and the different effects of their so-called “non-working”, because they are essential to the main scenario of my thesis, acquisitions where patents remain unutilized.

As a practical overview, I will examine a notable example of weaknesses of patents, the patent trolls, the national and international treaties and organizations that govern Patent Law, with

special attention to the United States and the European Union. I will devote a full subchapter to the organization and challenges of the patent protection laws and practices in the European Union, because it will help me choose and understand an appropriate case study for the scenario of my thesis, and the conduct of the competition authority in said case study as well.

1.3.1. Intellectual Property

"Intellectual property" "is the oil of the 21st century. Look at the richest men a hundred years ago: they all made their money extracting natural resources or moving them around. All today's richest men have made their money out of intellectual property."- Mark Getty.[133]

The term "Intellectual Property" is widely used by legal professionals, but there are varying definitions in the literature on what exact legal claims are included, considering especially the different national and international legal frameworks around intellectual property.[134] In order to come to an understanding of what aspects of intellectual property are generally accepted, in this chapter, I am going to examine the different definitions of different national and international legal frameworks. I will also examine some common controversies and misunderstandings about the term and attempt to find an approach that I can use henceforth.

Moore, Adam and Ken Himma (2018) define Intellectual Property as follows:

"Intellectual property is generally characterized as non-physical property that is the product of original thought. Typically, rights do not surround the abstract non-physical entity; rather, intellectual property rights surround the control of physical manifestations or expressions of ideas. Intellectual property law protects a content-creator's interest in her ideas by assigning and enforcing legal rights to produce and control physical instantiations of those ideas."[135]

The above definition highlights some key aspects of intellectual property:

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[133] Getty, M. (2000, March 02). Blood and oil The Economist: Business. Retrieved October 20, 2020, from https://www.economist.com/business/2000/03/02/blood-and-oil

[134] DLA Piper, (2020). Guide to Going Global IPT Full Handbook. Retrieved December 20, 2020, from https://www.dlapiperintelligence.com/goingglobal/intellectual-property/handbook.pdf

[135] Moore, Adam and Ken Himma. (2018). Intellectual Property. The Stanford Encyclopedia of Philosophy (Winter 2018 Edition). Retrieved October 20, 2020, from https://plato.stanford.edu/archives/win2018/entries/intellectual-property/ page 1

- Intellectual property is a non-physical property; therefore, the laws governing it are distinct from traditional property law. There may be some parallel concepts and similarities, but the regulations cannot be exactly derived from property law. According to critics, "information is not the kind of thing that can be owned or possessed and is not something that can be property, as that notion is typically defined." [136]
- Intellectual property is the product of original thought. The originality of thought, therefore, must be clearly established in every legal area of intellectual property. The definition leaves it up to the individual legal areas of intellectual property to define the rules how originality may be proven (e.g., through administrative procedures such as in the case of patents or litigation in the most frequent cases of copyright law).[137]
- Intellectual property is supposed to protect an idea, or in other words, a human thought, but the idea itself cannot be proven to have originated with or created by an individual unless the thought is expressed in some physical manifestation. Therefore, the legal protection must identify and control these physical manifestations.[138]

The need to identify physical manifestations of original thoughts is exactly why intellectual property laws have had controversies in the last decades as the digital economy, and the Internet has found new ways of expressions that could not be classified previously.[139] One such example was the digital streaming music industry, where the different delivery (manifestations) of the content had to be clearly codified by participating countries:

"The approach adopted by the drafters of the Internet Treaties to ensure broad, technology-neutral communication to the public right (WCT, Article 8) and the right to make available (WPPT, Articles 10 and 14) has proven to be the right one. These exclusive rights apply equally to all types of transmissions – downloads, on-demand streaming and other types of interactive transmission – and ensure that right holders can negotiate fair terms with digital services across territories."[140]

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[136] Id.. section 4.1
[137] Id..
[138] Id..
[139] Rechardt, L. (2015, May 1). Streaming and Copyright: a Recording Industry Perspective. Wipo Magazine (May 2015 issue). Retrieved October 20, 2020, from https://www.wipo.int/wipo_magazine/en/2015/02/article_0001.html
[140] Id..

The European Union's legal framework defines Intellectual Property according to Articles 114 and Article 118 of the Treaty on the Functioning of the European Union as follows:

"Intellectual property includes all exclusive rights to intellectual creations. It encompasses two types of rights: industrial property, which includes inventions (patents), trademarks, industrial designs and models and designations of origin, and copyright, which includes artistic and literary property. Since the entry into force of the Treaty on the Functioning of the European Union (TFEU) in 2009, the European Union has had explicit competence for intellectual property rights (Article 118)."[141]

The above definition highlights some similar points we have reviewed above:

- Intellectual Property is related to intellectual creations. We can identify these intellectual creations as the physical manifestations of the human thoughts cited in the Stanford Encyclopedia definition as the word intellectual being another expression for human thought, and creation being another expression for a physical manifestation of these thoughts.
- The European Union definition does not underline the necessity of originality. It references pre-existing laws and regulations on copyrights and industrial property; therefore, it leaves the burden of proof of originality as defined in those laws and regulations, if necessary.
- Intellectual Property consists of two broad categories:
    - industrial property, which includes patents, trademarks, industrial designs, designations of origin (such as "made in Germany"), and
    - the copyright includes commercial protection of artistic and literary works (such as books, but also computer programs).[142]

The World Intellectual Property Organization, the Switzerland-based specialized agency of the United Nations responsible for Intellectual Property protection worldwide, gives the following description about Intellectual Property:

"Industrial property legislation is part of the wider body of law known as Intellectual Property (IP), which refers broadly to the creations of the human mind. IP rights protect the interests of

[141] Bux, Udo. (2020, January 1). Intellectual, industrial and commercial property. Fact Sheets on the European Union. Retrieved October 20, 2020, from https://www.europarl.europa.eu/ftu/pdf/en/FTU_2.1.12.pdf page 1

[142] Id.. page 3

innovators and creators by giving them rights over their creations. The Convention Establishing the World Intellectual Property Organization (1967) does not seek to define IP but lists the following as protected by IP rights:

- literary, artistic, and scientific works;
- performances of performing artists,
- phonograms and broadcasts;
- inventions in all fields of human endeavor;
- scientific discoveries;
- industrial designs;
- trademarks, service marks, and commercial names and designations;
- protection against unfair competition;
- 'all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields.' "[143]

The above is not meant as a definition per se, but more as a description of intellectual property. It highlights some similar important points as the definitions above:

- Intellectual Property is about the creations of the human mind. Creation could be understood as the physical manifestation of a thought or idea. The reference to the human mind is similar to the reference of (original) human thoughts.[144]
- This description does not include the requirement of originality either, just like the European Union definition.[145]
- The Convention Establishing the World Intellectual Property Organization lists the different areas protected by Intellectual Property legislation. This list is much more exhaustive than the European Union definition list or the Stanford Encyclopedia definition, considering all inventions and protection against unfair competition part of Intellectual Property law.[146]

[143] WIPO. (2016). Understanding Industrial Property. World Intellectual Property Organization Publications, ISBN: 978-92-805-2588-5, Retrieved October 20, 2020, from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_895_2016.pdf page 5
[144] (Moore, Adam and Ken Himma, 2018)
[145] (Bux, 2020, page 1)
[146] (WIPO, 2016, page 5)

Protection against unfair competition is a fascinating topic that has drawn abundant debate, and is dealing with the business practices considered to harm markets' proper functioning by reducing transparency or distorting information on the markets.[147] Article 10 bis of the Paris Convention identifies three main areas of unfair business practices:

"*Acts causing confusion*

An act or practice, in the course of industrial or commercial activities, that causes, or is likely to cause, confusion with respect to another's enterprise or its activities, in particular, the products or services offered by such an enterprise constitutes an act of unfair competition.

Even the likelihood of confusion having a detrimental effect comparable to actual confusion constitutes an act of unfair competition and this widely enlarges the scope of protection. For instance, a trademark, whether registered or not, or a product's appearance may lead to confusion. Appearance of a product includes packaging, shape or other non-functional characteristic features of the product.

Acts that are misleading

A misleading act can create a false impression of a competitor's product or services leading to the customer, acting on false information, suffering financial damage. Misleading acts can take the form of a statement giving incorrect indications or allegations about an enterprise or its products or services. For example, misleading statements concerning the manufacturing process of a product may relate to a product's safety and create a false impression.

Acts damaging goodwill or reputation

Reducing the distinctive character, appearance, value or the reputation attached to a product could damage another's goodwill or reputation. For instance, any act that dilutes the effect of a trademark is considered unfair as it could destroy the originality and distinctive character of a trademark.

[147] Höpperger, M., Senftleben, M. (2007) Protection Against Unfair Competition at the International Level — The Paris Convention, the 1996 Model Provisions and the Current Work of the World Intellectual Property Organisation. In: Hilty R.M., Henning-Bodewig F. (eds) Law Against Unfair Competition. MPI Studies on Intellectual Property, Competition and Tax Law, vol 1. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-71882-6_3

Other acts that could be classified as causing unfair competition include discrediting another's enterprise or its activities, industrial or commercial espionage, and acting unfairly with respect to confidential information such as breach of contract or breach of confidence."[148]

I consider the above unfair business practices important relating to the topic of this thesis because although they are forbidden by the Paris Treaty, proving them in court involves lengthy litigation involving case law and precedent law. Thus, larger market players could take advantage of the perceived high costs of litigation and use these and other actions against smaller players to coerce them into unfavorable trades.[149]

Reviewing the above definitions, we can see several differences, especially when considering the boundaries (through the lists of protected areas) of the legal fields included in Intellectual Property. The Electronic Frontier Foundation also finds the boundaries of Intellectual Property Law unclear, but from a different standpoint:

"The controversy stems from two aspects of the term 'intellectual property.' First, the term is imprecise. Sure, 'intellectual property' includes copyright, patent, and trademark law, but there is little agreement about what other kinds of legal claims law it may encompass. For example, some may use the term to refer to one or more trade secrets, rights of publicity, semiconductor masks, or industrial designs, among other things. This ambiguity can create confusion, which can sometimes be manipulated by those who want to clothe themselves in the perceived legitimacy of the three "core" legal areas. In fact, in the U.S., the term 'intellectual property' first came into wide use in the United States, when advocates of the patent system sought to lump patent law together with copyright law in order to gain the advantage of the relatively more secure reputation of copyright law in the late 1800s."[150]

Since most definitions of Intellectual Property law includes some kind of division or listing of the different fields of Intellectual Property law, and since we could see from the examples and

[148] European Space Agency. (2020). Protection against unfair competition. ESA / About Us / Law at ESA / Intellectual Property Rights. Retrieved October 20, 2020, from https://www.esa.int/About_Us/Law_at_ESA/Intellectual_Property_Rights/Protection_against_unfair_competition

[149] (Höpperger & Senftleben, 2007)

[150] Electronic Frontier Foundation. (2010). Intellectual Property: The Term. Retrieved October 20, 2020, from https://www.eff.org/issues/intellectual-property/the-term

controversies above, that the lists are changing with the rise of the digital economy[151] and the appearance of more ways humans can express their thoughts, the boundaries of what is considered Intellectual Property are changing over time. It could also explain why apart from the core elements of Intellectual Property (patents, trademarks, copyrights) the definitions are diverging as to what constitutes Intellectual Property. This changing definition is not new either, there have been philosophical debates and other critiques throughout history that have influenced the definitions over time.[152]

As per the topic of this thesis, the most important inquiry area will be laws and practices governing patents. Patents are generally understood, and accepted innovations that benefit societal progress, and as such can be considered without much questioning as representing a value to customers. Therefore, it is enough to prove that some mergers and acquisitions involve patent acquisitions where this value is not realized, to prove the need for a legal framework preventing or managing transactions bearing this risk. Once established, the legal framework could encompass more areas of Intellectual Property and provide even more protection to preserve the values of other creations of the human mind. This could be another interesting topic for further research and investigation.

1.3.2. Patents

"A Patent is not a license to make money, it is a license to prevent others from making money."
– Dr. Kalyan C. Kankanala

In this chapter, I will examine the different definitions of patents and the roles and effects patent protection is intended to have in the market and society by the legislators. I am performing this study to understand and underline what patents are, why they are useful, and worth the protection I am going to propose in the latter part of this thesis.

1.3.2.1. Definition of Patents

The Cambridge English Dictionary defines a patent as follows (United States definition):

[151] (Rechardt, 2015)
[152] (Moore, Adam and Ken Himma, 2018, section 3)

"The legal right to be the only one who can make, use, or sell an invention for a particular number of years." [153]

The definition above highlights that the patent owner can make, use, or sell an invention. By including the production, use, and commercial sales of these rights, this right is very similar to property and commercial utilization rights. The European Convention on Human Rights states in Article 1 Protocol 1 the protection of property and the limitations of such protections: "Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law. The preceding provisions shall not, however, in any way impair the right of a State to enforce such laws as it deems necessary to control the use of property in accordance with the general interest or to secure the payment of taxes or other contributions or penalties."[154] Similar protections and limitations apply to patents as well under Intellectual Property Law.

The definition also highlights the exclusiveness of the rights of making, using, or selling on the market. This exclusiveness is key to understanding the role the legislator gives to the patent in the marketplace. By granting them exclusive rights to make, use, or sell an invention, the legislator gives the patent owner monopoly rights. The World Law Dictionary gives the following definition for monopoly rights: "Privilege granted by an authority to a person or entity to exclude all others from using, producing, or selling a certain invention, product, or service."[155] This is essentially the same definition as the Cambridge English Dictionary for a patent, only without the time limitation.

Although both approaches to understand patent rights as property rights or as monopoly rights may be debated,[156] they are very useful for understanding patents.

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[153] Cambridge English Dictionary. (2020, November 11). PATENT | meaning in the Cambridge English Dictionary. Retrieved November 14, 2020, from https://dictionary.cambridge.org/dictionary/english/patent

[154] Council of Europe. (1952, March 20). Protocol to the Convention for the Protection of Human Rights and Fundamental Freedoms as amended by Protocol No. 11 *. European Treaty Series, No. 9, 1-2. Retrieved October 20, 2020, from https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168006377c page 1

[155] World Law Dictionary. (2020). Definition of monopoly right. TransLegal. Retrieved October 20, 2020, from https://www.translegal.com/dictionary/en/monopoly-right/noun

[156] Computer & Communications Industry Association. (2020, March 2). Patents: Property or Monopoly? Patent Progress. Retrieved October 20, 2020, from https://www.patentprogress.org/systemic-problems/patents-property-or-monopoly/

Finally, the definition also highlights the limited time for the described legal protections. This limited-time is also important because the above monopoly rights are a temporary measure in which the patent owner can utilize their monopoly rights to make profits on their inventions without the competitive pressures that will inevitably decrease said profits according to the laws of demand and supply in a competitive market in economics. [157]

The World Intellectual Property Organization gives the following definition for a patent:

"A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something or offers a new technical solution to a problem. To get a patent, technical information about the invention must be disclosed to the public in a patent application. In principle, the patent owner has the exclusive right to prevent or stop others from commercially exploiting the patented invention. In other words, patent protection means that the invention cannot be commercially made, used, distributed, imported, or sold by others without the patent owner's consent. Patents are territorial rights. In general, the exclusive rights are only applicable in the country or region in which a patent has been filed and granted in accordance with the law of that country or region. The protection is granted for a limited period, generally 20 years from the filing date of the application." [158]

This definition highlights the exclusiveness of the rights to the patent owner. The definition also gives details on what an invention is, defining it as a product or a process that offers a new way of doing something or solving a problem. It clearly defines the extent of those rights as prevention of competition, such as preventing others from any commercial activity that would involve the invention. It also highlights the process of acquiring exclusive rights through a formal process called a patent application. It identifies a condition that such patent application will have, namely that the invention must be clearly described and published to the public. It also outlines the territorial (jurisdictional) and time limitations of the exclusive rights. It is important to note that patent protection applies only in the national jurisdictions where the patent has been filed or transferred because this will have crucial implications on the problems and proposed solutions identified in this thesis.

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[157] Greenlaw, S. A., & Taylor, T. (2017). Principles of Economics. OpenStax. Retrieved October 20, 2020, from https://openstax.org/books/principles-economics/pages/9-2-how-a-profit-maximizing-monopoly-chooses-output-and-price section 9.2

[158] WIPO - Patents. (2020). What is a patent? Patents. Retrieved October 20, 2020, from https://www.wipo.int/patents/en/

The Merriam-Webster dictionary defines a patent as follows:

> "a: a writing securing for a term of years the right to exclude others from making, using, or selling an invention
>
> b: the monopoly or right so granted"[159]

This definition highlights the rights of the patent owner similarly to the ones above. It also identifies the time limitations and the exclusivity of such rights. The important distinction here is that this definition includes both the monopoly right and the document (patent approval document) that gives such rights that could refer to as a patent.

The United States Patent and Trademark Office defines a patent as follows:

> "A property right granted by the Government of the United States of America to an inventor "to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States" for a limited time in exchange for public disclosure of the invention when the patent is granted." [160]

This definition equates the inventor's right to a property right, which other definitions have not done explicitly. The important point of this right, however, is not about what the inventor can do with their property, but what they are able to prevent others from doing (making, using, offering, selling). Therefore, even though this definition uses the word property, the rights are monopoly rights in nature.[161] This definition also highlights the fixed time and geographical limits of such monopoly rights. Lastly, it clarifies that this temporary monopoly right is given in exchange for publishing the invention when the patent is granted.

Summarizing the above definitions, we can identify the common points about a patent:

- It is a bundle of monopoly rights over the invention; thus, it allows the patent owner to prevent others from making or using the invention in any commercial activity.
- It is limited in time and geography (jurisdiction).
- It is given in exchange for publishing the invention in a clear and understandable way.

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[159] Merriam-Webster. (2020). Patent. Definition of Patent by Merriam-Webster. Retrieved October 20, 2020, from https://www.merriam-webster.com/dictionary/patent

[160] USPTO - Glossary. (2020). Patent definition. Glossary | USPTO. Retrieved October 20, 2020, from https://www.uspto.gov/learning-and-resources/glossary#sec-P

[161] (World Law Dictionary, 2020)

Therefore, a patent may also be understood as a financial and commercial encouragement through temporary monopoly rights given to inventors to publish their inventions. Such publication would, in theory create more technological and economical benefits to society to clearly cover the costs in the extra profits of the temporary monopoly[162] should the inventor use said monopoly rights.

Taking this definition, the following logical question is: What are the technological and economical benefits of a published invention to society? I am going to examine this question in the next chapter.

1.3.2.2. Benefits of Patents

In this chapter, I am going to examine the benefits of patents both from the economic and innovation standpoints, on a national and international level, and highlight the network effects of these benefits as well in each area. Finally, we will look at some criticisms the patent system has been facing nowadays.

According to the World Intellectual Property Organization, the benefits of patents are as follows: "One of the main functions of the patent system is to foster technological innovation by providing an incentive for research and development. The patent system also works to disseminate technical information and promote technology transfer." [163]

Therefore, the main benefits of the patents can be understood through two players: the inventors and the general public, the society.

- The inventors receive an incentive for their research and development efforts.
- As an indirect benefit of the inventor incentive the society may achieve more innovation activity and ultimately more technological progress.
- Through the public dissemination of technical information, the society may achieve better education, thus ultimately more innovation.[164]

[162] (Greenlaw & Taylor, 2017, section 9.2)

[163] (WIPO - Patents, 2020)

[164] Toivanen, O., & Väänänen, L. (2013, July 21). Does education lead to more innovation? VoxEU - Centre for Economic Policy Research. Retrieved October 20, 2020, from https://voxeu.org/article/does-education-lead-more-innovation-0

- Through knowledge transfer other inventors may also improve their own inventions, therefore society may achieve more or better inventions and ultimately more technological progress.[165]

Patents also have several other economical benefits by virtue of their key features like the ability to transfer the monopoly rights, thereby acting as financial instruments[166] and creating a market for inventions.

According to a study conducted at Northwestern University the "key features of the patent system – exclusion, transferability, disclosure, certification, standardization, and divisibility – increase transaction efficiencies and stimulate competition in the market for inventions. These properties of patents reduce transaction costs associated with transferring, licensing, cross-licensing, combining, implementing, and developing inventions. Patents give owners' right to exclude others from making, using, or selling their inventions. Patents help convert inventions into transferable assets so that inventors and adopters can transact more efficiently in the market for inventions. Patents promote disclosure of inventions, which reduces costs of search and bargaining in the market for inventions. Patents provide certification of technologies, which decreases information asymmetry in the market for inventions. Patents provide standardization in IP, which reduces the costs of contracting in the market for inventions. Finally, patents allow greater divisibility of technology, which promotes modularity and increases gains from trade in the market for inventions. Patents thus generate economic benefits that are based on more efficient transactions and greater competition in the market for inventions." [167]

This study emphasizes the financial asset nature of patents through which a market for the use and sale of inventions can take place. It also highlights how the patent system itself makes the inventions more standard, thus making the combined effects of inventions built on other inventions more precise and more efficient. Finally, because patents must be public by their definition, the information about patents makes the whole market of innovations more efficient.

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[165] WIPO - Technology and Knowledge Transfer. (2020). Supporting Technology and Knowledge Transfer. Patents. Retrieved October 20, 2020, from https://www.wipo.int/patents/en/technology/index.html

[166] (Computer & Communications Industry Association, 2020)

[167] Spulber, D. F. (2014, June). How Patents Provide the Foundation of the Market for Inventions. Northwestern University. Retrieved October 20, 2020, from https://www.law.northwestern.edu/research-faculty/clbe/events/roundtable/documents/Spulber_Patents_and_the_Market_for_Inventions.pdf

According to a study by the Australian Law Reform Commission, the patents have the following benefits:

They promote innovation through giving incentives to research.

"Patents promote innovation through the grant of limited monopolies, as a reward to inventors for the time, effort and ingenuity invested in creating new products and processes. The potential for financial returns adds an incentive to the traditional rewards of scientific innovation, such as academic recognition and promotion within research institutions. Without the incentive provided by patents, private investors may be reluctant to invest, resulting in greater calls on government funding or a failure to develop and exploit new technology." [168]

It's an important thought experiment to try and imagine a world without patents, especially since we have been so accustomed to a world full of Intellectual Property and Patents. In such a world, inventors would be incentivized to hide their inventions as much as possible, knowledge would only spread from those institutions that are financed through public investment, since their returns on the research would not be coming from the competitive market. By not only allowing but creating an efficient market for inventions, the private equity holders and the competitive markets are also participating in innovation, which has arguably been one of the most powerful sources of wealth creation in our modern world.[169]

They encourage investment and economic growth.

"Possessing a patent may help a company to grow by capitalizing on the market potential of its inventions. Small companies may use patents to attract financial backing. In addition, patents stimulate the growth of the national industry because local companies that hold patents can attract overseas investment and develop products for export. Profits generated by patent exploitation can be invested in further research and development, which may stimulate commercial and industrial growth. Patents also benefit Australian companies by providing a system for trading knowledge internationally through licence agreements."[170]

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[168] Australian Law Reform Commission. (2010, August 02). Economic benefits of the patent system. Genes And Ingenuity: Gene Patenting And Human Health (ALRC Report 99). Retrieved October 20, 2020, from https://www.alrc.gov.au/publication/genes-and-ingenuity-gene-patenting-and-human-health-alrc-report-99/2-the-patent-system/economic-benefits-of-the-patent-system/

[169] Vadastreanu, A., Bot, A., Farcas, F., & Szabo, I. (2015). Innovation capability - The main factor for wealth creation. Conference Grid, Cloud & High Performance Computing in Science (ROLCG), Cluj-Napoca, 2015, 1-4. 10.1109/ROLCG.2015.7367430

[170] (Australian Law Reform Commission, 2010)

The investment and economic growth benefits are, therefore, stemming from the growth of investment and economic activity both nationally and internationally. It includes

- the encouragement of financing for small companies (since the financial backer would understand the economic potential of the related monopoly rights),
- attracting international investment, especially if the patents are transferred to other countries by utilizing one of the international patent treaties and schemes as we will discuss in the next chapter,
- encouraging the export of the patented goods to take advantage of the monopoly rights, especially if transferred to other countries via the international treaties,
- trading for monopoly rights both nationally and internationally through granting licenses,
- utilizing the profits of all incentives above to drive even more innovation and economic activity.[171]

They encourage resource use and knowledge sharing.

"Patents promote knowledge sharing by requiring the details of the patented invention to be placed in the public domain in return for the exclusive right to exploit the invention. In the absence of this exchange, inventors might protect the details of new inventions through secrecy.

By encouraging knowledge sharing, patents reduce the duplication of research efforts and encourage researchers to build on existing inventions. Researchers may study a patented product and find ways to improve upon it. Access to patented inventions may also facilitate research that would not otherwise be possible. For example, access to a patented research tool may enable vital research into the causes of a genetic disorder and lead to the creation of a genetic test or treatment. This research may not have occurred if the tool had remained secret."[172]

The requirement of publication of the details of the invention in case the patent is granted gives several benefits to research activity in society. A direct benefit is that inventors will not hide their inventions but may even race to publish them, since the first to file and publish will likely

[171] Id..
[172] Id..

get the grants of the monopoly rights.[173] The indirect benefits are coming from other researchers, who by virtue of accessing the patented invention's details in a clear and understandable publication, are able to improve on said inventions or use said inventions to create entirely new inventions. Finally, researchers will be disincentivized from performing parallel research into the same invention once the patent is granted since they can access the public information that the monopoly rights have already been granted.[174] In summary, the patents exploit the network effects of sharing information about inventions to encourage resource use and knowledge sharing.

The study is based on the foundation that innovation itself is a value to the whole of society through the creation of new solutions to existing problems (social needs):

"Innovation benefits the community by creating new and improved goods and services that meet social needs. For example, innovations in medical research may produce new diagnostic tests or treatments, which improve community health." [175]

An Iowa State University study has described the economics of patents and drew several conclusions about what the economic effects of patents were. The main benefits of patents they identified were:

- They provide incentives for innovation.
- They promote the dissemination of knowledge.
- They assist in technology transfer.
- They assist in commercialization of new technology.[176]

They underline the inherent difficulty that inventors face, because their creation falls under the category of public goods.

"Specifically, knowledge is a quintessential public good. Pure public goods have two basic attributes. First, they are non-rival in consumption, meaning that a person's use of a public good does not affect the amount of it that is available for others. Second, they are non-excludable, meaning that it is not possible to prevent individuals from enjoying the public good

[173] Mohan-Ram, V. (2001, October 26). Patent First, Publish Later: How Not to Ruin Your Chances of Winning a Patent. Science Magazine. Retrieved October 20, 2020, from https://www.sciencemag.org/careers/2001/10/patent-first-publish-later-how-not-ruin-your-chances-winning-patent

[174] (Australian Law Reform Commission, 2010)

[175] Id..

[176] Langinier, C., & Moschini, G. (2002). The Economics of Patents: An Overview (CARD Working Papers ed.). Iowa State University. 335 page 1

once it is available. An example of a pure public good is national defense. It is clear that, absent of intellectual property rights, most discoveries and inventions would exhibit public good attributes. The problems that a competitive system has with public goods are readily apparent. An inventor may bear all the cost of an innovation, but everyone benefits (possibly to varying degrees) from a discovery, and thus everyone has an incentive to free ride on the innovative efforts of others. The inherent externalities associated with this class of public goods generate a market failure: a competitive market system may be expected to provide an inefficiently low level of innovations."[177]

Public goods have the well-researched problem of freeloader incentivization. Since everyone has access to them, everyone is enjoying their benefits. But only the creators of these goods bear the costs. Many goods such as public safety provided by police and streetlights, rule of law provided by the court system, national safety provided by the air force, military and navy of a nation are falling in this category. Therefore, typically these goods are being produced by a system outside of market forces such as institutions or organizations created by governments or international organizations.[178] The main economic benefits of the patent system come exactly from this realization that by involving the market economy players in innovation creation through creating a secondary market of monopoly rights, the whole economy benefits far more than they suffer the cost of the monopoly to customers.

This is exactly the reason why recently the whole patent system has come under intense scrutiny. The skeptics of the patent system argue that in some cases the costs of the monopoly rights are greater than the benefits. Critics argue about the misuse of inappropriately understood and granted patents (generic patents)[179], and the limiting factors on competition of the monopoly rights.

"Yet, for many academics, the patent system is a 'failure' (Bessen and Meurer, 2008), in a 'crisis' (Burk and Lemley, 2009), and a 'major wound' that should be abolished (Boldrin and Levin, 2013, p. 18). The press tends to agree: 'abusive and frivolous lawsuits brought by holders of patents are costing the American economy billions of dollars.' Antitrust policy

[177] Id.. page 2

[178] Cowen, T. (2008). Public Goods. The Concise Encyclopedia of Economics. Library of Economics and Liberty. Retrieved October 20, 2020, from https://www.econlib.org/library/Enc/PublicGoods.html

[179] Stallman, R. (2002). Are U.S. Patents Too Broad? Science Magazine, 297(5580), 336. 10.1126/science.297.5580.336a

makers seeking ‘a proper balance between exclusivity and competition’ argue that ‘invalid or overbroad patents disrupt that balance by discouraging follow-on innovation, preventing competition, and raising prices through unnecessary licensing and litigation’ (Federal Trade Commission, 2011, p. 1). The Supreme Court in a series of opinions (Bilski, Prometheus, Myriad) has ruled claims for a wide range of subject matters as patent-ineligible. Commentators have noted the ‘hostility to patents’ by the Executive Branch.”[180]

That said, considering the practical historical evidences whereby nations where the rule of law over Intellectual Property and Patents have been followed and enforced adequately for a long time have enjoyed immense economic growth, especially in the services and industrial sectors,[181] and considering the evidences presented in the articles cited in this chapter, it is very reasonable to assume that the patent system in general provides far more benefits to society than it costs, thus the value of patents realized through increased innovation and economic activity is such that its protection should be a priority of national and international governments, including the European Union.

Now that we have identified the immense value of patents both from the innovation and the economic sides, the important question is to delineate what a patent is and what is not. In order to determine therefore the boundaries of patents, we have to look at the determining factors of a patent in a patent application process.

1.3.2.3. Determining Factors of Patents

In this chapter, I will examine the factors that determine whether an innovation may be classified as a patent, thus a monopoly right may be granted. We have to note that there are differences between the different national laws in this area[182], but the general ideas are the same, thus we are going to focus on these, so as not to get lost in the national differences, but to be able to keep our focus on the general characteristics that make a patent.

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[180] Spulber, D. F. (2014, June). How Patents Provide the Foundation of the Market for Inventions. Northwestern University. Retrieved October 20, 2020, from https://www.law.northwestern.edu/research-faculty/clbe/events/roundtable/documents/Spulber_Patents_and_the_Market_for_Inventions.pdf page 5

[181] Haggard, S., MacIntyre, A., & Tiede, L. (2008, June 06). The Rule of Law and Economic Development. Annual Review of Political Science, 11(1). 10.1146/annurev.polisci.10.081205.100244

[182] Morningside Inc. (2018, September 06). Differences in Patent Eligibility Around the World. Morningside Blog. Retrieved October 20, 2020, from https://www.morningtrans.com/differences-in-patent-eligibility-around-the-world/

According to an Iowa State University study the following factors need to be satisfied to be able to consider an invention as a subject of a patent application and to have a reasonable chance of having the patent approved and the temporary monopoly rights granted:

"To be patentable, an innovation must be novel in the sense of not constituting part of the prior art or more generally of not being already in the public domain. A patentable innovation also must involve an inventive step, meaning that it must be non-obvious to a person with ordinary skills in the particular field of application. The innovation also must be useful to be patentable; that is, it must permit the solution of a problem in at least one application. A major element of a patent application is disclosure: the invention must be described in sufficient detail to enable those skilled in the field to practice it. The patent application also lays out specific claims as to the scope of the patent itself. The traditional statutory scope of patents — encompassing machines, industrial processes, composition of matter, and articles of manufacture — excluded important kinds of scientific discoveries such as laws of nature, natural phenomena, and abstract ideas. But recent developments in the use of patents for computer software, information technology, and biotechnology innovations are challenging a reductive interpretation of such exclusions." [183]

1.3.2.3.1. Requirement of Novelty

Therefore, the innovation must be something *genuinely new*, in other words "novel", a product of the creativity of the human mind. For this definition to be applicable in practice the creators of the patent system had to find a way to determine if something was indeed new. For this they created a logical test to determine if the proposed innovation was already known at the time of the patent application. The innovation can be considered already known if it is,

- part of the public domain of knowledge or
- it is a part of a prior art.[184]

What is the public domain?

According to a Stanford University article by Rich Stim the public domain is the following:

[183] (Langinier & Moschini, 2002, page 1)

[184] Bhatti, A. W. (2017). Topic 3: Legal Requirements for Patentability and typical Parts of a Patent Application. World Intellectual Property Organization. Retrieved October 20, 2020, from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_cnx_17/wipo_ip_cnx_17_3.pdf

> "The term "public domain" refers to creative materials that are not protected by intellectual property laws such as copyright, trademark, or patent laws. The public owns these works, not an individual author or artist. Anyone can use a public domain work without obtaining permission, but no one can ever own it." [185]

This definition is a negative one, since it basically defines that all creative materials that are not considered as legally protected as Intellectual Property are belonging to the public domain. Therefore, it is easier to define the public domain by what is not a public domain creative work. The consequence of a work of human creativity belonging to the public domain is that it can be used by anyone, that's why it is sometimes also called the intellectual commons or information commons.[186]

If the definition of the public domain entails those works that are not protected by Intellectual Property, then we are ought to examine the ways in which works can enter the public domain either by having been protected by Intellectual Property laws previously, or by never being under the protection of Intellectual Property lawyers in the first place. The latter case could have happened since Intellectual Property laws are a relatively recent phenomenon in history, and since the Intellectual Property laws themselves are only giving temporary protection to works of art. Even these protections have varied over time and across national and international borders and jurisdictions.

