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Operating companies against startups - a study of the US patent litigation landscape

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Entrepreneurship and Business Design

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Abstract

The playing field for businesses is ever changing, and with the transition to a knowledge economy, where intellectual property plays an increasingly important role, patent management is a vital key to competition. The number of patent litigations filed increases every year, and the legal system is becoming an increasingly important forum for competition between companies, both small and large. The fights are far from always fair, and this study aims to shed light on the part of the litigation landscape where power asymmetries exist between plaintiff and defendant. More exactly, this study will focus on understanding the U.S patent litigation landscape in regards to operating companies litigating startups. The focus lies on understanding the actors involved in the landscape, the potential motives of the plaintiffs, and the potential impacts on the defendants. This was done through a comparative study that combines quantitative and qualitative approaches.

The thesis is based on the analysis of two different datasets and two case studies. The finding from these can be gathered into three areas. First, plaintiffs can have both strategic and financial motives. The strategic motive is based on the motivation of gaining an advantage towards the competing defendant/startup, often through causing distress to the same party. Secondly, impacts due to patent litigation occur both during and after the active time of the litigation. These impacts can have devastating effects on startups and be threatening to its survival. Thirdly, several conclusions were made in regards to the characteristics of the defendants, plaintiffs, and the relation between these two parties, in the cases where operating companies litigate startups. Most defendants were, to a certain degree, established companies. This due to that no defendant was younger than two years, at the time of litigation, and very few defendants were pre-revenue when litigated. The plaintiffs were found to have a large spread in their characteristics, both in regards to their financial strength and patent portfolio size. However, almost all plaintiffs were active in the same industry as the defendant, indicating that the plaintiffs had strategic motives for filing a lawsuit. Regarding the relation between plaintiffs and defendants, the most substantial power asymmetry was found to be the size of their individual patent portfolios. One of the key findings of the study was that, for a startup, having a large patent portfolio had positive impacts on the risk of litigation and litigation outcome.

Keywords: Patent litigation, startups, operating companies, landscape, characteristics, motive, impact

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Nomenclature

Defendant – refers to a person, company, etc., against whom a claim or charge is brought in a court (opposed to plaintiff).[1]

Intellectual property – refers to property that results from original creative thought, as patents, copyright material, and trademarks.[1]

IPO – short for Initial Public Offering: a company's first stock offering to the public.[1]

Litigation – the act or process of litigating (to make the subject of a lawsuit; contest at law.)[1]

NPEs vs. operating companies – Both practicing (i.e. operating) and non-practicing entities (NPEs) hold the patent ownership, but only the practicing entities actually make, use or sell a product for which a patent is granted. NPEs generally acquire patents with the primary purpose of robustly enforcing those patents against practicing entities.[2]

Plaintiff – refers to a person, company, etc., who brings suit in a court (opposed to defendant).[1]

Startup – the exact definition varies, but usually refers to a new business venture, or a new commercial or industrial project.[1] In this study, all companies younger than 8 years are considered startups.

[1] http://www.dictionary.com
[2] http://www.lexology.com

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1 INTRODUCTION

1.1 BACKGROUND

In a world where intellectual property is more important than ever (Powel and Snellman, 2004), patents are amongst the most valuable assets a company can have (Petrusson, 2004). In order for a patent to be able to add value to the company, however, the company needs to be able to manage its patents, and one way of doing that is through enforcement (Petrusson, 2004). Patent litigation is one way of enforcing a patent, and more and more patent litigations are filed every year (Barry et al., 2017). Even though NPEs account for a large portion of all patent litigation, operating companies are also filing more patent litigations (Barry et al., 2017). Actors that know how to best work the US patent litigation system, and play the game, have a lot to gain from doing so. With a thought-out patent management strategy and the right resources, in terms of patent portfolio and money, some companies can actively use the patent litigation system to its advantage (Lemus and Temnyalov, 2015). But are there those actors that cannot?

As Graham and Sichelman (2010) and Chien (2013) discuss, young and small companies, such as startups, are at a disadvantage, and lack the capabilities to keep up with larger and more financially stable companies in "the patent litigation game". This interesting phenomenon encircles the topic of this thesis. Previous research also showed that there seems to be a link between entrepreneurial activity and patent litigation (Kiebzak et al., 2016), and former U.S President Obama's Council of Economic Advisers even mentioned it as a topic in need of more research (Council Of Economic Advisers, 2016).

All the above led the study focusing on shedding more light on the phenomenon of unfair relations, or power asymmetries, between plaintiffs and defendants (here being startups) in US patent litigation. Since there seems to be an abundance of research conducted in relation to litigation generated by NPEs, and close to none in regards to the specific topic of operating companies vs. startups, this study is focused on the latter case. Furthermore, after being unable to find information related to e.g. characteristics of patent litigation landscape, and motives and impact of litigation, the scope of the study was focused on three main areas which represented research gaps. These areas were (1) an overall mapping of the patent litigation landscape in order to see how and when operating companies litigate startups, (2) investigation of what motives the plaintiffs could have, and (3) investigation of how such a litigation would impact a startup. Eventually, the study aims to establish which factors that are more important than others for a company to consider, in order to successfully navigate an IP-centric business arena.

1.2 Purpose and research question

The aim and purpose of this paper are to understand the U.S. patent litigation landscape in regards to operating companies litigating startups. More specifically, mapping and understanding the characteristics (e.g. size and development stage) for the actors of the landscape, as well as the relation between them. Furthermore, a focus also lies on understanding the potential motives of the plaintiffs and the potential impacts on the defendants, in order to uncover why the landscape looks the way it does. The purpose will be addressed through two case studies and quantitative analysis of litigation and company data. Furthermore, in order to fulfill the purpose, the following three research questions have been formulated:

1. What are the characteristics of the patent litigation landscape for operating companies vs. startups?
2. What are possible motives for an operating company to litigate a startup?
3. What is the potential impact of patent litigation by an operating company on a startup?

1.3 Scope and Delimitations

Because of the complex nature of business in general, and patent litigation in particular, the scope of this study needed to be narrowed in order to be manageable. In regards to the time constraints of the study, the authors wished to achieve a balance between width and depth, which is why the following scope and delimitations were chosen.

Firstly, in regards to the quantitative part of the study, the authors limited the study to include two data sets; (1) all patent litigations for a given time period, (2) all patent litigations where the defendant had IPO'd (been through an IPO) during a given time period.

In regards to the first dataset, the scope only includes U.S patent litigations filed in the calendar year 2016. Additionally, cases filed with the Patent Trial and Appeal Board (PTAB), and the International Trade Commission (ITC) were excluded, together with cases of declaratory judgments. Furthermore, cases where the defendant did not qualify as a startup were also excluded from the scope. Due to the differences in characteristics between startups in different industries, all industries except the following five were excluded from the scope:

- E-commerce and Software
- Networking
- Mobile Communications and Devices
- Media Content and Distribution
- Financial Services

In regards to the second dataset, all delimitations from the first dataset apply except for the time constraint. Additionally, the IPO-constraint has been added, which means that only the cases where the defendant had IPO'd during calendar year 2015 or 2016 are included in the scope. To clarify, this means that the litigation could have been filed in any year leading up to the year of the IPO.

Furthermore, this study does not investigate litigation trends over time. Nor does it evaluate the legal claims of the cases or court proceedings.

NB: The companies used in the case study portion were not restricted to any of the above criteria.

2 THEORETICAL FRAMEWORK

As this study focuses on how litigation strategies of operating companies affect technology startups, it is central to understand patent litigation as a strategy and activity, between these two different types of actors. To understand the competitive interaction between these actors, and why patent litigation is used, it is of value to understand the nature of competition. This chapter is therefore initiated by presenting the views of Porter (1979), regarding what forces govern competition, with an emphasis on entry barriers related to one of the five forces, *Threat of new entrants*. This is followed by reasoning around the effect the knowledge economy and the Internet have had on the nature of competition, and an introduction of the concept of intellectual capital and intellectual property. Thereafter, in the second part of the chapter, theory around patent litigation is presented.

2.1 THE CHANGING NATURE OF COMPETITION

The section contains topics that describe the nature of competition and how it has evolved over time.

2.1.1 Porter's five forces of competition

Porter (1979) presents a model, explaining the components of competition within an industry as five different forces. These forces are the threat of new entrants, the bargaining power of suppliers, the bargaining power of customers, the threat of substituting products and services and the rivalry amongst existing companies, and are visualized in Figure 1. The competition in a given industry is based on the underlying economics, as well as the competitive forces from both established and new actors, so it should be noted that the forces described do not take the macro environment into consideration. The combined strength of these forces determines the potential profitability of an industry (Porter, 1979). A company should formulate its strategy with regards to the different forces, and if any of the forces change, the company should react accordingly. Knowledge of how the forces affect a company's industry, as well as the company's capabilities and resources, should indicate when the company ought to compete with its competitors, and when to avoid competition.

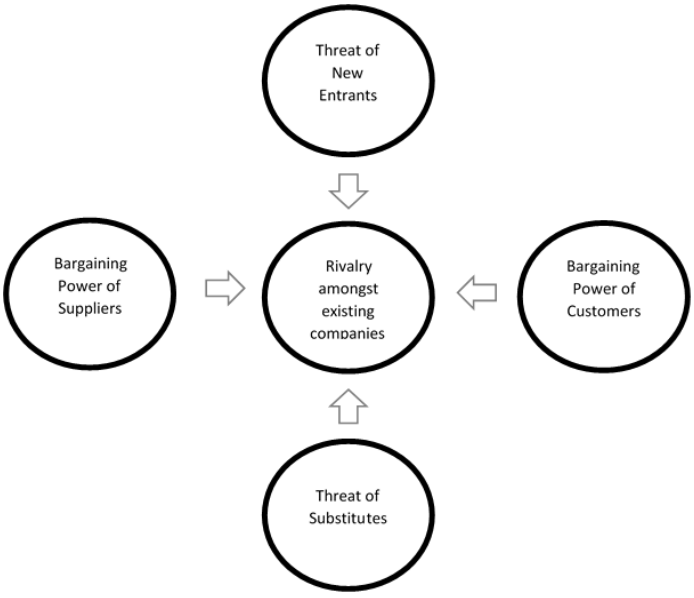


Figure 1 Porter's Five Forces of competition

In this study, the authors only focus on two of the forces of Porter's (1979) model. As it is the interaction between operating companies and technology startups that creates the scope of the study, the authors judge the threat of new entrants and the rivalry amongst existing companies to be the forces of greatest interest. These are therefore elaborated further in this section.

