

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

Synopsis of the Ph.D. Dissertation

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1. Background of the Dissertation

1.1. 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 have attempted 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.

I have also established 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, ensuring their utilization. I have also reviewed 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 by 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.

1.2. Reasons for the Research Topic

According to the WIPO definition of a patent, it is a “new way of doing something or offering a new technical solution to a problem”. Since patents are to foster technological innovation by providing an incentive for research and development, and to disseminate technical information and promote technology transfer, there is legally recognized value in them to both the inventor and society. In case the patented innovation remains unutilized, many of the benefits are failing to materialize, and at the same time, the costs of the patent rights to society do appear, namely the prevention of others from utilizing the innovation. Therefore, these scenarios are detrimental to consumers from the perspective of the unrealized benefits, and at the same time the very much realized costs of the monopoly rights.

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 case of 4G and 5G telecommunication networks cited in the dissertation, 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.

If we assume that the problem will remain unsolved, then the detrimental effects to the consumers 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.

Finally, to further illustrate the significance of this problem, let us look at two examples:

- Our first example is if some important pharmaceutical patent is not used, because the acquiring company decides to push their own patented products instead. For example, if an expensive high-end vaccine producer buys a competitor with a patent that would allow for cheaper vaccines. Many countries, especially in the developing world would not be able to buy the vaccine and potentially lives could be lost. Even if they are able,

the number of different vaccines will still be fewer and a virus may evolve immunity to them, again causing severe health issues, or even fatalities.

- Semiconductors are crucial parts of almost every device we are using today from phones to cars to refrigerators. In 2020 due to a global chip shortage many countries (Germany, South Korea, Japan) car industries had to stop production for weeks and supply has not been fully restored to this day, causing billions of euros lost. A similar situation could easily happen if an important semiconductor patent is left in the drawer, and a product flaw emerges with the competing patent in use, or a raw material shortage happens.

1.3. Objectives of the Research

The primary aim of this dissertation was to investigate the hypothesis that the scenarios where patents remain unutilized after the merger or acquisition happens are not desirable for the economy and society. If so, then investigate whether the current national and international organizations currently have effective operative measures in place to prevent such scenarios, identify the companies involved and hold them accountable.

The secondary objective of this dissertation was that, after describing the problem and its implications, to come up with a solution proposal to address it. Firstly, by investigating whether there is sufficient legal basis to handle these scenarios. Secondly, using this legal basis creating an operational framework for a new office of national or international competition authorities, which I am calling the Innovation Protection Office. There could be many other operational guidelines, processes, or organizational structures that would achieve the same result. Therefore, my main goal by 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.

1.4. Identification of the Research Tasks

The first research task involved laying the foundations for the research by presenting the fields of study of the acquisitions when patents remain unutilized: mergers and acquisitions laws and practices, antitrust laws and practices and intellectual property laws and practices. After laying the foundations the next step was to define the hypotheses by which the problem's existence can be investigated, and the implications can be understood. The last step was to create a

solution proposal that would address the issue as described and understood in the previous research steps.

1.4.1. Presentation of the Fields of Study

In order to achieve the objectives of investigating the existence, significance and describing the implications of acquisitions when patents remain unutilized, the first task was to research and describe the foundations of each legal area involved, namely mergers and acquisitions, antitrust law on anti-competitive practices, and intellectual property law, with a special emphasis on how they relate to each other in the fields and scenarios of patent misuse.

This was important because the definitions of each field, and the objectives of the regulator are quite different. In order to adequately investigate the often-overlooked case of acquisitions when patents remain unutilized requires both a solid foundation of definitions and a thorough understanding of the objectives of the legislator, to be able to navigate between these fields and the interests of customers and society in general.

1.4.2. Hypotheses

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 have attempted 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 have proposed a solution by presenting an operational framework for a new office of the competition authority (prior & post-Merger and Acquisitions).

1.4.3. Limitations

Although the objectives and hypotheses described above are quite narrow, and their main goal is to establish an understanding of the scenario of acquisitions when patents remain unutilized and their consequences, and provide some solution proposals, there were certainly many limitations to the research possible for a thesis.