"There are four common ways that works arrive in the public domain:

- the copyright has expired
- the copyright owner failed to follow copyright renewal rules
- the copyright owner deliberately places it in the public domain, known as "dedication", or
- copyright law does not protect this type of work."[187]

The above definition talks about copyrights, which is - as we have seen in the chapter about Intellectual Property - a distinct area of Intellectual Property, separate from industrial property and therefore distinct from patents. Therefore, only creative works of art can belong to the

[185] Stim, R. (2016, October). Welcome to the Public Domain. Stanford University Libraries. Retrieved October 20, 2020, from https://fairuse.stanford.edu/overview/public-domain/welcome/

[186] Ronan, D. (2006). Rethinking copyright: history, theory, language. Edward Elgar Publishing. ISBN 978-1-84542-282-0 page 103

[187] (Stim, 2016)

public domain; inventions and designs covered by patents cannot. Therefore, the first method of public domain art creation is when a work of art loses its protection by Intellectual Property laws through the expiration of such laws. In the case of copyrights, these expiration times are long, typically ranging from 50 years to 120 years, depending on national laws and regulations, as well as the type of art and the nature of the publication.[188]

There are interesting cases when work is dedicated to the public domain; therefore, the copyright is forfeited. Although not all legal systems allow for the dedication of works to the public domain, especially continental laws of Europe, some alternative solutions emerged, such as licenses granted to the general public. Such licenses include the Creative Commons License that is used extensively throughout the Internet for content intended for the public domain.[189]

Lastly, there are creative works of the human mind that are by their nature public, intended as such, and cannot become protected by Intellectual Property and copyrights, therefore they enter the public domain at the time of their creation. Such works of the human mind include e.g. laws (both national and local) and regulations. In the United States there was a legal case that had to determine this distinction, since local laws were protected by copyright for a while:

"For decades, publishers of model codes-sample laws that a city or state could adopt-have claimed copyright. State and local laws and ordinances based on such codes often contain copyright notices in the publisher's name or some other indication the publisher claims the copyright. In a significant victory for public domain proponents, a federal appellate court found that model codes enter the public domain when they are enacted into law by local governments."[190]

In the legal case Veeck v. Southern Building Code Congress International (SBCCI), Inc., 293 F.3d 791, 5th Cir. 2002, the key determinant that identified whether laws are part of the public domain was that the law becomes a fact once enacted. Since facts and theories cannot be

[188] Dusollier, S. (2010). Scoping Study on Copyright and Related Rights and the Public Domain. World Intellectual Property Organization. Retrieved October 20, 2020, from https://www.wipo.int/edocs/mdocs/mdocs/en/cdip_4/cdip_4_3_rev_study_inf_1.pdf

[189] Vollmer, T. (2013, December 27). Creative Commons 4.0 BY and BY-SA licenses approved conformant with the Open Definition. creativecommons.org. Retrieved October 20, 2020, from https://blog.creativecommons.org/2013/12/27/creative-commons-4-0-by-and-by-sa-licenses-approved-conformant-with-the-open-definition/

[190] (Stim, 2016)

protected by copyright, laws cannot be protected after their enactment either. As SBCCI sued Veeck for copyright infringement. Veeck lost in the trial court, but ultimately won on appeal.[191]
"The court held that:

- The law is always in the public domain, whether it consists of government statutes, ordinances, regulations, or judicial decisions.
- When a model code is enacted into law, it becomes a fact—the law of a particular local government. Indeed, the particular wording of a law is itself a fact, and that wording cannot be expressed in any other way. A fact itself is not copyrightable, nor is the way that the fact is expressed if there is only one way to express it. Since the legal code of a local government cannot be expressed in any way but as it is actually written, the fact and expression merge, and the law is uncopyrightable."[192]

"A fact or a theory - for example, the fact that a comet will pass by the Earth in 2027 - is not protected by copyright. If a scientist discovered this fact, anyone would be free to use it without asking for permission from the scientist. Similarly, if someone creates a theory that the comet can be destroyed by a nuclear device, anyone could use that theory to create a book or movie. However, the unique manner in which a fact is expressed may be protected. Therefore, if a filmmaker created a movie about destroying a comet with a nuclear device, the specific way he presented the ideas in the movie would be protected by copyright." [193]
According to the example above, only expressions of facts may be protected by copyrights. One can argue whether laws are facts or expressions of facts, but as far as the legal framework is concerned, an enacted law can and should be considered a fact.
What is a part of a prior art?
According to the European Patent Office, prior art can be anything that showed that the idea had been expressed before:

> "Prior art is any evidence that your invention is already known. The prior art does not need to exist physically or be commercially available. It is enough that someone, somewhere, sometime previously has described or shown or made something that contains a use of technology that is very similar to your invention. A prehistoric cave painting can be prior

[191] Id..
[192] Id..
[193] Id..

art. A piece of technology that is centuries old can be prior art. A previously described idea that cannot possibly work can be prior art. Anything can be prior art." [194]

The above description gives a very broad understanding of what is prior art. Any expression of the idea in question that is submitted in a patent application that can be proven to have happened before the application itself can reasonably disprove the novelty of the invention. This expression of the idea may not even be a patent. Therefore, for any company or individual wishing to patent an invention, it is not enough to search for previous patents; they must do extensive research into any kind of literary or verbal expression of the idea in previous sources. Many inventors make the mistake of searching for previous products, especially in patent databases and when they do not find an equivalent one, they invest heavily in their research, only to find at the end their patents rejected because the idea has been expressed before. The above reasoning can also be applied to historical inventions, since they have been clearly expressed before, therefore cannot be patented, even though they do not appear in any patent databases.[195]

1.3.2.3.2. Requirement of an Inventive Step

In order to be considered for a patent application, the invention must involve an inventive step as well, which is non-obvious to a person skilled in the art. According to the New Zealand Intellectual Property Office; therefore, an inventive step is as follows:

"An invention, so far as claimed in a claim, involves an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the prior art base.

1. The Patents Act 2013 requires that a claim for an invention involves an inventive step. A claim involves an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the prior art base.
2. An overview of inventive step was provided by Lord Hoffmann in Biogen Inc v Medeva plc [1997] RPC 1 at 34:

[194] European Patent Office. (2015, September 15). What is prior art? European Patent Office - What is prior art? Retrieved October 20, 2020, from https://www.epo.org/learning/materials/inventors-handbook/novelty/prior-art.html#:~:text=Prior%20art%20is%20any%20evidence,very%20similar%20to%20your%20invention.
[195] (Bhatti, 2017)

'Whenever anything inventive is done for the first time it is the result of the addition of a new idea to the existing stock of knowledge. Sometimes, it is the idea of using established techniques to do something which no one had previously thought of doing. In that case the inventive idea will be doing the new thing. Sometimes it is finding a way of doing something which people had wanted to do but could not think of the inventive idea would be the way of achieving the goal. In yet other cases, many people may have a general idea of how they might achieve a goal but not know how to solve a problem which stands in their way. If someone devises a way of solving the problem, his inventive step will be that solution, but not the goal itself or the general method of achieving it.'

3. Whether or not a claimed invention is inventive requires investigation using an objective test which can be applied to any claim. The test needs to use a specific method that is standardized and structured, rather than impressionistic and general, so that a consistent approach can be taken from case to case. The test is to be decided not on general legal principles (though these inform the approach taken) but on the technical facts of the claim at issue." [196]

The above definition shows that the judgment of the inventive step is one of, if not the hardest problems in evaluating a patent application. Since the inventive step involves something essentially new, which at the time of the patent application is already known and clearly expressed in the patent application a casual or intuitive assessment of whether it was indeed non-obvious inevitably will involve the benefit of hindsight. Therefore, whether the inventive step was about finding a new way to achieve a previously established goal, or finding a new way to get some obstacles out of the way for such a goal, or indeed finding a completely new goal and achieving it, the investigation has to be very systematic and has to find some methodology to avoid the pitfalls and biases of after-the-fact human thinking.[197]

The World Intellectual Property Organization suggests the following 4-step approach called a Pozzoli test. The 4-step approach is based on several court decisions, including:

[196] New Zealand Intellectual Property Office. (2020). Section 7: Meaning of inventive step. The Patent Examination Manual. Retrieved October 20, 2020, from https://www.iponz.govt.nz/about-ip/patents/examination-manual/current/meaning-of-inventive-step/

[197] Quinlan, Z. (2014). Hindsight Bias in Patent Law: Comparing the USPTO and the EPO. Fordham International Law Journal, 37(6), 1788-1819. Retrieved October 20, 2020, from https://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2360&context=ilj

- Pozzoli Spa vs. BDMO SA & Anor [2007] EWCA Civ 588
- Windsurfing International Inc. vs. Tabur Marine (Great Britain) Ltd, [1985] RPC 59

The 4-step approach:

> "Step 1: Identify the person skilled in the art and their relevant common general knowledge (CGK)
>
> Step 2: Identify the inventive concept of the claim in question or if that cannot readily be done, construe it
>
> Step 3: Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept
>
> Step 4: Viewed without any knowledge of the alleged invention claimed, do those differences constitute steps which would have been obvious to the person skilled in the art?"[198]

The above framework is an adequate mental tool to assess the inventiveness of an idea since it represents the mindset of the person skilled in the art at the time of the invention. However, according to a Study on Inventive Step by the World Intellectual Property Organization, there are many competing definitions and practices in the national laws about the inventive step:

"National/regional laws

- Having regard to the relevant prior art, the invention is not obvious to a person skilled in the art. (majority)
- The person skilled in the art would not have been able to easily make the invention based on the relevant prior art. (JP, KR)
- The invention constitutes an inventive progress and cannot be easily created by a person skilled in the art. (VN)
- Compared with prior art, the invention has prominent substantive features and represents a notable progress. (CN)
- The invention differs essentially from the state of the art. (Nordic countries)
- A feature of an invention that involves technical advance as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person skilled in the art. (IN)" [199]

[198] Scott, V. (2008). Inventive step. World Intellectual Property Organization. Retrieved October 20, 2020, from https://www.wipo.int/edocs/mdocs/scp/en/scp_23/scp_23_inventive_step_uk.pdf

Most of the national patent offices follow an approach that shows examples, and the patent officers make their judgement following the approach taken by those examples[200] (as we have seen above in the case of the Pozzoli test).

"National/regional guidelines provide:

(i) non-exhaustive exemplary reasoning, rationales, and indicators that may be applied to specific cases;

(ii) technical examples.

Lack of inventive step

- Simple substitution of a known element from another to obtain predictable results or interchange of material with another known material having analogue effect.
- Use of known technique or workshop modification to improve similar products, processes or devices in the same, predictable way.
- Simple and direct extrapolation of known facts, such as change of size, form or proportion, without any unexpected effect.
- Selection from a number of alternative possibilities without any unexpected effect.

In general, technical advantages of the claimed invention over the prior art are also taken into account.

Indicators that may be taken into account for the positive assessment of inventive step (case-by-case analysis)

- The claimed invention solved a long-felt need.
- Particular difficulties in solving the problem.
- Particular commercial success. Some guidelines clarify that commercial success must derive from the technical features of the claimed invention.
- The prior art taught away a PSIA from the claimed invention.
- The claimed invention produced unexpected technical effects or results.
- The claimed invention offers a surprisingly simple solution." [201]

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[199] World Intellectual Property Organization - Standing Committee on the Law of Patents SCP. (2015, July 31). Study on Inventive Step - Twenty-second session (July 27 to 31, 2015) - Presentation by the Secretariat. Study on Inventive Step. Retrieved October 20, 2020, from https://www.wipo.int/edocs/mdocs/scp/en/scp_22/scp_22_presentation_inventive_step.pdf

[200] European Patent Office Guidelines. (2019, October 24). Guidelines for Examination. Retrieved October 20, 2020, from https://www.epo.org/law-practice/legal-texts/guidelines.html.

Therefore, the exemplary reasoning works from both sides and assists the patent officers incorrectly judging the innovation by describing typical characteristics of,

- A lack of an inventive step such as predictable results by simple substitution, predictable combination or modifications, and direct extrapolation.
- An inventive step solving a long-identified need, technical difficulties, commercial success stemming from the technology etc.

The different approaches and definitions by which a theoretical "person skilled in the art" can find obvious solutions through their inventive capacity are also very noteworthy.

> "A PSIA is a person of ordinary creativity, not an automaton. (United States)
>
> A PSIA is not a dullard and has a certain modicum of creativity. (IN)
>
> The PSIA is capable of exercising the usual faculty of logic and rational reasons based on his knowledge. The PSIA has the ordinary creativity in selecting appropriate materials, optimizing a numerical range of the inventions, and replacing the inventions with equivalents (KR) or in selecting materials and changing designs (JP).
>
> The PSIA does not exercise inventive imagination. The PSIA does not possess intuition or the skills of deduction. (CH)
>
> The PSIA does not question the established views regarding the relevant technology. (SE)"[202]

The above identifiers, characteristics all try to highlight the imagined persona of the person skilled in the art, their capabilities, and approaches to problem-solving. Ultimately it is usually enough to take these assumptions, cases, and examples as well as try to imagine this persona making a decision to achieve an appropriate judgement on the inventive step. This is a difficult problem because invention by its nature is not classifiable into something known; only by observing it after the fact can we deduce some conclusions about it. Therefore, to make it operationally feasible and objective to the extent that it is possible, national legislators and patent offices have issued guidelines and manuals to help the patent officers decide on this

[201] (World Intellectual Property Organization - Standing Committee on the Law of Patents (SCP), 2015)
[202] Id..

crucial step of the investigation. The World Intellectual Property Organization publishes all such national guidelines and manuals on its website.[203]

1.3.2.3.3. Requirement of Utility

As a general requirement, utility/usefulness seems very hard to define since usefulness is a subjective property. What is useful for one person in one situation may not be useful to another person in another situation, so in order to determine what is useful from the patentability standpoint, we have to have very clear guidelines on what usefulness scenarios are considered.[204]

"The utility requirement often has been interpreted to mean that an invention must have a real use that can be demonstrated. It cannot be something that merely has a speculative use or a possible future use. This means that someone applying for a patent needs to conduct enough research and testing to show that the invention has some immediate usefulness. They will need to describe how the invention is useful in their patent application. Otherwise, the USPTO probably will deny the application.

However, a product does not need to be perfect to meet the utility requirement. If it helps achieve a certain goal, it can receive patent protection, even if it does not completely achieve that goal on its own. A stain remover does not need to remove every stain, as long as it reduces the stains overall. The product needs to work in the way that it is described and presumably cause some minor social benefit. As long as it makes life slightly easier or more efficient for some people, this is enough."[205]

As the Justia article describes, from the utility requirement standpoint, the legislator is usually very permissible since it is enough to prove a slight improvement in the lives of a small group of people for the innovation to be considered useful.

As far as the clear rules are concerned, according to which a patent officer may judge this usefulness of a slight improvement, the United States Patent and Trademark Office published

[203] World Intellectual Property Organization. (2020). Guidelines and Manuals of National/Regional Patent Offices. About IP - Patents. Retrieved October 20, 2020, from https://www.wipo.int/patents/en/guidelines.html

[204] Risch, M. (2010). Reinventing Usefulness. BYU Law Review, 2010(4), 1196-1254. Retrieved October 20, 2020, from https://digitalcommons.law.byu.edu/lawreview/vol2010/iss4/3/

[205] Justia.com. (2019, June). Usefulness Requirement for U.S. Patents. Justia.com. Retrieved October 20, 2020, from https://www.justia.com/intellectual-property/patents/patentability-requirements/usefulness/

their internal guidelines for examining patents. According to this guideline, two requirements need to be met at the same time:

"If at any time during the examination, it becomes readily apparent that the claimed invention has a well-established utility, do not impose a rejection based on lack of utility. An invention has a well-established utility if (i) a person of ordinary skill in the art would immediately appreciate why the invention is useful based on the characteristics of the invention (e.g., properties or applications of a product or process), and (ii) the utility is specific, substantial, and credible." [206]

The person of ordinary skill in the art, the same imagined persona that was used in the considerations of the inventive step, appears in consideration of the usefulness as well. This requirement ensures that specific and special excellence is not required to judge correctly whether the invention is useful. Even if it is a slight improvement in a small group of people's lives, the utility has to be a specific improvement in some clear and credible use cases of such a group of people.[207]

The guidelines also describe how a patent officer may determine whether the utility of the innovation under consideration is specific:

"A 'specific utility' is specific to the subject matter claimed and can 'provide a well-defined and particular benefit to the public'. In re Fisher, 421 F.3d 1365, 1371, 76 USPQ2d 1225, 1230 (Fed. Cir. 2005). This contrasts with a general utility that would be applicable to the broad class of the invention. Office personnel should distinguish between situations where an applicant has disclosed a specific use for or application of the invention and situations where the applicant merely indicates that the invention may prove useful without identifying with specificity why it is considered useful. For example, indicating that a compound may be useful in treating unspecified disorders, or that the compound has 'useful biological' properties, would not be sufficient to define a specific utility for the compound." [208]

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[206] United States Patent and Trademark Office. (2020). Section 2107 Guidelines for Examination of Applications for Compliance with the Utility Requirement. In Manual of Patent Examining Procedure (June 2020 ed.). United States Patent and Trademark Office. Retrieved October 20, 2020, from https://www.uspto.gov/web/offices/pac/mpep/s2107.html

[207] Id..

[208] Id..

Therefore, the requirement of a specific benefit may be established only if the said benefit can be applied to the specific invention and is not generalized. If the benefit is claimed to cover this invention only because a class or type of invention has shown usefulness in the past, then the patent may be rejected.[209]

The United States Patent and Trademark Office has also defined their guidelines for the consideration of the substantiality of the benefits:

> "[A]n application must show that an invention is useful to the public as disclosed in its current form, not that it may prove useful at some future date after further research. Simply put, to satisfy the 'substantial' utility requirement, an asserted use must show that the claimed invention has a significant and presently available benefit to the public: Fisher, 421 F.3d at 1371, 76 USPQ2d at 1230.
>
> Thus a "substantial utility" defines a "real world" use. Utilities that require or constitute carrying out further research to identify or reasonably confirm a "real world" context of use are not substantial utilities." [210]

Therefore, substantiality of the utility means that the research has been done to such an extent to prove at least one use-case where it will provide benefits. Suspected or theorized utility is not acceptable for the innovation to be patentable; therefore, basic research is usually excluded from the category of patentable inventions. According to recent studies, this does not mean however, that basic research does not contribute to patentable inventions, quite on the contrary.[211]

Most companies or individuals applying for patents do not have significant issues with the utility requirement. Their research is such that by following their self-interest, they want to establish whether their research has practical implications and real-world use-cases so that they can determine the earning potential of said inventions should they decide to commercialize

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[209] Id..

[210] Id..

[211] Jones, B. F., & Ahmadpoor, M. (2017, August 10). Tracing the links between basic research and real-world applications. The Conversation. Retrieved October 20, 2020, from https://theconversation.com/tracing-the-links-between-basic-research-and-real-world-applications-82198

them. The applications that do fail do so because they either do not present the patent office with enough information, or their utility is not credible.[212]

1.3.2.3.4. Requirement of Disclosure

As we have seen in the chapter about the Definition of Patents, the temporary monopoly rights of a patent are granted specifically in exchange for the publication of the invention when the patent is granted. This requirement is supposed to create those network effects described above in the Benefits of Patents chapter through the dissemination of knowledge.[213]

In order to decide whether the invention is patentable, the invention details must be clear and understandable enough to be put into practice by a person skilled in the art. We have reviewed the assumed mental capabilities and thought procedures of a person skilled in the art in the previous chapters.[214]

However, in recent years, the requirement of disclosure has raised some controversies, particularly in the field of biological research, especially as related to the Convention on Biological Diversity. The term often used for a controversial practice is called biopiracy.

"Often, in the search for new bioresources, researchers draw on local people's traditional knowledge about the properties of a particular plant, animal, or chemical compound. When researchers use traditional knowledge without permission or exploit the cultures they are drawing from – it's called biopiracy. Biopiracy happens when researchers or research organizations take biological resources without official sanction, largely from less affluent countries or marginalized people. Biopiracy is not limited to drug development. It also occurs in agricultural and industrial contexts. Indian products such as the neem tree, tamarind, turmeric, and Darjeeling tea have all been patented by foreign firms for different lucrative purposes." [215]

In order to prevent such patent applications where the novelty of the invention is clearly violated, but where the Patent Office may not be able to properly assess the novelty because of

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[212] Quinn, G. (2017, June 3). Patentability Overview: When can an Invention be Patented? IP Watchdog. Retrieved October 20, 2020, from https://www.ipwatchdog.com/2017/06/03/patentability-invention-patented/id=84071/

[213] (WIPO - Patents, 2020)

[214] (World Intellectual Property Organization - Standing Committee on the Law of Patents (SCP), 2015)

[215] Rose, J. (2016, March 8). Biopiracy: when indigenous knowledge is patented for profit. The Conversation Trust (UK) Limited. Retrieved October 20, 2020, from https://theconversation.com/biopiracy-when-indigenous-knowledge-is-patented-for-profit-55589

a lack of publicized information available in their language or culture, there have been numerous studies and discussions on the proposed mandatory disclosure to the Patent Office of the origin of genetic resources or traditional knowledge used in the invention.[216]

A technical study by the World Intellectual Property Organization has concluded the following: "Three broad functions have been considered for disclosure methods relating to GR/TK:

- to disclose any GR/TK actually used in the course of developing the invention (a descriptive or transparency function, pertaining to the GR/TK itself and its relationship with the invention);
- to disclose the actual source of the GR/TK (a disclosure of origin function, relating to where the GR/TK was obtained) – this may concern the country of origin (to clarify under which jurisdiction the source material was obtained), or a more specific location (for instance, to ensure that genetic resources can be accessed, so as to ensure the invention can be duplicated or reproduced);
- and, to provide an undertaking or evidence of prior informed consent (a compliance function, relating to the legitimacy of the acts of access to GR/TK source material) – this may entail showing that GR/TK used in the invention was obtained and used in compliance with applicable laws in the country of origin or in compliance with the terms of any specific agreement recording prior informed consent, or showing that the act of applying for a patent was in itself undertaken in accordance with prior informed consent.

Such mechanisms may be positively consistent with WIPO treaties, in that they are positive obligations (for instance, Article 4 of the Paris Convention provides that the "inventor shall have the right to be mentioned as such in the patent," PCT Article 5 requires that the description in an international patent application "shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art"), or they may be implicitly consistent, in the sense that they do not conflict with treaty requirements." [217]

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[216] Sarnoff, J., & Correa, C. (2006). Analysis of Options for Implementing Disclosure of Origin Requirements in Intellectual Property Applications (2005th ed., Vol. 14). United Nations Conference on Trade and Development. Retrieved October 20, 2020, from https://unctad.org/system/files/official-document/ditcted200514_en.pdf

[217] World Intellectual Property Organization. (2004, February 9). Technical Study on Disclosure Requirements in Patent Systems Related to Genetic Resources and Traditional Knowledge. Studies dealing with intellectual

According to this report, there would be several ways congruent with the current Intellectual Property international treaties of preventing biopiracy, but none have been implemented on an international scale so far.

Therefore, scientists have adopted preventative measures to prevent such controversial practices from taking advantage of flaws due to imperfect information in patent systems. "Biopiracy is not likely to disappear any time soon. As climate change threatens, many large agribusinesses and researchers are patenting drought-resistant, heat-resistant, and salt-resistant genes from plants for future use in crop species. To counter this, many researchers are attempting to collect genes and publish them in scientific domains (such as the NIH's online GenBank or various seed banks). By sharing genetic sequences, scientists can prevent big firms from claiming uniqueness and novelty, two criteria for patents. While patents were first used to protect inventions and stimulate innovation, many anti-biopiracy activists and some academic and scientific circles are pushing for changes in the system, as it is now thought to hinder research in many important areas. For now, the issue of biopiracy remains at a stalemate."[218]

1.3.2.3.5. Exclusion of Abstract Ideas and Natural Phenomena

Abstract ideas (in the definition of the United States Law) such as scientific theories about how certain natural phenomena, and the natural phenomena itself (e.g., the laws of physics) are not considered patentable in most national legal frameworks. This is due to the patent system's intention of encouraging directly useful information that would be applicable for some specific scope and use case of an invention. Basic research and scientific theories are more generic in nature; allowing patentability for them would endanger the patent system's objectives themselves.[219]

In the UK legal system, a discovery, a scientific theory of a mathematical method are all excluded from the innovations that are considered patentable:

"Abstract and purely intellectual ideas are excluded from patentability. A discovery may be new and maybe very significant scientifically and industrially, but you cannot prevent others from taking advantage of that discovery per se.

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property and genetic resources, traditional knowledge and traditional cultural expressions/folklore. Retrieved October 20, 2020, from https://www.wipo.int/edocs/pubdocs/en/tk/786/wipo_pub_786.pdf

[218] (Rose, 2016)

[219] (United States Patent and Trademark Office, 2020)

That said, discoveries, theories, and methods often lead to practical inventions, and those inventions are patentable. Some examples are given below.

- The discovery that a particular known material is heat-resistant is not patentable, but a fireproof safe incorporating the material would potentially be an invention.
- A material which has always existed (undiscovered) in nature is not patentable, but a process to isolate or extract this material may be an invention. The isolated / purified material itself is also potentially patentable.
- A theory as to how and why a known process works in the way it does is not patentable. However, a better understanding of the mechanism behind the process may lead to improvements being made. Those improvements would be patentable subject-matter.
- A mathematical method involving particular operations on a set of numbers to reach another set of numbers is not patentable. However, an image enhancement system which operates on a digital image to produce an enhanced image is patentable subject-matter, even though a digital image is of course a set of numbers." [220]

The examples above provide some clear distinctions and show how a general idea and a specific, significant invention are different. In most cases, patent officers can handily differentiate between the two.

Defining, however clearly, what is and what is not an abstract idea has created serious controversies, especially in the field of software-related innovations.[221] At the time of the creation of the patent system, inventions could clearly be understood as some machine or industrial process that would improve the lives of some individuals or companies. However, with the invention of the computer and the increase of software code in today's systems, this definition no longer seems applicable. Nowadays, most economic sectors are using software to leverage innovation at an increased speed and decrease cost, compared to hardware-based innovation. Yet, the patentability of such inventions implemented in software has been a very ambiguous area in patent law. Most national legal systems are excluding software-related

[220] Albright IP. (2020). Excluded Subject Matter. Albright IP - Patents. Retrieved October 20, 2020, from https://www.albright-ip.co.uk/patents/excluded-subject-matter/

[221] Jedrusik, A., & Wadsworth, P. (2017, February). Patent protection for software-implemented inventions. WIPO Magazine. Retrieved October 20, 2020, from https://www.wipo.int/wipo_magazine/en/2017/01/article_0002.html

inventions from patent protection, either explicitly or under the umbrella of abstract ideas such as mathematical methods.[222]

In the UK legal system, computer programs are explicitly named in the list of exclusions from patent protection, albeit with limitations:

"SCHEMES, RULES OR METHODS FOR PERFORMING A MENTAL ACT, PLAYING A GAME OR DOING BUSINESS, AND PROGRAMS FOR A COMPUTER

This exclusion, and in particular "programs for a computer", is probably the most controversial, most contested, and most confusingly unclear of all the categories of the excluded subject matter.

Like the firework and the musical instrument examples, which are technical means to an aesthetic end, a technical invention which results in improved business efficiency will not be excluded as a business method. For example, an improved voice recognition system which speeds up transcription of dictated letters is not necessarily excluded. However, a business method characterized only using a computer program in carrying out the method will not be allowed due to the combination of excluded categories.

A computer program may be patentable if the program provides a "further technical effect." For example, an invention involving computer software and enabling detection of the proper functioning of an anti-lock braking system was granted a patent. An application, however, for a computer program implementing a fixed-odds betting system, was refused.

The law on patentability of software is still developing, and it is difficult to give general advice."[223]

According to an article published in the WIPO Magazine, the software industry and software-based innovations are growing rapidly and already represent more than twenty-two percent of the global economy, and this number will only increase.

"Today, many technological innovations rely on software advances. Take the software-related innovations that have revolutionized the smartphone. Between 2009 and 2013, the total aggregate lines of code in the chips – the brains of the smartphone – shipped by Qualcomm

[222] Strowel, A., & Utku, S. (2016). The trends and current practices in the area of patentability of computer implemented inventions within the EU and the U.S. European Commission DG Communications Networks, Content & Technology. Retrieved October 20, 2020, from https://ec.europa.eu/newsroom/document.cfm?doc_id=41192

[223] (Albright IP, 2020)

increased from 330 million to 3.3 billion. These phenomenal and unprecedented developments were the result of years of high-risk R&D investment. Software-implemented functionality is making an expanding range of everyday products safer and more efficient with higher performance. It is creating entirely new offerings and capabilities, such as intelligent power grids, digital manufacturing, real-time farm management systems, smart cities powered by interconnected (Internet of Things) platforms, and digital healthcare. Estimates suggest that the digital economy – which relies heavily on software-related innovations – already represents 22.5 percent of the global economy. Global R&D spending on software offerings has also grown rapidly, rising from USD 86 billion in 2010 to USD 142 billion in 2015, an increase of 65 percent. The United States has one of the most software-intensive industries in the world (see Robert J. Shapiro, The U.S. Software Industry: An Engine for Growth and Employment, SIIA, 2014). In 2014 alone, the industry directly added an estimated USD 475.3 billion – and USD 1.07 trillion indirectly – to the country's GDP, directly employing 2.5 million people and indirectly supporting some 9.8 million jobs." [224]

Both the cited number of jobs and the GDP numbers, especially in the United States, show that if the patent system is to stay relevant in today's economy, it has to consider the software's innovation potential. This would be in line with the vision of the legislator originally creating the patent system to incentivize those inventors that come up with a novel idea and improve the economy and scientific progress in the country.[225] This is clearly the case in most software-based innovations as well in more and more industries.

In the United States, after years of ambiguity where courts have not defined the meaning of abstract ideas on purpose, the United States Patent and Trademark Office finally gave a definitive list of abstract ideas, thereby clearing some of the confusion about the eligibility of computer programs: "First, in accordance with judicial precedent and in an effort to improve certainty and reliability, the revised guidance extracts and synthesizes key concepts identified by the courts as abstract ideas to explain that the abstract idea exception includes certain groupings of subject matter: mathematical concepts, certain methods of organizing human activity, and mental processes. Claims that do not fall within one of these enumerated groupings cannot be characterized as reciting an abstract idea unless approved by the

[224] (Jedrusik & Wadsworth, 2017)
[225] (WIPO - Patents, 2020)

Technology Center Director, with approval indicated on the record in the file, and with a provided 'justification for why such claim limitation is being treated as reciting an abstract idea.' In essence, by narrowly identifying certain subject matter groups as being those that properly qualify for characterization as abstract ideas, the USPTO is effectively defining what is and what is not an abstract idea, thereby filling a void intentionally left ambiguous by both the Supreme Court and the Federal Circuit." [226]

This definitive list is surely a step towards more inclusive protection of software-implemented innovation using patents, the case laws and precedents including those from the United States Supreme Court are still making this area ambiguous for inventors.

Moreover, there are significant differences in the national legislative frameworks as well as the practical application of those frameworks by the national patent offices throughout the world. While the European Patent Convention (EPC) (Articles 2 (c) and Article 3) defines computer programs as such being excluded from patentability[227], and while we have seen the current ambiguity in the U.S. patent eligibility boundary guidelines, Japan has decided to follow a different approach: "Japan's Patent Act (Article 2(3)(i)), on the other hand, explicitly refers to computer programs as patentable subject matter. The Act states that the claimed subject matter must be recognized as a 'creation of technical ideas utilizing the law of nature' to qualify as a patentable invention. In general, according to the Examination Guidelines of the Japan Patent Office, to be patent-eligible, a claim for a software-related invention must demonstrate that software and hardware resources work cooperatively." [228]

As we have seen in this chapter, while the boundaries of patentable inventions are different in different jurisdictions and change over time as well, the fundamental goals of the patent system have remained the same. As economies change and more innovation is created in fields that are different from the traditional statutory definitions of machines and industrial processes, the definitions of patentable inventions will also need to adapt to stay relevant and keep granting

[226] Quinn, G. (2019, January 4). Revised Patent Eligibility Guidance Effectively Defines What is an Abstract Idea. IP Watchdog. Retrieved October 20, 2020, from https://www.ipwatchdog.com/2019/01/04/patent-eligibility-guidance-abstract-idea/id=104754/

[227] European Patent Office. (2007, January 3). European Patent Convention (EPC 1973). European Patent Office Legal Texts. Retrieved October 20, 2020, from https://www.epo.org/law-practice/legal-texts/html/epc/1973/e/apre.html

[228] (Jedrusik & Wadsworth, 2017)

competitive advantages to the economic and scientific progress of their respective nations.[229] However, this fluidity only underlines our previous points about the value of innovation that patents embody and that such values should be protected.

1.3.2.4. Weaknesses of Patents - Patent Trolls

"A patent troll is an individual or an organization that purchases and holds patents for unscrupulous purposes, such as stifling competition or launching patent infringement suits."[230]
In legal terms, a patent troll is a type of non-practicing entity: someone who holds a patent but is not involved in the design or manufacture of any product or process associated with that patent. Non-practicing entities include legitimate institutions such as startups, technology transfer agencies, universities, and research organizations. To differentiate patent trolls from legitimate non-practicing entities, they are sometimes referred to as patent-assertion companies: organizations that exist solely to obtain patents and profit from patent infringement claims. [231]
Due to the expensive patent litigation fee and the long period of court procedures, many companies who receive threats or infringement letters settle with the licensing fee regardless of whether they accept the patent is not genuine, or there was no infringement. It is often quicker and simpler for an organization to settle.[232]
"Simply looking at the aggregate economic impact of patent troll demand letters, however, misses their fundamental emotional impact – the intense popular rage that they generate. To understand that, put yourself in the place of a small business owner who is victimized by a patent troll." [233]

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[229] (Vadastreanu et al., 2015)
[230] Rouse, M. (2013). What is a patent troll? WhatIs.com. Retrieved October 20, 2020, from https://whatis.techtarget.com/definition/patent-troll
[231] Id..
[232] Wild, J. (2018, February 16). Why plaintiffs in US patent cases who understand the odds of victory are almost always best off settling. Lexology. Retrieved October 20, 2020, from https://www.lexology.com/library/detail.aspx?g=83faed64-c9ca-47ba-83a2-d80f9ea36c23
[233] Burt, S. (2015, February). It's Time to Stand Up to Patent Trolls! Wipo Magazine, (1//2015). Retrieved October 20, 2020, from https://www.wipo.int/wipo_magazine/en/2015/01/article_0002.html

As the foregoing suggests, defining a troll is very difficult. Some would even claim that Thomas Edison, one of the most prolific inventors in the United States, was an early troll, seeking licenses for patents that he did not plan to manufacture.[234]

The monetization of patents in the marketplace can spur innovation and drive economic growth and job creation. Many inventors just like to invent. Some have no interest in manufacturing anything but would prefer to go back to the lab and hunt for the next breakthrough. In trolls, inventors and others in the secondary market have a purchaser willing to pay for valuable patents: an entity that will help them reap the benefits of their efforts. It is widely recognized that patents are property and, like any other property, can be freely bought and sold, as long as there are no antitrust issues.[235]

1.3.3. Patent Protection Laws and Practices Worldwide

In this chapter, I will examine the history of Patent Law, and look at some prominent examples of the laws and treaties of this legal field in practice: the United States Patent Law, and the most important international treaties governing patent law. The understanding of the foundations of Patent Law, and the commonalities and differences between national and international patent laws and treaties is important to be able to better identify the effects and significance of patents in today's globalized economy and the detrimental effects of cases when the patents remain unutilized.

The first statutory patent system of the world developed in the city of Venice, Italy, at that time a maritime empire with important manufacturing industries such as glass making. Most of the patents in the city were granted in this field. By the 15th century, the Venetians realized that by establishing a system of innovation where new inventive devices are clearly described to the Republic of Venice's officials and granting temporary legal protection against any infringement for a period of 10 years, they could significantly increase the incentives of such inventors. As Venetians settled in other areas of Europe throughout their vast commercial interest sphere,

[234] Nothhaft, H. R., & Kline, D. (2010, June 1). Was Thomas Edison a Patent Troll? IP Watchdog. Retrieved October 20, 2020, from https://www.ipwatchdog.com/2010/06/01/was-thomas-edison-a-patent-troll/id=10829/

[235] Stoll, R. L. (2014, April). Patent Trolls: Friend or Foe? Wipo Magazine, 2(2014). Retrieved October 20, 2020, from www.wipo.int/wipo_magazine/en/2014/02/article_0007

they were seeking the same patent protection. This encouraged the development of patent systems in other European countries as well. [236]

The law that instituted the Venetian patent system is the Venetian Patent Statute of March 19, 1474, the world's oldest patent system: "[T]here are in this city, and also there come temporarily by reason of its greatness and goodness, men from different places and most clever minds, capable of devising and inventing all manner of ingenious contrivances. And should it be provided, that the works and contrivances invented by them, others have seen them could not make them and take their honor, men of such kind would exert their minds, invent and make things which would be of no small utility and benefit to our State. Therefore, decision will be passed that, by authority of this Council, each person who will make in this city any new ingenious contrivance, not made heretofore in our dominion, as soon as it is reduced to perfection, so that it can be used and exercised, shall give notice of the same to the office of our Provisioners of Common. It being forbidden to any other in any territory and place of ours to make any other contrivance in the form and resemblance thereof, without the consent and license of the author up to ten years. And, however, should anybody make it, the aforesaid author and inventor will have the liberty to cite him before any office of this city, by which office the aforesaid who shall infringe be forced to pay him the sum of one hundred ducates and the contrivance immediately destroyed. Being then in liberty of our Government at his will to take and use in his need any of the said contrivances and instruments, with this condition, however, that no others than the authors shall exercise them."[237]

"This patent system already had the important characteristics of today's national and international patent systems:

- It granted temporary protection against infringements, thereby endowing the inventor with monopoly rights for a period of 10 years.
- The protection was offered to inventions that passed an examination by the General Welfare Board.