2.1.1.1 Threat of new entrants – the barriers to entry

The threat of new entrants is the competitive threat of new competitors entering an industry, experienced by established companies in this industry (Porter, 1979). This threat affects the competitive environment of the industry, as a new entrant can bring new capacity, a desire to gain market share and substantial resources, and thereby affects the profitability of the established companies. This threat is determined by several factors, most of which can be linked to the barriers to entry for the industry. The barriers to entry are conditions or aspects of an industry that, from the perspective of a new entrant, act as a threshold to an industry, making it hard for new companies to establish themselves in said industry. The threat of new entrants is thereby lower when the barriers to entry are higher.

Porter (1979) mentions six major barriers to entry. These are *Economies of scale*, *Product differentiation*, *Capital Requirements*, *Cost disadvantages independent of size*, *Access to distribution channels*, and *Government policy*. Some barriers occur naturally, while others can be created by the existing companies in the industry to limit the threat of new entrants. If these barriers are high, and there is a high risk of retaliation from competitors towards a new entrant, the threat of new entrants can be considered as low. These six barriers to entry are discussed in further detail below, in order to enable an understanding of the dynamics between the new entrant, for example, a startup, and established companies in an industry.

2.1.1.1.1 Economies of scale

A company can experience economies of scale if the cost per unit of output decreases due to an increase in size, output, or scale of operation, as the fixed cost then is carried by a larger number of units (Porter, 1979). The variable cost per unit can also decrease when volume increases, for example, if larger quantities of raw material can be acquired and the cost per unit of raw material thereby drops.

Porter (1979) states that economies of scale can deter a potential new entry into the industry. This due to forcing the aspiring entrant to either enter in a large scale or accept a cost disadvantage. Economies of scale in production, research, marketing, and services are key barriers in certain industries. Economies of scale can also be present in distribution, utilization of sales force, financing and nearly any other part of a business.

Economics of scale is typically a difficult entry-barrier to overcome for startups. This due to the limited resources of startups which results in a cost-disadvantage. This cost disadvantage will make it difficult to compete with an incumbent of that industry.

2.1.1.1.2 Product Differentiation

A brand constitutes an important asset to companies in different industries. A strong brand distinguishes the products associated with the brand from other products. A brand also has the potential to be associated with different values in the mind of a customer, for example, exclusivity. According to Porter (1979), a brand can create a barrier to entry due to the cost

associated with changing the customer loyalty from an established actor within the industry to a new entrant.

2.1.1.1.3 Capital requirements

To enter a new industry can be costly for a company, a cost which Porter (1979) describes as a potential barrier to entry. Examples of costs are initial investments and startup costs needed to get operations running. The larger the cost for entering a new industry, the larger the entry barrier for new entrants become.

2.1.1.1.4 Cost Independent of size

Existing companies within an industry can hold a cost advantage, independently of their size and economies of scale, in relation to other companies. This cost advantage can according to Porter (1997) be due to the effects of the learning curve, proprietary technology, access to scarce resources, government subsidiaries and location. Cost advantages can be legally enforceable, for example through patent litigation, if they are legally controlled by a company. These advantages create the fourth barrier to entry.

2.1.1.1.5 Access to distribution channels

Gaining access to distribution channels are potentially of great importance for a successful entry into a new industry (Porter, 1979). If adequate distribution is difficult to acquire or access for a new entrant it creates a barrier to entry. Examples of this can be to gain access to shelf space in supermarkets or gain access to distribution in the watch industry in the 1950s.

2.1.1.1.6 Government policy

Governments can limit the entry into industries through different regulations and policies. This can create a barrier to entry for new entrants, for example in the liquor retailing industry and the mining industry (Porter 1979).

2.1.2 The patent's role as an entry barrier

In the context of this study, and the knowledge economy introduced in section *2.1.5 The knowledge economy*, it is important to understand the role patents can play as barriers to entry. As a patent grants a company the legal right to exclude others, incumbents which hold patents can block new entrants from entering the industry by blocking their right to utilize patent-protected technologies (Heger and Zaby, 2017). This boosts the overall profitability of the industry that is protected by the barrier (McGinn, 2010). However, it may be possible for the new entrant to *invent around* or to *license in* the patent in order to enter the industry (Granstrand, 2010). Both alternatives can create additional costs for the new entrant (Langinier, 2004), which creates a cost advantage for the incumbent.

Patents could be categorized as the entry barrier *Cost independent of size*, as a patent is an advantage independent of size, according to Porter (1979). This, as the relative size or economies of scale of the company holding the patent in relation to other companies, does not affect the advantage that the patent can create (Porter, 1979). However, this reasoning could be questioned, linking back to Petrusson's (2004) theory on the three arenas, presented in section *2.1.5 The knowledge economy*, as the commercial value of a patent can be questioned by other actors, forcing the patent holder to enforce its patent right in order for the patent to bring value as a control position. A patent owned by a startup with limited resources, in terms of both money, time and patent portfolio, might then not be able to benefit from the same advantage of a patent as a larger company with more resources. Patents as barriers to entry in an industry where the current actors are larger established companies, and the new entrant is a technology startup, therefore pose an even stronger barrier.

2.1.3 Impact of the Internet

Undoubtedly, the Internet has had a huge impact on how businesses operate. Porter (2001) is one of many authors that recognizes this in his article "Strategy and the Internet" from 2001. According to Porter (2001), the advent of the Internet has changed the nature of competition through a reduction of entry barriers. Porter (2001) argues, for instance, that there now is a lower need for a sales force, access to distribution channels, and physical assets. Furthermore, he also claims that the Internet intensifies the rivalry between competitors, both within and across industries. Porter (2001) also mentions that the Internet has led to reduced differences among competitors, as offerings are difficult to keep proprietary. And in addition to this, price wars are waged more easily, the geographical market is widened, and the number of competitors increases (Porter, 2001). He also explains that the cost structure changes, through variable costs being lowered, relative to fixed costs, and the pressure offer products at discounted prices increases.

In the future, competition is predicted to continue to increase as more and more businesses and companies choose to pursue business opportunities online, and the entry barriers continue to shrink (Porter, 2001). Furthermore, customers are empowered by reduced transaction costs (cost and ease of changing supplier or shopping somewhere else), which will add further to the pressure on profitability and market share of companies.

2.1.4 Blue and red oceans

Porter describes the barriers that startups experience when entering an established industry and trying to take market share from the incumbents in that industry. At times, new uncontested market space is created, for example by a startup. The difference between this established industry, described by Porter, and new uncontested market space is discussed by W. Chan Kim and Renée Mauborgne in *Blue Ocean Strategy* (Kim and Mauborgne, 2005). Whilst porter's five forces regard with the power and nature of competition in established industries it is of interest to understand companies that are active in a market that has uncontested market space, so called blue ocean.

2.1.4.1 Red Ocean

Porter discusses established industries with set boundaries and rules. These industries are called red oceans (Kim and Mauborgne, 2005). In red oceans, companies try to outperform their rivals with the objective to obtain a greater part of the fixed demand that exists within the industry. In the red ocean companies compete by differentiation or cost and these industries seldom have strong growth. It is called a red ocean due to the nature of the industry results in a "bloody" competition between the competitors that can result in a low profitability (Kim and Mauborgne, 2005).

2.1.4.2 Blue Ocean

Blue Oceans are in contrast to red oceans defined by that they are untapped market space and are formed by the creation of new demand. The blue oceans are often uncontested market space, meaning that they have very low or no competition. Blue Oceans can be created by expanding the boundaries of red ocean industries or by the creation of new demand. (Kim and Mauborgne, 2005) Central to the creation of a blue ocean is *value innovation* (Kim and Mauborgne, 2005), value innovation to simultaneously decrease cost and increase customer value. This is in contrast to red oceans where companies either compete by delivering reasonable value at a low cost our higher value at a higher cost (Kim and Mauborgne, 2005).

2.1.4.3 Red and blue oceans and their relevance for the conducted research

It is of interest to the research, especially when analyzing different cases of patent litigation, to understand if the defendant was active in a red or blue ocean. A startup that is active in a red ocean will potentially face a higher risk of being targeted by the incumbents in that industry. This due to the fierce competition of red oceans (Kim and Mauborgne, 2005). But if the startup creates a blue ocean, either by breaking the boundaries of a red ocean or creating a new ocean altogether, the incumbents will view it differently. The startup that is active in a blue ocean will "…go without credible challenge for 10-15 years…" (P.186, Kim and Mauborgne, 2005). This due to several reasons, whereof one is that a blue ocean strategy does not make sense based on conventional strategic logic, and will not be seen as a credible threat by the incumbents (Kim and Mauborgne, 2005). Therefore, the rationale for patent litigation towards a startup active in a blue ocean is different from the one towards a startup active in a red ocean.

A company that enters a red ocean and takes market share from its competition could potentially face retaliation through different means by the incumbents in that industry. When a company creates a blue ocean, it potentially does not face the same probability of competitive retaliation. This due to that blue oceans create new demand

2.1.5 The knowledge economy

This section lays out the theoretical base in regards to the knowledge economy. The knowledge economy is relevant for this research since it shows the rising importance of intellectual assets. This increased importance of intellectual assets results in a greater importance of patent management, and therefore also patent litigation. The theory regarding how the nature of competition has changed due to the knowledge economy, especially the entry barriers for startups, is of importance for the research in regards to understanding the motives of plaintiffs.