Since acquisitions when patents remain unutilized are not a well-researched niche of legal cases, especially since it falls on the intersection of the three legal areas of mergers and acquisitions, antitrust law and intellectual properties, peer-reviewed secondary sources describing the exact issue are quite rare. Primary sources are also quite scarce because companies are not required to publish their patent usage statistics and agreements, and so far, there have been very few surveys to gather such data.

This is the main reason why I carefully chose a case study that involves a sufficiently significant technology of 4G and 5G telecom networks, so that the relevance of the problem may be understood even in the absence of many different examples. If we can see even a few technologies that are involved, but those technologies are significant enough so that issues in their speed of development or customer access to them may negatively impact a large number of consumers and societies around the globe, then the relevance of the problem is shown.

In a more extensive and adequately funded research project, perhaps by the international or regional competition authorities that this problem relates to the most, I would definitely start from the primary source area and conduct more surveys and also search for more cases where similar technologies and the customer access to them were (or potentially could have been) affected. That would provide an even more solid foundation of understanding, and solution proposals.

1.5. Methodology

1.5.1. Data collection and applied methods

Since the availability of data, including primary and secondary sources was quite different concerning the different research tasks highlighted above, I have followed a different data collection strategy and applied different research methods. Therefore, I am going to describe the different data sources and approaches by research tasks. The table below shows the different

research tasks, the data used in each, and the methodologies selected for the investigation and solution design.

| Research Task | Data | Applied Methods |
|-------------------------|--|---|
| Analyze fields of study | Definitions, concepts, objectives Market research data Case studies Acts, Treaties, Case Law | Theoretical overview Quantitative analysis: statistics Comparative study (US, EU, China) Treaty and Case law analysis |
| Hypothesis # 1 | Patent statistics: IP5, EPO Patent usage strategies Patent licensing survey (EU) Merger control case: Freescale-NXP Patent landscapes, press releases | Quantitative analysis: statistics Management theory review Analyze survey results. Case study Analyze industry reports, corporate decisions |
| Hypothesis # 2 | Organizational charts, descriptions Procedural guidelines Merger control case: Freescale-NXP | Organization structural review Organization procedure review Merger control procedure review (authority conduct) |
| Hypothesis # 3 | Founding Treaty of the EU Article 102 Merger control procedure (EU Comm.) Compulsory licensing laws, treaties | Treaty applicability analysis Merger control procedure review Treaty and law applicability analysis |
| Solution proposal | Theoretical framework for org. design Definition of new comp. auth. office Organizational chart and description Prior M&A responsibilities Post M&A responsibilities | Theoretical design by abstraction layers Organizational Design: objective setting, role definition Organizational Design: hierarchy Organizational Design: processes Organizational Design: processes |

The first research task involved laying the foundations for the research by presenting the fields of study of the acquisitions when patents remain unutilized: mergers and acquisitions laws and practices, antitrust laws and practices and intellectual property laws and practices.

Secondary sources about the different legal fields are quite abundant, therefore I relied mainly on these sources in this first task. I put special emphasis on covering not only the legal frameworks themselves in theory, but the actual application of the legal frameworks. For this purpose, I examined the United States and the European Union practices as well. I performed a comparison in both the Antitrust Law chapter and Intellectual Property Law chapter, so both

legal fields are covered in theory as well as in practice. Since the issues around acquisitions when patents remain unutilized are quite complex and intersect many laws and regulations in practice, I also included several case studies to investigate the patent misuse scenarios that are happening in today's economies and that are the closest in nature to the actual scenarios examined in this dissertation.

The second part of the thesis was about the hypotheses by which the problem's existence and significance, and its implications can be understood, and to investigate each of them.

To prove that patents are a significant contributor in today's economic and technological development I have looked at the patent statistics of the largest patent offices (the so-called IP5), and the implications of the patenting trends on the different countries involved in the research.

To understand how companies are utilizing patents, I have looked at the typical licensing patterns in management literature. Since licensing was identified as one of the major utilization methods, I have also examined a survey by Technopolis Group Vienna for the European Commission on patent licensing.