[236] Frumkin, M. (1945, March). The Origin of Patents. Journal of the Patent Office Society, Vol. XXVII(No. 3), 143. page 143

[237] Mgbeoji, I. (2003). The Juridical Origins of the International Patent System: Towards a Historiography of the Role of Patents in Industrialization. In Journal of the History of International Law 5 (pp. 403-422). Koninklijke Brill NV. Retrieved October 20, 2020, from https://cyberleninka.org/article/n/346370 page 413

- The city established a registry of patents. Between the years of 1490 and 1550, over 120 patents were granted mostly in the fields of "water mills, pumps, dredging machines, and similar mechanical devices." [238]

The English patent system, from which many other common law patent systems originate, evolved differently, from the wide-scale grant of monopoly charters (letters patent) narrowing down to the fields of innovations. It became the first modern patent system that eventually established the concept of Intellectual Property. This helped the British Empire to become the engine of the Industrial Revolution. [239]

The kings of England have issued latter's patent for monopolies they wanted to favour. These favours were often granted in exchange for money; therefore, the granting of such monopolies in the form of letters patent became a significant revenue generation source for the English Crown. So much so indeed that it was widely abused, and the Crown eventually granted these latter's patent to common goods such as salt as well. The name patent comes from the Latin verb "patere" which means "to lie open, to be accessible".[240] In case of a patent for an invention, the document is a letter patent, an open letter to the public. [241]

Following public demand, the Parliament of England revoked all these monopolies and allowed only new inventions to be eligible for such monopoly rights, temporarily for a period of 14 years or less. These regulations were instituted in the Statute of Monopolies of 1624. The first important section was Section 1, to abolish all previous monopolies and allow only the Common Law to govern such rights:

"all Monopolies, and all Commissions, Grants, Licences, Charters and Letters Patents heretofore made or granted, or hereafter to be made or granted, to any Person or Persons, Bodies Politick or Corporate whatsoever, of or for the sole Buying, Selling, Making, Working or Using of any Thing within this Realm, or the Dominion of Wales ... or of any other Monopolies, or of Power, Liberty or Faculty, to dispense with any others, or to give Licence or Toleration to do, use or exercise any Thing against the Tenor or Purport of any Law or Statute

[238] Id.. page 414

[239] MacLeod, C. (2002). Inventing the Industrial Revolution, The English Patent System, 1660–1800 (May ed.). Cambridge University Press. ISBN: 9780521893992

[240] Waldert, P. (2016). Pateo, pates, patere. Latin is Simple. Retrieved October 20, 2020, from https://www.latin-is-simple.com/en/vocabulary/verb/266/

[241] (Mgbeoji, 2003, page 403)

... and all Proclamations, Inhibitions, Restraints, Warrants of Assistants, and all other Matters and Things whatsoever, any way tending to the Instituting, Erecting, Strengthening, Furthering or Countenancing of the same or any of them ... are altogether contrary to the Laws of this Realm, and so are and shall be utterly void and of none Effect, and in no wise to be put in Use or Execution."[242]

Subsequently, in Section 6, the statute provides the exception when monopolies may be granted:

> "shall not extend to any letters patents (b) and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm (c) to the true and first inventor (d) and inventors of such manufactures, which others at the time of making such letters patents and grants shall not use (e), so as also they be not contrary to the law nor mischievous to the state by raising prices of commodities at home, or hurt of trade, or generally inconvenient (f): the same fourteen years to be accounted from the date of the first letters patents or grant of such privilege hereafter to be made, but that the same shall be of such force as they should be if this act had never been made, and of none other (g)" [243]

This Statute of Monopolies became the foundation of common law patent regulations in the British Empire and its colonies. The applications for patents were standardized further during the reign of Queen Anne, when a requirement to attach a complete specification on the details of the operation of the invention for the public was added: "In the reign of Queen Anne, the law officers of the Crown established as a condition of grant that 'the patentee must by an instrument in writing describe and ascertain the nature of the invention and the manner in which it is to be performed. James Puckle's 1718 patent for a machine gun was one of the 1^{sts} to be required to provide a specification'."[244]

Some further practical implications were laid out in case law afterward, clarifying that gradual improvements of inventions are also patentable, even if the idea had not been implemented, but

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[242] Jacob, R. (2015). Intellectual Property and Competition Law: Can Economists Help? In IP and Other Things: A Collection of Essays and Speeches (pp. 77-84). Hart Publishing. ISBN 1849465959 page 79

[243] Id.. page 80

[244] Intellectual Property Office of the United Kingdom. (2010). History of Patents - The 18th century. Web Archives. Retrieved October 20, 2020, from https://web.archive.org/web/20140422075818/http://www.ipo.gov.uk/types/patent/p-about/p-whatis/p-history/p-history-18century.htm

the specification clearly shows the possibility of such practical implementation: “Extensive litigation on Watt's 1796 patent for steam engines set out the important principle that valid patents could be granted for improvements in a known machine. It also established that a patent was possible for an idea or principle, even though the specification might be limited to bare statements of such improvements or principles, provided they come into effect or were clothed in practical application.” [245]

These laws became the foundation for patent law in common law countries, not only in the United Kingdom, but also in the United States, Australia and New Zealand.

The philosophy of John Locke was a significant step in the development of patent law.

“Locke's theory of property is itself subject to slightly different interpretations. One interpretation is that society rewards labor with property purely on the instrumental grounds that we must provide rewards to get labor. In contrast, a normative interpretation of this labor theory says that labor should be rewarded. This part of the article argues that Locke's labor theory, under either interpretation, can be used to justify intellectual property without many of the problems that attend its application to physical property.” [246]

As Hughes argues, either the viewpoint when the granting of patents is considered a reward for the inventor’s labor after the fact, or as an incentive so that inventors even produce such labor, leads us to the conclusion that patents are the rights of the inventor, similar to property rights. Therefore, these rights are not simply the act of acquiring some monopoly rights, but an inherent attribute of the creation of works of the human mind. With these developments and related to this famous invention of James Watt’s steam engine, patent misuse, a negative aspect of patent law, has also emerged as a highly debated issue. Richard Trevitchik invented a new type of steam engine, so he ended up inventing around the patent held by Watt; however, this invention was banned until the expiry of Watt’s patent. Whether this slowed or hastened the progress of science is still being debated. [247]

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[245] Id..

[246] Hughes, J. (1988, December). The Philosophy of Intellectual Property. Georgetown University Law Center and Georgetown Law Journal, 77(287), 1-73. Retrieved October 20, 2020, from http://justinhughes.net/docs/a-ip01.pdf page 6

[247] Selgin, G., & Turner, J. L. (2011, November). Strong Steam, Weak Patents, or the Myth of Watt’s Innovation-Blocking Monopoly, Exploded. The Journal of Law & Economics, The University of Chicago Press, 54(4), 841-861. 10.1086/658495 page 841

National patent and international patent systems that have since developed are following slightly different rules and practices. In the following paragraphs, I will investigate the United States laws and regulations that are fundamental to the patent system and will continue with the international treaties that govern the patent system worldwide. In the next chapter, I will investigate the patent system's legal framework in the European Union and its specific laws and properties.

The United States Constitution Article 1, Section 8, Clause 8, states the following:

> "The Congress shall have Power … to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." [248] This constitutional section has many important implications on the United States Patent and Copyright system. As per the origins and scope of the power of Congress in this matter, the rights and responsibilities of Congress are to issue temporary monopoly rights to inventors. As to what the time and contractual limits of such monopolies are, as well as what conditions the inventors must fulfill when applying for such monopoly right, indeed if they even have to apply or the rights are granted automatically as in the case of copyrights, Congress is free to decide. [249]

Thus, the Patent Act of 1793 defined the subjects of patents and their basic procedures. The subjects as defined here have not changed ever since. They include new and useful arts, machines, manufacturers or compositions of matter, or improvements on such inventions:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when any person or persons, being a citizen or citizens of the United States, shall allege that he or they have invented any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter, not known or used before the application, and shall present a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the same, and praying that a patent may be granted therefore, it shall and may be lawful for the said Secretary of State, to cause letters patent to be made out in the name of the United States, bearing teste by the President of the United States, reciting the allegations and

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[248] Congress.gov. (2020). ArtI.S8.C8.1 Copyrights and Patents. Constituition Annotated - Analysis and Interpretation of the U.S. Constitution. Retrieved October 20, 2020, from https://constitution.congress.gov/browse/article-1/section-8/clause-8/

[249] Id..

suggestions of the said petition, and giving a short description of the said invention or discovery, and thereupon granting to such petitioner, or petitioners, his, her, or their heirs, administrators or assigns, for a term not exceeding fourteen years, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said invention or discovery, which letters patent shall be delivered to the Attorney General of the United States, to be examined; who, within fifteen days after such delivery, if he finds the same conformable to this act, shall certify accordingly, at the foot thereof, and return the same to the Secretary of State, who shall present the letters patent thus certified, to be signed, and shall cause the seal of the United States to be there to affixed: and the same shall be good and available to the grantee or grantees, by force of this act, and shall be recorded in a book, to be kept for that purpose, in the office of the Secretary of State, and delivered to the patentee or his order."[250]

The Patent Act of 1952 used a slightly different language to describe the same subjects: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." [251]

Both the Acts mentioned above highlight the procedure to submit the invention of process, machine, manufacture, composition of matter, or an improvement in any of these areas to the state's representatives, practically the United States Patent and Trademark Office, part of the Department of Commerce. It also highlights the usefulness and novelty, and disclosure criteria we described in detail in the previous chapters.

The Patent Act of 1952 also added the requirement of non-obviousness of the invention to be granted a patent: "A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in Section 102 if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person

[250] (Public Acts of the Second Congress, 2nd Session, Chapter 11, 1793)

[251] US Patents Act of 1952 § 101, 35 U.S.C. § 100. (1952, July 19). Patentability of Inventions and Grant of Patents. Retrieved October 20, 2020, from https://www.govinfo.gov/content/pkg/STATUTE-66/pdf/STATUTE-66-Pg792.pdf#page=6 page 797

having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made." [252]

This requirement was added in order to prevent applicants from filing patents where the knowledge was already common or obvious, and thus making no new significant advances but only acquiring monopoly rights. Such practices are clearly harmful to the economic and scientific progress and to customers, because of the unnecessary monopoly profits that customers would have to bear.[253]

In 2011, a new law was passed in the United States, the most significant since 1952, the Leahy-Smith America Invents Act. This act had three provisions among which the switch from a "first to invent" to a "first inventor to file" system was the most significant. The United States was among the last countries to abolish the first to invent principle and transition into a first to file system through the enactment of this regulation.[254]

The first inventor to file system is described in the Leahy-Smith America Invents Act as follows:

> "SEC. 3. FIRST INVENTOR TO FILE.
>
> (a) DEFINITIONS.—Section 100 of title 35, United States Code, is amended—
>
> (1) in subsection (e), by striking ''or inter partes reexamination under section 311''; and
>
> (2) by adding at the end the following:
>
> (f) The term 'inventor' means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.
>
> (g) The terms 'joint inventor' and 'coinventor' mean any 1 of the individuals who invented or discovered the subject matter of a joint invention.
>
> (h) The term 'joint research agreement' means a written contract, grant, or cooperative agreement entered into by 2 or more persons or entities for the performance of experimental, developmental, or research work in the field of the claimed invention.
>
> (i)(1) The term 'effective filing date' for a claimed invention in a patent or application for patent means—

[252] Id.. page 798

[253] (Greenlaw & Taylor, 2017, section 9.2)

[254] Roberts, J. (2013, March 18). "First to file" patent law starts today: what it means in plain English. gigaom.com. Retrieved October 20, 2020, from https://gigaom.com/2013/03/18/first-to-file-patent-law-starts-today-what-it-means-in-plain-english/

(A) if subparagraph (B) does not apply, the actual filing date of the patent or the application for the patent containing a claim to the invention; or

(B) the filing date of the earliest application for which the patent or application is entitled, as to such invention, to a right of priority under section 119, 365(a), or 365(b) or to the benefit of an earlier filing date under section 120, 121, or 365(c).

(2) The effective filing date for a claimed invention in an application for reissue or reissued patent shall be determined by deeming the claim to the invention to have been contained in the patent for which reissue was sought.

(j) The term 'claimed invention' means the subject matter defined by a claim in a patent or an application for a patent.'' [255]

There is a rather important difference though, between the "first inventor to file" system of the United States Patent and Trademark Office and the "first to file" system of the European Patent Office. The former allows the inventor a grace period of one year whereby if they disclose their invention to the general public, and they file for a patent in this timeframe, their patent will get approved on the basis of them being the first to publish the invention, regardless of other applicants for the same inventions.[256] This way the United States has only partly transitioned between the two approaches and still gave some time for inventors to file their patent applications even after publication. This change is arguably maintained to allow for smaller companies, generally startups greater participation in the patent system, according to John Koenig: "Effective March 17, 2013, the U.S. patent system awards a patent to the first inventor to file an application — aligning with the rest of the world, according to the original U.S. patent system. But the first inventor to file also receives a U.S. one-year grace period until filing, from the date he or she makes an invention public. This means that an inventor can effectively stop-the-clock on prior art by making a public disclosure, use or sale of the invention. For small

[255] United States Patent and Trademark Office. (2011, September 16). Leahy-Smith America Invents Act. Public Law 112–29. Retrieved October 20, 2011, from https://www.uspto.gov/sites/default/files/aia_implementation/20110916-pub-l112-29.pdf

[256] Quinn, G. (2016, January 9). First to File Means File First! The Risk of Not Immediately Filing a Patent Application. IP Watchdog. Retrieved October 20, 2020, from https://www.ipwatchdog.com/2016/01/09/first-to-file-means-file-first-filing-a-patent-application/id=64809/

businesses, this grace period creates valuable time to seek financing, customers and sourcing, without sacrificing patent rights." [257]

The Law also introduced a post-grant review of the patent to enable the opposition to be expressed no later than nine months from the patent approval and request to invalidate a patent if the patentability conditions were not met according to the opposer.[258] The provisions of the Leahy-Smith America Invents Act went into effect on March 16th, 2013.

There are further case laws that have identified the boundaries and correct legal interpretations of the Patent Acts and their relationship to Antitrust and Competition Law, including the rulings of the Supreme Court of the United States. Some notable examples of case law that were related to both patents and antitrust laws are the following:

In Kimble vs. Marvel Entertainment, LLC, 576 U.S. 446 (2015) the Supreme court defended a previous case of 50 years earlier, Brulotte vs. Thys Co., 379 U.S. 29 (1964). The case was about licensing contracts extending beyond the lifetime of the patent, which were ruled to be unenforceable by the Supreme Court in the previous case of Brulotte vs Thys Co. The main criticism the previous ruling received was an assertion whereby patent misuse cases should be judged on the basis of antitrust law principles. That assertion would also mean that contracts without significant anticompetitive effects should not be proscribed. Therefore, if the private contract extends beyond the life of the patent, its validity should not be challenged unless it clearly falls under an antitrust case and affects competition negatively. The Supreme Court upheld the decision of the previous case law, on the grounds that patent misuse cases should not be judged on antitrust grounds in general, in order to preserve the balance between encouraging innovation and ensuring public access to innovation.[259] As the Supreme Court stated: "An unpatentable article, like an article on which the patent has expired, is in the public domain, and may be made and sold by whoever chooses to do so." [260]

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[257] Koenig, J. (2011, September 21). The America Invents Act is Better for Small Business. johnkoenig.com. Retrieved October 20, 2020, from https://johnkoenig.com/the-america-invents-act-is-better-for-small-business/

[258] Cornell Legal Information Institute. (2011, September 16). 35 U.S. Code § 321 - Post-grant review. Legal Information Institute. Retrieved October 20, 2020, from https://www.law.cornell.edu/uscode/text/35/321

[259] Roche, A. (2017). Kimble v. Marvel Entertainment, LLC: Economic Argument Defeated; Superpowered Stare Decisis Prevails. Journal of Business & Technology Law Proxy, 12(1), 1-14. Retrieved October 20, 2020, from https://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1009&context=proxy page 4

[260] 376 U.S. 225. (1964) Sears, Roebuck & Co. v. Stiffel Co. U.S. Supreme Court. Retrieved October 20, 2020, from https://supreme.justia.com/cases/federal/us/376/225/

In FTC v. Actavis, Inc., 570 U.S. 136 (2013) "the US Supreme Court held that "pay-for-delay" settlements between patent-owning drug companies and their generic competitors could be anticompetitive even if these settlements were within the scope of the owners' patent rights."[261] The Federal Trade Commission stated that such a practice should be inherently presumed to be anti-competitive and in the interest of sharing monopoly profits. The Supreme Court ruled that such practice falls under the realm of antitrust law and should be judged accordingly. The practice itself may or may not constitute as anti-competitive behavior, depending on the effects and circumstances of the reverse payment settlement; therefore, the application of such practice does not presume anticompetitive behavior.[262]

The competition authority (the Federal Trade Commission) must investigate in a normal procedure and weigh according to the Rule of Reason Test as opposed to the Presumptive Illegality Test: "The Supreme Court had essentially four possible ways to deal with these issues:

> A. The Scope of the Patent Test: This was the majority rule, which held that if the settlement was within the scope of the patent and the litigation was not sham, the decision of the parties as to the terms of settlement would be respected. This is the rule applied to patent cases in general, and the question was whether it should also apply in the somewhat weird world of Hatch-Waxman (more on this below).
>
> B. The Presumptive Illegality Test: This was the FTC's approach, and a slight retreat from its initial position. To the FTC, a settlement is legal if the patent owner gives up one kind of property (part of his patent term), but presumptively illegal if he gives up some other kind of property (such as a cash payment). The original formulation of the test was that any payment or transfer of value of any kind (other than giving up part of the patent term) was not merely presumptively, but per se illegal (and the FTC urged Congress to legislate). But before the Court in Actavis, the FTC scaled back to requesting only that the settlement be presumed to be illegal and that the parties could try to justify it—to the same agency that had publicly announced many times that such settlements were all illegal.

[261] (Lim, 2014)

[262] Carrier, M. (2018, June 18). FTC v. Actavis: Where We Stand After 5 Years. IP Watchdog. Retrieved October 20, 2020, from https://www.ipwatchdog.com/2018/06/18/ftc-v-actavis-stand-5-years/id=98536/

C. The Rule of Reason Test: The full, untrammeled rule of reason inquiry: whether, on balance, the pro-competitive aspects of the transaction outweigh the anticompetitive aspects. As this is the test that the Court adopted, we will speak about it in more depth below.

D. Let Congress Fix What Congress Hath Wrought: This argument is really quite simple. What prompted the whole situation of odd-looking settlements was the structure that Congress set up in the Hatch-Waxman Act. Under that statute, a generic company can take a patented drug, create its own version, and do the bioequivalence testing necessary to get it approved, all without being deemed to have infringed the innovator's patent." [263]

The case law of patents and antitrust is extensive since both fields of law intersect in the area of patent misuse, whereby patent owners are trying to gain more monopoly profits than originally intended by the legislator when granting the temporary monopoly rights under patent laws in order to encourage innovation.[264] Since it is in the interest of patent holder companies to seek every way in which these monopoly profits may be extended, this body of case law can be expected to continue to grow both in the United States, as well as around the world.

In the following section, I will examine the international treaties governing intellectual property and patents, the organizations, and procedures they have created to allow for greater interoperability of the inherently national intellectual property legal frameworks.

The first such treaty is the Paris Convention for the Protection of Industrial Property, first signed in 1883, then revised several times: at Brussels in 1900, at Washington in 1911, at The Hague in 1925, at London in 1934, at Lisbon in 1958 and at Stockholm in 1967, and was amended in 1979. The treaty is governed by the World Intellectual Property Organization.[265]

The most important provisions are defining how the national treatment of the industrial property should be handled, the right of priority that should be given to applications transferred

[263] Bernard, K. (2014). Hatch-Waxman Patent Case Settlements— The Supreme Court Churns the Swamp. Minnesota Journal of Law, Science and Technology, 15(1), 123-134. Retrieved October 20, 2020, from https://scholarship.law.umn.edu/cgi/viewcontent.cgi?article=1060&context=mjlst page 124

[264] Singer, J. (2015, April 21). What is "patent misuse"? IP Spotlight. Retrieved October 20, 2020, from https://ipspotlight.com/2015/04/21/what-is-patent-misuse/

[265] WIPO - Paris Convention. (2020). Paris Convention for the Protection of Industrial Property. World Intellectual Property Organization - WIPO-Administered Treaties. Retrieved October 20, 2020, from https://www.wipo.int/treaties/en/ip/paris/

to member countries, and the common rules for the specific types of intellectual property, including patents.[266] The national treatment rules are the following:

"Under the provisions on national treatment, the Convention provides that, as regards the protection of industrial property, each Contracting State must grant the same protection to nationals of other Contracting States that it grants to its own nationals. Nationals of non-Contracting States are also entitled to national treatment under the Convention if they are domiciled or have a real and effective industrial or commercial establishment in a Contracting State." [267]

This basic rule essentially gives equality of patent owner privileges, regardless of which member country the inventor first applied for the patent grant. The right of priority provision is as follows:

"This right means that, on the basis of a regular first application filed in one of the Contracting States, the applicant may, within a certain period of time (12 months for patents and utility models; 6 months for industrial designs and marks), apply for protection in any of the other Contracting States. These subsequent applications will be regarded as if they had been filed on the same day as the first application. In other words, they will have priority (hence the expression "right of priority") over applications filed by others during the said period of time for the same invention, utility model, mark or industrial design." [268]

The right of priority rule, therefore, prevents applications in other countries from gaining the patent by parallel applications to the original inventor's patent. It also gives the grace period for the inventor to decide which countries they wish to include in their patent rights, given that such protections and applications are not automatic because ultimately it is up to the national patent office to register the patent based on their own procedures.[269]

The common rules are defining these exact independence criteria that a granting of a patent in a member state does not give any obligations to the other states to grant the patent in their

[266] WIPO - Summary of Paris Convention. (2020). Summary of the Paris Convention for the Protection of Industrial Property (1883). World Intellectual Property Organization - WIPO-Administered Treaties. Retrieved October 20, 2020, from https://www.wipo.int/treaties/en/ip/paris/summary_paris.html

[267] Jaina, S., & Jain, R. K. (2011). Patents: Procedures and Practices. Universal Law Publishing. ISBN 8175349867 page 168

[268] Id.. page 168

[269] (WIPO - Summary of Paris Convention, 2020)

countries as well. The refusal or termination of patents are independent as well, and there is no obligation to refuse or terminate a patent in case another member state does so.[270]

There is an essential case for preventing patent abuse, especially when the patents are failing to work or working insufficiently; therefore, the customers are not able to access the innovation as presumed in the patent application process. The action to be followed in such cases is a compulsory license, which is a license not granted by the patent owner but by an authority of the state. As well as the compulsory license, a forfeit of a patent may be forced after sufficient time (2 years) from the grant of the first compulsory license has been issued. These rules have been defined to make the conditions under which the patent owner's rights may be revoked or decreased more standardized in all member countries. [271]

Another significant treaty is the Patent Cooperation Treaty, concluded in 1970, which established a system for filing patents internationally, thus requesting the monopoly rights for an invention in many countries at the same time. Even though the granting of the patents is still in the sole control of the patent offices of the member countries, this allows the inventors a significantly easier system of application. This opportunity for the inventors can encourage innovation further, especially for inventions that could have international or global relevance, since there are now more than 150 member countries of the Patent Cooperation Treaty. [272]

The following illustration shows the procedures of the Patent Cooperation Treaty system:

[270] (Jaina & Jain, 2011, page 168)

[271] Id.. page 169

[272] United States Patent and Trademark Office. (2018, September 20). Patent Cooperation Treaty. USPTO - Patents - International Protection. Retrieved October 20, 2020, from https://www.uspto.gov/patents-getting-started/international-protection/patent-cooperation-treaty

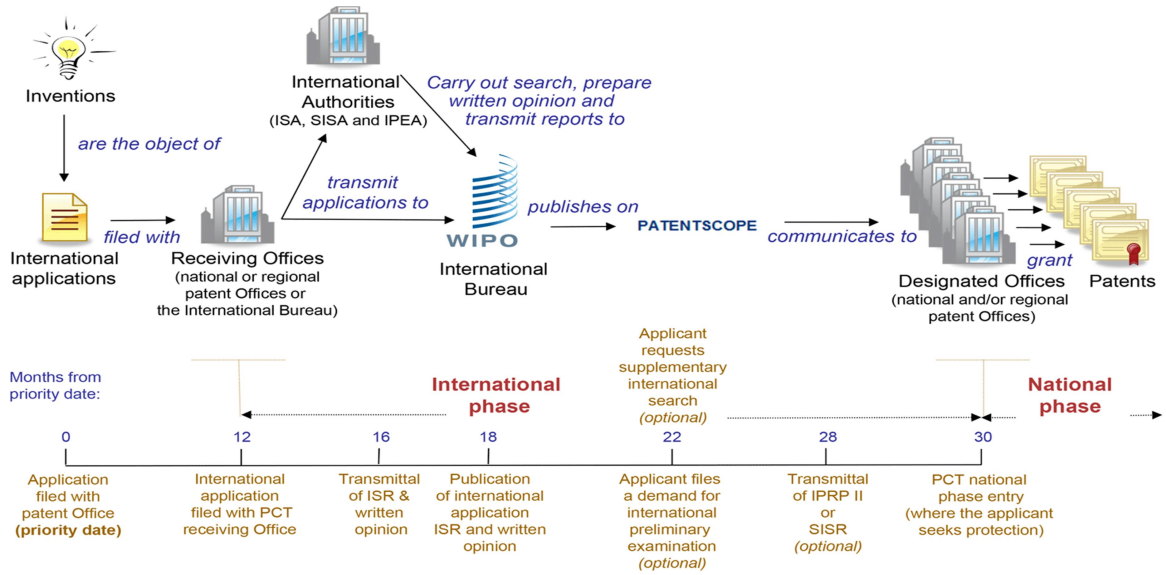

Figure 2 Patent Cooperation Treaty System [273]

An invention going through an international patent application follows these steps:

1. A patent application is filed with one of the patent offices of the contracting states of the Patent Cooperation Treaty. The patent office is called a Receiving Office and may be a national or regional patent office, or in some cases the International Bureau in Geneva, Switzerland. The regional offices include among others the European Patent Office, the African Intellectual Property Organization, and the Eurasian Patent Organization. As a general rule, at least one of the applicants must be a citizen of one of the contracting countries in order for this filing to be accepted. Some patent office requires citizenship of the same country where the patent was filed. The filing date of this application is going to be accepted as the original filing date in each contracting country the patent application will proceed to in later steps.[274]
2. An "International Search" is conducted by one of the International Searching Authorities to determine the most relevant prior art regarding the invention to be patented. This search will be the basis of an International Search Report and a formal opinion of the International Searching Authority on the patentability of the invention. The choice of the available International Searching Authorities depends on the

[273] WIPO - PCT FAQs. (2020, April). Protecting your Inventions Abroad: Frequently Asked Questions About the Patent Cooperation Treaty (PCT). World Intellectual Property Organization. Retrieved October 20, 2020, from https://www.wipo.int/pct/en/faqs/faqs.html
[274] Id..

Receiving Office where the original patent application was filed. The International Searching Authorities include, among others the European Patent Office, China National Intellectual Property Administration, the Japan Patent Office, Indian Patent Office, the United States Patent and Trademark Office, Nordic Patent Institute and Visegrad Patent Institute. The search report may help the inventor decide which national patent offices to further submit the application to, considering the costs of translation and several processing fees.[275]

3. The next step is the International Preliminary Examination, which aims to determine whether the invention is genuinely new (test of novelty), whether it involves an inventive step (test of non-obviousness), and is applicable to be used in the industry where the applicant claims (test of usefulness). Even though this Preliminary Examination step is optional since the three criteria above are generally considered to be common between national patent offices, many such offices rely on this examination heavily and grant the patent in their respective countries without much further investigation. Some additional advantages of this examination are prevalent in cases when the International Searching Authority has negative findings but allows the applicant to produce further documents to justify their claims. Such procedures involving multiple response rounds could be very costly both in time and money for the applicants if they had to perform them with each national patent office.[276]
4. The application, along with the International Search Report and the formal opinion on patentability is published by the World Intellectual Property Organization, normally after 18 months from the filing date.[277]
5. Finally, the patent application enters the "national phase", when the various patent offices where the application was intended to be transferred take over and perform their own investigations. The findings of neither the International Search Report nor the formal opinion on patentability nor the Preliminary Examination are binding for any of the patent offices of the contracting states, so the patentability is ultimately decided by the member states themselves according to their own rules and regulations. The national

[275] Id..
[276] Id..
[277] Id..

phase must start 30 months after the initial filing (priority date); otherwise, the international patent application has no effects on the regional or national applications.[278]

The Patent Cooperation Treaty is a very important treaty in practical effects since many innovations have potential global applicability, and both the value of the monopoly rights that could be gained from such inventions are significantly increased, and the costs of registering those monopoly rights are significantly decreased by international cooperation. Furthermore, such a cooperative system also significantly decreases the probabilities of parallel development of the same invention in multiple countries as well as the exploitation of regulatory arbitrage. Thus, this and other international treaties make patented inventions more economically viable and advantageous for the inventors in today's globalized economy.[279]

The patents filed under the umbrella of the Patent Cooperation Treaty are rapidly increasing. While 2004 was the first year when the total number of applications filed under the Patent Cooperation Treaty had reached one million since the conclusion of the Treaty in 1970, the total number of applications is expected to reach 4 million by the end of 2020. [280]

The Strasbourg Agreement Concerning the International Patent Classification of 1971 is another important step in the international treaties about patents. It can be considered a continuation of the Paris Convention and the previous European Convention of the International Classification of Patents for Invention of 1954. This agreement deals mainly with extending the previously European classification to all the Paris Convention countries. [281]

The International Classification of Patents is a hierarchical system of categorization for patents, adopted by more than 100 countries since the signing of the Strasbourg Agreement. The classification subdivided into sections, classes, subclasses, groups, and subgroups. "The areas (sections) of technology are as follows:

- A Human Necessities

[278] Id..

[279] OECD. (2015). Inventions across borders. In OECD Science, Technology and Industry Scoreboard 2015 (pp. 138-154). Organisation for Economic Co-operation and Development. Retrieved October 20, 2020, from https://www.oecd-ilibrary.org/docserver/sti_scoreboard-2015-23-en.pdf?expires=1609187563&id=id&accname=guest&checksum=EE38E02B370C15BB990363C2ADB18A22

[280] World Intellectual Property Organization. (2019, September 17). Report of the Director General to the 2019 WIPO Assemblies. wipo.int. Retrieved October 20, 2020, from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1050_2019.pdf

[281] World Intellectual Property Organization. (1979, September 28). Strasbourg Agreement Concerning the International Patent Classification. Retrieved October 20, 2020, from https://wipolex.wipo.int/en/text/291858

- B Performing Operations; Transporting
- C Chemistry; Metallurgy
- D Textiles; Paper
- E Fixed Constructions
- F Mechanical Engineering; Lighting; Heating; Weapons; Blasting Engines or Pumps
- G Physics
- H Electricity" [282]

This standardized classification helps the national and regional patent organizations to achieve easier interoperability, especially when considering the international patent application process as we described above.

The Patent Law Treaty (PLT) of 2000 has continued along the same lines of standardization. The aim of this treaty was the standardization of formal procedures of national and regional patent applications, thus making the procedures easier to inventors. The Patent Law Treaty achieves this by defining the maximum extent of requirements that national and regional patent offices may require an applicant for filing a patent application. Contracting states may provide more generous terms than the ones outlined in the Patent Law Treaty, but they cannot provide more stringent ones.[283] A notable exception to this rule is the filing date requirements, where the treaty defines absolute requirements and not maximum ones. These requirements are described by the World Intellectual Property Organization as follows:

"The PLT requires that the office of any Contracting Party must accord a filing date to an application upon compliance with three simple formal requirements:

First, an indication that the elements received by the office are intended to be an application for a patent for an invention;

Second, indications that would allow the office to identify or to contact the applicant (however, a Contracting Party is allowed to require indications on both);

Third, a part which appears to be a description of the invention.

[282] Espacenet. (2016, July 6). International Patent Classification (IPC) system. Espacenet. Retrieved October 20, 2020, from https://pt.espacenet.com/help?locale=pt_PT&method=handleHelpTopic&topic=ipc

[283] United States Patent and Trademark Office. (2019, October 31). Patent Law Treaty. Office of Policy and International Affairs. Retrieved October 20, 2020, from https://www.uspto.gov/ip-policy/patent-policy/patent-law-treaty

No additional elements can be required for according a filing date." [284]

This standardization process further enhanced the predictability of the patent application procedures for inventors, therefore through reducing the risks, the associated perceived costs of applying for patents in multiple countries, as in the case of an international patent application, are reduced as well. The Patent Law Treaty was signed in 2000 and entered force in 2005.[285]

Finally, the Budapest Treaty of 1977 deals with a special area of patents, inventions concerning microorganisms. The treaty requires the member states to accept the disclosure of biotechnological inventions by submitting the microorganisms themselves as part of the patent procedure regardless which national or regional authority the original patent application was filed at. This was especially important for biotechnological research, since requiring microorganism samples to be sent to every national patent office would imply significant costs for the applicant.[286]

In this chapter, I have examined the history of Patent Law, and have looked at two prominent examples of the laws of treaties of this legal field in practice: the United States Patent Law, and the most important international treaties governing patent law. The understanding of the foundations of Patent Law, and the commonalities and differences between national and international patent laws and treaties will enable us to better identify the effects and significance of patents in today's globalized economy and the detrimental effects of cases when the patents remain unutilized.

1.3.4. Patent Protection Laws and Practices of the European Union

In this chapter, I will examine the laws and treaties governing the legal field of patents in Europe, especially regarding the European Union. I am performing this examination to be able to understand the legal environment where I am investigating the case of acquisitions when patents remain unutilized, including the statistics and case study in the subsequent chapters.

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[284] WIPO - Summary of the Patent Law Treaty. (2005). Summary of the Patent Law Treaty (PLT) (2000). WIPO-Administered Treaties. Retrieved October 20, 2020, from https://www.wipo.int/treaties/en/ip/plt/summary_plt.html

[285] Id..