The dynamics and characteristics of the global economy is changing continuously, and over the past couple of decades the world has seen an intellectualization of the economy, which means that we have moved from a paradigm where a company's physical property was considered its most valuable assets, to one where intellectual property is considered the most valuable (Petrusson, 2004). Some industries are changing more rapidly than others, but even large and old established companies in traditional industries need to acknowledge intellectual property and learn how to use it to create value, at least as a complement to traditional operations. Powel and Snellman (2004) explain how companies increasingly rely to a greater extent on their intellectual capabilities, rather than on their physical or natural resources. An example that testifies to this, is how companies choose to conduct more and more of their value-adding activities/operations outside the boundaries of the company, e.g. through outsourcing of sub-processes (e.g. assembly, product design, PR, etc.) (Powel and Snellman, 2004).

So, with intellectual property, and knowledge, being the name of the game, companies need to learn how to generate wealth from their intellectual assets. As de Soto (2000) points out in his book *The Mystery of Capital*, property is an important driving force in the capitalist economy. De Soto (2000) describes how the notion of physical property has been a key success factor in the development of western economies and explains how intellectual property will have the same role in the knowledge economy. But in order for intellectual property to be treated as property, the way physical property is, and to start generating economic value, it needs to be collectively recognized as property (Petrusson, 2004). Even though claiming physical assets as property arguably is as much of a social construction as claiming intellectual assets as property,

the latter is harder to achieve because of the intangible nature of intellectual assets (Levin, 2011). Intellectual property is complex and difficult to define, which is why it is important to have well working accepted established societal structures in place to help facilitate the management of intellectual property (Levin, 2011; Petrusson & Pamp, 2009). The patent systems is a prime example of an institution that facilitates such structure, which is why patents has grown to become one of the most important tools used to claim intellectual assets as property (Petrusson, 2004).

2.1.5.1 Material vs. intellectual value chain

The value chain is a broad term that could be considered to be the backbone, or the essence, of all value-adding activities companies conduct related to their core business (e.g. creating a product or service), and is different in the industrial economy, prior to the knowledge economy, compared to in a knowledge economy (Heiden, 2016). The value chain is thus essential, not only for a company's profitability but also for its competitive advantage, since the competitive edge is reflected by what goes on in its value chain, making it an eminent source of competitive advantage (Chyi Lee and Yang, 2000).

The material, or industrial, value chain (pre-knowledge-economy), described by Porter (1979), focuses mainly on the production of physical goods, and the value chain activities related to just that. Figure 2 shows an illustration of the material value chain (Heiden, 2016), in which one can see how all activities are centered around producing the physical product (or service).

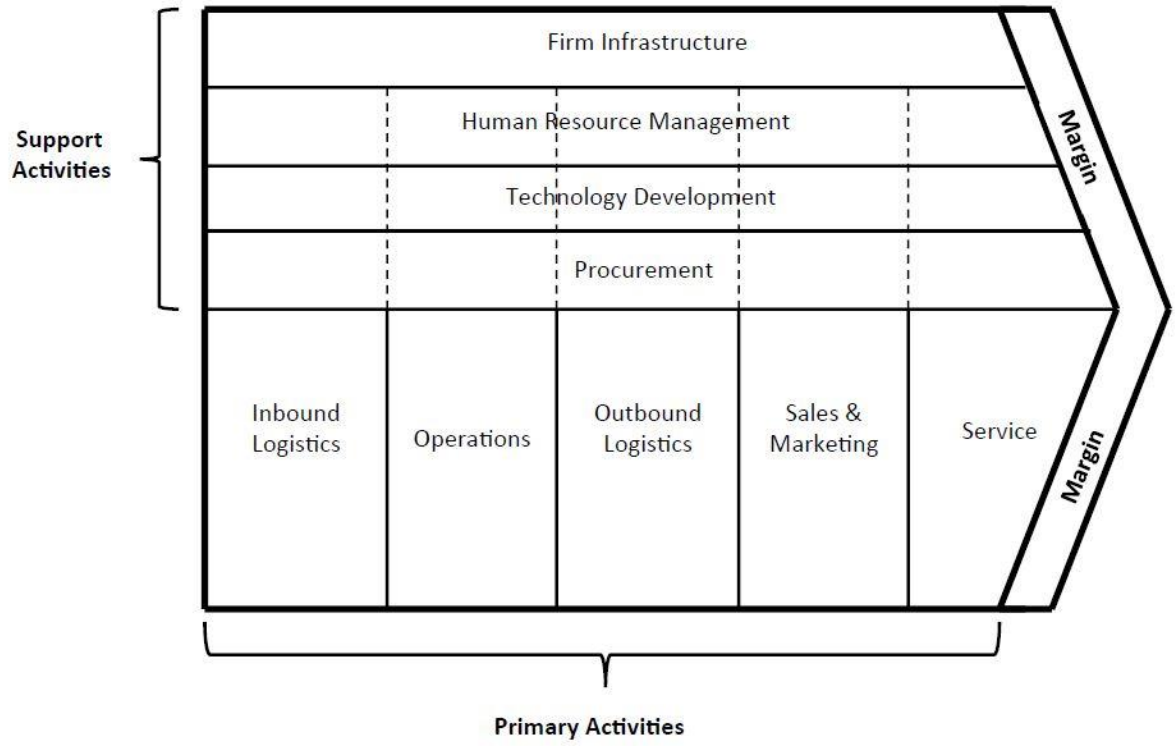


Figure 2 Illustrating the material value-chain

In the knowledge economy, however, the value chain is different. The intellectual value chain, which is central to the knowledge economy, is centered around creating, capturing and commercializing all assets, and its activities are not limited to the ones only related to physical

assets. On the contrary, physical products are just one of many products of the intellectual value-chain, with e.g. virtual products, license offers, and service offers being examples of other outputs from the process.

Figure 3 shows an illustration of the intellectual value chain (Heiden, 2016), in which one can see that activities related to intellectual assets are acknowledged and treated equally important as the physical assets.

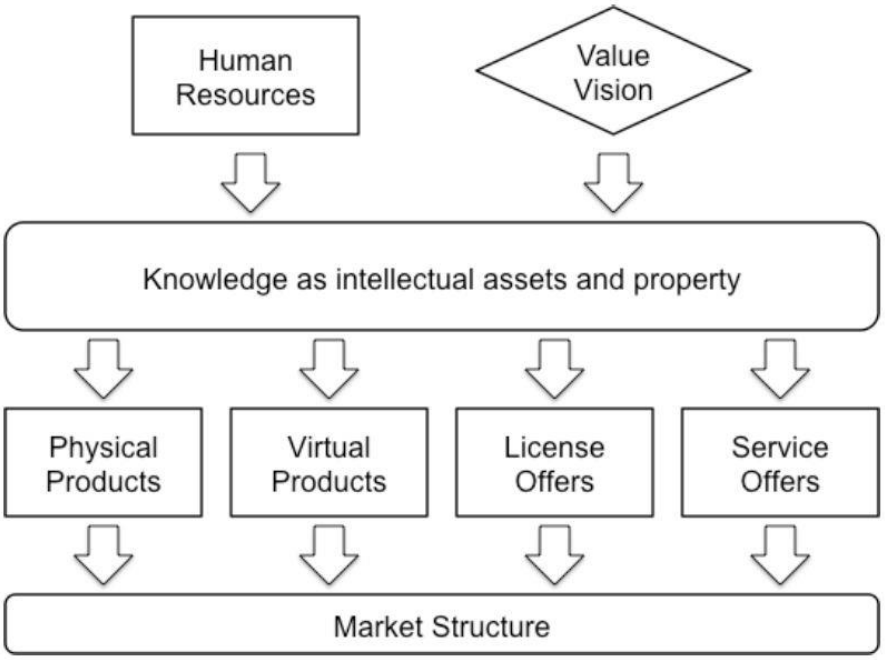


Figure 3 Illustrating the intellectual value chain

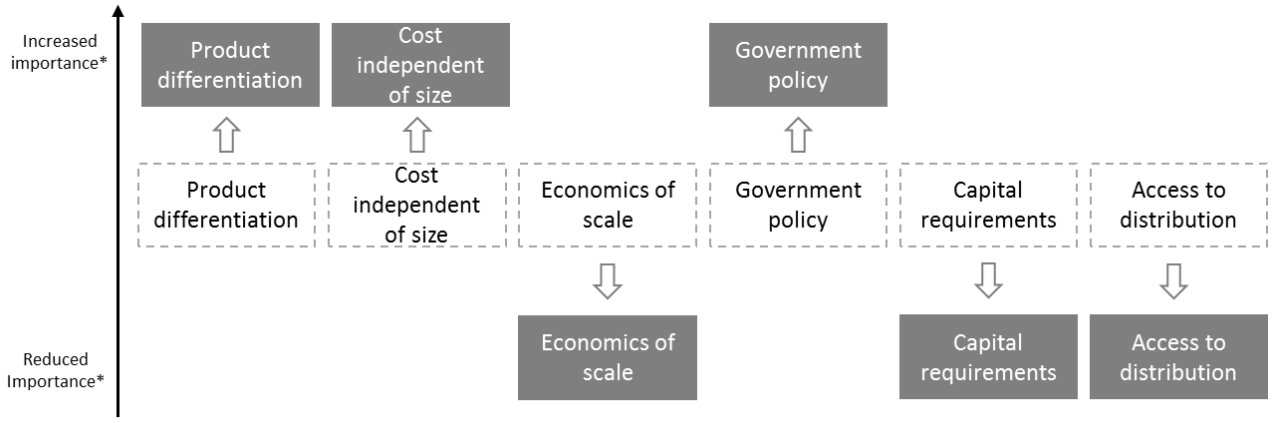
The natural consequence of the shift from the material value chain to the intellectual value chain is that activities and processes that are related to the governing of intellectual assets (such as patent and brand management) are becoming increasingly important for companies that wish to stay competitive profitable.