Having understood the relevant usage scenarios, and the patent statistics, I have established the case selection criteria, and the guidelines I needed to follow in my case study, that I cited as a practical example of an acquisition when patents remained unutilized.

The next step was to dissect a case study of an acquisition when an important patented technology, involving today's 4G and 5G telecom network technology, remained unutilized by the acquiring company, following the approach cited above.

The next research task was to investigate whether the current authorities that could cover the acquisition scenarios when patents remain unutilized have sufficient institutional or procedural guarantees to ensure that the customer access is protected in these cases. For this research task I have examined in detail the organizational structures and processes of the United States and European Union institutions involved, the Patent Offices and Competition Authorities. I have also looked at the EU competition authority conduct specifically in the case study analyzed previously.

The next research task was to investigate whether there is sufficient legal basis to handle these cases. To investigate the existing legal basis, I first investigated the EU competition authority's most important documents, the Founding Treaty of the European Union which identifies its responsibilities, the EU merger control procedures, and finally the laws around patent usage and

licensing, especially compulsory licensing, which I identified as a strong incentivizing factor that can be used in my solution proposal.

The final research task was to create a solution proposal. For this purpose, I designed an organizational structure and operational processes utilizing the legal tools investigated above in a pre-Merger and Acquisition and post-Merger and Acquisition division of organizational procedures.

1.6. Structure of the PhD Dissertation

The structure of this thesis has followed the research tasks as described above.

In the first chapter (Chapter One) I presented 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 observed the practice as well, especially in the EU and US context.

In the second chapter I have focused on the first hypothesis and investigated the scenario of acquisitions where patents remain unutilized, including the existence, significance, and effects of the issue.

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

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

In the fifth chapter, I have drawn my conclusions on the research I have presented in this dissertation and identified some areas for further research.

2. New Scientific Results

2.1. Results

Through an analysis of current regulations in the fields of Mergers and Acquisitions, Competition (specifically Antitrust Law) and Intellectual Property, and an analysis of the current practices and operation of law enforcement agencies responsible for Competition and Intellectual Property (such as Competition Authorities and Patent Offices) in Europe and the United States, as well as through a carefully selected case study of company acquisitions when important patents remained unutilized I have attempted 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 have proposed a solution by presenting an operational framework for a new office of the competition authority (prior & post-Merger and Acquisitions).

2.1.1. Acquisitions When Patents Remain Unutilized

Hypothesis # 1: Acquisitions where patents remain unutilized are *undesirable* and present a *significant* issue.

First, 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, this examination served as an emphasizing factor on the magnitude of the problem.

The investigation has shown that 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. The trends investigated also highlighted 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’.

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.

Looking at the statistical economic data a correlation could be identified between the number of patents filed, and the income level of the PCT member states. 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. 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 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. The best examples of the latter case are the top patent applicants of China from the Information and Telecommunication sectors.

For the purposes of my study, it was sufficient to accept that the patent system has major implications on the competitiveness of national and regional economies, regardless of whether the patents are used as an offensive or defensive measure.

In order to investigate 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 was sufficient to analyze the larger patent holder company acquisition data that involves merger and acquisition control. The selected case study of the 4G and 5G technologies in the Information and Telecommunication industries was such a case, handled by the European Commission as the relevant competition authority.

To understand whether the usage scenarios of patents are all impacted by the acquisitions in question I examined a survey by Technopolis Group Vienna for the European Commission on patent licensing. From this investigation above, some important conclusions could be drawn.

- 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. Joint ventures are also often used.
- Thus, in order to investigate the lack of utilization in my case study investigation, I needed to examine the utilization scenarios. I needed 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, I could 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 was 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 was important to show whether the current merger and acquisition control procedures take into account the risk of customers losing access to innovation.

In the next chapter, I have examined 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. I have analyzed the case of 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.

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. According to the documents from the European Commission merger control case and the European Patent Office patent of Freescale Semiconductors, we could understand that without the Gallium Nitride power transistor technology, the 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. This was a very important finding that underlines the importance of my previous statements of correlation between innovation, patents and the performance of national and regional economies.

By investigating the patent landscape reports and market shares pre- and post-acquisition, I have found that the acquiring company almost completely abandoned the GaN product line and fell behind in the related Intellectual Property landscape. I have also concluded 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.