[286] World Intellectual Property Organization. (1980, September 26). Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. WIPO Database of Intellectual Property WIPO Legislative Texts. Retrieved October 20, 2020, from https://bccm.belspo.be/documents/files/deposit/budapest-treaty.pdf

The main regulatory body in case of patent protection in the European Union is the European Commission. According to the European Commission's website on patent protection they consider it a key asset in the technological development of the European Union: “Patents are a key tool to encourage investment in innovation and encourage its dissemination. The European Commission constantly monitors the need for and effects of patent-related legislation across the European Union. It is working to introduce cost-saving, efficient uniform patent protection across Europe and is looking at measures to enhance patent exploitation.”[287]

The current situation in the European Union is still best described as a double system. In the previous decades many attempts have been made towards a unified patent application and court system in Europe, with some initiatives being very successful, while others experiencing a rocky road of long consultations, fragmented application into national law and even withdrawals. Therefore, in the quote above, the European Commission considers it one of its main goals to introduce a uniform patent system across Europe. There are still two ways that an inventor may seek protection for their technological innovations and apply for patents: through the national patent offices or through the European Patent system administered by the European Patent Office. However, even the European patents granted by the European Patent Office cannot be considered a unitary patent; they are rather a group of national patents in each member state of the European Patent Organization.[288]

The trend towards a European Patent started with the so-called Community Patent. The 1975 Community Patent Convention established a single patent application procedure for the whole of the European Economic Community (the predecessor of the European Union). This procedure unified the filing and the examination of the patent applications. There is a single prosecution phase executed by the European Patent Office, which is a significant difference from the operative procedures of the World Intellectual Property Organization, where every application ultimately is prosecuted on a national level (the national phase). However, since the

[287] European Commission - Patent Protection in the EU. (2020). Internal Market, Industry, Entrepreneurship and SMEs - Patent protection in the EU. European Commission website. Retrieved October 20, 2020, from https://ec.europa.eu/growth/industry/policy/intellectual-property/patents_en

[288] European IPR Helpdesk. (2018). IPR Chart: European Patent (EP). European IPR Helpdesk. Retrieved October 20, 2020, from http://www.iprhelpdesk.eu/sites/default/files/documents/IPR-Chart-European-Patent.pdf

resulting patent is still essentially a national one, the litigation e.g., infringement lawsuits, are still to be executed on a national level.[289]

Jorge Cruz (1998) describes the European patent process under the name "Munich Convention" very clearly[290], and draws the lines of the two phases involved: "How does the Munich Convention work? Munich is the home of the European Patent Office, which receives and examines applications and then grants or refuses the respective patent. When filing a patent application, the applicant must indicate the Member States in which he wishes to obtain protection; a tax is payable for each State-known as the designation fee. Once the patent has been granted, it comes under the administration of the authorities of the designated countries and is subject to the laws thereof. In other words, the European patent system comprises two different phases which are complementary and cannot be separated. The first phase takes place at the European Patent Office, which receives and examines the application, and subsequently grants or refuses the respective patent. The second phase is handled by the authorities of the designated countries and initially consists of the validation of the granted patent by means of the filing of the respective translation, in accordance with the requirements of each country. Therefore, the patent validation process does not end with the grant-decision given by the European Patent Office, since it must be completed at the authorities of the designated countries."[291] The Luxembourg Agreement of 1989 further revised the Community Patent Convention, mainly dealing with translation requirements into the languages of the member states of the European Patent Organization.[292]

The issues with the current fragmentation of the patent policy landscape in Europe is very significant, since it affects corporate decision making in one of the most crucial areas where Europe would need a truly single market: the knowledge-based economy. Even though the Lisbon summit in March 2000 identified the development of the knowledge-based economy as a main objective of the European Union: "to make the EU, by 2010, the most competitive and

[289] Singleton, J. (1979). Convention on the Grant of European Patents (European Patent Convention) and Convention for the European Patent for the Common Market (Community Patent Convention). The International Lawyer, 13(No 1. Winter 1979), 119-140. Retrieved October 20, 2020, from https://www.jstor.org/stable/40705915?seq=1 page 120

[290] Cruz, J. (1998, September). The community patent convention: What sort of future. Journal of World Intellectual Property, 1(5), 819-826.

[291] Id.. page 819

[292] Sugden, A. (1991). The Communitv Patent - The Luxembourg Agreement of 1989. World Patent Information, 13(1), 5-8. 0172-2190/91

dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion".[293] The results by 2019 are somewhat disappointing, the research commitments of 3% of GDP are barely met by only a few member countries, the majority are way behind.[294]

The Figure below represents the R&D expenditure as % of GDP across all sectors in 2017 in the European Union.

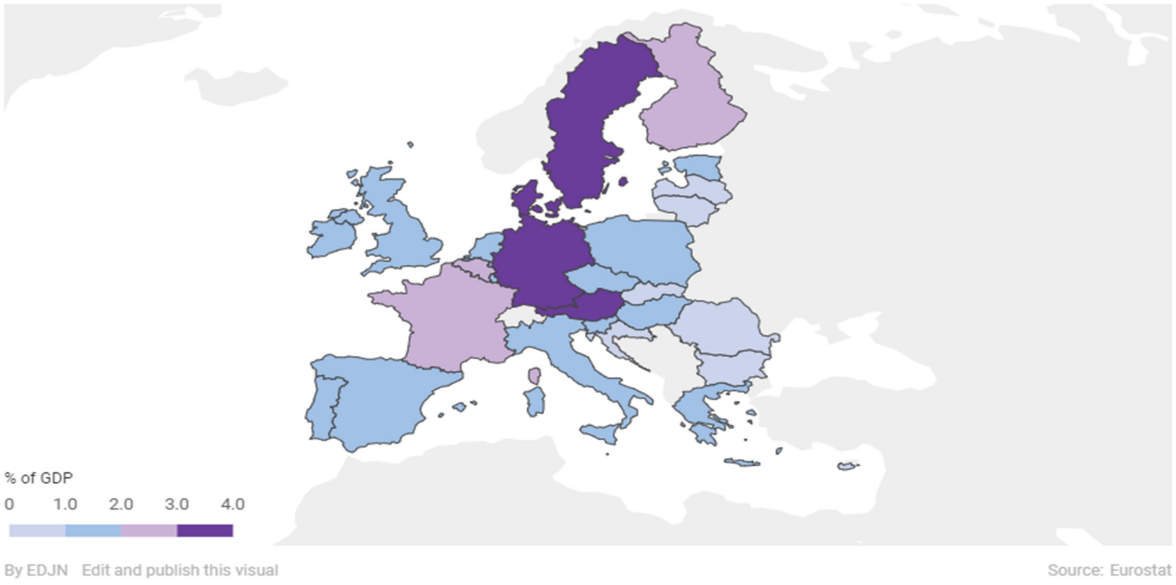

Figure 3 R&D expenditure as % of GDP across all sectors in 2017 in the European Union

Source: (Chevallier, 2019) [295]

While the patent system fragmentation cannot be determined as the sole factor in explaining the trends why the knowledge economy goals were not met as described in the above article by Chevallier, he argues that countries that have retained significant industries such as Germany and South Korea are doing better in terms of Research & Development spending as well, and in turn this investment is fueling their growth more.[296] As we will see in later chapters, these are

[293] Chevallier, M. (2019, May 25). R&D: Europe's knowledge economy in trouble. The European Data Journalism Network - Originally: Alternatives Aconomiques. Retrieved October 20, 2020, from https://www.europeandatajournalism.eu/eng/News/Data-news/R-D-Europe-s-knowledge-economy-in-trouble
[294] Id..
[295] Id..
[296] Id..

the exact countries strongest in patent applications and grants as well. This correlation is definitely worth noting.

Martinez (2001) argues that this fragmentation of patent policies in Europe is a serious issue,[297] forming an obstacle in the way of a truly integrated single market:

"At present there is no supranational patent; countries retain control over their patent systems using patent-related policies to serve their national interests. Further, innovative firms do not pursue worldwide patenting strategies due to costs and other strategic considerations. Consequently, patents create an important non-tariff barrier to trade, segment the international market of patented goods and generate cross-country differences in market structures. Continuing national differences in patent policy within the European Community (EC) constitutes the main obstacle to the goal of forming a truly integrated single internal market. The Luxembourg Convention on the Community Patent of 1975 and the Agreement relating to Community Patent signed in 1989-which aimed to create a unitary patent with equal effect throughout the EC-never entered into force, as only France, Germany, Greece, Denmark, Luxembourg, the United Kingdom and the Netherlands ratified the Convention. The resistance of certain countries to the entry into force of a Community patent reflects different national attitudes towards innovation, depending on whether the comparative advantage of a particular country lies in innovation or in imitation. However, these national differences are inconsistent with the goal of the completion of a single internal market in the EC."[298]

There is one significant regulatory body that is still needed to establish the European Commission's goals of establishing a unitary patent system: a unified patent court. The road to a unified patent court has been long and arduous and it has still not ended.

The Unified Patent Court was proposed in Regulation (EU) No 1257/2012 of the European Parliament and of the Council on 17th December 2012 on implementing enhanced cooperation in the area of the creation of unitary patent protection. When the Unified Patent Court was proposed, an analysis by Coyle (2012) highlighted the problem very clearly:

"NATURE OF THE PROBLEM: THE BRUSSELS I REGULATION

[297] Martinez, F. (2001, September). Towards a Patent Reform in Europe. Journal of World Intellectual Property, 4(5), 767-787-790.

[298] Id.. page 767

As previously discussed, patents issued by the European Patent Office are issued as a bundle of national patents. While this bundle in theory provides protection for the patent holder throughout Europe, such protection is meaningless without the ability to enforce the rights that come with a patent."[299]

Enforcement of patent holder rights - as we will see in later chapters - is one of the major concerns of companies even while utilizing their patents under their own commercial efforts, or through different licensing schemes. Therefore, a unified system of litigation would bring immense benefits in terms of risk and costs to European patent holders. However, many countries have recently joined and have withdrawn, such as in the case of the United Kingdom and Germany. The UK has even ratified the United Patent Court despite Brexit in 2017.[300] After the Brexit negotiations have turned in another direction, the United Kingdom decided to withdraw instead from the Unified Patent Court project in 2020.[301] Germany, one of the strongest supporters of the Unified Patent Court is also yet to finally ratify the agreement. A final vote is expected to take place on the 18th of December 2020 in the Bundesrat. Apart from Germany's decision, two other signatory states will still need to agree to be bound by the agreement, in order for the project to enter its final phase.[302]

In summary: the European Union is still struggling to align the member states' interests and unify the patent system throughout the European Union. Compared to the United States and China, each with their own large number of patents, this is a significant disadvantage and is contributing to the European Union falling short of its predictions in terms of strengthening its knowledge-based economies. While the European Patent Office is able to accept applications,

[299] Coyle, P. (2012). Uniform Patent Litigation in the European Union: An Analysis of the Viability of Recent Proposals Aimed at Unifying the European Patent Litigation System. Washington University Global Studies Law Review, 11(1), 171-192. Retrieved October 20, 2020, from https://openscholarship.wustl.edu/law_globalstudies/vol11/iss1/6 page 177

[300] Marollé, P. (2017). The Long-Awaited European Patent with Unitary Effect and ad hoc Unified Patent Court: United Kingdom shows goodwill for driving the patent package to entry into force, even though roadblocks may still be lying down the way. European Patent Institute. Retrieved December 20, 2020, from https://information.patentepi.org/1-17/upc-brexit.html

[301] Unified Patent Court - UK Withdrawal. (2020, July 20). UK Withdrawal from the UPCA. Unified Patent Court. Retrieved October 20, 2020, from https://www.unified-patent-court.org/news/uk-withdrawal-upca

[302] Unified Patent Court - German Ratification. (2020, November 26). UPC – Progress on German ratification. Unified Patent Court. Retrieved November 28, 2020, from https://www.unified-patent-court.org/news/upc-progress-german-ratification

perform their prosecution, and grant patents on a European scale, a Unified Patent Court is still missing for a truly unitary European patent.

In this chapter, I have investigated the field of Intellectual Property Law, and more narrowly Patent Law, both from the theoretical and the practical standpoints. As a theoretical overview I have examined the definitions of intellectual property and patents to get a solid understanding of the legislator. I also performed a detailed analysis of the determining factors of patents to be able to thoroughly understand the benefits of them, and the different effects of their so-called "non-working", because they are essential to the main scenario of my thesis, acquisitions where patents remain unutilized.

As a practical overview, I have examined a notable example of weaknesses of patents, the patent trolls, the national and international treaties and organizations that govern Patent Law, with special attention to the United States and the European Union. In this final subchapter, I have reviewed the organization and challenges of the patent protection laws and practices in the European Union. Hopefully this will help me choose and understand an appropriate case study for the scenario of my thesis, and to understand the conduct of the competition authority in said case study as well.

Chapter Two

2. Acquisitions When Patents Remain Unutilized

In this chapter, my main objective is to investigate (and hopefully prove) my first hypothesis:

Acquisitions where patents remain unutilized are undesirable and present a significant issue.

To investigate my first hypothesis,

- I am first going to look at the patent statistics to understand the importance of patents in today's economies. This will serve as an emphasizing factor to show why patents and their usage is so important.
- Then I will try to answer the question: How are companies typically using patents? Therefore, I will investigate how patents are usually licensed and utilized by companies, especially in the Information Technology and Telecommunication sectors.
- This is needed to come up with a method of proof and case study selection, to find a practical example where the effects of such an acquisition were indeed undesirable and significant.
- Then I will perform the case study itself.
- Finally, I will summarize the detrimental effects of acquisitions where patents remain unutilized.

Since in this chapter I am investigating a practical issue, by including the patent statistics, the typical patent utilization scenarios, and a carefully selected case study, I will make sure to use data and evidence to determine the existence and significance of the issue.

2.3. Acquisitions with Patent Involvement

In this chapter, I will first examine the statistics and trends around patent applications and grants worldwide and in the European Union. This examination will give a general idea of how the patent landscape has evolved in the last decades, which countries and companies are the most active in patent applications.

It is important to first look at the statistics from the so-called IP5. This is another name for the five largest patent offices of the world, the Korean Intellectual Property Office (KIPO), European Patent Office (EPO), Japan Patent Office (JPO), China National Intellectual Property Administration (CNIPA), and the United States Patent and Trademark Office (USPTO). These

offices regularly have meetings to synchronize their efforts towards an efficient global Intellectual Property application system. These synchronization efforts range from harmonization of operative procedures in the patentability criteria, through prior art search and efficient descriptions for public disclosure, to standardization of the Intellectual Property classifications. The five patent offices together handle around 85 percent of the patent applications of the world. [303]

The following infographic from the IP5 (fiveipoffices.org) shows the most important details about the patent application and grant statistics globally, by region, and in time.

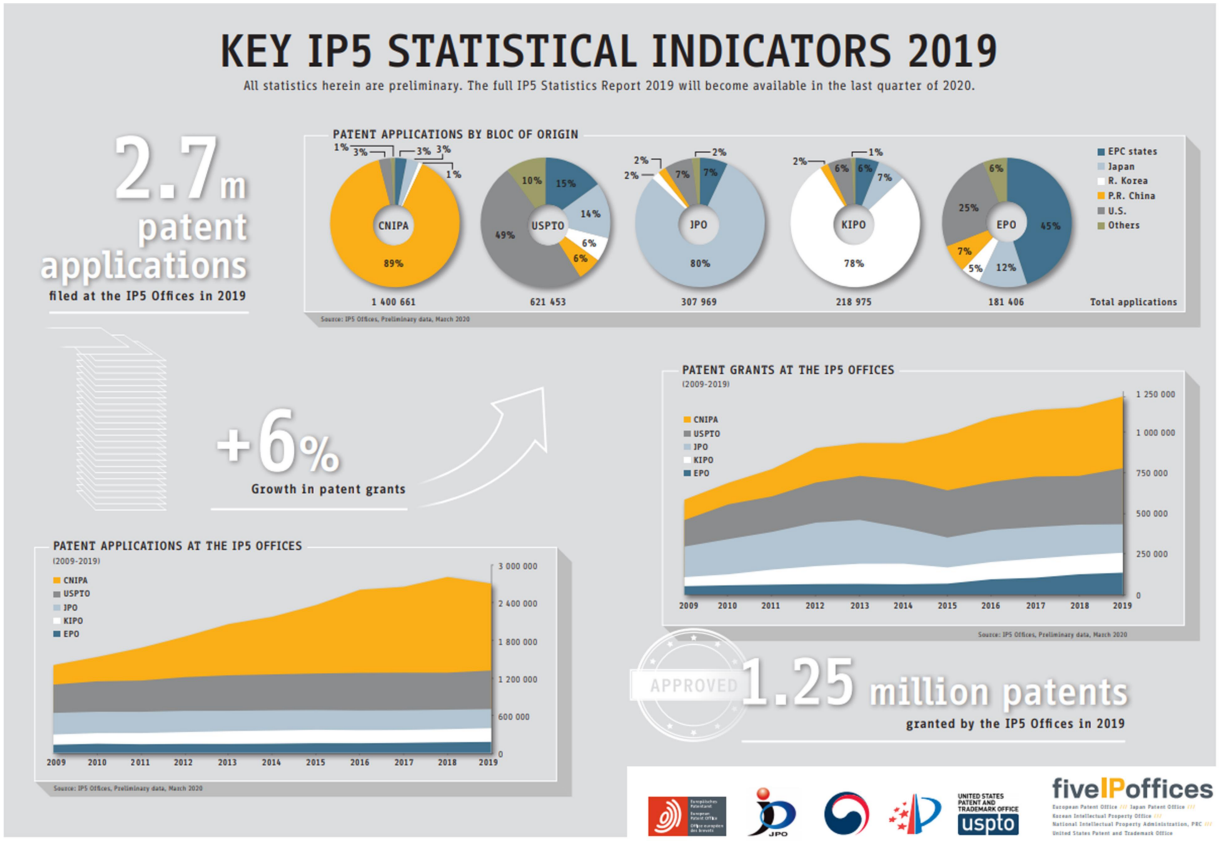

Figure 4 Key IP5 Statistical Indicators 2019

Source: Five IP offices (IP5) - Key Indicators [304]

[303] EPO Newsletter. (2019, June 13). World's five largest patent offices agree on joint task force for emerging technologies and AI. EPO Magazine. Retrieved October 20, 2020, from https://www.epo.org/news-events/news/2019/20190613a.html

[304] Five IP offices IP5 - Key Indicators. (2019). Key IP5 statistical indicators 2019. Five IP offices (IP5). Retrieved October 20, 2020, from https://www.fiveipoffices.org/wcm/connect/fiveipoffices/8c91611d-1ee9-4501-8f64-3867964cc076/Key+IP5+statistical+data+2019.pdf?MOD=AJPERES&CVID=

As we can see from the statistics, the number of patent applications has been steadily rising in the last ten years, almost doubling from 2009 to 2019 to a total of 2.7 million patent applications in 2019.[305] The number of patent grants has also increased significantly, following a similar trend of doubling between 2009 and 2019 to a total of 1.25 million patents granted in 2019, with a 6% increase in patent grants during the last year.[306]

The majority of the patent application growth has been due to the increase in patent applications filed with the China National Intellectual Property Administration office, while the increase in the number of patent grants is distributed more among the agencies, with the China office again being responsible for the majority of the growth.[307]

The only office where the number of patent grants decreased during the last 10 years was the Japan Patent Office. The United States and Europe seems to be the most diverse in terms of the origin of patent applications[308], since only 49% of patents filed with the United States Patent and Trademark Office was from applicants in the United States, and 45% of patents filed with the European Patent Office were from the countries of the European Patent Convention. The fact that the rest of the applications are from countries outside these regions shows that these two regions are favored by companies all over the world for patent registration. This may be explained by many factors, among them the maturity of the Intellectual Property legislation and enforcement in these regions, as well as their market size, especially in the knowledge-based sectors.[309]

The previous decade before 2009 was termed as the "global warming of patents," whereas a large increase in patent application numbers was experienced worldwide owing in large part to the growing number of companies wishing to extend their national patents to other regions and

[305] Five IP offices IP5 - Patent Applications. (2019). Table 1: patent applications at the IP5 Offices in 2019 compared to 2018. Five IP offices (IP5). Retrieved October 20, 2020, from https://www.fiveipoffices.org/wcm/connect/fiveipoffices/fd1937d3-a7e7-4cb3-98a3-b091cd36317b/Table+1+Patent+Applications+in+2019+compared+to+2018.xlsx?MOD=AJPERES&CVID=

[306] Five IP offices IP5 - Patent Grants. (2019). Table 2: granted patents at the IP5 Offices in 2019 compared to 2018. Five IP offices (IP5). Retrieved October 20, 2020, from https://www.fiveipoffices.org/wcm/connect/fiveipoffices/2f7af4e1-15f1-4741-89c3-74c4d566333e/Table+2+Patent+Grants+in+2019+compared+to+2018.xlsx?MOD=AJPERES&CVID=

[307] Croft, J. (2019, July 9). China plays catch-up with Europe and US in patents filing race. Financial Times. Retrieved October 20, 2020, from https://www.ft.com/content/8ecf7464-8d05-11e9-b8cb-26a9caa9d67b

[308] (Five IP offices (IP5) - Patent Applications, 2019)

[309] (Five IP offices (IP5) - Patent Grants, 2019)

countries, rather than a large increase in national filings.[310] In an increasingly globalized world of technology-related markets, especially in the Information and Telecommunication sectors, this is a perfectly reasonable corporate behavior aimed at protecting the company's intangible assets overseas.[311] This last decade is characterized more by the patent boom of Chinese companies, and the international application of those patents, especially the largest Chinese Information and Telecommunication companies such as Huawei and ZTE were much more active than in the previous decade. [312]

The World Intellectual Property Organization publishes its statistics on the working of the Patent Cooperation Treaty (PCT) patents (otherwise known as international patents) each year in their publication called PCT Yearly Review. The PCT Yearly Review 2019 edition, has included a special theme looking at long term statistics of the international patents, for the 40-year anniversary of the Patent Cooperation Treaty. This report section has several significant findings relevant to our investigation, so I am going to examine these each in the following paragraphs.

Since the entry into force of the Patent Cooperation Treaty in 1978 both the number of member countries and the number of applications filed has risen sharply. Compared to 1978, when the Patent Cooperation Treaty had 13 member states, in 2018 the Treaty counted 152 countries. The majority of the Patent Cooperation Treaty member countries were from the high income or upper-middle-income countries, with a combined share of 61.8% in 2018. The trend, however, is that the share in patent applications of the high-income countries is decreasing, and the share of the middle-income countries is increasing. However, the share of low-income economies was negligible even in 1978, and similarly in 2018. [313] We can see a correlation between the number of patents filed and the relative strength of economies. We can observe similar correlations when the world's major economies have grown over the last 40 years, how the

[310] Uppenberg, K. (2010). The knowledge economy in Europe - A review of the 2009 EIB Conference in Economics and Finance. European Investment Bank Economic and Financial Studies, 2010(02), 1-48. Retrieved October 20, 2020, from https://www.eib.org/attachments/efs/the_knowledge_economy_in_europe.pdf page 27

[311] Straus, J. (2008, March 11). Is There a Global Warming of Patents? The Journal of World Intellectual Property, 11, 58-62. 10.1111/j.1747-1796.2008.00334.x

[312] WIPO. (2020). PCT Yearly Review 2020: The International Patent System. World Intellectual Property Organization Publications: PCT Yearly Review. Retrieved November 20, 2020, from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2020.pdf

[313] WIPO. (2019). PCT Yearly Review 2019: The International Patent System. World Intellectual Property Organization Publications - PCT Yearly Review. Retrieved November 21, 2020, from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2019.pdf page 8

number of patent applications from those regions was following similar trends. It merits further scientific investigation and discussion whether the patent system was merely a reflection of economic prosperity or (at least the partial) cause of it. Arguments could be made whereby companies from high-income countries were able to invest more in research and development and thus file the resulting new inventions as patent applications; therefore, the number of patents is a mirror that shows the economic progress of a country. However, arguments could also be made that inventions from companies in middle-income countries have enabled them to protect their economic interests especially through the use of international patents, thus increasing the prosperity in their respective countries.[314] The best examples of the latter case are the top patent applicants of China from the Information and Telecommunication sectors.

These interpretations are not mutually exclusive. In fact, they are in line with the original intentions of the creators of the patent systems, according to which companies who are investing in research and development should be rewarded with the temporary monopoly rights, so they can increase the prosperity of their respective countries directly through their activities, and indirectly increasing the prosperity in all member countries by disclosing their inventions publicly.[315]

The same trend can be observed from the numbers when we look at the patent applications by region. Until around 1995, Europe and North America collectively were responsible for approximately 88% of all patent applications. Since 1995 however, the share of Asia had increased significantly to the point when in 2009, Asia already surpassed North America, and in the next year, Europe as well. By 2018, for the first time in history, more than 50% of the patent applications originated from Asia.[316]

The four countries leading in the number of total applications filed by 2018 were the United States with 1.15 million patent cases, followed by Japan with 640 thousand patent cases, Germany with 390 thousand patent cases, and finally China by 300 thousand patent cases. China's rise in patent cases is even more apparent if we take into consideration that before

[314] Chu, A. C., Kou, Z., & Wang, X. (2019, October 28). Effects of patents on the transition from stagnation to growth. Journal of Population Economics, 33, 395–411. https://doi.org/10.1007/s00148-019-00753-6

[315] (WIPO - Patents, 2020)

[316] (WIPO, 2019, page 10)

1993, Chinese applicants filed a total of five patent applications only, so virtually all their applications came after the mid-1990s.[317]

By 2018, the share in the number of patent applications of China has almost reached the corresponding value from the United States and surpassed Japan, all-around 20% of the international patent applications. Germany and Korea came next with around 7% each.[318]

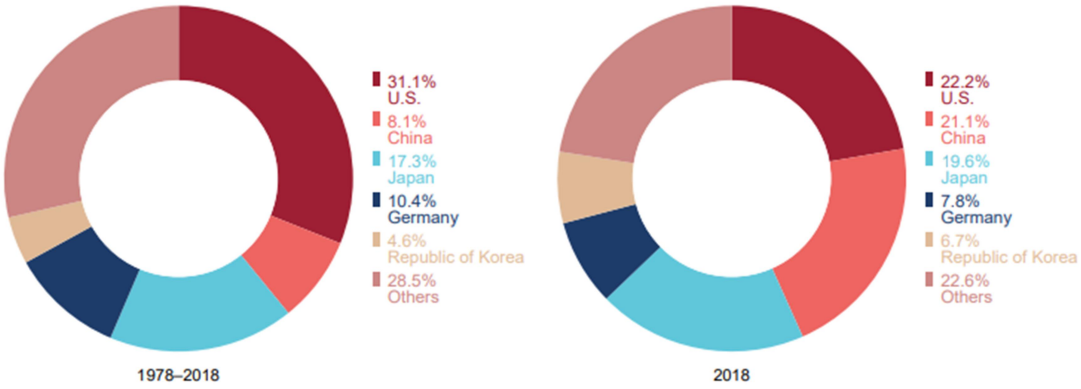

Figure 5 Distribution of PCT applications filed by origin, 1978–2018 and 2018

Source: WIPO Statistics Database, March 2019 [319]

Looking at the distribution by the fields of technology reveals other interesting details about the development of technologies worldwide over time. In the first 20 years between 1978 and 1998, the main fields of technology for patents were medical technology, biotechnology, organic chemistry, measurement, and electrical machinery, accounting for a total of around 28% of international patent applications. In comparison, in the last 20 years between 1998 and 2018, the main fields of technology for patents were computer technology, medical technology, digital communication, electrical machinery, and pharmaceuticals, accounting for a total of around 31% of international patent applications.[320]

[317] Id.. page 10
[318] Id.. page 11
[319] Id.. page 11
[320] Id.. page 13

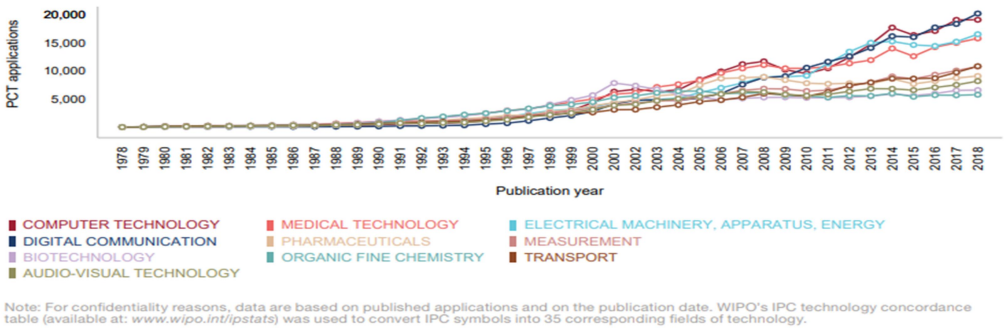

Figure 6 Trend of the top 10 fields of technology, 1978–2018

Source: WIPO Statistics Database, March 2019 [321]

From the trends above we can highlight the rise of computers and telecommunication, and since the advent of smartphones, a combination of both. The developments in the smartphone patent space were made all the more transparent by the wide media coverage of the so-called 'smartphone patent wars'.[322]

This patent trend is the reason why I have decided to choose a very important area of acquisitions when patents remained unutilized from exactly these fields of technology, the Information and Telecommunications industry. By highlighting a case from the most prominent technologies involving today's patented innovations, I could more confidently determine the importance of the problem identified in this dissertation. The 4G and 5G telecom networks are an especially prominent and easy to understand example (involving a crucial technology to the operation of today's smartphones) to investigate and determine whether their development was due to careful consideration on the part of the antitrust law enforcement agencies.

The final important statistics from this report are the top companies that have applied for international patents during the last 40 years. The following figure shows their overall ranking throughout the 40 years of the period between 1978 and 2018, and their relative ranking in the years 1990, 2000, 2010, 2018; therefore, we can draw some conclusions on their patenting activities over time as well.[323]

[321] Id.. page 13

[322] Kumar, A., & Bhasin, B. S. (2016, October 12). Innovation and survival: lessons from the smartphone wars. IAM Magazine. Retrieved October 20, 2020, from https://www.iam-media.com/innovation-and-survival-lessons-smartphone-wars

[323] (WIPO, 2019, page 14)

Ranking in					Applicant	Origin	PCT applications
1978–2018	1990	2000	2010	2018			1978–2018
1	23	6	1	12	PANASONIC IP MANAGEMENT CO., LTD.	Japan	34,081
2		6,896	4	1	HUAWEI TECHNOLOGIES CO., LTD.	China	33,899
3		2	5	18	KONINKLIJKE PHILIPS ELECTRONICS N.V.	Netherlands	32,783
4	2	5	6	10	ROBERT BOSCH CORPORATION	Germany	27,654
5	5	1	12	14	SIEMENS AKTIENGESELLSCHAFT	Germany	27,403
6			2	5	ZTE CORPORATION	China	25,746
7	1,510	16	3	4	QUALCOMM INCORPORATED	U.S.	24,858
8	98	3	9	9	TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)	Sweden	22,429
9	72	19	14	2	MITSUBISHI ELECTRIC CORPORATION	Japan	19,342
10		22	62	3	INTEL CORPORATION	U.S.	17,963
11		378	7	8	LG ELECTRONICS INC.	Republic of Korea	17,349
12	833	261	8	16	SHARP KABUSHIKI KAISHA	Japan	16,593
13	1,510	37	17	6	SAMSUNG ELECTRONICS CO., LTD.	Republic of Korea	15,680
14	195	13	16	30	3M INNOVATIVE PROPERTIES COMPANY	U.S.	14,746
15	22	7	13	34	BASF SE	Germany	14,654
16	127	17	28	13	SONY CORPORATION	Japan	14,563
17	1,510	223	11	236	TOYOTA JIDOSHA KABUSHIKI KAISHA	Japan	14,201
18		4	27	36	PROCTER & GAMBLE COMPANY	U.S.	13,603
19		122	10	22	NEC CORPORATION	Japan	13,282
20		30	20	11	MICROSOFT TECHNOLOGY LICENSING, LLC	U.S.	12,870
21	1,510	160	18	15	HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.	U.S.	12,095
22		61	15	35	NOKIA TECHNOLOGIES OY	Finland	11,749
23	34	27	19	43	FUJITSU LIMITED	Japan	10,049
24	84	18	26	27	HITACHI, LTD.	Japan	9,854
25	6	12	116	329	MOTOROLA, INC.	U.S.	9,666

Figure 7 Top 25 PCT applicants, 1978–2018

Source: WIPO Statistics Database, March 2019 [324]

The large majority of these companies are involved in digital communication or computer industries. There are also some notable companies from the electrical and automobile industries as well. Most of the companies are from Japan, Korea, China, the United States, and Germany, with the notable exceptions of Philips and Nokia that are headquartered in other European countries. We can observe the relative rise of the digital communication and computer industry companies that have grown to be the largest patent applicants than companies from other industries.[325]

In the following section, I will look at the European Patent Organization statistical database, which are the key countries, industries, and companies in Europe who are taking advantage of the international patent system.