2.1.5.2 Impact on competition (entry-barriers)

The rise of the knowledge economy over the past decades has had a significant impact on economies and competition (Jaffe and Trajtenberg, 2005; Granstrand, 2010). Granstrand (2010) describes, in his book *Industrial Innovation Economics and Intellectual Property,* the phenomenon of the shift towards intellectual capitalism, which is his take on how the knowledge economy is affecting the capitalist economy and nature of competition for companies. Granstrand (2010) divides assets into two main categories; tangible (material) and intangible (non-material), and argues that the importance of intangible assets is increasing in a knowledge economy, while the importance of tangible assets is decreasing. Granstrand (2010) describe tangible assets as either being physical capital (e.g. machinery, natural resources, etc.) or financial capital (e.g. securities, money, etc.). Intangible assets is described as either being intellectual property rights (patents, trade secrets, databases, etc.), relational capital (e.g. goodwill, reputation, etc.) and human capital (relating to human competencies of different kinds).

By using the definitions and reasoning of Granstrand (2010) and Heiden (2016) to define Porter's six entry barriers, one could deduce how the knowledge economy would affect the competitive landscape from the perspective of barriers of entry. *Product differentiation* would be categorized as intangible since Porter (2001) describe said entry barrier as the brand, which Granstrand (2010) and Heiden (2016) would categorize as an intangible asset since it consists of elements like e.g. trademarks. Thus, in a knowledge economy, *product differentiation* would become more important. *Capital requirements*, though, would be categorized as financial capital, thus belonging to the tangible, or material, category, which means that it would become a less significant entry barrier. *Cost independent of size*, however, is characterized by patents and knowledge within the company (e.g. learning/experience curve amongst employees) and belongs therefore to the intangible category, thus becoming a more important entry barrier. *Access to distribution* is considered tangible, or material, in the traditional sense since it refers to e.g. having to set up your own distribution channels. In a knowledge economy, however, one has a greater opportunity to form complex collaborations with third-parties and outsource distribution, making the entry barrier of relying on access to existing distribution channels, or setting up your own, less important. *Government policy* arguably falls into the category of relational capital, thus falling into the category of intangible assets, which means it would become less important in a knowledge economy. Lastly, *Economics of scale* refers to the traditional benefits one could enjoy from having the ability to e.g. produce or buy large quantities, which will reduce the average cost per unit. As Powel and Snellman (2004) confirms, however, companies choose to outsource more and more tasks to actors outside the borders of the company itself (e.g. smartphone manufacturing), which makes having an own economy of scale less important in a knowledge economy.

So to summarize, *Product differentiation*, *Cost independent of size*, and *Government policy* are entry barriers which are more important in a knowledge economy, while *Capital requirements*, *Access to distribution*, and *Economics of scale* are less important in a knowledge economy, as illustrated in Figure 4.



*Due to the changing nature of competition through the knowledge economy and the internet

Figure 4 Importance of entry-barriers in the knowledge-economy

2.1.5.3 Patent management

As discussed in *2.1.5 The knowledge economy,* controlling, protecting, and monetizing on the knowledge within a company has become very important, and is now a determining factor for a company's competitive advantage (Levin, 2011; Teece, 1999). Companies in general, and technology companies in particular, therefore need to possess the skills of claiming and utilizing their intellectual assets to stay competitive, and patents are among the most important tools companies can use to achieve that (Petrusson, 2004).

To successfully use patents in order to achieve this requires good patent management skills, and according to Petrusson (2004) that starts with an understanding of how intellectual property rights (such as a patent) are perceived, and how the perception changes depending on the perspective through which the patent is viewed. Like discussed earlier, intellectual property is a type of social construction. A patent (or an intellectual property right, IPR) is a legal right to exclude others from using the intellectual property in question, granted to the assignee (owner of the IPR) by patent offices. However, the creation of actual value from, and monetization of, a patent, is dependent on the ability to enforce it. Petrusson (2004) has created a model that is based on three structural arenas (Figure 5), each of which represent a perspective from which the patent is viewed, as well as a forum within which the patent is utilized/enforced. The three arenas are an administrative, a judicial, and a business arena, and the patent can be considered as the key used to claim rights on each arena (Petrusson, 2004).

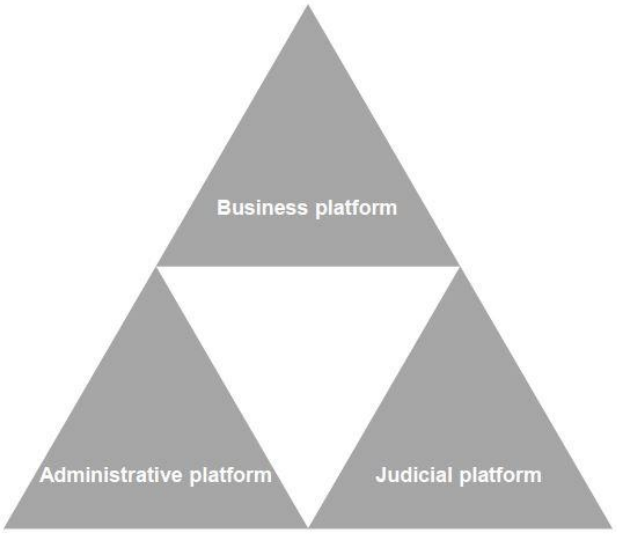


Figure 5 The three arenas (Petrusson, 2004)

The administrative arena represents the structured platform on which patents are registered and administered. It includes patent offices and roles such as patent attorneys and patent examiners, and it is where the patent right is formulated, defined and issued. However, should a company feel the need to enforce a patent, legally speaking, this is done in the judicial arena with the legal right granted the company in the administrative arena. Hence, the judicial arena is the platform on which the patent owner can actually bring action against an infringing party, and bring them to court. Furthermore, on the judicial arena, the patent right granted the company on the administrative arena can be invalidated if it is found that it was wrongfully issued, which can happen as a result of patent offices not having access to all information. Lawyers,

prosecutors and judged are some of the most important roles in the judicial arena. The nature of these two arenas, especially the judicial, differs in nature from the third, the business arena, since they are structural platforms based on integration into national legal systems. The business arena, however, to a large extent is international. The business arena is, furthermore, arguably the most important one since it is where the patent right can be used to create value for the company. In the business arena, the patent right can e.g. be traded, used as leverage in negotiations, or used as a financial security. I.e. the business arena is where the company utilizes the patent right granted them in the administrative arena, to conduct business. Obviously, all three arenas are closely interlinked and dependent on each other, which is why cross-functional expertise is favorable in order to manage patents successfully. (Petrusson, 2004)

Another aspect that advocates the importance of patent management is the impact that internet has on the nature of competition, since it enhances the effects of the knowledge economy. So to conclude, it is important to have good patent management for a company that would like stay competitive in a knowledge economy.

2.2 PATENT LITIGATION

As just discussed in *the changing nature of competition,* intellectual property in general, and patents in particular, are becoming more and more important for a company wishing to ensure a competitive advantage. Furthermore, one way for a patent to add value for the company is through enforcement, and since the forum for enforcement is patent litigation, having an understanding for how the patent litigation system works is naturally important (Petrusson, 2004). Therefore, the following section will outline the characteristics of the US patent litigation system and what existing theory has to say about the relation between plaintiffs and defendants.

2.2.1 Characteristics of the US patent litigation system

Litigation is defined as "A contest in a court of law for the purpose of enforcing a right or seeking a remedy; a judicial contest." (Granstrand, 2010, p. 337). Patent litigation regards the litigation of a patent, where the plaintiff argues that the defendant has infringed on one or several of the plaintiff's patents. The U.S. Patent infringement lawsuit is typically expensive, complex, intrusive, lengthy and time-consuming (Lateef and Zoretic, 2010). Because of this, a substantial amount of suits is settled before even going to court (Lateef and Zoretic, 2010). According to Yooun and Goodrich (2015), the majority of patent litigations end in voluntary settlement, and for 2015, 76 % of all US patent litigations did just that. Depending on what side you are on, and the outcome, a litigation could both threaten a company's survival, as well as propel the company to success (Zabeth and Offen-Brown, 2010). The process consists of a number of different events and phases, with the following being six of the most significant ones: (1) the filing of the complaint, (2) fact discovery, (3) expert discovery, (4) summary judgment motions, (5) jury trial, (6) Verdict and appeal to court of appeals for the federal circuit (Lateef and Zoretic, 2010). A simplified graphical representation of the U.S. litigation process is shown in Figure 6 (Note: some of the phases may overlap).

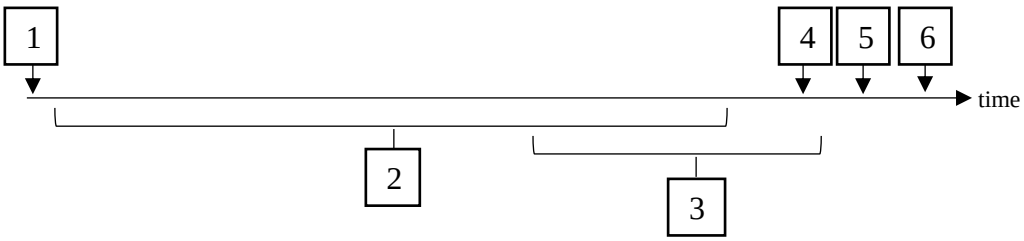


Figure 6 Illustration of the U.S. patent litigation process

2.2.1.1 Forum

Due to the high stakes for both the plaintiff and the defendant in patent lawsuits, all elements of the suit are important to the outcome. Therefore, where the plaintiff chooses to file the complaint, i.e. in which forum/court, is considered important for the outcome of the case (Zabeth and Offen-Brown, 1958). This phenomenon, which is indicated by where the patent lawsuits are filed, is called forum shopping and has been a part of the patent system for decades (Anderson, 2015). Out of the 94 federal district courts in the United States, almost half of all patent lawsuits were filed in two courts in 2013, with these courts being the District of Delaware and the Eastern District of Texas (Anderson, 2015). The districts with the most patent suits are also those that are processing the cases the fastest, have the highest likelihood of going to trial, and have the highest win-rate (i.e. being the most plaintiff-friendly) (Anderson, 2015).

Since the companies' locations are not the only factor determining in what district court the plaintiff chooses to file the lawsuit, additional traveling arrangements might be needed for all involved parties, since in-person representation sometimes is needed. This adds complexity to the situation (e.g. representation must be familiar with the specific jurisdiction) and entails additional resources (e.g. money and time), which a smaller and financially weaker company, such as a startup, likely will suffer more from.