Finally, by examining the conduct of the competition authority, it could be concluded 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.

2.1.2. Protecting Customer Access to Innovation: Organizations

Hypothesis # 2: Current national/international organizations do not have effective measures to prevent or mitigate acquisitions when patents remain unutilized.

In this chapter, I have examined the organizations involved in cases of mergers and acquisitions when patents remain unutilized. I have reviewed their objectives, their current organizational structures and processes, and examined whether 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 Competition Authorities and Patent Offices I have attempted to investigate my hypothesis that even if this legal field at the intersection of consumer 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.

I have reviewed the following competition authorities and patent offices:

- United States Competition Authorities: Federal Trade Commission and the Antitrust Division of the Department of Justice
- European Union Competition Authority: European Commission Directorate General for Competition
- United States Patent and Trademark Office
- European Patent Office

I have found that the organizational structure and processes of the competition authorities is mainly concerned with market concentration, they have no dedicated organizations, roles, or procedures for the protection of innovations.

Similarly in the case of EU and US patent offices, I have found no dedicated departments or roles, or processes, since they are built around the Patent Cooperation Treaty (PCT).

In order to determine whether the legislative protection is taking place in practice, I have investigated in detail the conduct of the European Commission in the case of the Freescale acquisition by NXP. It can be concluded that the European Commission was concerned mainly with market concentration. The Commission raised concerns, specifically in 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.

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. 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.

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. But there is no evidence that the Competition Authority 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.

Therefore, through the detailed examination of the definition, roles, responsibilities, and operational procedures of competition authorities as well as patent offices in both the United States and the European Union I 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, I 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.

2.1.3. A Solution Proposal: An Innovation Protection Office

Hypothesis # 3: There is *sufficient legal basis* to prevent or mitigate acquisitions when patents remain unutilized.

At first, 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 cases. Section b of Article 102 of the Treaty on the Functioning of the European Union, 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 European Commission 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, such as the TRIPS Agreement and the Doha Declaration, and some national laws in the field of compulsory licensing. 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 have investigated the German example in more detail. In Germany, the legal basis for compulsory licensing is defined in Section 24 (1) of the Patent Act (Patent Gesetz) and is 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, the German regulation includes some special provisions in terms of the semiconductor industry as well.

Although I am suggesting that these options shall be used as a last resort, their 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.

In summary, I have found that compulsory licensing is a valuable and viable legal tool that may strengthen the power of the merger control process and encourage the companies to find solutions for patent utilization.

Solution Proposal: Present an operational framework for a new office of the competition authority (prior & post-Merger and Acquisitions).

I have introduced a solution to handle the problem of acquisitions when patents remain unutilized. First, I have created a theoretical framework for organization design, that served as a basis for the following chapters. This top-down design framework based on different

abstraction levels helped in making sure that the concepts and values of society are properly represented in the proposed organization’s objectives, structure and operational methodology. The concepts and values of society represent the first layer in my theoretical framework for organizational design. 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. The third layer are the interventions, which are all the institutions, organizations that are established to enforce and implement the representations as cited above. 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.

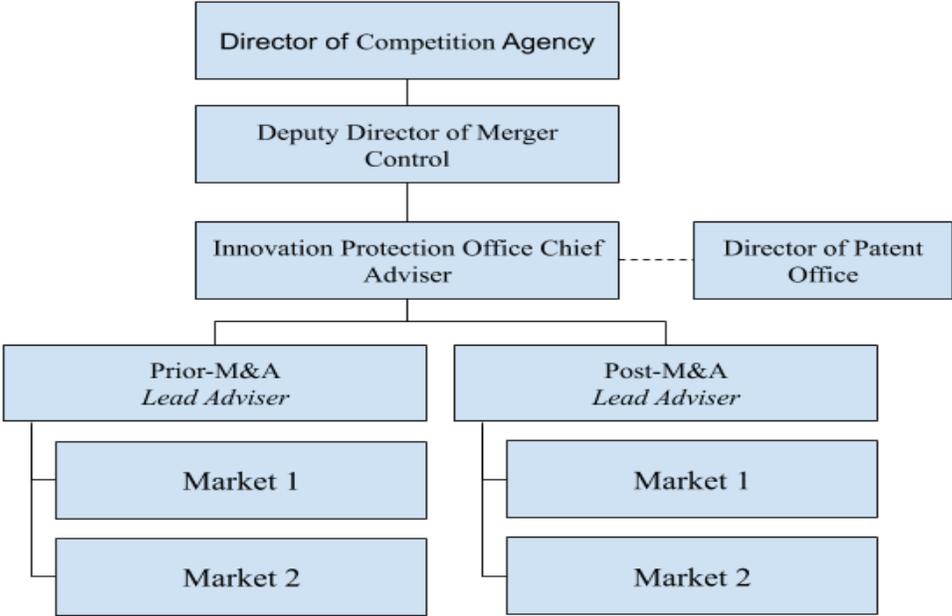
I have summarized in the table below the different levels of the Abstract Pyramid as they relate to the proposed solution in this thesis, the Innovation Protection Office of the competition authorities.