[324] Id.. page 14
[325] Id.. page 14

The European Patent Organization is an international organization responsible for the policies governing and granting patents based on the European Patent Convention of Munich signed in 1973. Its objective of granting such "European patents" is executed by the European Patent Office, which has its headquarters in Munich and has branches in the Hague, Berlin, and Vienna.[326]

The preamble of the European Patent Convention defines the objectives of the European Patent Organization as follows:

> "The Contracting States,
>
> DESIRING to strengthen co-operation between the States of Europe in respect of the protection of inventions,
>
> DESIRING that such protection may be obtained in those States by a single procedure for the grant of patents and by the establishment of certain standard rules governing patents so granted,
>
> DESIRING, for this purpose, to conclude a Convention which establishes a European Patent Organisation and which constitutes a special agreement within the meaning of Article 19 of the Convention for the Protection of Industrial Property, signed in Paris on 20 March 1883 and last revised on 14 July 1967, and a regional patent treaty within the meaning of Article 45, paragraph 1, of the Patent Cooperation Treaty of 19 June 1970,
>
> HAVE AGREED on the following provisions:" [327]

The European Patent Organization has 38 member states at the moment, including all member states of the European Union, Albania, North Macedonia, Iceland, Liechtenstein, Monaco, Norway, San Marino, Serbia, Switzerland, and Turkey. [328]

The European Patent Office publishes their statistics yearly, in a so-called Patent Index. The Patent Index of 2019 has included statistics about the patenting activity in Europe in 2019 and some comparisons to the previous years. The number of patent applications filed at the European Patent Office since 2015 has been increasing steadily, by a yearly average of 4-5%. The total number of patent applications in 2019 has reached about 181 thousand. The ratio of patent applications from the different regions have been relatively stable, with the European

[326] European Patent Office. (2019, April 5). About us - Legal foundations. EPO - Legal Foundations. Retrieved October 20, 2020, from https://www.epo.org/about-us/foundation.html

[327] (European Patent Office, 2007)

[328] (European Patent Office, 2019)

Patent Organization member countries and the United States representing the majority. There was a notable rise in the patenting activity of applicants from the People's Republic of China. European patent applicants represent 45%, and the United States patent applicants represent 25% of the total number of patent applications.[329]

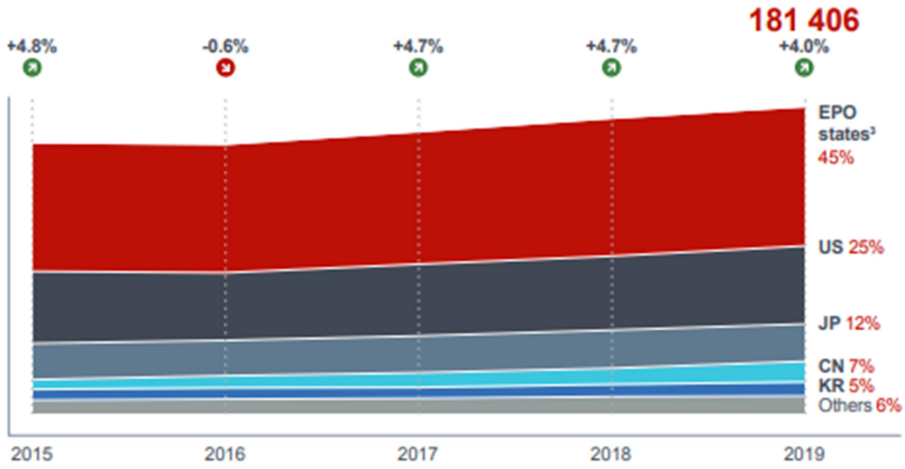

Figure 8 European Patent Application Index

Source: European Patent Index, 2019 [330]

Following the global trends, as mentioned above, the European Patent Office has received most of the increase in patent applications in the fields of digital communication and computer technologies. Together with a relatively stable number of medical technology patents, these two technological fields form the top 3 fields of patent applications. [331] The top applicants submitting patent applications to the European Patent Office in 2019 were essentially the same companies we saw in the global ranking, albeit their relative positions are different. From the Chinese companies Huawei is present as the leader of patent applications, but ZTE is notably missing from the statistics. Alphabet, the parent company of Google has a strong and growing presence in the European Patent Office application numbers as well, head-to-head with Microsoft. The other companies are essentially the same as we saw in the global ranking.[332]

[329] European Patent Office - Patent Index. (2020, January 27). Patent Index 2019 - Statistics at a glance. European Patent Office - Annual reports and statistics. Retrieved November 20, 2020, from http://documents.epo.org/projects/babylon/eponet.nsf/0/BC45C92E5C077B10C1258527004E95C0/$File/Patent_Index_2019_statistics_at_a_glance_en.pdf page 2
[330] Id.. page 2
[331] Id..
[332] Id.. page 6

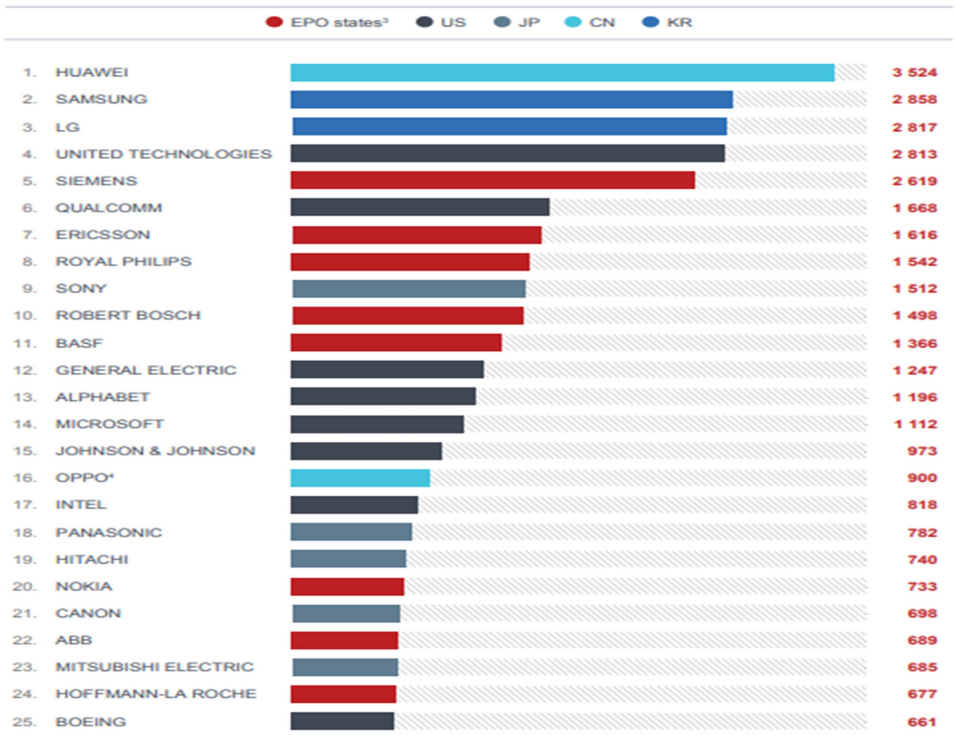

Figure 9 Global Ranking Patent Application

Source: European Patent Index, 2019 [333]

The trends we have seen globally, wherein the digital communication and computer technology companies dominate the markets, are very similar in terms of patents in Europe. Although European and the United States' companies are still very much representing the majority in Europe, however, Chinese, and Korean companies patenting activity has risen in the last few years.[334]

One more important factor is the patenting activity of large versus small companies versus universities and public research organizations that the European Patent Office reported on. The large corporations are responsible for the majority of patents. However, there is a significant minority of patents submitted by small and medium-sized corporations as well, amounting to 18% in 2019.[335]

[333] Id.. page 6
[334] Id.. page 6
[335] Id.. page 8

In this chapter, I have investigated the patent statistics. They showed that the number of patents has been constantly growing in the last decades, especially in computers and telecom industries. There is also a strong correlation between the number of patents and the strength of the economies. Strong economies such as the United States, Germany, Japan, South Korea dominate, and the rise of China is also very noticeable. The large companies are holding the majority of the patents. These findings show the relevance and importance of the patents and their usage. The findings about the relationship of company size to patent ownership, as well as the significant technologies I am planning to use in my case study selection as well, to make my case study cover as much of the patent area as possible, both from the technology and from the company size perspectives.

2.4. Patent Licensing and Commercialization

In this chapter, I will try to answer the question: How are companies typically using patents? Therefore, I will investigate how patents are usually licensed and utilized by companies, especially in the Information Technology and Telecommunication sectors. I will also use the findings of this investigation in my method of proof for the case study in the next chapter, to cover the usage scenarios and determine whether important patents remained unutilized.

There are two major business strategies for the utilization patents. Brad Woodcox (2012) describes the licensing/sale and commercialization scenarios of the patent as the most prominent utilization forms.[336]

"*Licensing/Sale*. This scenario often arises when an inventor chooses not to pursue a startup company full-time but still wants to profit from the idea. The inventor conceptualizes the idea and may develop a prototype. In order to protect the idea, the inventor desires to obtain one or more patents covering the elements of the invention. The inventor will then license or sell these patents to another company, which is in a position to commercialize the invention. (This strategy is typically viewed as a lower risk and lower reward than the second scenario, as some of the risk and reward is shared with the licensee or acquirer of the patents).

In general, a granted patent will entice more demand and a higher price tag than a patent application, as the granted patent has clear rights while the application just has the possibility

[336] Woodcox, B. (2012, December 9). An Entrepreneur's Guide To Patents: Application Strategy For Utilization Or Monetization. TechCrunch. Retrieved October 20, 2020, from https://techcrunch.com/2012/12/08/an-entrepreneurs-guide-to-patents-application-strategy-for-utilization-or-monetization/

for future rights (and additional costs of continuing prosecution of the application). Hence, in this scenario, an inventor is incentivized to obtain a patent quickly in order to capitalize on the potential financial benefits of the granted patent.

Commercialize. A second scenario arises when an inventor wants to directly commercialize the invention. This may include building, manufacturing, and/or selling the elements associated with the invention. In this case, an inventor would desire to utilize patents to attempt to block competitors and gain a competitive advantage. However, an inventor could only enforce these rights after the patent is granted. Further, if the company needs to raise capital, some investors will utilize the presence of patents in their determination to invest or not invest and the presence may even affect the valuation determined during the investment round. Hence, in this scenario, an inventor is again incentivized to obtain a patent quickly in order to capitalize on the potential financial benefits of the granted patent."[337]

I would argue that from the options above, the first and most obvious one is to use the patent in the company's own commercial activities. These activities may include the production or outsourced manufacture of the invention, assembly, and marketing, sales. Marketing and sales also may be performed under the company's own brand or that of a channel partner, called white-label sales.[338] If we are talking about a small company, this strategy will usually involve the raising of some form of capital, since the production, manufacture, assembly, marketing and sales activities usually require significant investment which the small company owner may not have. Even if they would have, they still often go for investment to share the risks with investors and co-founders.[339] In the case of a large company, this strategy usually involves senior management allocating resources to the new product line, based on careful assessment of the return on investment (ROI) possibilities.[340]

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[337] Id..

[338] Gainor, D. (2014, June 3). Why A White Label Solution Is Easier Than Building Your Own. Forbes. Retrieved October 20, 2020, from https://www.forbes.com/sites/theyec/2014/06/03/why-a-white-label-solution-is-easier-than-building-your-own/

[339] Polovets, L. (2016, March 3). Startups are Risk Bundles. Coding VC. Retrieved October 20, 2020, from https://www.codingvc.com/startups-are-risk-bundles/

[340] Zamfir, M., Manea, M., & Ionescu, L. (2016, January 26). Return On Investment – Indicator for Measuring the Profitability of Invested Capital. Valahian Journal of Economic Sciences, 7. Retrieved October 20, 2020, from https://www.researchgate.net/publication/309516326_Return_On_Investment_-_Indicator_for_Measuring_the_Profitability_of_Invested_Capital/fulltext/58153e4008aeb720f684ae8d/Return-On-Investment-Indicator-for-Measuring-the-Profitability-of-Invested-Capital.pdf

Licensing or selling the patent is an often-used strategy as well. Not only in the case of the inventors that do not wish to start their own company full time as the article above mentions, but also in other business scenarios as well. For example, in case of an invention with a large potential market, building and scaling a single company, especially to many different geographies may require more time than desirable, and thus may decrease the overall value of the patent. In such cases, it is often in the patent holder's best interest to sell or license the patent even by using an exclusive licensing deal to cover the customer demand in some geographies that the patent owner cannot immediately cover by their own commercial activities. Such exclusive licenses are widely used, even to the extent that the national or international patent courts allow the exclusive licensee to have similar rights in patent infringement lawsuits that the patent owner has. For this purpose, in some jurisdictions, exclusive licenses must be registered with the patent office as well.[341] There may also be cases when the patent owner does not even plan to launch any commercial activity, their sole intention is to license or sell the monopoly rights of the invention and generate revenue. As far as our investigation is concerned both strategies are completely justified use cases, and both could provide the customers with access to the patented innovation.

In general, determining whether a company has used a patent in their commercial activities is usually more straightforward. In case of a product patent, it is enough to look at the product portfolio of the company and we can determine if the patented invention was used.[342] In case of a method or process patent it is harder, because we will have to have information about how the company produces its products or services. This is even more difficult in international cases because the different regulatory bodies such as the United States Patent Office[343] and the

[341] European Patent Office - European Patent Academy. (2018, May 8). The effects of licences under patents. European Patent Academy - Patent litigation. Block 2. Retrieved October 20, 2020, from https://e-courses.epo.org/wbts_int/litigation/Licences.pdf page 4

[342] Queen's University Library. (2020, September 10). How to Find Patents Related to a Product. Research Guides - Patents and Designs. Retrieved October 20, 2020, from https://guides.library.queensu.ca/patents/product-search

[343] Farkas, B. (2012). How Business Method Patents Protect Internet and Software Companies - Is a business methods patent right for your business? NOLO. Retrieved October 20, 2020, from https://www.nolo.com/legal-encyclopedia/business-method-patents-30098.html.

European Patent Office[344] have different theoretical and practical approaches to these types of inventions.

However, there are no widely accepted databases (public or otherwise) or statistics available for research purposes on patent licensing activities. However, there are some licensing statistics published by the European Patent Office according to Chapter 5.11 of the European Patent Guide:[345]

> "Licences and other rights
>
> 5.11.008
>
> A European patent application may be licensed or give rise to rights in rem and may be the subject of legal means of execution in respect of the whole or part of the territories of the designated contracting states.
>
> 5.11.009
>
> Rule 22 applies to the registration of the grant or transfer of a licence, the establishment or transfer of a right in rem and any legal means of execution affecting such an application (see point 5.11.003). The above standard of proof applies to the registration of licences and rights in rem. For the registration of legal means of execution, however, the instrument itself (the original or a copy thereof) must be filed.
>
> 5.11.010
>
> Licences, rights in rem and legal means of execution are registered only in respect of pending European patent applications. No such rights are entered in the European Patent Register after a European patent has been granted.
>
> 5.11.011
>
> A licence will be recorded as an exclusive licence if the applicant and the licensee so request. A licence will be recorded as a sub-licence where it is granted by a licensee whose

[344] Wagner, S. M. (2006). Business Method Patents in Europe and their Strategic Use — Evidence from Franking Device Manufacturers. In Economic Analyses of the European Patent System (pp. 69-106). Deutscher Universitäts-Verlag/GWV Fachverlage GmbH, Wiesbaden. https://doi.org/10.1007/978-3-8350-9050-7

[345] European Patent Office - European Patent Guide. (2020, October 19). Licences and other rights. European Patent Guide. Retrieved November 20, 2020, from https://www.epo.org/applying/european/Guide-for-applicants/html/e/ga_c5_11_3.html

licence is recorded in the European Patent Register. The terms and conditions of the licences are governed by the national law applicable in each case.

5.11.012

Upon request and subject to payment of the prescribed administrative fee, a registration of a licence or other right will be cancelled, subject to submission of documents providing evidence that the right has lapsed or of a declaration by the proprietor of the right that they consent to its cancellation".[346]

The main advantage of registering licenses with the European Patent Office is when a company is licensing a patent pending invention, and the licensee's rights need to be protected in case of a patent application transfer.[347] However, this registration is neither mandatory, nor explicitly covers patents that have already been granted.[348]

Therefore, if we want to get an idea about patent licensing volumes and activities, we are facing significant challenges to try and determine how extensively patents are actually utilized in the economy.

The European Commission, realizing the relative lack of reliable information in patent licensing statistics, conducted a survey. The survey was conducted by the Technopolis Group Vienna in the year 2013.[349]

The main objectives were described as follows: "The European Commission, DG Research and Innovation, contracted a consortium consisting of Incentim – KU Leuven Research and Development, KITeS - Università Bocconi and Technopolis Consulting Group as subcontractor to perform a study on the 'Measurement and analysis of knowledge and R&D exploitation flows, assessed by patent and licensing data'. Part of the study was the execution of a survey on patent licensing behaviour of European firms. This part of the study, performed by Technopolis and executed between March 2012 and April 2013, is the subject of this report. It constitutes deliverable D2.3 as outlined by the Commission´s terms of reference. This survey has been

[346] Id..

[347] European Patent Office - Patent Application Transfer. (2019, January 19). Transfer of the European patent application. European Patent Office Guidelines for Examination. Retrieved October 20, 2020, from https://www.epo.org/law-practice/legal-texts/html/guidelines/e/e_xiv_3.htm

[348] (European Patent Office - European Patent Guide, 2020)

[349] Radauer, A., & Dudenbostel, T. (2013). PATLICE Survey - Survey on patent licensing activities by patenting firms. Technopolis Group Vienna. Retrieved October 20, 2020, from https://ec.europa.eu/research/innovation-union/pdf/patlice-survey.pdf

commissioned against the backdrop of a growing importance of patents, as indicated by the soaring number of patent applications (more than 50% increase in yearly applications at the EPO by comparison to 10 years ago) and a much broader use of patents today other than for protective purposes. Such reasons include also revenue generation through licensing or the usage of patents to conclude cross-licensing agreements with other partners. However, data specifically on patent licensing is hardly available and not regularly collected. The survey provided a means to collect very specific and detailed data on the scope of patent licensing activities, the rationales for engaging into patent and technology licensing, or the question that are the main regions for the "trade" of patents via licensing."[350]

The report acknowledges the fact that data is scarce and infrequent, and at the same time highlights the importance of understanding the actual spread of licensing activities, since it is a major strategy of patent utilization.[351]

In the next section, I will examine each of the main findings of the report and identify their significance in terms of my area of study: acquisitions when patents remain unutilized.

Patent licensing is an increasingly important economic area.

"The importance of licensing has increased over the years, as most firms report increasing licensing revenues over time and an increasing number of licensing deals. This can be observed with all major industries for which patenting is relevant. Patent licensing has to be mostly understood as technology licensing, as patents are rarely out-licensed on their own (i.e., licensing agreements usually cover more than just the patents)."[352]

This underlines my point that licensing patents can be an absolutely relevant solution in cases where patents would otherwise remain unutilized. I will therefore include the encouragement of patent licensing in my proposed solutions later in this thesis.

It is also important to note that *patents are usually not licensed on their own*, in order for licensing agreements to be relevant, effective and efficient, industrial know-how and similar forms of information such as trade secrets need to be shared with the licensee as well, to enable

[350] Id.. page II
[351] (Woodcox, 2012)
[352] (Radauer & Dudenbostel, 2013, page II)

their efficient operation.[353] This in turn will ensure that they can provide the products or services in similar quality that the patent owner company could.

- "Based on a per-firm view analysis of European patent licensors, patents are predominantly out-licensed to firms not affiliated with the licensors. Trade in patents via (out-)licensing occurs predominantly within Europe. The second most important trading region is North America, leaving behind Asian regions to a considerable extent. Most licensing occurs among competitors, and only to a smaller extent between suppliers and (B2B) customers.
- The most important motives to out-license are revenue-generating motives, to ensure freedom-to-operate as well as stopping patent infringements. There are differences between SMEs and large firms, with SMEs placing more importance on revenue generating motives, while large firms out-license more to ensure FTO and stop (perceived) infringement."[354]

According to the above, *licensing usually happens between competitors in Europe*, and in some cases North American companies are also involved. Licensing an invention to a competitor may make sense if the potential market is large enough that both companies can make profits by better serving the customer demand, and the patent owner company may generate *extra revenue with the licensing deal*. In terms of our investigation, it is important to note whether such licensing activities are encouraged by the regulators in case of acquisitions when patents remain unutilized, or they were out of the scope of the activities of the regulator.

- "The by far *most important barrier for patent out-licensing is the potential loss of their competitive/technological edge,* followed by difficulties to identify the right partners. Another important barrier, in particular for micro-enterprises and small firms, is that the patented technology may not be developed enough. We find a considerable share of firms where the expectations they set into their out-licensing were seemingly not met in reality."[355]

[353] Snyder, J. (2019, May 10). Important Considerations In Licensing Know-How with Patents. Kilpatrick Townsend. Retrieved October 20, 2020, from https://www.acc.com/sites/default/files/program-materials/upload/5.9%20Licensing%20Know-How%20with%20Patents.pdf page 7
[354] (Radauer & Dudenbostel, 2013, page II)
[355] Id.. page III

These findings are also very relevant to our topic, since the barriers to licensing may prove to be obstacles to the customer access to innovation as well. Especially such cases should be identified and prevented when patents remain unutilized so that the acquiring company may keep their technological advantage, without providing the superior products or services to their customers by utilizing the invention acquired. Even if this is just one of many cases why an acquiring company may choose to leave a patent unutilized, it is however very much in line with the findings of this survey. Another consideration as identified may be a lower profit that the company may receive from out-licensing compared to what was planned or expected, and these scenarios may ultimately also lead to patents remaining unutilized.

- "The most important channels by which licensors get in touch with licensees are informal networks, followed by their own research, being contacted by the licensee and events such as trade fairs. Intermediaries searching on the licensor´s behalf and technology/licensing exchange platforms are (currently) almost irrelevant. SMEs use all means to get in touch with licensees more intensely than large firms."[356]

Small companies seeking out all the available channels to license their inventions is understandable if we consider that their interests often are in a very extensive licensing scheme, so that most of the profits of offering the new products or services to customers may be captured, in all geographies involved. On the other hand, larger companies may or may not want to utilize the new inventions in fear of cannibalizing their existing product line revenues or risking their reputation should a new product or service fail. This provides them with some incentives not to utilize patents, instead follow a so-called defensive patent strategy.[357] Thus, these defensive patent strategies may lead to customers failing to get access to the patented innovation.

- "We see a cascade of measures by which patents are shared/transferred to third parties. (Bilateral) out-licensing of patents is the means probably used most, followed by sale of patents and entering joint ventures. Patent pools are rarely used with the exception of

[356] Id.. page III

[357] Dodds, J. (2007). Patenting Strategies: Building an IP Fortress. In Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices (pp. 911-920). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A. Retrieved October 20, 2020, from http://www.iphandbook.org/handbook/chPDFs/ch10/ipHandbook-Ch%2010%2004%20Dodds%20Patenting%20Strategies.pdf page 919

groups of companies in specific technology fields where standards play an important role. Patent auction events are currently irrelevant for the majority of firms."[358]

These findings point to *bilateral out-licensing agreements, sales of patents and joint ventures* being the most relevant use cases of patent licensing activities. It will be important in this thesis to try and investigate whether the conduct of the regulators usually involves encouragement of any of these scenarios to try and keep patents utilized. My proposed solution should also encourage licensing activities and accept sales or joint ventures as well to encourage the utilization of patents.

- "The strongest motive to in-license patents is to ensure Freedom-to-Operate (FTO), followed by closing technological gaps and enabling rapid time to market. The most significant barriers are unacceptable terms of the licensor as well as the refusal of the potential licensors to grant licenses at all." [359]

These findings are highlighting a possible use case, when the licensor may follow strict *negotiation tactics* to such an extent, that the *potential licensees cannot reasonably make a licensing deal*. This use case - as we will see in later chapters - has been the exact scenario when compulsory licenses have been issued by some governments in case of some important pharmaceuticals to try and supply the local market in developing countries[360], and ensure customer access to innovation.[361] In my solution proposal therefore, I will make sure to include some compulsory licensing options, but as a last resort incentivizing factor only, to encourage these voluntary negotiations to reach a conclusion.

- "Overall, many barriers to out- and in-licensing have not been judged to be of high importance, and we received feedback that licensing is not a big or the biggest problem area for the firms in the context of putting patents to use. Other issues, such as

[358] (Radauer & Dudenbostel, 2013, page III)
[359] Id.. page III
[360] World Health Organization. (2006). THE DOHA DECLARATION ON THE TRIPS AGREEMENT AND PUBLIC HEALTH. WHO. Retrieved October 20, 2020, from https://www.who.int/medicines/areas/policy/doha_declaration/en/
[361] World Trade Organization. (2006, September). TRIPS and pharmaceutical patents: fact sheet. World Trade Organization - Trade Topics - TRIPS. Retrieved October 20, 2020, from https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm00_e.htm

enforcement of IPR or litigation practices in jurisdictions abroad are often judged to be more problematic areas than licensing."[362]

For the companies involved, the *costs of litigation abroad* seem to be a much *more pressing problem*, than the licensing itself. However, perceived, or real difficulties and costs associated with such litigations may in turn discourage patent owner companies from producing, importing, or otherwise supplying the domestic market e.g., through licensing deals. This is also an undesirable outcome that developing countries may especially face, when considering that many companies from developing nations are often concerned with the potential need to litigate in such countries.[363]

In this chapter, I investigated the patent utilization scenarios. From our discussion above, we can draw the following important conclusions.

- Companies can either utilize their patents on the market, thus provide customers with access to innovation, under their independent commercial activities or
- they can license them, to generate revenue or to avoid infringement that would involve lengthy litigation, especially in foreign jurisdictions, among other reasons.[364]
- Joint ventures are also often used.[365]

2.5. Acquisitions when Patents Remain Unutilized: Case Study

In this chapter I will investigate in detail a practical case of acquisitions where patents remain unutilized. In order to be able to make a deliberate and careful selection of case study, I will use the insights uncovered in the previous two chapters. I will also use these insights to identify the method of proof for the case study. Finally, I will conduct the case study itself.

2.5.1. Case selection criteria and method of proof

As we have seen from both the global patent statistics and those of the European Patent Office, the key technological areas, especially in terms considering their recent growth trends, are the

[362] (Radauer & Dudenbostel, 2013, page III)
[363] Spence, W. C. (2019, October 3). Prepare for litigation and avoid it where possible. IAM Magazine. Retrieved October 20, 2020, from https://www.iam-media.com/prepare-litigation-and-avoid-it-where-possible
[364] (Radauer & Dudenbostel, 2013, page II)
[365] Id.. page II

Digital Communication and Computer Technologies fields. Therefore, I have paid careful attention to choosing a case study that involves these technologies.

From the patent application statistics related to company size[366], we can conclude the logical division of cases of acquisitions with patent involvement:

- Small or medium-sized patent holder company acquisitions
- Large patent holder company acquisitions.

In the case of small or medium-sized patent holder company acquisitions, the merger and acquisitions control are often not enforced due to a perceived low market impact. Therefore, merger and control case data are hard to find. The statistics are also scarce on how many of these companies get acquired because these acquisitions are considered as completely private contracts.[367] It is even harder to determine whether the patents that the small or medium-sized companies held were utilized or remained unutilized after the acquisition.

In the case of a large patent holder company getting acquired, the merger and acquisition control is often enforced due to a perceived high market impact, to the point when even a dominant market position may be established. Competition case law data may thus be found much easier, for example in the European Union Competition Case Law databases.[368] Market research is also more straightforward to credibly determine whether the patents under investigation were utilized after the acquisition, since these companies issue many press releases, and the industry analysis of their respective sectors will very likely include them.

Therefore, while it may be beneficial from both the investigative coverage and the subsequent solution presentation sides to include the companies when merger control procedures are not activated, I will focus on the ones when these measures come into play. It can be an interesting topic of further research, especially considering the acquisitions of patent holder startup companies by larger players, to determine the frequency, customer effects and overall economic impact of such acquisitions as well.[369]

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[366] Id.. page 8

[367] OECD. (2020). Start-ups, Killer Acquisitions and Merger Control. OECD. Retrieved December 20, 2020, from http://www.oecd.org/daf/competition/start-ups-killer-acquisitions-and-merger-control-2020.pdf

[368] European Commission. (2012, April 16). European Courts Judgements. European Commission - Competition. Retrieved October 20, 2020, from https://ec.europa.eu/competition/court/index.html

[369] (European Patent Office - Patent Index, 2020, page 8)

In order to prove the hypothesis of this thesis according to which there are important cases of acquisitions when patents remain unutilized, and to examine the detrimental effects of such acquisition scenarios it is sufficient to analyze the larger patent holder company acquisition data that involves merger and acquisition control.

As far as the method of proof is concerned, I want to be able to determine whether the scenario of acquisitions where patents remained unutilized takes places in a particular acquisition. In my case study description therefore, I will need to investigate the utilization scenarios. I need to determine,

i. whether the acquired patents were used in the independent commercial activities of the acquiring company after the merger and acquisition procedure ended,
ii. whether the patents were used or improved upon by other companies active in the specific innovation area, which I could use as a signal of a private licensing agreement,
iii. whether there were joint ventures between the patent acquiring company and another company that improved upon the patent being active in the specific innovation area.

If none of the above patent utilization methods took place, we can consider it proven that in the case under study the patent remained unutilized in the markets of the acquiring company.

Even if the patent did not remain unutilized, it's still important to examine what information was considered in the merger and acquisition investigation cases by the competition authorities about the likelihood of the patent utilization scenarios mentioned above, whether the authority actually took this information into consideration. This analysis is also important to show whether the current merger and acquisition control procedures take into account the risk of customers losing access to innovation. This examination we will perform in a subsequent chapter on Protecting Customer Access to Innovation.

Considering all of the above selection criteria and method of proof, in this chapter I will examine a case study of an important innovation area in Information and Communications Technology, the case of Gallium Nitride RF Power Transistors, which is used more extensively in the current 4G LTE networks and are expected to grow both in innovation (Intellectual Property) and utilization in the developing 5G networks.[370] I am going to analyze the case of

[370] Fogarty, K. (2019, August 15). GaN Versus Silicon For 5G. Semiconductor Engineering. Retrieved October 20, 2020, from https://semiengineering.com/gan-versus-silicon-for-5g/

Freescale Semiconductors, a former frontrunner in the GaN innovation area, that was acquired by NXP Semiconductors as part of a consolidation trend in the semiconductor manufacturing industry.[371] I will attempt to show that the acquiring company almost completely abandoned the GaN product line and fell behind in the related Intellectual Property landscape. I will also attempt to show that other companies with patent portfolios independent from NXP and Freescale had to take up the Intellectual Property leadership and develop the Gallium Nitride Radio Frequency Power Transistor technology further on their own. In the next chapter, I will take this case study further by examining the conduct of the competition agency involved in the merger and acquisition investigation and show that there were no safeguards or considerations protecting the access to innovation of the customers, quite the opposite.

2.5.2. The Semiconductor Industry

In this chapter, I will examine the Semiconductor Industry, the different products and subcategories of products in the industry at the time of the merger control procedure, so as to show the technological situation and market structure before the NXP Semiconductors - Freescale Semiconductor acquisition.

The European Commission Directorate-General for Competition, the department of the Commission performing the merger control for the NXP Semiconductors - Freescale Semiconductor acquisition summarized the industry as follows:[372]

> "The proposed transaction concerns the manufacturing and sale of semiconductor devices. (10) Semiconductors are materials, such as silicon, which can act as an insulator, but are also capable of conducting electricity. Semiconductors are at the heart of devices such as diodes, transistors and other electronic components, and can be found in virtually every electronic device today. The end-products that contain semiconductor devices range from base stations, mobile phones, computers, domestic appliances and cars to medical equipment, identification systems, large-scale industry electronics and aerospace equipment.

[371] NXP Investor Relations. (2015, December 7). NXP and Freescale Announce Completion of Merger. NXP Investor Relations Press Releases. Retrieved October 20, 2020, from https://investors.nxp.com/news-releases/news-release-details/nxp-and-freescale-announce-completion-merger

[372] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 3

(11) Semiconductor devices are rarely bought as end-products by consumers. They are mainly bought by equipment manufacturers in virtually all sectors within the electronic equipment industry."[373]

Semiconductors therefore can be understood as the essential building blocks in today's digital economies, which are a part of nearly all electronic devices, be it consumer devices or backbone infrastructure devices in several industries including especially the information communication technology sectors.[374]

The semiconductors were further subdivided by the Commission's Department of Competition into the following four categories:

- Integrated circuits (ICs)
- Discretes
- Optical Semiconductors
- Sensors and Actuators.[375]

Integrated Circuits (IC) are defined as follows:

"An IC is a semiconductor device composed of diodes, transistors and other electronic components, combined with conductive interconnect material, which controls the current and voltage of electricity running through it. While the first ICs consisted of a handful of components, over the year's ICs have become increasingly compact and complicated. Current existing ICs used in electronic devices are called "microchips" or "chips" and can contain several billion transistors along with diodes and other electronic components."[376]

This market of the Integrated Circuits ("chips and microchips") had at the time of the merger control procedure significant competition, and the two companies involved in the acquisition were not going to have a combined market share to cause concerns in the markets of the member states of the European Union. The patent landscape of these circuits is not part of our investigation either, so we can safely exclude these products from this case study. The Optical

[373] Id.. page 3

[374] Bos, J. (2020, August 18). Let's get digital: identifying investment opportunities in semiconductors. NN Investment Partners. Retrieved October 20, 2020, from https://www.nnip.com/en-INT/professional/insights/lets-get-digital-identifying-investment-opportunities-in-semiconductors

[375] (European Commission DG Competition, 2015, page 3)

[376] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 4

Semiconductors are defined as follows: “Optical semiconductors are devices that have either luminescent or light-receiving functionalities. Luminescent devices include light-emitting diodes (“LED”) and laser diodes, while light-receiving devices include solar cells and photo-detectors.”[377] Since optical semiconductors were a product group of NXP Semiconductors only, Freescale Semiconductor was not producing, nor performing research and development in this area,[378] therefore we can safely exclude these products from this case study as well.

Sensors and Actuators are defined as follows in Part IV.4.1. Product market definition:

> “(86) Sensors semiconductors are used to help to manage and transmit data from a real-world environment for embedded processing applications. Sensors are specifically designed to measure externalities like pressure, temperature, magnetic fields or acceleration.
>
> (87) Actuators use electronic signals in order to influence the real world by performing a certain action.”[379]

Since Actuators were not sold by and were not involved in the research and development efforts of neither NXP Semiconductors, nor Freescale Semiconductor, and since the market of the Sensors had at the time of the merger control procedure significant competition, and since the two companies had neither a large combined market share, nor could their products be substituted for each other, and since they continued unchanged as a business line after the acquisition we can safely exclude them from this case study as well.[380]

The discrete are the main focus of this case study, since the RF power transistors and their innovations are falling into this category. The definition of discrete and RF power transistors are as follows: “Discretes are physically standalone packaged semiconductors specified to perform an elementary electronic function.”[381]

The category of discretes can be subdivided into the following four segments:

- RF and microwave

[377] (European Commission DG Competition, 2015, page 3)
[378] Id.. page 3
[379] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 16
[380] Id.. page 16
[381] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 11

- Power transistors and thyristors
- Rectifiers and power diodes
- Small signal and other discretes[382]

For our investigation purposes the relevant subcategory is RF and microwave, since the innovations in the Gallium Nitride Transistors was in this category. The RF and microwave technology are the one used in the Information and Communications Technology industry and other industries like broadcasting and military extensively. The RF and microwave technology can be further subdivided into four product segments:

- RF power transistors
- RF SST
- RF diodes[383]

The main difference between RF power transistors and SST and diodes is described as follows: "from a technical viewpoint, RF power transistors are typically high power (>1-watt average output power up to more than 1 kW) devices, whereas RF SST and RF diodes are low power RF devices with average output power of less than 1 watt. Additionally, there is also a significant price difference, as the price of RF power amplifier modules amounts to approximately USD 25, whereas RF SSTs for mobile handsets and RF SSTs for infrastructure are typically sold for USD 10-20 cents and 30-120 cents respectively."[384]

The RF power transistors are used mainly in the wireless infrastructure market, in fact 60-70% of them are used in base stations of the mobile telecom infrastructure, providing cellular communications capability in 3G, 4G Long Term Evolution (LTE), and more recently 5G technologies, by the major telecom equipment providers who in turn are selling them worldwide to all telecom operators.[385]

[382] Id.. page 11

[383] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 12

[384] Id.. page 12

[385] (European Commission DG Competition, 2015, page 12)

The major telecom equipment providers were Huawei, ZTE, Ericsson, Nokia and Alcatel-Lucent, the RF power transistor market was dominated by them.[386] The Commission investigation also interviewed their representatives about the forecasted effects and consequences of such a merger, the relative position of NXP Semiconductors and Freescale Semiconductor both in terms of market share, perceived quality and brand awareness, and in sustainability and market dynamics. We will also use some of their statements in order to highlight the perceived innovation position of Freescale Semiconductor before the acquisition.

At the time of the merger control investigation and procedure (and in the 5 years since) there were two main technologies used to design, produce and innovate on these RF power transistors:

- Silicon based laterally diffused metal oxide semiconductor ('LDMOS')
- gallium nitride on silicon carbide substrate ('GaN').[387]

At the time of the merger control investigation, 80-90% of the RF power devices for wireless carriers were produced using the LDMOS technology.[388] However, industry experts generally agreed that Gallium Nitride RF power transistors were needed to be designed, produced and further innovated on by the semiconductor vendors, since the telecommunications industry was going to expand in the 4G LTE technologies using this underlying hardware technology. At the time, GaN technology was mainly used by the military, radar and satellite communications industries only.[389]

Since NXP Semiconductors and Freescale Semiconductor had a combined market share in the RF power transistor market to reasonably assume the company after the acquisition will be a dominant player, the Commission raised concerns about the acquisition.[390]

"In the market of RF power transistors, the Parties' combined share is of [60-70]% (NXP [20-30]% and Freescale [30-40]%). Furthermore, in the possible segment of RF Power transistors

[386] Cohen, B., Gupta, N., Agre, J., & Zhang, H. L. (2014). Analyzing the Telecommunications Equipment Sector Using a Qualitative Framework (October ed.). IDA Science & Technology Policy Institute. Retrieved October 20, 2020, from https://www.ida.org/-/media/feature/publications/a/an/analyzing-the-telecommunications-equipment-sector-using-a-qualitative-framework/d-5346.ashx page 13

[387] (European Commission DG Competition, 2015, page 12)

[388] Id.. page 12

[389] Id.. page 12

[390] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 21

used in wireless infrastructure, the Parties' combined share amounts to [70-80]% (NXP [20-30]% and Freescale [40-50]%). The proposed transaction thus gives rise to a horizontally affected market in relation to the market for RF power transistors, where the Parties have a combined share of more than 20%."[391]

Below I created a figure illustrating the semiconductor industry, the relevant sub-categories of products and markets, with the RF power transistor market and technologies at the time of the merger control procedure.