2.2.1.2 Time

A typical United States patent litigation case is highly time-consuming, both in regards to the length from filing until final judgment and the time consumed by the elements of the case (Shifley and Berghammer, 2017). The typical time from filing until final judgment in a trial court is between three to five years (Shifley and Berghammer, 2017).

2.2.1.3 Cost

There is a number of different direct cost that occur to the defendant and the plaintiff in the U.S. Patent system. These could be categorized into *Process Cost*, *Remedies*, and *Damages*.

2.2.1.3.1 Process Cost

According to Towns (2010), it is estimated that patent litigation on average cost between $3-$10 million (excluding remedies). In general, the larger the amount at dispute, the larger the litigation cost. Roughly 60% of these costs occur during the discovery phases (see Figure 6) (Towns, 2010). These costs occur due to different activities related to the suit, these are for example, legal counsel (including outside legal counsel, paralegal services, etc.), fees and costs for court reports, and costs for expert witnesses (Goldstein and Divine, 2015). Due to that the cost is the same independent of the size of the company, it adversely affects a small company compared to a large. E.g. a cost of 3 million dollars potentially has a greater impact on a company that has $100,000 in revenue than on a company that has $100 m in revenue.

2.2.1.3.2 Remedies

Other costs that can occur to the defendant are Remedies according to the U.S. Patent Act. These remedies are *Injunction relief* and *damages*. Injunction relief is the right for the patentee to stop the infringer from continuing infringing activities. Injunction can either be *preliminary* or *permanent*, and a preliminary injunction is an injunction that is in force during the pendency of the lawsuit (Zhang, 2001). In contrast, a permanent injunction is enduring (Zhang, 2001). Both a preliminary and permanent injunction can create large costs for the defendant, due to the defendant not being able to sell the affected products during the time of the injunction. This can potentially lead to a strong impact on the cash flow of the company.

2.2.1.3.3 Damages

The U.S. Patent Act states that "Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court." (35 U.S.C. §284, 1952). There are three types of damages, namely basic damages, increased damages, interest in damage awarded (Zhang, 2001). The court may also award attorney fees to the prevailing party (35 U.S.C. §285, 1952). This results in that losing a patent litigation case as a defendant may lead to substantial costs on top of the direct costs. A PwC report from 2016 states that the median damages awarded were $7.3 Million between 2011-2015. In the same report, there can be seen that Damages have been as high as $1,673 million which indicates the potential magnitude of damages in the U.S. Patent system (Barry et al., 2017).

2.2.2 Relation between plaintiff and defendant

The purpose of this study is to investigate the relation between plaintiff and defendant. Relation, in this context, does not refer to if the parties have, or have had, any relationship or previous encounters with each other, but rather how the characteristics of each party, plaintiff and defendant, relate to the other. One metric used to assess the relation between the parties, for example, could be the patent portfolio size. If the portfolio size of the plaintiff is ten times bigger than the one of the defendant, that tells something about their relation. The relation can be assessed using several metrics, such as revenue and prior litigation activity.

In a study made by Lanjouw and Schankerman (2004), one of their main conclusions was that there is a negative correlation between litigation and patent portfolio size, meaning that the bigger patent portfolio a company has, the smaller is the risk of getting litigated against. Their interpretation of that result is that having a larger patent portfolio facilitates 'IP-trading', making it easier to settle potential infringement disputes without having to go through the process of litigation. Lemus and Temnyalov (2015) confirms that that is how the game is played and states that it is praxis for companies to counter-sue, or at least threaten with a counter-suit, if they were to be accused of infringement.

This behavior, in combination with the fact that litigation is costly (see section *2.2.1.3 Cost*) results in a phenomenon where small and young companies (such as many startups) end up at a disadvantage. Building a patent portfolio and financial capital usually takes time, which in this case works against the startup. Graham and Sichelman (2010) discusses this in their paper "*Patenting By Entrepreneurs: An Empirical Study*" and conclude that "even though startup companies are well aware of the strategic uses of patents, resource constraints may mean that fewer of them can engage in these [patent litigation] strategies as compared with large incumbents." (Graham and Sichelman, 2010, p.5).

2.3 IMPACT OF PATENT LITIGATION ON STARTUPS

As for defendants in general, patent litigation towards startups are tedious and complex (Halt et al., 2017). This section will outline potential impacts of patent litigation for startups. The impacts are categorized into *During litigation* and *Post litigation.*

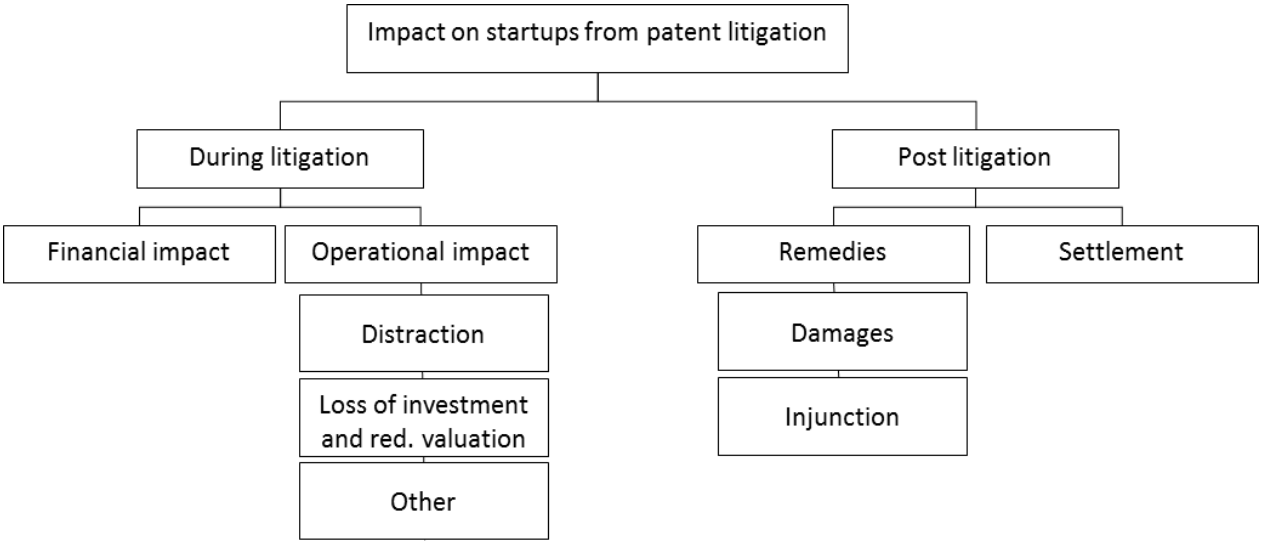


Figure 7 Potential impacts from patent litigation on startups

2.3.1 During litigation

This section consists of impacts that occurred during litigation. These impacts are categorized into *Financial impact* and O*perational impact*.

2.3.1.1 Financial Impact

During the period of litigation, substantial costs can occur for the defendant. This is discussed on a general basis in *2.2.1.4 Process Cost*. For startups, the direct cost can be substantial in comparison to its other costs (Feldman, 2014), and it is recognized that it adds to the general cost of doing business (Feldman, 2014). Phneah (2011) argues that patent litigation is distracting to the strategic direction of organizations and that they have to redirect financial resources from internal activates to manage the cost of litigation. Feldman (2014) mentions that dealing with patent demands, which includes patent litigation, was one startup's second highest cost, and another startup had spent $4 million in litigation expenses. Chien (2013) states that the negative impact on a startup usually is derived from the cost of defense, in litigation, and not the lack of merits of the patent case, and gives an example of a startup that, within a short time after being sued for patent infringement, knew it was not infringing. However, the startup had $3 million in litigation expenses before the suit was dismissed.

2.3.1.2 Operational impact

Operational impact is categorized into *Distraction, Loss of investment and reduced valuation,* and *Other.*

2.3.1.2.1 Distraction

Because of the amount of time and human resources required to deal with litigation, it often causes a distraction for employees and management of the company. This is discussed by Feldman (2014), who states that patent litigation was a major distraction to management and employees. He lists one example, of a startup, where about 40 percent of the chief technical officer's time was redirected to address issues caused by patent litigation. Another example showed that patent demands had absorbed hundreds of hours of the CEOs time (Feldman, 2014). Because of the limited resources of a typical startup, distractions like these are likely to have a significant overall impact on the company.

2.3.1.2.2 Loss of investment and reduced valuation

Being involved in patent litigation can, furthermore, impact startups negatively in terms of access to finance and valuation of the company (Feldman, 2014). Feldman (2014) found in his research that a startup involved in patent litigation run a significant risk of getting its market value reduced and experience trouble raising capital, as a result of the litigation. These findings are shared by Chien (2013), who raises that venture capitalists see an increased risk of investing in a startup with a pending lawsuit against it.

2.3.1.2.3 Other

Preliminary injunctions can have a great impact on the operations of a startup but are unlikely to be incurred (Lanjouw and Lerner, 2001).

2.3.2 Post litigation

The outcome of a case can result in remedies or settlement costs for the defendant. These can have a large effect on a startup, and might even force it to seize operations completely (Alois, 2016). The effect of a remedy is further discussed in Section *2.2.1.5 Remedies*. Settlements are common in the U.S. patent litigation landscape, but the terms of a settlement are difficult to investigate due to them rarely being disclosed (Hovenkamp, 2017). Settlement costs can of course potentially have a great financial impact and are discussed further in section *2.2 Patent litigation.*

2.4 MOTIVES OF LITIGATION

To gain an understanding of the patent litigation landscape between operating companies and startups, it is of interest to understand the motives that drive these actions. To understand these motives better, it is important to have an understanding of what patent litigation means, and what the consequences of one could be, which is discussed in section *2.2 Patent litigation.* As described there, a patent litigation is a complex and often very costly ordeal, for both the defendant *and* the plaintiff, which consequently should be reflected in the motives. Previous research outlines a number of potential motives for patent litigation, and in this study, they have been grouped into the following to categories, which are outlined in this section; *Strategic-motives and Financial-motives* (as illustrated in Figure 8).