| 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Patent Cooperation Treaty Procedures • Merger Control Procedures • Innovation Protection merger control advisory |
| L4: Scenarios | Prior Merger and Acquisition processes Post Merger and Acquisition processes |

I have used the following definition for the Innovation Protection Office:

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 proposed organizational structure is illustrated below:



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 have proposed 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.

I have also defined the 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.

Prior Merger and Acquisition responsibilities of the Innovation Protection Office will include:

1. *Analysis of Merger and Acquisition cases where patent ownership is involved.*
2. *Risk assessment on patents remaining unutilized.*
3. *Recommendations on additional merger control criteria to ensure customer access to innovation.*

For the recommendations that may be offered by the Innovation Protection Office to the Competition Authority I have suggested 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.

The Post-Merger and Acquisition responsibilities of the Innovation Protection Office should be set up as follows:

1. *Analysis of compliance with merger control commitments*
2. *Analysis of effects on customer access to innovation*

In case the previously required 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.

2.2. 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.

After presenting the three legal fields of study, 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 Agencies 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 do not have offer organizational or procedural guarantees in acquisitions when patents remain unutilized. 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, consumer effects, and overall economic impact of said scenario when patents remain unutilized would also be worth a thorough investigation.

3. List of the Relevant Publications

1. Pathak, M. (2018). "CYGNUS" Law and Policy. Assam Book Hive. India. ISBN: 978-93-80247-60-1
2. Pathak, M. (2018). Policy and Law Premise for technology framework "CYGNUS". In: Doctoral Working Papers. Gondolat, Budapest, Hungary. ISBN 9789636936280
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4. Pathak, M. (2018). Namghoria Culture In Assamese Social Life: Concerning Judicial Dimensions, Contribution Of Namghoria Culture On Assam's Socio-Cultural Life. Srimanta Sankardeva Kalakshetra Society, India.
5. Pathak, M. (2018). Diversity In Culture: A New Legal Challenge. In: International Studies Of Law And Culture Conference Journal. Hungary.
6. Pathak, M. (2017). Satra As Judicial Arbitraters. In: Srimanta Sankardeva's Synthesizer of Spirituality Economics and Culture Assam's Socio-Cultural Life. vol 3. Srimanta Sankardeva Kalakshetra Society, India.
7. Pathak, M. (2016). Satra Institution for Indigenous Justice Delivery. In: Analysis of Socio-Culture Traditions. Sanaskritik Mahasava Assam and Sanaskritik Mahasava Kamrup Jila Samiti, India.
8. Varadarajan, V., Pathak, M. (2014). Farewell Kyoto: A Series of Research Monographs. Kindle Ebook version. Retrieved October 20, 2020, from <https://www.amazon.in/Farewell-Kyoto-Monographs-VENUGOPAL-VARADARAJAN-ebook/dp/B00RJTZJMO>.
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10. Varadarajan, V., Pathak, M., Gupta, A. (2012) Carbon Remediation for the Airline Industry via ATF Drop-in Substitution: Strategic and Operational Perspective. In: SAE International Journal of Aerospace. vol 5. United States. <https://doi.org/2012-01-1509>