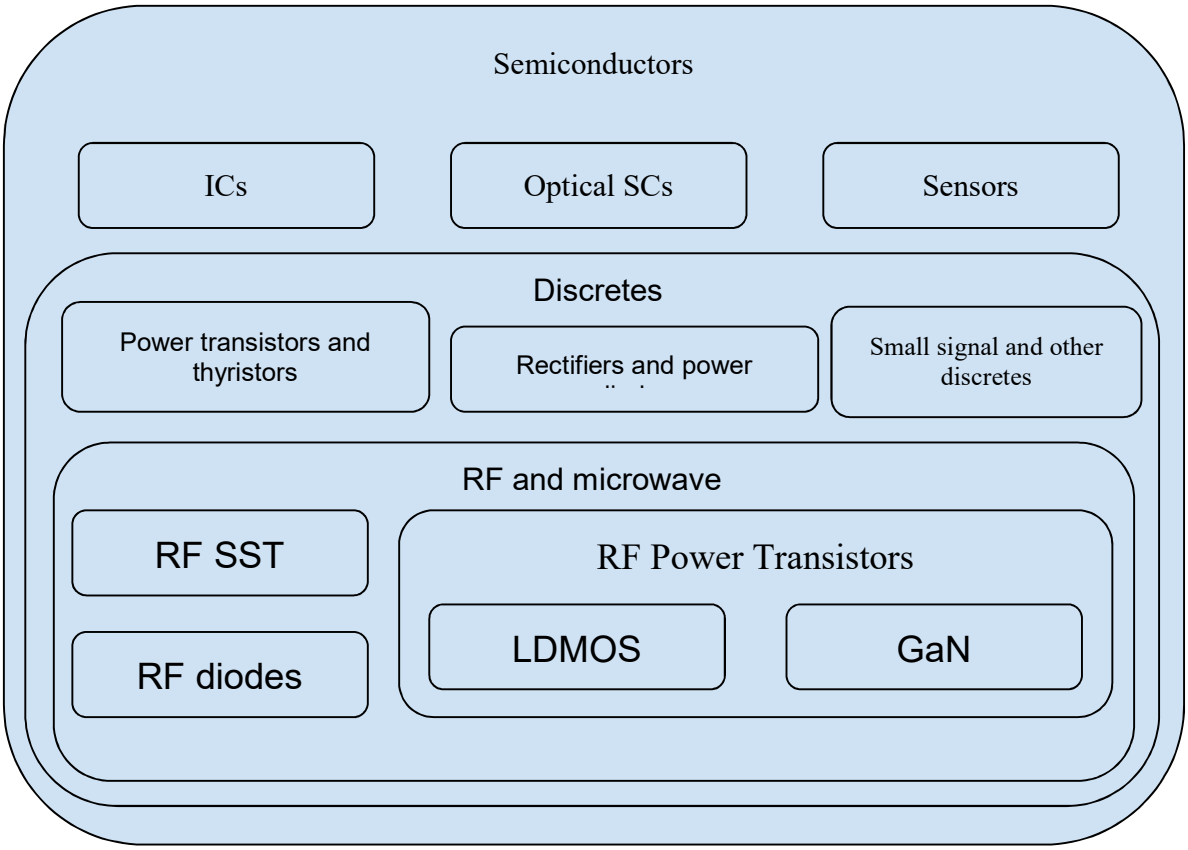

Figure 10 Semiconductor industry, the relevant sub-categories

2.5.3. Freescale as an innovation leader in GaN

In this chapter, I will examine some news articles, interviews with semiconductor customers from the telecom equipment provider industry, and in the next chapter I will take a detailed look at Freescale's patent for Gallium Nitride RF Power transistors. I am performing this

[391] Id.. page 21

analysis to show that Freescale was very active, and in some market segments, could be considered the technological leader in this up-and-coming technology before the acquisition.

At the end of the year 2014, Freescale launched a new wave of Gallium Nitride on Silicon Carbide transistors for military and industrial applications, which at the time were considered the highest performance devices in the market in their category. Semiconductor Today Magazine is the first digital-only magazine for the compound semiconductor and advanced silicon industries, operating since 2006[392] wrote the following: "Freescale launches 100W, 2.5GHz GaN-on-SiC RF power transistor for military and industrial applications,

RF power transistors supplier Freescale Semiconductor of Austin, TX, USA has introduced what are claimed to be the industry's highest thermal and wideband performance GaN device with a 125W continuous wave (CW) gallium nitride on silicon carbide (GaN-on-SiC) transistor. By offering extended operational bandwidth, the new MMRF5014H is suitable for wideband amplifiers in scientific equipment, as well as in military communications products for the US defense sector including jammers, radar implementations and electronic warfare (EW) systems."[393] Their strategic plans of further innovation in this space were also articulated: "The new GaN product is the first of several that Freescale plans to introduce to help push existing performance while addressing the stringent size, weight and power (SWaP) requirements of the defense industry and other markets."[394]

The customers of Freescale Semiconductor and NXP Semiconductors, the telecom equipment manufacturers such as Huawei, ZTE, Ericsson, Nokia and Alcatel-Lucent made the following statements during the interviews in the merger control procedure of the European Commission that illustrate the perception of Freescale as an innovation leader: "For example, one customer explained that, as far as LDMOS RF power transistors are concerned, 'Freescale is the dominant market leader followed by NXP. Infineon remains a distant third.' " [395]

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[392] Semiconductor Today Magazine. (2006). About Semiconductor Today Magazine. Retrieved October 20, 2020, from http://www.semiconductor-today.com/about.shtml

[393] Semiconductor Today Magazine. (2014, December 1). Freescale launches 100W, 2.5GHz GaN-on-SiC RF power transistor for military and industrial applications. Semiconductor Today Magazine. Retrieved October 20, 2020, from http://www.semiconductor-today.com/news_items/2014/DEC/FREESCALE_011214.shtml page 1

[394] Id.. page 1

[395] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 34

In relation to Freescale, one respondent commented that " 'Freescale has a very strong technology base in LDMOS and integrated passive devices (IPD) matching elements, as well as a very strong plastic overmold packaging technology. Freescale also has a very broad portfolio of products in all RF Power applications (cellular and other). It has a very large and experienced R&D team in several locations worldwide. Moreover, Freescale has a very strong application knowledge and ability to design circuits for customers.' Other respondents also submitted that Freescale had potentially the broadest and best product portfolio in the RF power transistors sector." [396]

2.5.4. Freescale patent for High-Speed Gallium Nitride Transistor Devices

In this chapter I will examine the important patent of High-Speed Gallium Nitride Transistor Devices and highlight its benefits to wireless network equipment technology development.

The patent application was filed in 2012 and published first in 2013. Further applications on the same invention and further applications were going on until 2015 June, when the acquisition merger control procedure was going on.[397] This shows the continued innovation activity of Freescale in the GaN transistor device area. The brief description of the invention is as follows: "Semiconductor devices used in high-efficiency power amplifier (HEA) applications require higher speed and power handling capability. To meet these operating requirements, high power semiconductor devices may be formed with semiconductor materials, such as gallium nitride (GaN) having material properties that are suitable for use in such applications. For example, high speed transistor switch devices, such as high electron mobility transistor (HEMT) devices, formed with GaN-based materials offer many advantages in RF applications, especially in HEA applications, by delivering high current, high breakdown voltage, and high unity gate current cutoff frequency (fT). However, as the speed of the devices is increased by shrinking the gate length and increasing the electron concentration in the device channel, gate and drain leakage currents can increase and device breakdown voltage can be reduced. Attempts to reduce gate leakage current in such devices may adversely affect other device properties. For example,

[396] (European Commission DG Competition, 2015, page 35)

[397] European Patent Office. (2016, March 1). US9276101B2 High speed gallium nitride transistor devices. Espacenet search results. Retrieved October 20, 2020, from https://worldwide.espacenet.com/patent/search/family/049379274/publication/US2013277680A1?q=pn%3DUS2015295075A1

device features and processing steps used to reduce leakage current can degrade the fT of the device by adding gate capacitance."[398]

According to the description above, the main advantage of the Gallium Nitride transistor technology is that it offers overall higher speeds to the equipment in which they are used by using more electrical power without significant danger of device breakdown.[399]

First users of the technology were the military, aviation and radar as well as the satellite communication industries due to the higher price compared to traditional RF power transistors, but during the years it became more and more standard in telecom equipment in 3G, 4G LTE and lately 5G devices. The following article from the Microwaves & RF Magazine highlights the benefits that happened to 4G, and the current developments enabled in 5G by Gallium Nitride power transistors: "At the semiconductor level, the mainstream commercialization of gallium-nitride-on-silicon (GaN-on-Si) has opened the door to improved RF power density, space savings, and energy efficiency. These improvements come at affordable cost structures that are on par with LDMOS at scaled volume production levels, as well as far below GaN-on-silicon-carbide (GaN-on-SiC). In parallel, the use case for GaN has expanded beyond discrete transistors for high-power RF applications. The economies of scale achieved with GaN's propagation into commercial 4G LTE wireless infrastructure has enabled GaN's migration into the monolithic-microwave-integrated circuit (MMIC) market, where it's helping system designers achieve higher levels of functionality and device integration for next-generation 5G systems."[400]

In summary we can understand that without the Gallium Nitride power transistor technology, their high speeds of the current 4G and the future 5G mobile telecommunication networks would have been possible only with significantly higher prices or not possible at all.

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[398] Id..

[399] (Fogarty, 2019)

[400] Fischetti, T. (2018, January 25). 5G Wireless and the New Imperative for Denser and Faster Multi-Function Devices. Microwaves & RF Magazine. Retrieved October 20, 2020, from https://www.mwrf.com/technologies/semiconductors/article/21848934/5g-wireless-and-the-new-imperative-for-denser-and-faster-multifunction-devices page 1

The below figure is from the original patent application. It shows the manufacturing process of GaN Power transistors: [401]

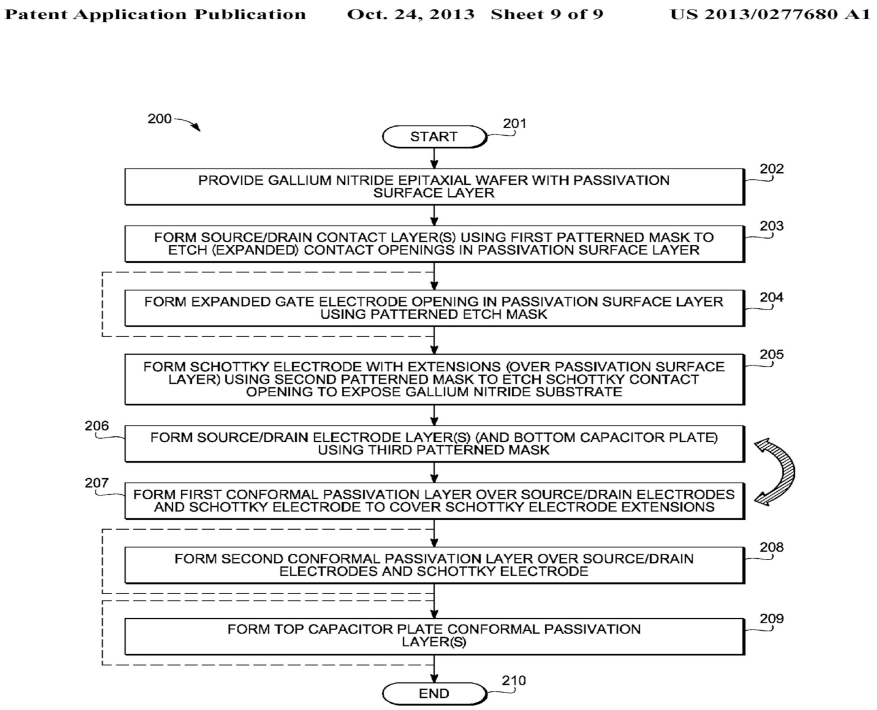

FIG. 24

Figure 11 Patent Application of GaN Power transistors

2.5.5. Merger Control and NXP's decision to divest

In order to be able to go forward with the merger NXP Semiconductors decided to divest its RF power business and submitted their commitments to the European Commission. They would divest the entire RF power business, with multiple locations, including research and development centers and laboratories worldwide into a new company. Concerns were

[401] (European Patent Office, 2016)

expressed by industry players about how and whether the new company will be sustainable, but most agreed the business unit can act as a standalone company. [402]

The European Commission deemed it sufficient that the market concentration will not increase as a result of this divestment. They also expressed that they were sufficiently convinced that the new company will be able to continue operating both from the economic sustainability standpoint and the research standpoint.[403] However, the investigation was only concerned with the RF power business of NXP Semiconductors and made no investigations on Freescale's RF power business and how it will be affected by the acquisition.

During the merger control procedure, the Commission also received news that NXP Semiconductors is planning to sell the newly divested company to Jianguang Asset Management Co. Ltd ('JAC') of China. JAC is a subsidiary of the private equity JIC Capital ('JIC') – a state-controlled Chinese investment company. [404] The Commission raised some concerns about the US investigation in the foreign purchase of the company, especially in case of the scenario when such acquisition would have been forbidden by the Committee on Foreign Investment in the U.S. ('CFIUS').

The acquisition of the newly divested company was announced in May 2015, much earlier than the Commission investigation issued its report asking NXP Semiconductors to fix the RF power market concentration issue. Considering this news, it could reasonably be assumed that NXP wishes not to continue its RF power business, even after acquiring Freescale. NXP published a press release about the scope of the acquisition: "Under the agreement, the entire scope of the NXP RF Power business and approximately 2,000 NXP employees who are primarily engaged globally in the RF Power business, including its entire management team, are to be transferred to an independent company incorporated in the Netherlands, which will be 100% acquired by JAC Capital upon closing of the transaction. Additionally, all relevant

[402] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 37

[403] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 46

[404] European Commission DG Competition. (2015). Case M.7585 - NXP SEMICONDUCTORS / FREESCALE SEMICONDUCTOR. EUR-Lex. 32015M7585. Retrieved October 20, 2020 from https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:32015M7585&from=EN page 44

patents and intellectual property associated with the RF Power business will be transferred in the sale, as well the NXP back-end manufacturing operation in the Philippines that is focused on advanced package, test and assembly of RF Power products."[405]

However, the Commission has not investigated nor raised any concerns about what will happen with the newly acquired RF power division of Freescale Semiconductor after the divestment and the subsequent Freescale acquisition, whether it will be continued in competition with the Chinese companies. They closed the procedure and allowed the acquisition to go forward.[406] The acquisition of Freescale Semiconductor was closed in December 2015.

2.5.6. GaN power transistor IP landscape today

In the years following the acquisition the semiconductor market of Gallium Nitride transistors has grown immensely. In their 2020 GaN Patent Landscape report, Knowmade has written the following about the market: "In recent years, the radiofrequency (RF) GaN market has grown impressively and has reshaped the RF power device industry landscape. The GaN RF industry continues to ramp up, driven by telecom and defense applications, and with 5G implementation coming, the RF GaN market is developing fast. According to Yole Développement's report RF GaN 2018, the total RF GaN market size is expected to increase from $380 million in 2017 to $1.3 billion by 2023."[407]

After the acquisition of Freescale Semiconductor however, both the new divested and sold Europe-based company called Ampleon, and NXG Semiconductors have fallen behind in the Intellectual Property race. The Intellectual Property landscape of Gallium Nitride power transistor technology is currently dominated by Wolfspeed (a Cree subsidiary company) and increasingly Intel, as well as different Chinese companies.[408] According to a new report by Knowmade: "Cree has the stronger IP position thanks to numerous fundamental patents,

[405] NXG Semiconductors. (2015, May 28). NXP Semiconductors Announces Agreement to Sell RF Power Business. NXP Media Center. Retrieved October 20, 2020, from https://media.nxp.com/news-releases/news-release-details/nxp-semiconductors-announces-agreement-sell-rf-power-business page 1

[406] European Commission. (2015, 11 12). Non-opposition to a notified concentration. Eur-Lex - Official Journal of the European Union, Case M.7585, 1. Retrieved October 20, 2020, from https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:C2015/375/02&from=EN page 1

[407] Knowmade. (2019, February). RF GaN Patent Landscape. Knowmade Patent & Intelligence. Retrieved October 20, 2020, from https://www.knowmade.com/downloads/rf-gan-patent-landscape/

[408] Knowmade. (2020, November). RF GaN Patent Landscape 2020. Research and Markets. Retrieved November 10, 2020, from https://www.researchandmarkets.com/reports/5185404/rf-gan-patent-landscape-2020

especially for GaN-on-SiC technology. Over the past 5 years, inventive activity at Cree, Sumitomo Electric and Toshiba stalled. These IP leaders have developed broad patent portfolios covering a wide range of RF GaN technology nodes. The reduced IP activity could be a sign of confidence in their already robust RF GaN patent portfolio. Intel and MACOM have strongly increased their IP activity since 2017, especially for GaN-on-Silicon technology. Intel is currently the most active patent applicant in the RF GaN field, with a record-high level of activity of patenting new inventions over the last couple of years which could, down the road, position it ahead of Sumitomo Electric, Fujitsu or Cree in terms of IP leadership."[409]

The following figure shows the relative Intellectual Property positions of the significant companies:

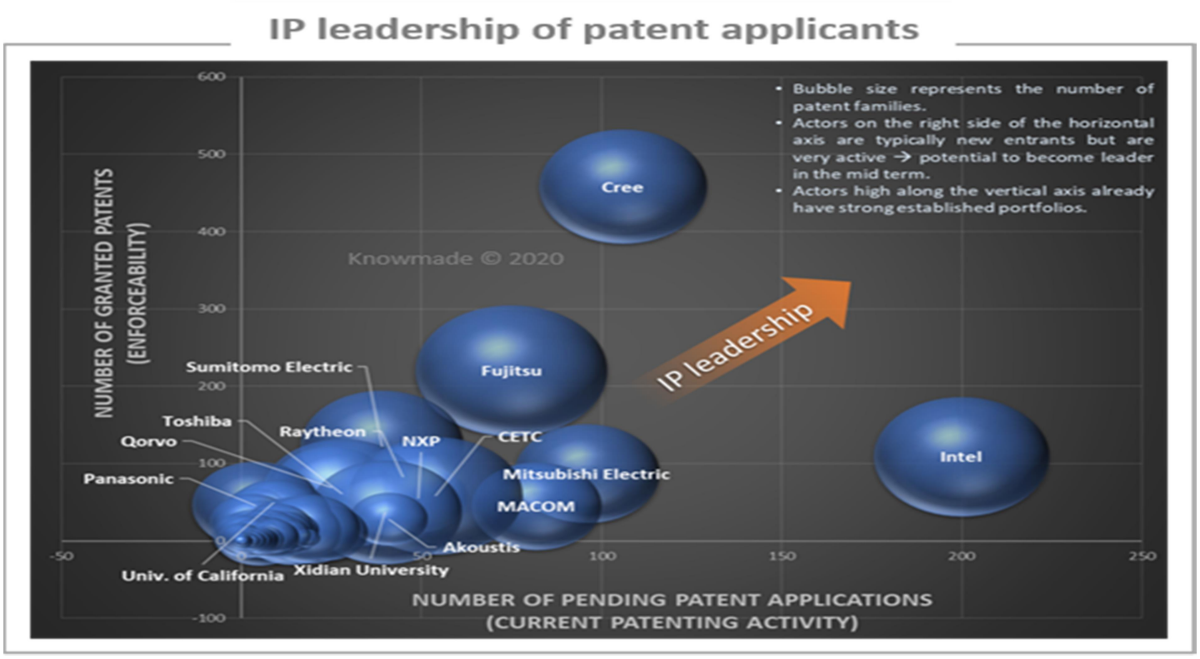

Figure 12 Patent Leadership of Companies[410]

Taking a detailed look into Cree and Wolfspeed's history shows us the following:

- Wolfspeed is a spinoff of the RF power business of Cree, an LED company. The spinoff was announced in 2015, and completed in 2016, after the NXP Semiconductors - Freescale Semiconductor acquisition.[411]

[409] Id..
[410] Id..

- Infineon, the third and relatively small market player in the years before the NXP-Freescale acquisition, tried to acquire Wolfspeed in 2016, but the acquisition was not allowed by the regulator.[412]
- Wolfspeed entered into a joint venture with San'aan, and later in a long-term supply agreement with Infineon. Ultimately Wolfspeed acquired Infineon.[413]

From the reports above we can conclude that,

- 5G development has increased the market of GaN power transistors and propelled innovation forward in this technology.[414]
- However, NXP/Freescale, as well as the Europe-based divested company Ampleon lost their Intellectual Property positions almost completely in the patent landscape.[415]
- The new innovative player, Wolfspeed developed their own patents and technologies, and cooperated with Infineon, the third largest player before the acquisition in question.[416]
- Thus, the further development of GaN technology did not build upon Freescale's previous innovations, but on an independent patent portfolio by other companies such as Wolfspeed and Intel.[417]

In summary we can conclude that the innovation effects of the NXG Semiconductor - Freescale Semiconductor acquisition were not adequately considered by the European Commission, because their processes were focused mainly on market concentration, and the possible loss of innovation through dismissed utilization of patents were not included in their investigation.

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[411] Yole Developpement. (2018, September 17). Cree-Wolfspeed Strategic and Competitive Analysis by Yole Développement. SlideShare.net. Retrieved October 20, 2020, from https://www.slideshare.net/Yole_Developpement/creewolfspeed-strategic-and-competitive-analysis-by-yole-dveloppement page 12

[412] Id.. page 12

[413] Id.. page 12

[414] (Fogarty, 2019)

[415] (Knowmade, 2020)

[416] (Yole Developpement, 2018, page 12)

[417] (Knowmade, 2020)

2.6. Detrimental Effects on Customers

According to the WIPO definition of a patent, it is a "a new way of doing something or offers a new technical solution to a problem" as we have discussed in the chapter about patents.[418] We have also examined previously how patents can represent value to customers. In case the patented innovation remains unutilized, the problem may or may not get solved by another innovation, thus obstructing technological progress and the creation of market value. In the above case of 4G and 5G telecommunication networks, the problem and the resulting market demand was high enough to warrant other technical solutions than the one patented by Freescale Semiconductors Ltd, so alternative solutions emerged, with many new patents and innovations. However, it can reasonably be assumed, that not every technical problem may be solved with non-competing patents, thus a new company wishing to solve a problem may not have the freedom-to-operate to bring a solution to market without infringing on the monopoly rights of a patent acquirer company that did not wish to utilize said patent. In this case, the problem itself may remain unsolved, or the new company may incur the costs of litigation, fines and compensation to the patent acquirer company. Since a company itself cannot be the ultimate cost bearer, the financial implications of such a situation will be transferred on the owners (through shareholder losses), employees (through lower wages and benefits) or even the customers themselves (through higher prices).

If we assume that the problem will remain unsolved, then the detrimental effects to the customers will be the lack of the above-mentioned benefits the patented invention would provide. Even if the problem eventually gets solved, the reduced number of different innovations solving the problem are likely to still result in decreased competition and slower technological progress in general.

[418] (WIPO - Patents, 2020)

Chapter Three

3. Protecting Customer Access to Innovation: Organizations

In this chapter my main objective is to investigate (and hopefully prove) my second hypothesis:

Current national/international organizations do not have effective measures to prevent or mitigate acquisitions where patents remain unutilized.

To investigate my second hypothesis, I will examine the organizations involved in cases of mergers and acquisitions when patents remain unutilized. I will review their objectives, their current organizational structures and processes, and examine if they have any organizational (a dedicated department) or procedural (dedicated process) guarantees that would handle these scenarios and protect the customer access to innovation. By reviewing the examples of the United States and European Union Competition Authorities and Patent Offices I will attempt to prove my hypothesis that even if this legal field at the intersection of customer protection, mergers and acquisitions, competition laws, and patent law has sufficient legislative protection, it does not have sufficient organizations and procedures for the enforcement of those legal protections.

3.3. Competition Authorities

This chapter examines and provides a valuable foundation for future discussions about how to reconfigure the basic architecture of the competition authorities. The chapter focuses on improving the volume's effort to show the connections between institutional arrangements and substantive policy outputs. "To consider possible adjustments to an existing antitrust system, the analysts must understand the intricate, elaborate, and often-hidden circuitry that connects the entire enforcement framework."[419]

"The emphasis in Institutional Structure on institutional arrangements helps correct a serious imbalance in the study of antitrust law. A substantial body of economic literature has examined

[419] Kovacic, W. E. (2012). The Institutions of Antitrust Law: How Structure Shapes Substance. Michigan Law Review, 10(6). Retrieved October 20, 2020, from https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1105&context=mlr page 1025

how institutional quality affects public policy."[420] After the beginning of the year 2000, the question of the structural architecture of the competition authorities has drawn growing attention for several reasons. However, not much academic study or application has centered on the institutional design aspects of the competition authorities.

Liberal business regulation has natural monopolies and has given rise to a challenge in organizational structure policy, with more than one entity engaged in the implementation and drafting of competition laws and their goals. This dilemma is partially due to the fact that in markets with a strong monopoly aspect, regulation by market price management is often seen as a temporary occurrence before adequate competition has arrived. When this happens, the question arises of whether the competition aspects of utility regulations should be integrated into the broader powers and responsibilities of the competition authority and removed from the sector regulator, or whether both agencies should collaborate on competition issues.[421]

"Deciding on the allocation of functions between the competition authority and the sector regulator usually depends on the extent to which competition without price regulation has been achieved. For example, there is usually greater deference to the role of the competition authorities in the telecommunications sector where competition is more advanced. In the European context, for example, the European Union Commission's Directorate General for Competition plays a significant role. Whilst the United States has relied primarily on sector-specific rules applied by sector-specific institutions, New Zealand relied until 2001 almost exclusively on antitrust (i.e., competition) law and Australia, Chile and the United Kingdom chose a combination of both."[422]

In reality, antitrust officials appear to have the ex-post function of policing competition, reacting to inappropriate behavior that has already arisen, whereas sector regulators have a more ex-ante role of fostering competition, i.e., working to discourage anti-competitive activity in the day-to-day operation of regulatory activities. The difference in role leads to differences

[420] Kovacic, W. E. (2012). The Institutions of Antitrust Law: How Structure Shapes Substance. Michigan Law Review, 10(6). Retrieved October 20, 2020, from https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1105&context=mlr page 1020

[421] Sophie Trémolet, & Diane Binder. (2009, October). Competition Authorities – What are the potential functions of competition authorities and how can they collaborate with sector regulators? http://regulationbodyofknowledge.org. Retrieved September 22, 2019, from http://regulationbodyofknowledge.org/faq/market-structure/competition-authorities-what-are-the-potential-functions-of-competition-authorities-and-how-can-they-collaborate-with-sector-regulators/

[422] Id..

in primary functions. The competition authority is generally concerned with all sectors and has three main functions:

- Consumer welfare and Customer Protection from Anti-competitive practices.
- Remedies for anti-competitive behaviour, such as collusion and control of the power of the incumbent to limit competition;
- Ensuring the merger of companies would not substantially limit competition: in the energy market for example, mergers and acquisitions which aim to re-aggregate the roles of the electricity supply industry, such as generation and distribution, which the reform sought to disaggregate in order to encourage competition.[423]

Both market regulation and compliance mechanisms consist fundamentally of two components: regulatory regulations and institutional frameworks for the execution of policies, implemented to ensure the effectiveness of every framework. And the structure of the two elements is interdependent. Transparent comprehension of the experience and adaptation of the laws by the authorities applying those policies is of critical significance.

"Good rules remain a dead letter if there is no efficiently run organization with the processes to implement them. Conversely an efficiently managed authority cannot compensate for fundamental flaws in the rules which it is to implement. And the rules must be shaped in a way that they can be implemented within the real-world constraints to which the organization is subject - such as limited resources. Academic attention focuses mainly on the legal instruments and not so much on the organizational side. One reason for this is probably that competition policy and enforcement is still mainly a subject for lawyers. Another reason could be that it is not easy for outsiders to obtain detailed and comprehensive information about the interior workings of a competition authority." [424]

Hence focus must be more into implementing an institution that has transparency and better distribution of the duties in order to meet the goal and objectives of the competition policies.

[423] Id..

[424] LOWE, P. (2008). The design of competition policy institutions for the 21st century — the experience of the European Commission and DG Competition. European Commission: Competition Policy Newsletter, 3(2008). ISSN 1025-2266

Focusing just on the amendment of laws will not bring the desired results but must have a more solution-oriented team and proactive in taking actions.

3.3.1. United States Competition Authorities

In recent cases it is observed that a large number of countries have adopted a competition law and new competition authority to implement it. There has been an increasing demand on the part of developing countries for guidance on the institutional design they should adopt for their newly created competition institution. At the same time many prominent and influential authors discussed and argued on the focus of new competition authority organizational structure and understood the issues of competitional practices and interpretation of the competition laws altogether.

Competition Authorities generally operate in compliance with the competition laws and policies of the nation. In the USA, competition officials are split into 1. Department of Justice, and 2. Federal Trade Commission.

The first agency Antitrust Division of the Department of Justice is part of the executive branch of the government. Its location in the Department of Justice, rather than in a department more specifically charged with economic policy, follows from the Sherman Act's origins as a criminal statute. It suggests a tradition of prosecution, as much as of policy analysis. The second agency, the Federal Trade Commission, is an independent body, located politically and geographically between the legislature and the executive. One reason for its creation was to bring greater technical expertise to competition policy. [425]

A glimpse of the organizational structure of the Department of Justice agency tackling competition law in the United States.

[425] Wise, M. (1998, June). United States - The Role of Competition Policy in Regulatory Reform. Competition Law and Policy, OECD. Retrieved October 20, 2020, from https://www.oecd.org/daf/competition/sectors/2497266.pdf

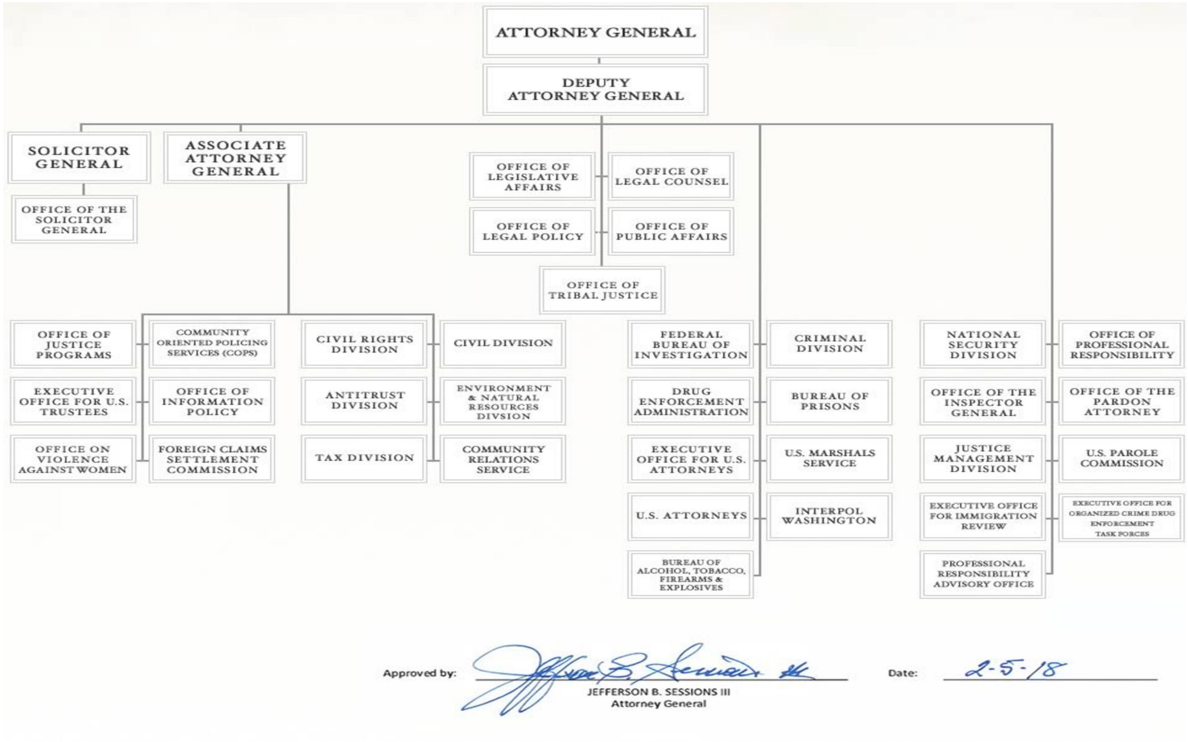

Figure 13 Organizational structure of the United States Department of Justice [426]

Image source: https://www.justice.gov/agencies/chart

The subject of inquiry in Institutional Structure is a regulatory regime with astonishing, distinctive characteristics. No system of the United States law (maybe no body of law in any jurisdiction) decentralizes the decision to prosecute more than the antitrust regulatory regime.

J. Kirkwood and R.H Lande found in 2008 and as Hovenkamp observed in 2013 the reality is that the United States enforcement agencies have consistently followed a consumer welfare standard. Over time the narrow economic goal of protection of consumer surplus has gained wide acceptability.[427]

[426] United States Department of Justice. (2020). Organizational Chart. United States Department of Justice. Retrieved October 20, 2020, from https://www.justice.gov/agencies/chart

[427] Frederic, J. (2016, January). The institutional design of Competition Authorities : Debates and Trends. European Parliament. Retrieved October 20, 2020, from https://www.europarl.europa.eu/cmsdata/100755/Frederic%20Jenny%20The%20institutional%20design%20of%20Competition%20Authorities.pdf

3.3.2. European Union Competition Authority

"The aim of EU competition policy is to safeguard the correct functioning of the single market."[428]

'European Competition Authorities' (ECA) is a discussion forum set up by the competition authorities within the European Economic Area, the European Commission, and the European Free Trade Association (EFTA) supervisory authority.[429]

The European Commission, along with the national competition authorities, directly enforces the competition laws of the European Union, Articles 101-109 of the Treaty on the Operation of the European Union (TFEU), to make the economies of the European Union perform easier by ensuring that all firms compete reasonably and fairly on their merits. This will benefit customers, companies and the European economy as a whole.[430]

The role of the European Commission is described by the European Union Fact Sheet of the European Parliament as follows:

"The Commission is the EU institution that has the monopoly on legislative initiative and important executive powers in policies such as competition and external trade. It is the principal executive body of the European Union and is formed by a College of members composed of one Commissioner per Member State. The Commission oversees the application of Union law and respect for the Treaties by the Member States; it also chairs the committees responsible for the implementation of EU law. The former comitology system has been replaced by new legal instruments, namely implementing and delegated acts." [431]

The European Commission is considered one of the world's most sophisticated antitrust enforcers, handling a wide scale of matters ranging from company mergers, commercial competition issues, cartels, and state aids.

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[428] Szczepański, M. (2019, October). EU competition policy: Key to a fair single market. Retrieved October 20, 2020, from https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/642209/EPRS_IDA%282019%29642209_EN.pdf

[429] ECA. (2020). European Competition Authorities. https://www.bundeskartellamt.de. Retrieved October 20, 2020, from https://www.bundeskartellamt.de/EN/Internationalwork/ECA/ECA_node.html

[430] European Commission Competition Policy. (2020, July 29). Competition Policy in the European Union. https://ec.europa.eu. Retrieved September 15, 2020, from https://ec.europa.eu/dgs/competition/index_en.htm

[431] Mussa, G. (2020, November). Fact Sheets on the European Union - The European Commission. The EU at work - European Union institutions and bodies - The European Commission. Retrieved November 20, 2020, from https://www.europarl.europa.eu/factsheets/en/sheet/25/the-european-commission

The European Union ensures that competition is not distorted, and it is fair, by applying similar rules for every company within the European Union. The applicable legal basis for the Commission's activities is as per Chapter 1 of the European Union Treaty, which lays down the basis for Community rules on competition. The Treaty prohibits State aid, although there are exceptions that should be justified, for example, services of general economic interest. It must be demonstrated that they do not distort competition in such a way as to be contrary to the public interest.[432] The competition laws are also established by the European Union to guarantee equal competition while allowing room for creativity, unified standards and the growth of small enterprises. "The Commission also monitors planned mergers and acquisitions of companies if their combined businesses exceed specified revenue thresholds. Over the past 10 years (2009-2019), the Commission has approved over 3000 mergers and rejected nine. Importantly, the Commission has the right to assess mergers between non-EU companies if they carry out a significant part of their business in the EU."[433]

The European Commission has four major functions to play:

It proposes laws to Parliament and the Council; it manages the policies of the European Union and manages the budget; and enforces European Law (together with the Court of Justice). It is empowered to represent the European Union on the international arena, for example by negotiating arrangements between the European Union and other countries.