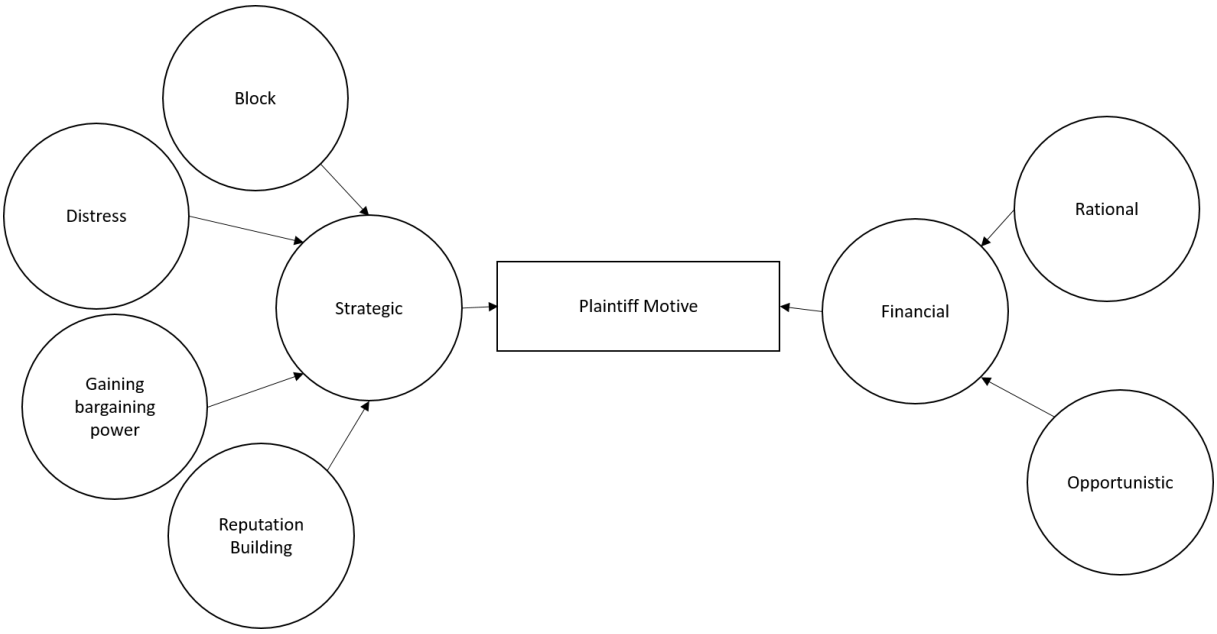


Figure 8 Potential motives for plaintiffs

2.4.1 Strategic motives

Strategic has had many different definitions in research (Mintzenberg and Quinn, 1996). In this study, however, strategic is defined as reaching goals and objectives by the adoption of course of action and the allocation of resources to reach these goals (Chandler, 1962). Therefore, the motives related to a company wanting to achieve a business goal is grouped under S*trategic motives* in this study. These motives are then further grouped into B*lock*, *Distress*, G*aining bargaining power*, and *Reputation-building*.

2.4.1.1 Block

Through patent litigation, it is possible for a company to block a competitor (Galasso et al., 2009). Therefore, a possible motive for a plaintiff to file a patent lawsuit towards a competitor is to block the actor in question from utilizing the technology described in the disputed patent.

2.4.1.2 Distress

The impact of patent litigation for a company can be immense, both in regards to the direct and indirect financial costs of being involved in patent litigation (further described in section *2.2.1.3 Cost*). Hence, patent litigation can be a tool to create financial distress for the defendant. Chien (2009) refers to this as *patent predation*, while Meurer (2203) calls it *anti-competitive*.

Because of the fact that the process cost of litigation is not correlated to the size of the company, and therefore is approximately the same for all companies, independent of size or financial resources, this cost has a nonproportionately large effect on a small company compared to a large one. For example, a cost of 3 million dollars likely has a greater impact on a company that has $100,000 in revenue than on a company that has $100M in revenue.

2.4.1.3 Gaining bargaining power

Another potential motive behind a patent litigation from an incumbent towards a startup is to increase the incumbent's bargaining power in some context. As Chien (2013) describes, a company that wish to have a better position in a negotiation could file a patent lawsuit, towards the company it is in negotiation with, to increase its bargaining power. Furthermore, Chien (2013) also claims that another situation where increased bargaining power is desirable to have

is if the company has an interest in acquiring the other company, in which case filing a patent litigation against the target company could apply pressure to it, leading to increased bargaining power. Even if the company/plaintiff does not have a valid claim, the lawsuit itself will impact the target company, as is further discussed in section *2.3 Impact of patent litigation on startups*.

2.4.1.4 Reputation building

Yet another potential strategic motive behind a patent litigation is to build up a certain reputation, (Lanjouw and Schankerman, 2001; Agarwal et al., 2009). To be known as a company that is not afraid to enforce its patent rights and take on a litigation, could potentially deter competitors and other actors from challenging the company (Agarwal et al., 2009). Previous research also shows that recently litigated patents are more likely to be cited, which is another potential motive related to reputation-building that a company could have since the number of citations is positively correlated to the value of the patent (Lanjouw and Schankerman, 2001).

2.4.2 Financial motives

The second group of motives for patent litigation contains motive related to extracting financial resources from another company. Financial motives have been divided into *opportunistic* and *rational*.

An opportunistic patent litigation is when the plaintiff has a low probability of success and seeks to extract financial resources through a settlement (Meurer, 2003). A rational motive is when the plaintiff's main objective is to gain capital from the transaction in order to increase its own profits. The defendant, in this case, does not need to be a competitor or active in the same, or adjacent, industry as the plaintiff.

3 METHOD

As mentioned in *1 Introduction,* the authors hypothesize that there is more going on than meets the eye when established operating companies sues startups for patent infringement, which is why the purpose of the study is to find out (1) how the patent litigation landscape looks, (2) what the motives for an established operating company to litigate a startup are, and (3) what impact such litigation has on the startup. Each of these three areas correlates to a research question (hereinafter referred to as RQ), and in order to study this phenomenon closer, several pieces of information were needed. For RQ1, the landscape was studied by going through and categorizing all US patent litigation cases of 2016, so all cases where established operating companies sued startups were identified. These (16) cases were then subject to further investigation, where additional data was gathered for each case to be able to further pinpoint the characteristics of each case. This set of cases were complemented with cases from prior years where the defendant had IPO'd either in 2015 or 2016.

Information about patent litigation cases, and the involved parties, is often scarce and not public. The information needed to investigate the motives of the plaintiff, and the impact of the defendant (discussed in RQ2 and RQ3) needs to be more extensive and detailed than the information usually available for any given case. Therefore, in order to answer RQ2 and RQ3, a case study was conducted. The case study includes in-depth analysis of two cases where more extensive information was available.

Elaborating further on this, this section will outline the building blocks of research methodology, including research strategy, research methods, and quality of research.

3.1 RESEARCH STRATEGY

Research strategy outlines the plan according to which the research is conducted and is here categorized into *Research approach, ontology and epistemology*, and *Qualitative and quantitative research considerations.*

3.1.1 Research approach, ontology, and epistemology

The philosophical debate regarding research approaches are often centered around the two contrasting philosophical theories, positivism and interpretivism, but in the cases where the research topic would be better served with a combination of them both, pragmatism is generally considered to be the most popular paradigm (Wilson, 2014).

The previous research related to the topic of this study was scarce, especially for the part of this study that regards the characterization of the US patent litigation landscape where established operating companies litigate startups. The notion of researching areas that lack coverage in the literature is described as gap-spotting and most commonly caused by a research area being neglected, either because it is overlooked or under-researched (Sandberg and Alvesson, 2011). So, for this study, a combination of deductive and inductive reasoning was used to answer all three research questions. Research question 1, however, that regards characterization of the patent landscape, is more descriptive in its nature and was therefore answered mostly with descriptive reasoning, where a landscape and/or situation was neutrally depicted (Bryman and Bell, 2015). Because of the subjective nature of that research question, both quantitative and qualitative research methods were used (pragmatic approach), to generate empirical and normative data (Bryman and Bell, 2015). The second and third research question regarding

impact and motive, however, were better covered by previous research, which enabled the authors to use existing theories to deductively confirm or discard hypotheses (deductive reasoning) (Bryman and Bell, 2015).

The aim of this thesis is to produce a study which is as academically sound as possible, which, in one sense, means conducting research that is transparent and replicable. When conducting this study, however, the authors realized that this was more complicated than anticipated due to ontological and epistemological reasons. The question of what is an objectively true fact, and what is a construction created by society, and consequently if (and when) social entities can be considered objective entities (which means having a reality external to social actors), is the main concern of social ontology. Tying ontological reasoning to this study, one could argue that data like company name, revenue and year of foundation are objectively true and that there is no element of subjectivity in that data. On the other side of the scale, however, when it comes to data like if a company is an NPE, or a startup, for example, one could argue that that is ontologically different, seeing how that data might differ depending on who you ask. Somewhere in the middle between those two instances are data like e.g. industry, which to a certain extent also could differ depending on who you ask, but not to the same degree as for whether a company is an NPE or not.

Epistemology is a concept, related to ontology that also plays a role in this discussion. Bryman and Bell (2015) explains how epistemology relates to business research in the following way: "An epistemological issue concerns the question of what is (or should be) regarded as acceptable knowledge in a discipline" (Bryman and Bell, 2015, p. 15). In other words, this addresses the issue of what can be assumed as common truth in a discipline, or what can be stated in a study without needing to be justified. Again, some statements (e.g. whether a company is private or public) probably does not need justification or further explanation, but when it comes to using classifications like NPEs and startups, some people might argue that those concepts are not constitutionalized/recognized enough in order to qualify as common truth. Positivism is an epistemological consideration that addresses the notion of subjectivity and highlights the difference between a scientific statement (objectively value free) and a normative statement (requiring a subjective element, e.g. what is right/wrong) (Bryman and Bell, 2015).

Bryman and Bell (2015) furthermore express that scientific statements are the true domain for scientific research (which this thesis aims to be recognized as). However, as discussed above, some elements of this research are more, or less, reified than others. To handle this, the authors have tried to stay pragmatic and balance positivism and interpretivism to achieve interesting scientifically sound results that can be accepted in the relevant field of business. How this was done will be discussed in further detail in *Qualitative and Quantitative research considerations.*

3.1.2 Qualitative and Quantitative research considerations

As Bryman and Bell (2015) discuss, there is a difference between quantitative and qualitative research, but the difference should not be exaggerated. There is a connection between quantitative and qualitative research design, and ontological and epistemological commitments, but it is not deterministic, meaning that even though there are connections, they are not perfect (Bryman and Bell, 2015).

Tying this to this study, one could start to question which parts that are truly qualitative, and what are truly quantitative. As discussed earlier, some observable data is more or less reified

than others, which in this case begs the question about how to quantitatively analyze qualitative data, and vice versa. This study does never apply a full-fledged quantitative analysis, but does, however, draw conclusions based on qualitative findings that have been quantified. For instance, one piece of data gathered in the study is an indicator of whether or not a company is an NPE or not, which to a certain extent is a matter of interpretation. Another piece of data gathered is the company revenue. These two data points were treated and analyzed equally, as two observed facts, but the underlying data for these data points were arguably different in nature. Most people would probably argue that a company's revenue is more ontologically objective than whether or not the same company is an NPE. Thus, some of the data collected for this study is of the ontologically objective type, while some data requires subjective interpretation.

Coming at it from another direction, a qualitative assessment of the quantitative data was also made. So, to summarize, in order to reach high-quality results, quantitative and qualitative approaches have been combined through the study, partly in order to tackle the issue of dealing with data that is more and less reified than other.

3.2 Research design

The research design provides a framework for the collection and analysis of data and is meant to guide the authors through e.g. how data is interpreted, aggregated and generalized in the study (Bryman and Bell, 2015). Five different designs are usually outlined, but in many cases, a single study practically utilizes more than purely one of those designs (Bryman and Bell, 2015). That is also the case for this study, which utilizes some design elements from case study design, but that mainly coheres to the comparative design.

As Bryman and Bell (2015) describes it, a comparative design is basically when one study multiple contrasting cases and compare them with each other. Furthermore, a comparative design embodies the logic of comparison and is often preferred because it helps people understand the social phenomenon better when it is depicted with two or more contrasting examples (Bryman and Bell, 2015). The design method in itself is relatively straight-forward permeates the whole study, which becomes clear when using it together with the case study design.

Case study design usually entails the study of one single case (Bryman and Bell, 2015), but as Piekkari et al. (2009) argues, the case study convention for business-related research is somewhat different and more grounded in how case studies practically are used for business research than how they theoretically should be used. Piekkari et al. (2009) distinguish between positivistic approaches and alternative approaches, where a positivistic case study research design comes closest to describing what research design is utilized in this research.

With a positivistic research approach, "the goal is to extract variables from their context in order to generate generalizable propositions and build theory, often through conducting multiple case studies, and using a variety of data collection methods to triangulate and improve the validity of the study" (Bryman and Bell, 2015, p. 61). In accordance with that approach, this study has reviewed multiple cases and then used different points and sources of data to validate the case study findings.

The reason for adopting these strategies was mainly the scarcity of relevant data. Compared to alternative research designs, the comparative and positivistic case study design were the ones with which the accessible data could be treated in a way that maximized flexibility while at the same time ensured valid and reliable research.

Furthermore, in regards to the case study, Bryman and Bell (2015) outlines the following five commonly used categories in which different types of case studies can be organized; the critical case, the unique case, the revelatory case, the representative case, and the longitudinal case. The case study conducted for this thesis aims to have a threefold purpose; to provide context, exemplify and support conclusions. This is to make the facts, reasoning, and findings easier to absorb by the reader. Ergo, the cases selected could be considered a combination of revelatory and representative cases. Representative cases, or typical cases, are cases which are representable for what the study, in its entirety, is trying to communicate, and exemplifies that, while revelatory cases are cases that are used to shed light on an illustrative phenomenon which contributes to a certain, potentially unique, finding (Bryman and Bell, 2015).

3.3 Research Methods

Research methods outline different techniques one could use to collect data (Bryman and Bell, 2015). This section outlines the required data needed for this study, how it was collected and how the research process was designed.

3.3.1 Required data

To answer the research questions, several sets and types of data were required. The choice of data sets was dependent on several factors, and one could argue that different data sets could have served the study's purpose better, but the data sets chosen for this study are the product of what the researchers, in consultation with senior research advisors, considered to be the most effective in regards to available resources. The required data is outlined in Figure 9.

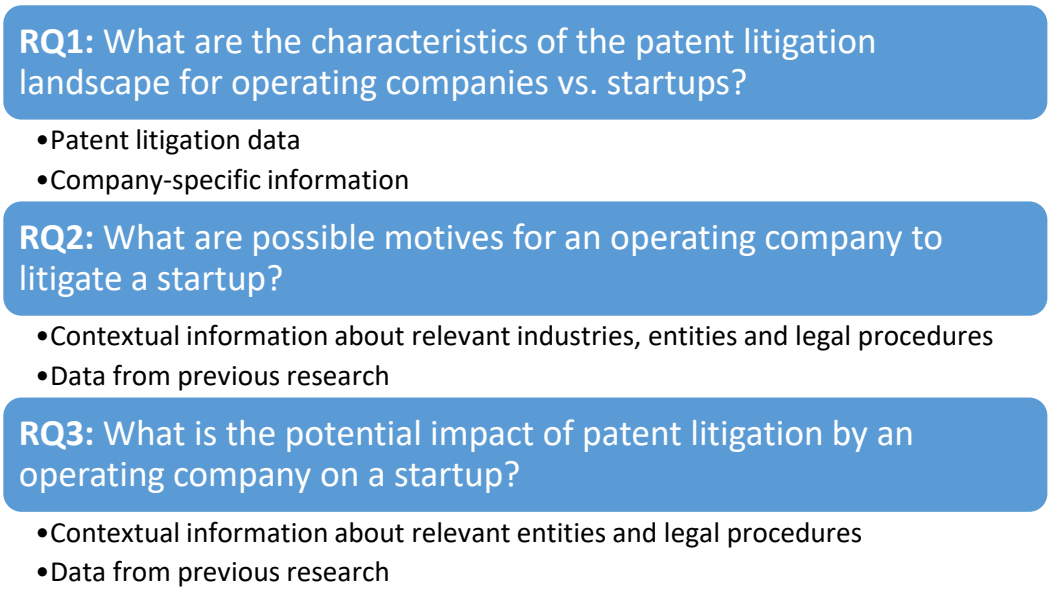


Figure 9 Required data per research question

To answer the first research question, two pieces of information was needed. The first piece of information needed in order to analyze what characteristics make up the patent litigation landscape was a full list of all US patent litigations (see *3.4.1.4 Sampling*). Such a list contains the name of plaintiff and defendant, a case reference number, a filing date, and the patent number for which industry the patent which the suit regarded belonged to. These data points alone would not be sufficient to characterize the plaintiffs and defendant in the way needed for this research, so to enable further analysis of the litigation landscape, additional company information was needed. The second piece(s) of information needed was the data outlined in Table 1 for each company (defendant and plaintiff). Note: Since the research is of exploratory nature, it is difficult to know in advance what indicators would prove worthwhile reviewing.

Table 1 List of additional data parameters that were collected for each company. The two italicized parameters (bottom) are constructed by the authors and will be explained further in the chapter Research Process.

Variable	**Explanation**	**Reason for inclusion**	**Data source**
Type	Shows if company is public or private	Indicates the level of establishment	Various. E.g. Crunchbase, Owler, Wikipedia, own website.
Estimated revenue	Estimated revenue for the trailing twelve months (or the latest 12-month period available)	Indicates company size	Various. E.g. Crunchbase, Owler, Wikipedia, own website.
Effective parent company	Show, if applicable, the name of the effective parent company. Effective implying active ownership.	To make sure that a seemingly small company is not just being used as a pawn by a larger corporation.	Various. E.g. Crunchbase, Owler, Wikipedia, own website.
Industry	Shows what industry the company primarily belongs to	To see if companies sue within other industry than the ones they are in	RPX
Size of patent portfolio	Shows how many patent families the company is assigned to	To indicate company size and establish power asymmetry between plaintiff and defendant	Cipher, Google Patents
Lawsuit activity	# of suits by/against company	To indicate experience with lawsuits and predation behavior	Cipher, Google Patents
Year of foundation	What year the company was founded	To indicate company age	Various. E.g. Crunchbase, Owler, Wikipedia, own website.
Latest funding round, type	Shows, if applicable, what type the company's latest funding round (e.g. A, B, C, seed, debt …)	To understand what development stage the company was in	Crunchbase
Size of latest funding round (in million USD)	Shows, if applicable, (in million USD) the size of the last funding round	To get an indication of company size and development	Crunchbase
Year of last funding round	Shows, if applicable, what year funds from the latest funding round was received	To understand at what point in time the funding needs occurred	Crunchbase
Indication of being a startup	*A made-up metric to indicate if company should be considered startup or not*	*To separate experienced/older companies from startups*	*Various. E.g. Crunchbase, Owler, Wikipedia, own website.*
Indication of being an NPE	*A made-up metric to indicate if company should be considered NPE or not*	*To separate operating companies from NPEs*	*Various. E.g. Wikipedia, own website, online articles.*

The second and third questions are purely qualitative and did all require two types of data; data from previous research and empirical data. Previous research was used as a starting point, and

helped to form hypotheses and define exactly what empirical data was needed to be gathered. As it turns out, the data from previous research was insufficient to answer the research questions, which moved the focus to the empirical data.

3.3.2 Data collection

The required data was primarily collected using the following two methods; Literature review, and secondary/primary data collection. This section outlines how these methods have been interpreted and utilized for this research.