The Deputy General Competition policy areas include antitrust, merger, liberalization, state aid and international cooperation. Antitrust issues are understood as all agreements and conduct prohibited under Articles 101 and 102 of the Treaty on the Functioning of the European Union. Merger issues are governed by Commission Regulation (EC) No 802/2004 implementing Council Regulation (EC) No 139/2004 and its annexes. Liberalization issues are regulated according to Article 106 of the Treaty on the Functioning of the European Union. State aid issues are regulated with a goal of ensuring that government interventions do not distort competition within the EU by unfairly favouring one company or a subset of companies over others as per Articles 107 - 109 of the Treaty on the Functioning of the European Union.

[432] EUR.LEX. (2020, August 11). Summaries of EU Legislation: Competition. eur-lex.europa.eu. Retrieved September 7, 2020, from https://eur-lex.europa.eu/summary/chapter/competition.html?root_default=SUM_1_CODED%3D08&locale=en

[433] (Szczepański, 2019)

International cooperation between competition agencies is pursued to make the European Union competition enforcement both more effective and efficient.

The organization structure to handle the areas of work shows in the chart below with a detailed look at who reports to whom and the true power structure of the new European Union Commission.

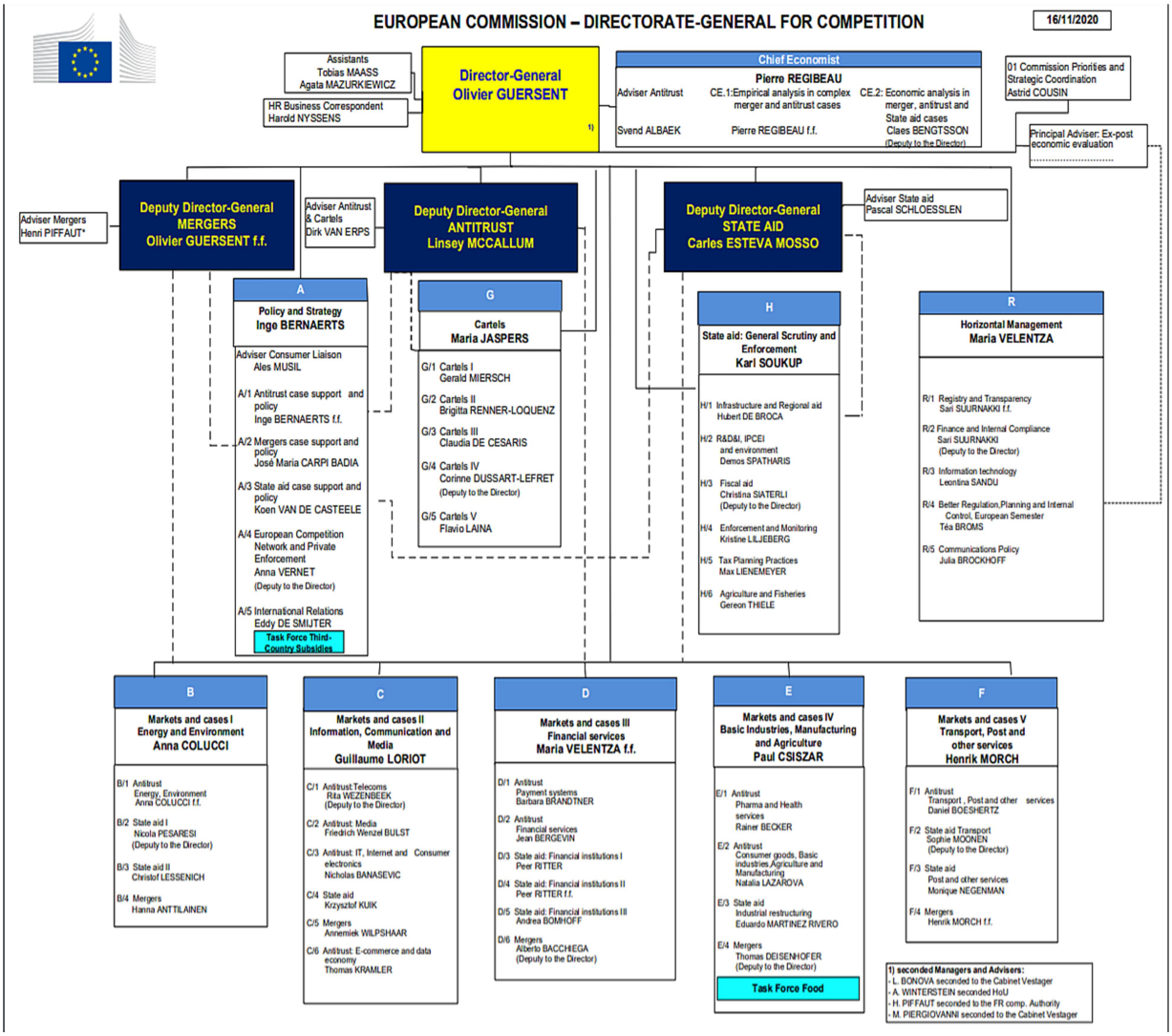

Figure 14 Organizational Structure of the European Commission[434]

Image Source: https://ec.europa.eu/dgs/competition/directory/organi_en.pdf

[434] European Commission Directorate General for Competition - Org Chart. (2020, December 16). Organizational Chart. European Commission Directorate General for Competition. Retrieved December 20, 2020, from https://ec.europa.eu/dgs/competition/directory/organi_en.pdf

The Directorate-General for Competition (DG COMP) is a Directorate-General of the European Commission, located in Brussels. “DG Competition is primarily responsible for directly enforcing Articles 101 to 109 TFEU. The Commission has fully delegated its powers to the DG to examine the case and manage the due process.”[435] The DG Competition is responsible for the development and application of competition policy for the European Union. More importantly, the European Union's antitrust body is not DG Competition, but the European Commission.

It has a dual role in antitrust enforcement: an investigation role and a decision-making role. The notoriously secretive Directorate-General for Competition of the European Commission has broad powers to prosecute, including search and seizure in Member States, and to penalize infringements in European Union competition law.

The Director-General is one of the most professional antitrust regulatory agencies in the world alongside the United States agencies, i.e., the Federal Trade Commission and the Department of Justice's Antitrust Division. “Comparative information on the effectiveness of different competition authorities is scarce. The Global Competition Review assessed DG Competition, together with the US authorities, as an 'elite global enforcer', mentioning the high total value of cartel fines and the Google investigation as its main achievements.”[436]

3.3.3. Case Study on the European Commission Decision

In this chapter, I am going to examine the conduct of the European Commission as the relevant competition authority in the merger control case study I cited above: NXP Semiconductors vs. Freescale Semiconductor. I will examine this case specifically from the innovation protection viewpoint to determine the role the European Commission played in this specific case. My main goal is to understand whether they should take into account the innovation protection aspects as per the current regulation and whether they did take it into account in the case under investigation.

[435] (Szczepański, 2019)
[436] Id..

According to the Founding Treaty of the European Union, in antitrust cases, the innovation aspects need to be examined as well. Article 102 of the Treaty on the Functioning of the European Union [437] states the following:

> "Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between the Member States. Such abuse may, in particular, consist in:
>
> (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
>
> (b) limiting production, markets or technical development to the prejudice of consumers;
>
> (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
>
> (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts."[438]

According to section b of Article 102, limiting production, markets, or technical development to the customers' prejudice is clearly a case of patent misuse. A merger control case where it can be reasonably assumed that a significant patent will remain unutilized, therefore, should include considerations preventing such misuse. The merger control procedure allows the Commission to use several tools to enforce that such outcomes do not happen, one of which is commitments they may require from the merging companies.[439]

In the following chapter, I will describe my proposed solution, where I will propose they do so and will explain some procedure that would - in my opinion - very likely achieve the desired outcome while not preventing the mergers and acquisitions outright.

However, in the case of the Freescale acquisition by NXP, the European Commission was concerned mainly with market concentration. The Commission raised concerns, specifically in

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[437] (Eur-lex.europa, 2008)

[438] Id..

[439] European Competition Network. (2013, December 9). ECN Recommendation on Commitment Procedures. European Competition Network. Retrieved October 20, 2020, from https://ec.europa.eu/competition/ecn/ecn_recommendation_commitments_09122013_en.pdf

the market for RF power transistors, where - if the acquisition was allowed - the combined market shares were expected to reach up to 60–70%. Therefore, the Commission proposed the commitment that NXP divest their RF power business: "The First Commitments consist of the divestment of NXP's entire RF Power business (the "RF Power business") as a fix-it-first solution aiming to eliminate the entire overlap between the Parties' activities in RF Power transistors for all applications." [440]

Following the Commission's proposal, NXP Semiconductors mitigated the market concentration issues by selling their RF Power transistor business to Chinese JAC Capital, so they can acquire Freescale and utilize Freescale's other business lines, not involving the RF Power transistors directly.[441] The acquisition was subsequently approved by the Commission. The acquisition involved NXP Semiconductor's existing RF Power business at the time. After the Freescale acquisition was closed, NXP did not rebuild the core RF Power business and thus the Freescale patent was left unutilized.[442]

This decision by the European Commission ended up not having any serious consequences, since other competing patents took the place of this innovation as we have previously discussed in the case study.[443] But there is no evidence that the Competition Agency considered the innovation aspects of this acquisition as it was related to the Gallium Nitride RF power transistor patents held by Freescale Semiconductors. They certainly did not propose any commitments to ensure that those patents shall remain utilized.

3.4. Patent Offices

In this chapter I will first look at what options inventors have to represent their interests, including patent agencies and patent attorneys. Then I will examine the operation of the United States and European Patent offices.

Patent agencies help companies and individuals with patent issues and other intellectual property rights (IPR) and infringement of the IPR. They help in providing protection of the company's products and ideas

[440] (European Commission DG Competition, 2015, page 37)
[441] (NXG Semiconductors, 2015, page 1)
[442] (Knowmade, 2020)
[443] (Yole Developpement, 2018, page 12)

“A patent agency will often be involved right from conception of an idea to acquisition of the patent, or even longer - just because a company has obtained its patent does not mean that the patent agency’s job is done.” [444]

Patent agencies can play the role of a consulting partner in connection with the selection of an appropriate form of protection, and help customers to prepare patent applications for submission to their respective Intellectual Property Office or patent applications outside the jurisdictions and monitor rights and cases of attempted infringement.

“A patent agency or a legal firm specializing in intellectual property rights will often also be able to assist your company in connection with legal proceedings relating to intellectual property rights, e.g., in the event of patent disputes. In case of infringement of intellectual property rights, a patent agency will be able to represent the Intellectual Property Rights holder.” [445]

Apart from the IPR cases, some patent agencies and legal firms specializing in intellectual property rights also handle various other agreements involving intellectual property rights. Examples include transfer agreements for trademarks or domain names, or adviser in connection with licensing discussions and the preparation of license agreements, if the company is looking to license out any of its intellectual property rights, such as a patent, design or trademark.[446]

However, there are two types handling the Intellectual property issues from a US perspective, that is patent agent and patent attorney. Although both handle the Intellectual Property Right matters, there is yet a difference in their duties.

Patent agents specialize in obtaining patents like attorneys, they're able to prepare, file, and prosecute patent applications as well as appear in front of the Patent Trial and Appeal Board. [447] According to United States attorney experts, the capacity to practice law makes the difference between patent attorneys and patent agents. “A patent attorney has attended law school and taken and passed an examination for registration to practice law in that state. A

[444] Swedish Intellectual Property Office PRV. (2020). https://www.prv.se. Retrieved July 11, 2020, from https://www.prv.se/en/knowledge-and-support/glossary/patent-agencies/

[445] Id..

[446] Id..

[447] Key, S. (2016, October 26). Should You Hire a Patent Agent Instead of a Patent Attorney?Patent experts weigh in. Inc.com. Retrieved July 11, 2020, from https://www.inc.com/stephen-key/should-you-hire-a-patent-agent-instead-of-a-patent-attorney.html

patent agent is not a lawyer and cannot provide any legal advice, including advice on patent licensing or patent infringement. Only lawyers can draft contracts or non-disclosure agreements or represent you in any legal proceedings involving state or Federal court."[448]

The European Patent Attorney is defined as, "Qualified professional representatives appointed to act on behalf of an applicant to draft a patent application and/or to accompany the application through the various stages of the patent grant procedure."[449]

3.4.1. United States Patent and Trademark Office

The United States has been very progressive in setting up a patent enforcement agency far earlier than the rest of the world. A brief history of the office is described by Thomson Reuters/FindLaw (2016): "Congress established the United States Patent and Trademark Office (USPTO) to issue patents on behalf of the government. The Patent Office as a distinct bureau dates from the year 1802, when a separate official in the Department of State who became known as 'Superintendent of Patents' was placed in charge of patents. The revision of the patent laws, enacted in 1836, reorganized the Patent Office and designated the official in charge as Commissioner of Patents. The Patent Office remained in the Department of State until 1849 when it was transferred to the Department of Interior. In 1925 it was transferred to the Department of Commerce where it is today. The name of the Patent Office was changed to the Patent and Trademark Office in 1975 and changed to the United States Patent and Trademark Office in 2000. For over 200 years, the basic role of the United States Patent and Trademark Office (USPTO) has remained the same: To promote the progress of science and the useful arts by securing to inventors the exclusive right to their respective discoveries."[450]

The United States Patent and Trademark Office (USPTO or Office) is an agency of the U.S. Department of Commerce. Their task is to grant patents to protect inventions and to register trademarks. It serves the needs of inventors and companies with regards to their technologies

[448] Ferrell, J. (2020). What is the difference between a patent attorney and a patent agent? carrferrell.com. Retrieved July 11, 2020, from http://www.carrferrell.com/what-is-the-difference-between-a-patent-attorney-and-a-patent-agent

[449] European Patent Office. (2020, February 07). European Patent Attorney. www.epo.org. Retrieved July 13, 2020, from https://www.epo.org/service-support/glossary.html

[450] Thomson Reuters Findlaw. (2016, June 20). The U.S. Patent and Trademark Office. FindLaw. Retrieved October 20, 2020, from https://www.findlaw.com/smallbusiness/intellectual-property/the-u-s-patent-and-trademark-office.html

and corporate goods and the recognition of services. It also advises and supports the President of the United States, the Secretary of Commerce and other government agencies in matters concerning both domestic and global aspects of intellectual property. The Office promotes industrial and technical knowledge through the protection, classification and distribution of patent information. Hence it can be analyzed that the United States Patent and Trademark Officers handle wide duties in protecting the rights of new inventions and innovations.[451]

In carrying out its relevant patent duties, the United States Patent and Trademark Office reviews applications and grants patents on inventions where the applicants are entitled to them, publishes and disseminates patent information, records allocations of patents, maintains search files for United States and international patents, and maintains a search room for public use in the review of patents and records released. Copies of patents and official documents are made available to the public by the Office. It offers training to professionals on the provisions of the patent statutes and regulations and publishes the Manual of Patent Examining Procedures to explain these requirements.[452] Different roles are conducted with respect to trademarks. By preserving intellectual endeavors and promoting technical advancement, the United States Patent and Trademark Office aims to maintain the technological edge of the United States. The United States Patent and Trademark Officers also disseminates patent and trademark knowledge that encourages an awareness of intellectual property rights and enables the creation and sharing of new technology around the world.[453]

[451] USPTO - About Us. (2018, June 5). About Us. United States Patent and Trademark Office. Retrieved December 20, 2020, from https://www.uspto.gov/about-us

[452] USPTO - MPEP. (2020, June). Manual of Patent Examining Procedure (MPEP). United States Patent and Trademark Office. Retrieved October 20, 2020, from https://www.uspto.gov/web/offices/pac/mpep/index.html

[453] (USPTO - About Us, 2018)

The image of the organizational chart of USPTO: (Figure 15)

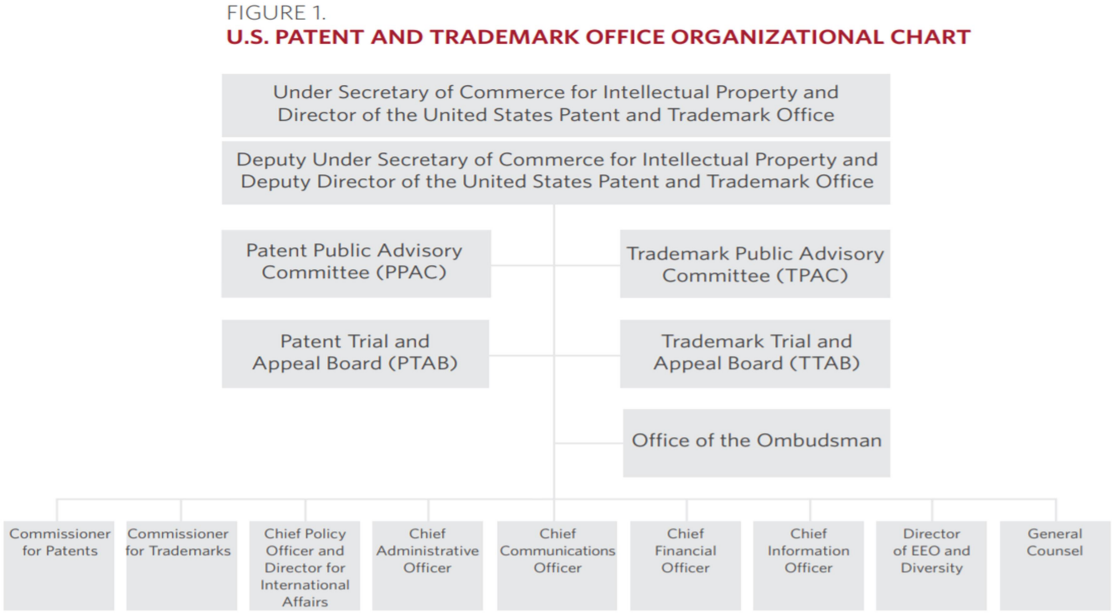

Figure 15 United States Patent and Trademark Office Organizational Chart

Source: U.S Patent and Trademark Office Organizational Chart[454]

In the recent case regarding constitutional issues in the decision making of the Patent authorities by Arthrex v. Smith & Nephew, 2019, a patent owner who lost at the Patent Trial and Appeal Board (PTAB) level, successfully contended before the Federal Circuit that the appointment of the Administrative Patent Judges was unconstitutional. "Applying the test set forth in Edmond v. United States, 1997, where the Federal Circuit considered:

1. whether an appointed official weather has the power to review and reverse the officers' decision;
2. the level of supervision and oversight an appointed official has over the officers; and
3. the appointed official's power to remove the officers."[455]

[454] United States Patent and Trademark Office. (2018, September 20). Patent Cooperation Treaty. USPTO - Patents - International Protection. Retrieved October 20, 2020, from https://www.uspto.gov/patents-getting-started/international-protection/patent-cooperation-treaty

[455] Pramod Chintalapoodi. (2020, November 16). SUPREME COURT TO DECIDE CONSTITUTIONALITY OF PATENT BOARD. ChipLaw Group. Retrieved October 20, 2020, from https://www.chiplawgroup.com/supreme-court-to-decide-constitutionality-of-patent-board/

It is argued that "the only two presidentially-appointed officers that provide direction to the USPTO are the Secretary of Commerce and the Director. Neither of those officers individually nor combined exercises sufficient direction and supervision over Administrative Patent Judges (APJs) to render them inferior officers. Because the Federal Circuit found that APJs were 'principal officers,' it concluded that their appointments by the Secretary of Commerce violated the Appointments Clause."[456] The controversy of the case Arthrex, Inc. v. Smith & Nephew, Inc. 2019, demanded for a new hearing before a new panel "because the Board's decision in this case was made by a panel of APJs that were not constitutionally appointed at the time the decision was rendered."[457] "If the Supreme Court decides that the PTAB judges were appointed unconstitutionally, then all those 10,000 decisions by the PTAB to date could be open to challenge – leading to chaos in the patent law system."[458]

Therefore, in my analysis, careful planning for legislative bodies, and the understanding of transparency in patent law needs to be organized.

3.4.2. European Patent Office

The European Patent Organization is an intergovernmental organization set up on 7 October 1977, on the European Patent Convention (EPC) signed in Munich in 1973. It has two bodies, the European Patent Office and the Administrative Council.[459] The two organs of the European Patent Organization, one is the European Patent Office (EPO), which acts as an executive body as well, and the other being the Administrative Council acts as a supervisory body to a limited extent.

[456] Id..
[457] (Arthrex, Inc. v. Smith & Nephew, Inc. 953 F. 3d 760 - Court of Appeals, Federal Circuit 2020, 2019)
[458] (Pramod Chintalapoodi, 2020)
[459] European patent office. (2018, September 18). epo.org. Retrieved July 13, 2020, from https://www.epo.org/about-us/governance.html

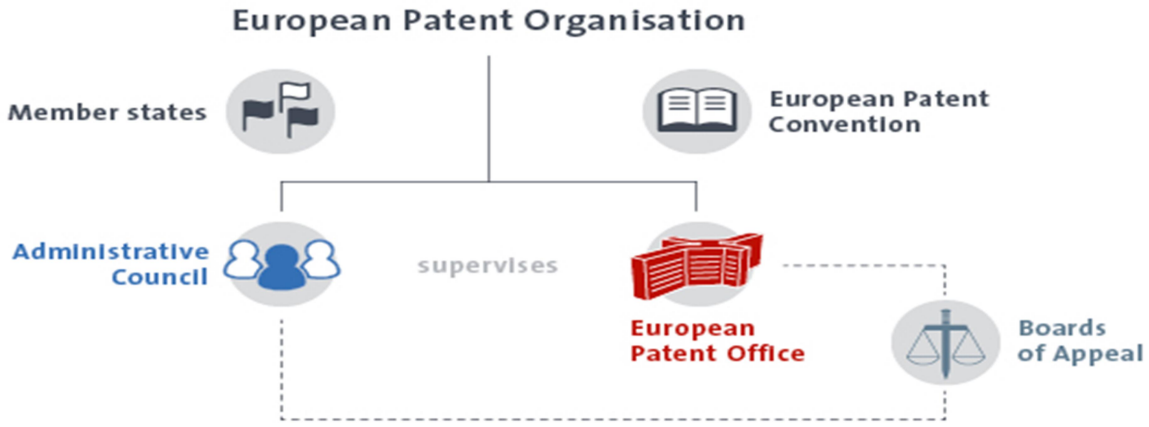

Figure 16 Organizational Structure of the European Patent Organization

The image of the organizational structure of the EPO [460]

The composition and functioning of these two organs: The European Patent Office (EPO) and the Administrative Council, are explained below:

1. *Administration of the European Patent Office (EPO)*

EPO headquarter is in Munich with several branches in the Hague, Berlin, Vienna, and Brussels. "The European Patent Office (EPO) is headed by a president who is answerable to the Administrative Council. Assisted by a Vice-President, the President of the EPO ensures of the day to day functioning of the EPO and its branches; preparing and implementing budget; and may propose the amendment of the EPC, general regulations or decisions that fall within the competence of the Administrative Council. He appoints EPO employees, decides on promotion, and exercises disciplinary authority over the employees, and summits annual management reports to the Administrative Council."[461] Hence, the President of the EPO's administrative task focuses mostly on decision making and appointment of employees, preparing annual management reports only within the Administrative council.

2. *Department of EPO*

For proper functioning, the EPO follows eight parts of structural examination guidelines and has distributed the task into several departments.

[460] Id..

[461] Mario Egbe Mpame. (2018). Regional Intellectual Property Integration in Developed and Developing Countries, Munich, GRIN Verlag, Retrieved October 20, 2020, from https://www.grin.com/document/446150.

“The Guidelines for Examination give instructions on the practice and procedure to be followed in the various aspects of the examination of European applications and patents in accordance with the European Patent Convention and its Implementing Regulations.

The Guidelines have the following eight-part structure:

- Part A: Guidelines for Formalities Examination
- Part B: Guidelines for Search
- Part C: Guidelines for Procedural Aspects of Substantive Examination
- Part D: Guidelines for Opposition and Limitation/Revocation Procedures
- Part E: Guidelines on General Procedural Matters
- Part F: The European Patent Application
- Part G: Patentability
- Part H: Amendments and Corrections”[462]

In consideration of the above guidelines, Mario Egbe Mpame (2018) describes the different departments of the European Patent Office in detail:[463]

“The departments of the EPO include: a Receiving Section; Search Divisions; an Examination Divisions; Opposition Divisions; a Legal Division; Boards of Appeal; and an Enlarged Board of Appeal. While the Receiving Section is responsible for the examination on filing and the formality examination of patent applications, the Search Divisions conduct search and draw search reports as a preliminary stage for determining novelty. The Examining Divisions is responsible for conducting the substantive examination of European Patent applications. In this regard, each of the Examining Divisions consists of three technically qualified examiners, and even oral proceedings are carried out before the Examining Division. The Opposition Divisions are responsible for the examination of oppositions against any European patent. Depending on the field, the division consists of three technically qualified examiners, at least two of whom shall not have taken part in the proceedings for grant of the patent to which the opposition relates. While the Legal Division is responsible for decisions relating to entries in the Register of European Patents, and the registration on and deletion from the list of professional representatives, the Boards of Appeal are responsible for the examination of appeals from decisions of the Receiving Section, the Examining Divisions and Opposition Divisions, and the

[462] (European Patent Office Guidelines, 2019)
[463] (Mario Egbe Mpame, 2018)

Legal Division. The Enlarged Board of Appeal on its part, is a five-member board that is in charge of deciding on points of law referred to it by Boards of Appeal; giving opinions on points of law referred to it by the President of the European Patent Office, and deciding on petitions for review of decisions of the Boards of Appeal."[464]

As we can see from the review of the procedural guidelines and the organizational setup of the European Patent Office, although it handles every matter of the patent applications, there is a lack of patent authority or guidelines for the protection of customer access to innovation.

3.5. Conclusion

"If the government objects to monopoly prices for new inventions, it should stop granting patents. It will be absurd to grant patents and stop depriving them of any value by forcing the patentee to sell at a competitive price." - Ludwig von Mises.[465]

Through the detailed examination of the definition, roles, responsibilities, and operational procedures of competition authorities as well as patent agencies in both the United States and the European Union we could not find organizational or procedural guarantees that the protection of customer access to innovation would be enforced to a satisfactory degree. In fact, by examining a case study when a patent remained unutilized after a decision of the European Commission, we could see a situation where the objectives of preventing market concentration and encouraging the use of invention ended up in conflict with each other. While judging from the subsequent events, the decision of the European Commission was the right one, in this case, it was not due to careful planning on the effects on the customer access to innovation, but merely due to other companies finding other ways to innovate. Therefore, I consider it sufficiently warranted that a new operational unit, e.g., a new office of the Competition Authority, be set up to protect the customer access to innovation and ensure this aspect of mergers and acquisitions is explicitly represented in all merger control procedures.

[464] Id..

[465] Mises, L. v. (2010). Human Actions: A Treaties on Economic (The Scholar's Edition ed.). Ludwig von Mises Institute. ISBN-10 : 1610161459 page 760-761

Chapter Four

4. A Solution Proposal: An Innovation Protection Office

In this chapter, I am going to investigate my third hypothesis first, to establish the legal background, and then examine a proposed solution for the problem we identified with mergers and acquisitions when patents remain unutilized.

My third hypothesis is as follows:

There is sufficient legal basis to prevent or mitigate acquisitions where patents remain unutilized.

I will focus my investigation on the European Union, both on the foundational laws and the merger control procedure aspects, but will discuss the principles and also include the relevant international treaties. This will hopefully illustrate how the proposed solution and its legal basis can be applied in other jurisdictions as well, where the legal foundations are similar.

The solution I am proposing is the establishment of an Innovation Protection Office whose sole purpose is to represent the interests of enabling and maintaining customer access to innovation represented by patents in merger and acquisition cases falling currently under the umbrella of the competition authority. This office would provide reports, and practical recommendations, including analytical, contractual, and in some cases, regulatory actions that the competition agency may consider in their procedures to approve or deny a merger or acquisition. This new office would also perform audits on the aforementioned actions in cooperation with the Patent Office in order to monitor their effectiveness and finetune the operational framework and methodology by which it operates and advises the competition agency, and ultimately if necessary, to facilitate the initial legal action in case of non-compliance.

In order to appropriately define the organizational structure, the objectives, and the operational methodology of the new office, I decided to first examine a possible theoretical framework to help me in designing the operational system holistically, by following a top-down approach. This framework will allow me to take into account concepts and values the new organization should follow and encourage, such as sustainability considerations of the current economic conditions as well as equity of rights, from customer rights through the rights of companies to perform the mergers and acquisitions to achieve efficiencies, all the way to patent owner's rights.

Subsequently, to illustrate how the new office will operate, I will explain its primary roles and objectives, organization structure, and operative relationships with other organizations such as the competition authority itself and the patent offices.

Afterward, I will examine the analytical and legal processes and methodologies the office is going to use in analyzing the mergers and acquisitions prior and post-Merger and Acquisition to assist the competition authority's decision-making procedure and influence policy-making or facilitate initiation of legal actions. The list of these legal and analytical processes and methodologies is not intended to be interpreted as an exhaustive list, rather a starting toolkit by which the office may start its operations. I purposefully included dedicated processes so that the office may improve the effectiveness of their operations both in advising the competition authority and policymakers and facilitating legal actions.

4.3. Legal Background

In this chapter I will attempt to investigate my third hypothesis:

There is sufficient legal basis to prevent or mitigate acquisitions where patents remain unutilized.

I will focus my investigation on the European Union, its treaties and its merger control procedure, and the national and international treaties around the "patent non-working" scenario. Even though this investigation will focus on the EU, I believe the applicability of the proposed solution, the Innovation Protection Office, especially its Prior and Post Merger and Acquisition processes are much wider. These processes are designed based on fundamental rights around fair competition, general merger control procedures, and international treaties around patent non-working which may be applicable in many other jurisdictions as well. However, this thesis does not aim to discuss the differences and commonalities of international legal frameworks in this area. The investigation of this hypothesis is rather an example on the minimum set of rules an organization can use to prevent or mitigate acquisitions where patents remain unutilized.

The first question I will investigate is whether the European Union foundational laws and treaties cover the case of acquisitions where patents remain unutilized. The relevant treaty to

this patent misuse case is the Treaty on the Functioning of the European Union, especially Article 102 about the abuse of a dominant position. [466] It states the following:

> "Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between the Member States. Such abuse may, in particular, consist in:
>
> (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
>
> (b) limiting production, markets or technical development to the prejudice of consumers;
>
> (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
>
> (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts." [467]

According to section b of Article 102, limiting production, markets, or technical development to the customers' prejudice is clearly a case of patent misuse. Therefore, in antitrust cases, the innovation aspects need to be examined as well. A merger control case where it can be reasonably assumed that a significant patent will remain unutilized, therefore, should include considerations preventing such misuse.

Since in the case of European Union competition law, the European Commission, and its Directorate-General for Competition along with national competition authorities is responsible for directly enforcing Articles 101 to 109 of the Treaty on the Functioning of the European Union[468], I will investigate the European Commission's merger control procedures next, to identify which steps if any are applicable to examine the patent misuse cases. [469]

The EU merger control procedure involves the following steps:

"*Notification*

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[466] (Eur-lex.europa, 2008)

[467] Id..

[468] European Commission Directorate-General for Competition. (2020, July 29). Directorate-General for Competition. European Commission Directorates General. Retrieved October 20, 2020, from https://ec.europa.eu/dgs/competition/index_en.htm

[469] European Commission. (2013, August 13). Merger Control Procedures. European Commission – Competition - Mergers. Retrieved April 20, 2021, from https://ec.europa.eu/competition/mergers/procedures_en.html

The Commission must be notified of any merger with an EU dimension prior to its implementation. Companies may contact the Commission beforehand to see how to best prepare their notification. There are pre-prepared templates used to notify their mergers, based on the complexity of the case.

Phase I investigation

After notification, the Commission has 25 working days to analyse the deal during the phase I investigation. More than 90% of all cases are resolved in Phase I, generally without remedies. A phase I review may involve the following:

- Requests for information from the merging companies or third parties;
- Questionnaires to competitors or customers seeking their views on the merger, as well as other contacts with market participants, aimed at clarifying the conditions for competition in a given market or the role of the merged companies in that market.

Remedies

If the Commission has concerns that the merger may significantly affect competition, the merging companies may offer remedies ("commitments"), i.e. propose certain modifications to the project that would guarantee continued competition on the market. Companies may offer remedies in phase I or in phase II.

The Commission analyses whether the proposed remedies are viable, and sufficient to eliminate competition concerns. It also takes into account the views of market participants in a market test. If remedies are accepted, they become binding upon the companies. An independent trustee is then appointed to oversee compliance with these commitments.

Phase II investigation

Phase II is an in-depth analysis of the merger's effects on competition and requires more time. It is opened when the case cannot be resolved in Phase I, i.e. when the Commission has concerns that the transaction could restrict competition in the internal market. A phase II investigation typically involves more extensive information gathering, including companies' internal documents, extensive economic data, more detailed questionnaires to market participants, and/or site visits.

The final decision

Following the phase II investigation, the Commission may either:

- Unconditionally clear the merger; or

- Approve the merger subject to remedies; or
- Prohibit the merger if no adequate remedies to the competition concerns have been proposed by the merging parties.

Judicial review

All decisions and procedural conduct of the Commission are subject to review by the General Court and ultimately by the Court of Justice. The companies or other parties demonstrating an interest can appeal within 2 months of the decision." [470]

From the above procedures the Phase I and Phase II investigation steps are perfectly adequate for the Commission to investigate

- whether the merger and acquisition case involve patents by checking the patent ownerships and patent portfolio of the merging companies,
- perform a risk assessment that patents may remain unutilized.

In case the risk assessment is positive, they may use the merger control remedy procedure by requiring commitments from the merging companies, which commitments will become legally binding.

Finally, to determine the applicable remedies, we must examine the cases of patent utilization. As we have identified before, companies can use patents in two main ways: they can use them in their independent commercial activity (production, sales, import) or as granting rights to other companies to supply the market (voluntary licensing, selling the patent rights outright, joint venture). Failing to acquire any of the above commitments, there is another powerful tool available for the Competition Authority to encourage and ensure utilization of the patents: compulsory licensing. Therefore, in the next section I will investigate international treaties and some national laws that govern compulsory licensing.

Although I am suggesting that compulsory licensing shall be used as a last resort, its usage, and publication to the companies involved in the merger control procedure is expected to have a significant incentivizing factor in seeking other options such as voluntary licensing, patent rights sale, or joint ventures.[471]

The concept of compulsory licensing is described by the European Patent Office as follows:

[470] Id..

[471] (Radauer & Dudenbostel, 2013, page II)

"In some cases, national authorities may license companies or individuals other than the patent owner to use the rights of the patent without the consent of the patent owner." [472]

The compulsory licensing practices and regulations are different in each of the 38 contracting States of the European Patent Convention, with some significant divergence in the applicability of the compulsory licenses as well. Since Germany has the strongest patent activity in Europe, I will take a look at the German example in more detail in the following section. In Germany, the legal basis for compulsory licensing is defined in Section 24 (1) of the Patent Act (Patent Gezets). The relevant sections in our investigation are the following:

"it must be demonstrated that: (1) the applicant has tried, within a reasonable period of time, unsuccessfully to obtain permission from the proprietor of the patent to use the invention on reasonable commercial terms and conditions; (2) the public interest calls for the grant of a compulsory licence."[473]

The German regulations are therefore in line with my suggestions that the compulsory licensing may only be used as a last resort, when voluntary licensing agreements have been pursued before, but where the patent owner was not willing to offer reasonable commercial terms and conditions.

While in most countries compulsory licensing practices are restricted to pharmaceutical inventions, where the public interest is much more evident to determine,[474] the German regulation includes some special provisions in terms of the semiconductor industry as well. Section 24 (4) of the Patent Gesetz describes the applicability only in the case of anti-competitive practices:

"A compulsory licence under subsection (1) may be granted for a patented invention in the field of semiconductor technology only where this is necessary to eliminate those anti-competitive practices pursued by the proprietor of the patent which have been established in court or administrative proceedings."[475]

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[472] EPO. (2019, January 14). Compulsory licensing in Europe. EPO Materials & programmes. Retrieved November 20, 2020, from https://www.epo.org/learning/materials/compulsory-licensing-in-europe.html

[473] European Patent Academy. (2018). Compulsory licensing in Europe - A country-by-country overview. European Patent Office. ISBN 978-3-89605-222-3 page 29

[474] (World Health Organization, 2006)

[475] (European Patent Academy, 2018, page 29)

Since patent misuse falls under the umbrella of anti-competitive practices, the German regulations have an explicit clause supporting the last resort action I am proposing.

The Patent Gesetz, Section 24 subsections (5), (6), and (7) also apply in our case, since the proposed Innovation Protection office is specifically trying to prevent the non-working of patents described in in Section 24 of the Patent Gesetz, subsections:

> "(5) Where the proprietor of the patent does not apply the patented invention in Germany or does not do so predominantly, compulsory licences in accordance with subsection (1) may be granted to ensure an adequate supply of the patented product on the German market. Import shall thus be equivalent to the use of the patent in Germany.
>
> (6) The grant of a compulsory licence in respect of a patent shall be admissible only after the patent has been granted. The compulsory licence may be granted subject to limitations and made dependent on conditions. The extent and the duration of use shall be limited to the purpose for which the compulsory licence was granted. The proprietor of the patent shall be entitled to remuneration from the proprietor of the compulsory licence, such remuneration being equitable in the circumstances of the case and taking into account the economic value of the compulsory licence. Where, in relation to recurrent remuneration payments due in the future, there is a substantial change in the circumstances which governed the fixing of the amount of remuneration, each party shall be entitled to require a corresponding adjustment. Where the circumstances upon which the grant of a compulsory licence was based no longer apply, and if their recurrence is improbable, the proprietor of the patent can require the withdrawal of the compulsory licence.
>
> (7) A compulsory licence in respect of a patent may be transferred only together with the business involved in exploiting the invention. A compulsory licence in respect of an invention which is the subject matter of a patent with an earlier filing or priority date may be transferred only together with the patent with a later filing or priority date." [476]

In line with the German legislation, I am proposing that import shall be deemed sufficient access to innovation to customers as well. National trade policy is not in the scope of the proposed Innovation Protection Office, only the protection of the customer's access to innovation.

[476] European Patent Academy. (2018). Compulsory licensing in Europe - A country-by-country overview. European Patent Office. ISBN 978-3-89605-222-3 page 29-30

On an international level, the TRIPS Agreement and the subsequent Doha Declaration are the most important treaties to consider in terms of compulsory licensing. The Trade-Related Aspects of Intellectual Property Rights is a World Trade Organization Agreement that took effect in January 1995. The TRIPS agreement provides flexibility to countries to determine their public interest and thus define their compulsory licensing measures.[477] The Doha Declaration affirmed the rights of (especially developing) countries to these flexibilities in the protection of the health of their citizens.[478]

Bond and Saggi (2012) explains that the threat of compulsory licensing itself may be enough to convince the patent holder to change their behavior[479]: "Exactly when a country can issue a compulsory license is not explicitly addressed by TRIPS although it does mention national emergencies, other circumstances of extreme urgency, and anti-competitive practices as possible grounds for compulsory licensing. Overall, it appears that countries seeking to use compulsory licensing have a fair bit of discretion at their disposal, something that has been a source of major concern for pharmaceutical companies and other supporters of strong intellectual property rights. For example, it is far from clear as to what constitutes reasonable commercial terms? Similarly, how much remuneration to the patent-holder is adequate? Available evidence suggests that patent holders have tended to receive fairly low royalty rates when compulsory licensing has occurred. Even though compulsory licensing is permitted under TRIPS, it has not often been used by developing countries. Of course, for the option to invoke compulsory licensing to matter, compulsory licensing need not be used: the threat to issue a compulsory license can impact the behavior of patent-holders to the advantage of developing countries thereby making its use unnecessary."[480]

In this chapter, I have investigated the legal basis of the solution proposal, the new Innovation Protection Office, with a focus on the European Union. I have found that the current laws, regulations and procedures are adequate to ensure the utilization of patents in merger control

[477] (World Trade Organization, 2006)
[478] (World Health Organization, 2006)
[479] Bond, E., & Saggi, K. (2012). Compulsory licensing, price controls, and access to patented foreign products (April ed.). Department of Economics - Vanderbilt University. Retrieved October 20, 2020, from https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_econ_ge_4_12/wipo_ip_econ_ge_4_12_ref_saggi.pdf page 4
[480] Id.. page 4

cases. The European Commission's responsibility clearly includes the examination of these patent misuse cases as well, and its merger control procedures, especially the Phase I and Phase II investigations and the Remedies process allows for legally binding commitments to be made that can ensure patent utilization. Finally, I have investigated the international treaties and some national laws around compulsory licensing which may strengthen the power of the merger control process and encourage the companies to find solutions for patent utilization.

4.4. A Theoretical Framework of Organization Design

In this chapter, I will create a theoretical framework for organization design, that will serve as a basis for the following chapters. I am going to use this top-down design framework based on different abstraction levels to make sure that the concepts and values of society are properly represented in the proposed organization's objectives, structure and operational methodology.
I am calling this top-down framework the Abstract Pyramid, which represents the abstraction aspect of the framework. It has been convenient to use the ladder of abstraction principles in expounding theories, first popularized by S.I Hayakawa.[481] The ladder of abstraction aims to reduce the effort in explaining certain non-trivial theoretical concepts by drilling down from the base concept and reaching a real-world analogy or otherwise practical application. The idea of abstraction ensures that as the reader moves through the pyramid, they gain a deeper understanding of practical applications of the abstract concepts, as was previously explained. The bidirectional movement concept is a critical element in the idea. The higher levels represent a general or pointed concept or idea, which, as we move through the lower levels, undergoes translation into a more practical and quantifiable outcome. The figure below illustrates the hierarchy of the theoretical framework from the top-level concepts all the way to the scenarios and actions that should be followed by the organization.

[481] Semanticist S. I. Hayakawa, an American linguist, had a significant insight on how we absorb information at different levels of abstraction all at the same time , in his book 'Language in Thought and Action' (1949).

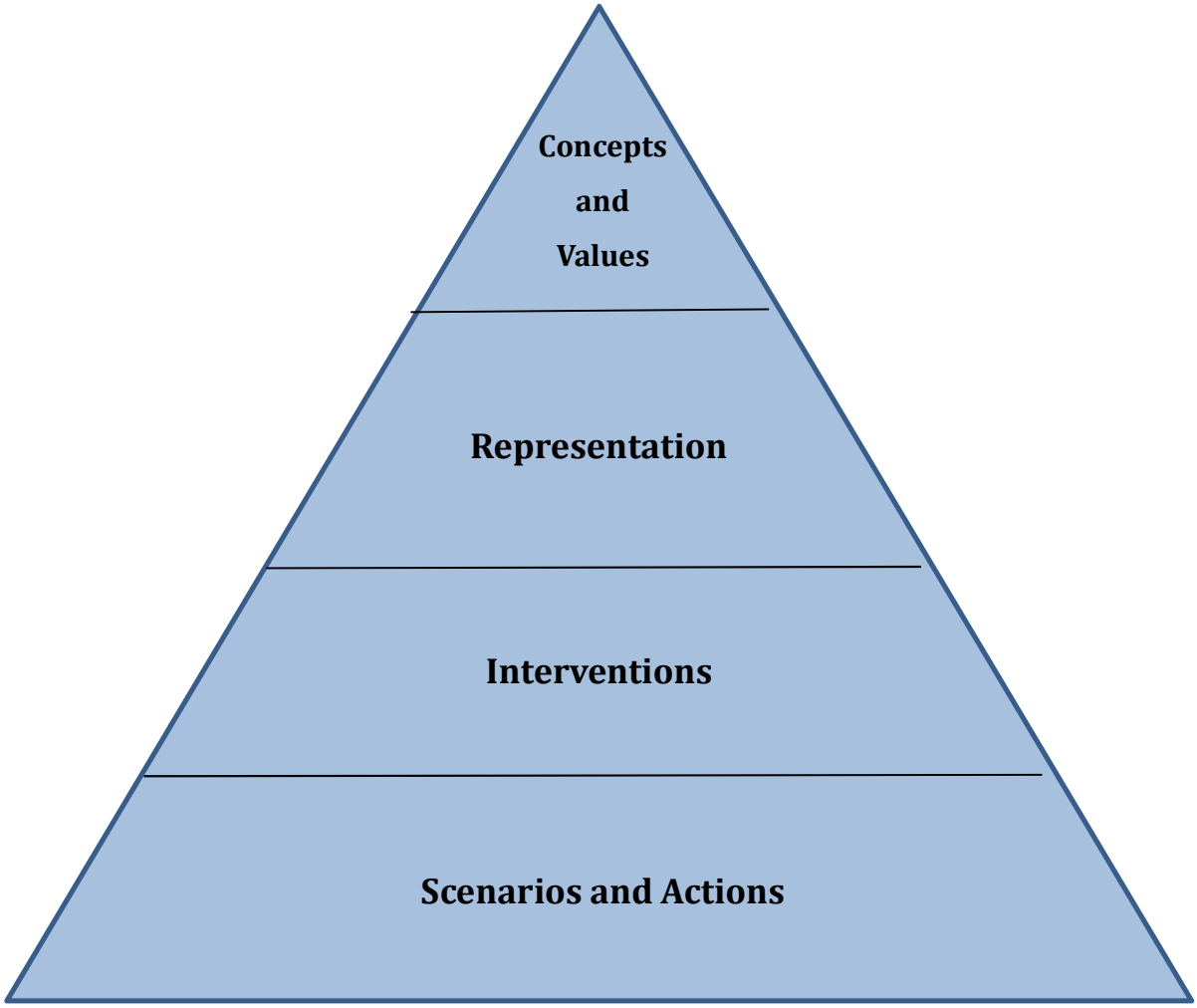

Figure 17 Abstract Pyramid: Framework proposal

Any solution to stakeholders' problems (producers and customers) on anti-competitive actions between two firms needs to perform holistically and sustainably. A holistic solution means the main concepts and values of a society are taken into account, as well as the interests of its stakeholders. A sustainable solution in this context means such a system that not only takes into account all relevant values of society, and the interests of its stakeholders, but also aligns said interests in order to incentivize behavior that implements and enhances such values.

In this theoretical framework I will attempt to follow the approach by United Nations on Sustainable Development[482] on the means of implementation:

[482] United Nations. (2012, June 22). Report of the United Nations Conference on Sustainable Development. Retrieved October 20, 2020 from https://www.riob.org/fr/file/273754/download?token=nZIUIgRD

"We reiterate that each country has primary responsibility for its own economic and social development and that the role of national policies, domestic resources and development strategies cannot be overemphasized. We reaffirm that developing countries need additional resources for sustainable development. We recognize the need for significant mobilization of resources from a variety of sources and the effective use of financing, in order to promote sustainable development. We acknowledge that good governance and the rule of law at the national and international levels are essential for sustained, inclusive and equitable economic growth, sustainable development and the eradication of poverty and hunger." [483]

The approach by the United Nation reaffirms the role of national policies, and development strategies. But it also underlines that such policies and development strategies follow the values of society as well. These concepts and values represent the first layer in my theoretical framework for organizational design. These values could range from Equality, Sustainability, Freedom of Expression to many others, depending on the society and its priorities. Some of the philosophical approaches of the last decades on Equality[484], Justice[485] also advocate that linking of theoretical concepts and values to practical institutions and virtues of life[486], otherwise these concepts and values are meaningless and void for society.

In case of the Innovation Protection Office, I will attempt to include the following concepts and values in their mission and operations, in line with the above United Nations approach:

- Rule of Law

The design of the new office will make use of existing legal frameworks and respect the current laws, regulations and practices.

- Sustainability

The design of the new office will make use of incentives to steer stakeholders into following behaviors that are in line with the concepts and values described here.

- Fair Competition

[483] Id.. page 48

[484] Arneson, J. Richard. (1989). Equality and Equality of Opportunity for Welfare. Vol 56, Philosophical studies. https://doi.org/10.1007/BF00646210

[485] Sen, A. (2011, May 31). The Idea of Justice (Reprint edition ed.). Belknap Press: An Imprint of Harvard University Press. ISBN-13 : 978-0674060470 page ix-x

[486] O'Neil Onara. (1996). Towards Justice and Virtue. Cambridge University Press. https://doi.org/10.1017/CBO9780511621239

The design of the new office will aim to enable fair competition and discourage, prevent or even punish anti-competitive behavior.

- Access to Innovation

The design of the new office will aim to increase access to innovation i.e. the adequate supply of the market at reasonable price and quality.

- Intellectual Property Protection

The design of the new office will aim to respect the legal right of Intellectual Property to encourage innovation, so long as those rights do not interfere with the other values cited above.

The second layer of the abstraction pyramid is the representations of the concepts/values in our current legal frameworks. These representations mean elements of the legal framework such as international treaties, national laws and government decrees. In my thesis some of these important treaties and laws are the Paris Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the Treaty on the Functioning of the European Union, the TRIPS Agreement, the Doha Declaration, the Patent Gesetz etc.

The third layer are the interventions, which are all the institutions, organizations that are established to enforce and implement the representations as cited above. In my thesis these can be the national or regional patent offices and competition authorities, including their current processes around the Patent Cooperation Treaty and the merger control procedures respectively. The new Innovation Protection Office of the competition authorities, with its proposed organizational structure also belongs in this layer.

The fourth layer are the individual scenarios and actions that should be followed by the institutions and organizations to ensure that the values defined at the top are achieved, and at the same time, the representations of the international treaties, national laws and government decrees are adhered to. In my thesis these scenarios and actions can be the prior and post-merger and acquisition processes I am proposing in the next chapters for the Innovation Protection Office.

I have summarized in the table below the different levels of the Abstract Pyramid as they relate to the proposed solution in this thesis, the Innovation Protection Office of the competition authorities.

Level	In the proposed solution: Innovation Protection Office
L1: Concepts and Values	Rule of Law Sustainability Fair Competition Access to Innovation Intellectual Property Protection
L2: Representations	Paris Convention for the Protection of Industrial Property Patent Cooperation Treaty Treaty on the Functioning of the European Union TRIPS Agreement Doha Declaration Patent Gesetz
L3: Interventions	**Organizations**: • European Patent Office, United States Patent and Trademark Office, National Patent Offices • European Commission Directorate-Generale for Competition, United States Federal Trade Commission and Department of Justice, National Competition Authorities • Innovation Protection Office **Procedures**: • Patent Cooperation Treaty Procedures • Merger Control Procedures • Innovation Protection merger control advisory
L4: Scenarios	Prior Merger and Acquisition processes Post Merger and Acquisition processes

Figure 18 Abstract Pyramid levels for the proposed Innovation Protection Office

In this chapter, I have created a theoretical framework for organization design, that will serve as a basis for the following chapters. This top-down design framework based on different abstraction levels will help in making sure that the concepts and values of society are properly represented in the proposed organization's objectives, structure and operational methodology.

4.5. Objectives of the Innovation Protection Office

In this chapter, I will define the objectives of the Innovation Protection Office. This definition will be essential to understand the practical role the Innovation Protection Office will play, and to be able to design an applicable organizational structure and the necessary external relationships the office should have. The definition of the objectives is also important to be able

to capture the laws and regulations (in other words, the legal framework) the Innovation Protection Office will take advantage of, to deliver said objectives. Finally, the objectives and the legal framework will determine what practical operational methodology the department will be able to follow.

In the following discussion I am going to use the following definition:
The Innovation Protection Office is a proposed advisory body to the Competition Authority responsible for analyzing and recommending preventative or remedial action for cases of mergers and acquisitions when customer access to innovation is likely to be (or have been) severely decreased, temporarily or permanently.
The above definition states that the Innovation Protection Office is a proposed advisory body to the Competition Authority. A competition authority (also called competition regulator or economic regulator) is a government agency responsible for regulating and enforcing competition laws and may also enforce customer protection laws as we have discussed in previous chapters. Ensuring customer access to innovation in case of patents remaining unutilized after some mergers and acquisitions falls both under the enforcement of competition laws, namely the merger control regulations of the antitrust laws, and customer protection laws insofar as access to patented technologies and products are considered customer rights. Therefore, the proposed office is best established in the Competition Authority.
Since not all national or regional competition authorities have the clear and statutory powers to protect customer rights in addition to regulating and enforcing competition law, the establishment of the Innovation Protection Office may need to take place in another government agency in some countries. For the purposes of our study, I am going to assume that the theoretical Competition Authority is responsible for customer protection as well, at least as far as mergers and acquisitions are concerned. This assumption is not unreasonable considering that in the case of European Union competition law, the European Commission, and its Directorate-General for Competition along with national competition authorities is responsible for directly enforcing Articles 101 to 109 of the Treaty on the Functioning of the European Union.[487] As we have discussed in the previous chapters, Article 102 states that the abuse of a

[487] European Commission Directorate-General for Competition, 2020)

dominant position includes any "limits to production, markets or technical development to the prejudice of consumers",[488] thus preventing such abuses is clearly the responsibility of the competition authority.

Another important part of this definition is that the newly established Innovation Protection Office will be an *advisory body* to the Competition Authority. Since many competition authorities have organizational structures divided along functional lines or sometimes along industries it is reasonable to establish an organizational entity that is cross-functional. In case the competition authority divides work based on the industries being regulated, this advisory body may also act in a cross-functional manner since the innovations covered by patents may be used in many industries.

Furthermore, as we will discuss below, the roles of the proposed Innovation Protection Office are clearly of an advisory nature to influence the decision-making of the merger control organization of the competition authority.

The definition states that the role of the Innovation Protection Office is related to merger and acquisition cases where the customer access to innovation is likely to be (or - in the cases of mergers that already happened - have been) severely decreased. As far as this study is concerned, we define the customer access to innovation as the availability of patented products or services on the domestic market for customers (either via domestic production or import). By patented products or services, we mean both product and process patents necessary for the availability of said goods for the domestic markets in at least similar quality and price as they exist in other countries. It is necessary to include the minimum quality and price assurances as well, otherwise the domestic customers may not be able to access said innovations, as we will discuss below in subsequent chapters about compulsory licensing.

Since the cases when the Innovation Protection Office will provide relevant advice to the merger control procedures involve only those cases when at least one of the companies involved in the merger and acquisition is a patent owner, it is not necessary that each merger and acquisition case goes through the analysis phase of this advisory body. This allows for a more detailed analysis in some cases, without endangering the efficient approval of the majority of merger and acquisition cases.

[488] (Eur-lex.europa, 2008)

The above definition also highlights that the detrimental effects on customer access to innovation may not necessarily be permanent, some mergers and acquisitions will not outright disable the customers of the domestic market from buying the patented products or services at the usual quality or price, but they may delay such access deliberately or inadvertently. This is especially important in cases when licensing (voluntary or compulsory) is prescribed by the competition authority as a merger control criterion, but such licensing alone will not automatically and immediately grant customers access to the products or services in question.

The definition identifies analysis and the recommendation of preventative and remedial actions as the main responsibility of the Innovation Protection Office. Such actions include proposing some additional merger control criteria on patent utilization as gatekeeper conditions for the mergers or acquisition to be approved, follow-up on the previously accepted merger and acquisition commitments and proposing actions in case of non-compliance or undesired outcomes.

The definition leaves it up to the Innovation Protection Office to determine in their analysis whether the effects of the loss of customer access to innovation are significant enough to impose merger control criteria or post-merger litigation for failure to comply. This flexibility is necessary since the efficient operation of the markets requires the mergers and acquisitions of companies in general, therefore the costs and benefits of the innovation protection mechanisms must be weighed carefully. Especially considering that either voluntary licensing merger criteria or especially compulsory licensing merger criteria may limit the patent owner's rights, therefore large-scale usage of such measures may ultimately affect the innovation encouraging effects of patents.

4.6. Organizational Structure

In this chapter I will design a proposed structure for the Innovation Protection Office that could deliver on the objectives highlighted in the previous chapter. The organizational structure proposed above is not the only structure that would enable the office to achieve its goals, but it is a viable option. In designing this structure, I have taken into account the usual organizational structures of competition authorities, such as the organization of the Directorate-General for Competition of the European Commission discussed in previous chapters. While this proposed organizational structure is fully compatible with the current European Union competition

authority, it is not exclusive to this authority. I have deliberately highlighted the operational responsibilities and the roles each manager, taskforce or department may have in this organization, as well as the external relationship with the patent office, so that a similar structure may be established in other (national or international) competition authorities.

According to the definition discussed above the Innovation Protection Office will have the following operational responsibilities:

1. Prior-Merger and Acquisition:
    a. Analysis of Merger and Acquisition cases where patent ownership is involved
    b. Risk assessment on patents remaining unutilized
    c. Recommendations on additional merger control criteria to ensure customer access to innovation
2. Post-Merger and Acquisition:
    a. Analysis of compliance with merger control commitments
    b. Analysis of effects on customer access to innovation
3. Improving operational effectiveness and influence policymaking

To cover the above responsibilities, I am proposing the following organizational structure:

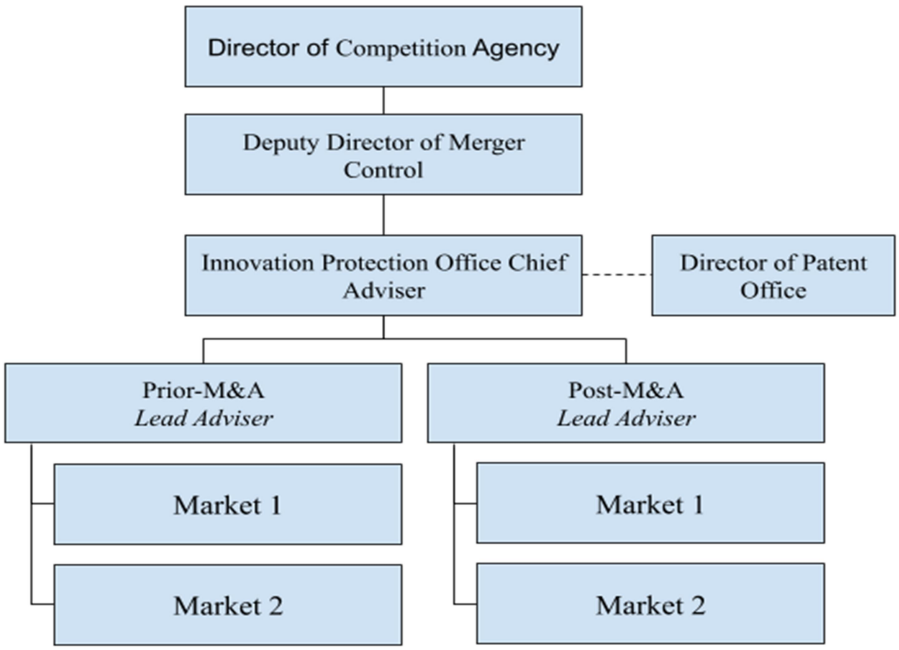

Figure 19 Proposed Organizational Structure for Innovation Protection Office

The manager responsible for the Innovation Protection Office's operations may be called the Chief Adviser and report directly to the Deputy Director responsible for Merger Control. This is desirable since the reports and recommendations of the Innovation Protection Office are intended to be used in the merger control procedures of the Competition Agency.

The Chief Adviser and Lead Advisers should work closely with the Patent Office to identify and understand the effects of patents on customers, especially considering the factors influencing the ability of companies to bring to market the products and services relying on patents such as industrial know-how, dependent patents and licensing considerations. That is why I included the Patent Office Director in an advisory capacity in the organizational chart.

Since the analysis and recommended actions differ significantly prior to the Merger and Acquisition procedure and post the Merger and Acquisition, I am proposing the establishment of two departments in the office, one responsible for the analysis and recommendations directly influencing the merger control criteria (Prior Merger and Acquisition Department), and the other responsible for the analysis and recommendations of previously approved mergers, the commitments therein, their compliance and the actual effects they had on the customer access to innovation. Each department may have further subdivisions if necessary, such as one based on markets and industries. It would allow different workforces to specialize in specific industries. This subdivision may follow the merger and acquisition department's division by industry if there is one in place, or it may follow the international patent classifications as well. Efficient understanding of the industrial applicability and know-how of the different patents or patent portfolios of the companies involved in the Merger and Acquisition case is paramount for the Innovation Protection Office's reasonably efficient operation.

The responsibility of recommending improvements on the operational effectiveness and policy-making is logically best left assigned to the Lead Adviser of the Post-Merger and Acquisition department since they are the ones assessing the effects of the merger control criteria and the effectiveness of the Competition Law and Intellectual Property Law regulations in preserving the efficient market conditions while maintaining the customer access to innovation.

4.7. Operational Methodology

In this chapter, I will describe a possible operational methodology whereby the Prior Merger and Acquisition objectives and the Post-Merger and Acquisition objectives of the Innovation

Protection Office may be achieved. To define this operational methodology, I have taken into consideration the legal framework described above, as well as the organizational structure proposed in the previous chapters. Therefore, I have divided the operational process descriptions into two subchapters: Prior-Merger and Acquisition, Post-Merger and Acquisition that corresponds to the departments of the office I proposed, based on the operational responsibilities in each area.

The following process is not the only one that would achieve the desired objectives of the Innovation Protection Agency. However, it is intended as an initial operational framework, to be improved upon and changed as necessary, based on the results that will be gathered in the Post-Merger and Acquisition investigations.

I will describe the processes below following a linear approach a merger and acquisition case will go through. This will enable an easier understanding of how the different aspects of analysis, recommendation, commitments and follow-up came into play, and how the Innovation Protection Office will track each of them.

4.7.1. Prior Merger and Acquisition

As discussed above, the Prior Merger and Acquisition responsibilities of the Innovation Protection Office will include:

1. *Analysis of Merger and Acquisition cases where patent ownership is involved.*

In order for a merger and acquisition case to even enter serious analysis, a preliminary search needs to be conducted. Since the patent ownerships can easily be determined using the public patent search databases, a software-controlled process may even automate this preliminary search. Therefore, only those cases would arrive at the Innovation Protection Office that will have actual investigation relevance.

The Analysis of the Mergers and Acquisitions will need to identify which patents each company has, which patents are they using currently in their direct industrial and commercial operations on the domestic markets, whether they are producing the products or offering the services domestically, importing them or are not supplying the market currently. A further possible utilization is when a patent owner company is licensing their patent to another company that offers or is planning to offer the patented products or services in the domestic

market. The analysis needs to cover the quality and price of such products and services as well, both domestically (if available) and internationally. This aspect of the analysis is also important because the scenario of patents remaining unutilized in the domestic market may involve quality compromises or availability issues through prohibitive price setting, especially in the cases of developing countries.

The analysis should be comprehensive and involve all stakeholders from the companies involved in the merger control procedure to their suppliers, the current and prospective customers, further inventors wishing to innovate on the company's patent etc. In order to achieve this comprehensive analysis, widely used analytical tools such as SWOT or PESTEL analysis may be used.

2. *Risk assessment on patents remaining unutilized*

The next step is the risk assessment, which needs to examine all the current merger control criteria, and the compatibility of such criteria with patent utilization. This risk assessment phase alone would have identified the issues in the NXP Semiconductors - Freescale Semiconductor case study we have discussed above.

Furthermore, the risk assessment needs to identify if the patented products or services are offered currently on the domestic market, the likelihood that the market operation of the merged company will change and affect the availability, the quality or price of such products or services. In case the products or services are not yet available, the likelihood of market entry of each company without the merger, of the merged company after the merger, or a market entry of another company through licensing needs to be determined.

3. *Recommendations on additional merger control criteria to ensure customer access to innovation*

The final step is the recommendations on additional merger control criteria for the competition authority's merger control procedure. This phase is only necessary if the risk assessment phase showed significant risks, or when the analysis and risk assessment identified the innovation as so important to the domestic customers that despite the relatively low risk, some contingency measures are still recommended to be included in the merger control commitments required from the merged company.

For the recommendations that may be offered by the Innovation Protection Office to the Competition Authority I am suggesting a three-step approach:

1. If commitments from the merged company can be credibly offered that they will produce, import or otherwise supply the domestic market at a reasonable quality or price (compared to other markets) under their own industrial and commercial operations, then such commitments shall be required.
2. Otherwise, voluntary licensing agreements, patent sale agreements or joint venture agreements shall be required to be shown to the competition authority, whereby another company can credibly be accepted to produce, import or otherwise supply the domestic market at a reasonable quality and price. In order to make it more credible that the company licensing the patent will actually be able to offer the products or services at the expected quality and price, commitments to share industrial know-how may also be included as additional merger control criteria.
3. At the same time, when the voluntary licensing negotiation is taking place, a contingency mechanism involving a compulsory licensing proposal shall be submitted by the Innovation Protection Office and shared with the companies involved in the merger control procedure. The publication of such a compulsory licensing proposal may incentivize the company to finalize a voluntary licensing deal instead and render the contingency option void.

4.7.2. Post-Merger and Acquisition

As we discussed in previous chapters, the Post-Merger and Acquisition responsibilities of the Innovation Protection Office will be as follows:

1. Analysis of compliance with merger control commitments

This analysis will only be necessary for cases where merger control commitments on innovation protection were both recommended by the Innovation Protection Office and incorporated into the merger control procedure by the Competition Authority.

In these cases, the main goal of this analysis is to examine whether the commitments to produce, import or otherwise supply the domestic market were met, either through the merged company's own industrial and commercial activity or through licensing to another company and providing the needed knowledge transfer the company committed to.

2. *Analysis of effects on customer access to innovation*

This analysis should be conducted for every case when the Innovation Protection Office was involved, whether or not the merger control recommendations were applied and incorporated into the merger control procedure by the Competition Authority. This is recommended because there may be cases when the Innovation Protection Office suggested merger control measures, but they were not applied. These cases will provide valuable data for comparative study on the effects where such controls are applied versus on cases where such controls were not applied.

The main goal of this analysis is to understand which processes and recommendations have worked well in each industry to protect the customer access to innovation while maintaining efficient operation of the markets through justified mergers and acquisitions.

In case the above commitments were not sufficiently met, or despite the commitments having been met the customer access to innovation still is not at the level planned either due to problems in availability, quality or price, the analytical reports of the Innovation Protection Office shall suggest remedial actions:

1. Fines or other penalties for failing to comply may be imposed on the companies involved.
2. Further commitments such as voluntary or compulsory licensing, sale or joint venture agreements, and knowledge transfer of industrial know-how may be required.
3. In extreme cases, applicable legal sanctions as per the country's Patent Law may be recommended to be initiated in case the patent continues to be "non-working" in the domestic market.
4. Improving operational effectiveness and influence policymaking.

This responsibility of the Post-Merger and Acquisition Department should be conducted on a regular basis, preferably based on statistics gathered from the previous two types of analysis. The first objective of this activity is to provide objective metrics to influence the change of procedures of the Competition Authority. The second objective is to influence policy making in the country, especially regarding patent regulations, compulsory pricing, patent working requirements, and Competition Law, especially considering cases under merger control.

4.7.3. Conclusion

"There is no more neutrality in the world. You either have to be part of the solution, or you're going to be part of the problem." - Leroy Eldridge Cleaver

In these chapters, I have introduced a solution to handle the problem I am investigating in this thesis, mergers and acquisitions when patents remain unutilized. The proposed solution of an Innovation Protection Office as an advisory body established as part of the Competition Authority was described extensively regarding its objectives, with an example of a possible organizational structure and operational methodology. I have also determined that such a solution does not require a change to the current laws and regulations in most countries. It can take advantage of existing, albeit not often-used provisions in national and international patent laws and treaties, as well as practices already employed by the Competition Authority such as merger control criteria commitments from the companies involved in the merger control procedure.

Chapter Five

5. Conclusion

In this dissertation, my goal was to review from all sides the practical scenario when important patents remain unutilized by the companies after the merger or acquisition happens. I did not only aim to analyze the legal framework of this scenario, including the laws and regulations involved and the organizations involved in the enforcement of said laws, but I set out to suggest a practical solution as well. The solution is aimed at either preventing such scenarios, identifying the companies involved, holding them accountable, and/or enabling them to ultimately provide the customers with access to the innovation through their own activities or through licensing activities.

The methodology I used was the following:
I examined the three legal fields Mergers and Acquisitions, Competition Law and Intellectual Property Law, their definitions, the objectives of the legislator, some of their most important practical implications in the fields where they intersect from the perspective of our study: Mergers and Acquisitions, Antitrust Laws and Patents. Wherever I deemed it beneficial for understanding, I included studies of the United States and European Union legal frameworks in each area, as well as some recent case studies. I performed this study to get a sufficiently deep understanding of each area to be able to determine the adequacy of the current national and international laws and treaties to cover my scenario of mergers and acquisitions when patents remain unutilized from the regulation standpoint.

Then I investigated the practical implications of acquisitions when patents remain unutilized by examining the available statistical economic data on this subject. For the purposes of my study, however, this study served only as an emphasizing factor on the magnitude of the problem. Then I proceeded to illustrate the problem with a case study of a European merger control case when two semiconductor companies were involved in an acquisition, and an important patent for today's 4G and 5G telecom networks was left unutilized after said acquisition. The eventual further development of the technology was not because of careful planning and assessment on

the part of the European Competition Authority, but because of independent technological and industrial development of other companies, mainly in the United States and China.
After explaining the detrimental effects of such scenarios, I proceeded to show that even though the current national and international laws and treaties may provide adequate legal protection against such cases, there are not enough organization and procedural guarantees established in the organizations currently responsible for enforcing the regulations. To show the current organizational structures and processes, I again looked at two of the most progressive organizations in the enforcement of the aforementioned legal frameworks, the United States and European Union Competition Authorities and Patent Offices.

Finally, I have designed a solution proposal that could be implemented by regulators interested in solving the problem I presented. The proposed solution is an Innovation Protection Office acting as an advisory body to the Competition Authority by analyzing the effects of mergers and acquisitions on customer access to innovation both prior- and post-the mergers and acquisitions and recommending preventative or remedial actions. The preventative and remedial actions suggested ranged from commitments of industrial and commercial activity to voluntary and compulsory licensing, patent sale, or joint venture establishment, all the way to recommending legal sanctions applicable under the current national and international legal frameworks. My proposed solution has the added benefit of influencing the Competition Authority procedures and policymakers by evidence-based analysis of the effectiveness of its procedures in protecting customer access to innovation.

In summary, I found that the implications of my study on protecting the customer access to innovation may be applicable to all countries where the Competition Authority and the Patent Office does not have sufficient organizational or procedural guarantees. However, considering that access to patented innovation in quality and affordable products and services is usually a more significant issue in developing nations, my findings may be especially relevant to the legislators and the Competition Authorities in these countries.

Although this dissertation has focused on patents and the availability of patented inventions to customers, the field of Intellectual Property is much more comprehensive, and it may warrant

further studies to discover if there are other necessary fields of Intellectual Property where customer access is impacted when companies are merging or are getting acquired. Another important research topic that directly relates to this study would be to try and determine the effect of mergers and acquisitions on the loss of customer access to patented innovation in cases when merger control procedures are not even getting involved since it falls under the radar of dominant or potentially dominant market shares. Such cases include the acquisitions of patent holder startup companies by larger players, where the frequency, customer effects, and overall economic impact of said scenario when patents remain unutilized would also be worth a thorough investigation.

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