3.3.2.1 Literature review

Even though the most insightful finding of this research did not come from the literature review, it is still considered to be the foundation upon which all other data collection methods are based on. As Bryman and Bell (2015) confirms, the literature review is a crucial part of the research and is a heavy influencer of both the scope of the research questions and the research design. This study has utilized a systematic review which is defined as a 'replicable, scientific and transparent process' (Bryman and Bell, 2015), to ensure a high level of objectivity and unbiasedness as well as a clear description of actions and choices made throughout the entire study. Although the bulk of the literature review was conducted in the earlier phases of the research, it has been revisited continuously as new information was uncovered.

Google Scholar and the university library (Chalmers University of Technology) are the two primary sources used to search for literature. Because of the US-centric nature of our topic, however, a substantial amount of literature was found through various online sources, e.g. trade magazines and interest organizations. The criteria used to establish the relevance of discovered literature was very simple. Much of the reviewed related literature are NPE-oriented, and lack to consider the role Operating Companies in the way this study aimed to. This means that only a very limited set of literature was directly relevant for this study, making the triage rather easy – every piece of relevant literature that was discovered was used. Because of the novel nature of the problem related to the research question, any outdated literature was not discovered, and no other criterion than relevance was ever needed to be used.

Due to the limited time frame of the research period, the sources of literature cannot be guaranteed to have been completely exhausted, but a thorough search was conducted.

3.3.2.2 Secondary and primary data collection

Secondary and primary data collection was used to find data both for the qualitative part (case study) and for the quantitative part. For the latter, in order to review the US patent litigation landscape, as described in *Required Data*, a structured manual data collection process needed to take place. Investigation showed that there was no existing single database that contained all the information needed for the analysis, thus one needed to be made by combining several sources of data. The process of populating a database with accurate data was not only tedious and time-consuming work, but involved a great amount of analysis in order to make up for the, sometimes lacking, data quality and to ensure coherence.

Regarding the difference between secondary and primary data collection, Bryman and Bell (2015) describe primary data as data collected by the author(s), while secondary data is collected by anyone other than the author(s). The distinction between primary and secondary data, however, is not always crystal clear, but since the majority of the data for this study has not been previously processed by someone else, it is considered to be primary.

The data collection process started with the identification of relevant data parameters (outlined in in *Required Data*), and then transitioned into a database review. Most data parameters could be collected from multiple databases, with each one being slightly different from the other. For the patent litigation data, for instance, MaxVal[3], RPX[4] and Patexia[5] were all potential candidates, but because RPX also provided data regarding what industry the disputed patent belongs to, they became the source of choice. Regardless of source, the data quality was never impeccable, and data cleaning needed to be made. This became obvious when company names were reviewed. In the majority of the cases where one company was recorded as plaintiff or defendant multiple times, during the selected time period, the company name had been inputted in an inconsistent manner (i.e. causing name mismatch). In most cases, it was a matter of a punctuation (e.g. "Facebook Inc." vs "Facebook, Inc."), which made the identification process and grouping of companies rather straight-forward. In some cases, however, the concurrence was not as easy to make. Common sources of name incoherence were both when companies would be registered under one name, but be "doing business as" another name, and when company names simply had been inputted incorrectly and misspelled, most likely due to human error.

In contrast to the litigation data, when it came to the company-related data, a single database was not found to contain the required data for *all* companies on the list, thus a combination of different databases was often used for population of the same data parameter. Revenue data is possibly the clearest example of that since a wide arrange of data sources, ranging from highly controlled Nasdaq to crowd-sourced Owler.com, were used to collect companies' estimated revenue. Quite often, multiple data points, incoherent with each other, were discovered, in which case the authors had to subjectively judge what data point seemed to be the most accurate.

Another piece of data that was needed in order to get the sample with IPO-related cases was information about what companies that IPO'd in the selected industries during 2015 and 2016. This information was collected from IPOscoop.com[6], which is an online tracker of IPO activity in the US.

Furthermore, the qualitative part, the case studies, an array of different secondary data sources was used to find relevant information. The majority of the sources were accessed online and included e.g. business journals, libraries, government databases (such as USPTO) and newspaper magazines.

3.3.3 Research process

The aim of this section is to outline what the overall research process looked like and explain, more in detail, how each process step was conducted and how it fits into the study. Broadly speaking, the research process can be divided into three main phases, where the first phase covers the research project initiation, the second phase covers the actual research, and the third phase covers the analysis and conclusion of the research findings from the second phase. As illustrated in Figure 10, the sequence of all process steps was not sequential, but rather parallel. The main reason for this is that the nature of this topic required iterative processes where theory, practice, literature, and research, developed as the research progressed.

[3] http://litigation.maxval-ip.com/
[4] https://search.rpxcorp.com/
[5] https://www.patexia.com/ip-research/lawsuits
[6] https://www.iposcoop.com/

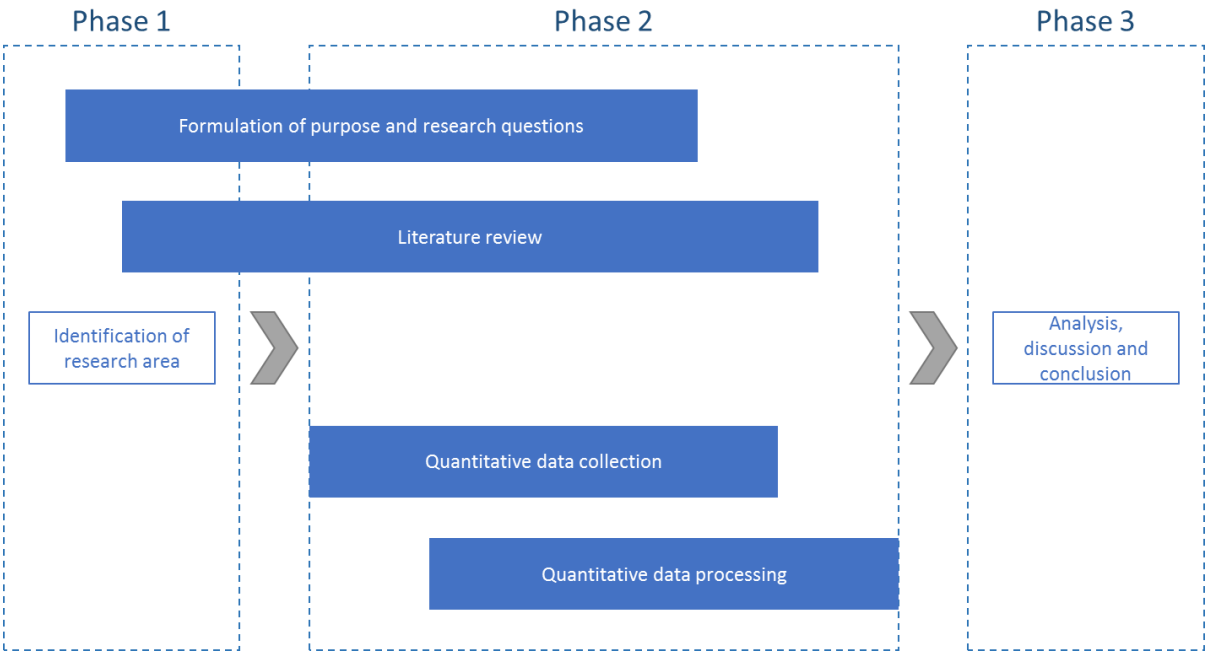


Figure 10 Illustration of the research process

3.3.3.1 Phase one

The initial phase represents the initiation of the study and includes the identification of an area in need of research, formulation of research questions, and outlining of the preliminary study process. Furthermore, prior research was reviewed in order to assess whether or not the selected area of research had already been exhaustively researched, and it turned out that the opposite was the case.

3.3.3.2 Phase two

The second phase consists of three major process steps, or sub-processes; case studies, quantitative data collection, and construction of theoretical framework. In regards to the first two sub-processes, what data that was required, and how it was collected, has been outlined in previous chapters (*Required Data* and *Data Collection* respectively), and how the data was sampled is outlined in *Sampling* under *Validity*. What the following section will focus on, however, is how the collected data was processed and analyzed.

When processing the case studies, a number of factors were considered. These factors can be split into three categories; (1) company-specific information, (2) chain of events, and (3) outcomes.

Company-specific events (1) refers to data that regards both the defendant and the plaintiff in each case and includes size, age, business model and number of patents in respective patent portfolio. Additionally, their litigation history, both as plaintiffs and defendants, was considered in order to identify possible patterns of behavior. Since the research is of exploratory nature, it is difficult to know in advance what indicators would prove worthwhile reviewing. Furthermore, the chain of events (2) aimed to outline how the case unraveled and depict, chronologically, what events took place and when. In outcomes (3), all the consequences resulting from the case are outlined, examples of which could be a possible settlement and/or damage fees, impact on company reputation, or other legal implications.

Furthermore, the quantitative data collection resulted in a database consisting of hundreds of litigation cases, where each case had two sets of each data parameter presented in Table 1 (corresponding to the defendant and plaintiff respectively). In order to make sense of the data and draw conclusions, some categorization, sorting, and filtration needed to be done. Since the research question requires the cases containing NPEs and/or startups to be distinguished, the first step was to construct an indicator for respective entity type.

NPE indicator: Several reasons contributed to making an objectively sound process of establishing whether an entity seems to be an NPE, difficult. The lack of a homogenized definition of an NPE causes incoherence when information needs to come from different sources, but even with a clear definition in mind, the information one would need to determine such a thing is often insufficient. In this study, the definition of an NPE is that it has no products/services, and to assess that, three different criteria were formulated, and *should a company meet any of the three criteria, it would be categorized as a potential NPE*. Criteria 1: No information about the company, except data related to patent litigation, was found using Google. Criteria 2: Third party sources (e.g. articles/forums) categorizes the company as NPE or patent troll. Criteria 3: The company itself states that it is an NPE.

Startup indicator: Just as in the case for NPEs, the definition of a startup differs greatly depending on who you ask. A number of factors, such as age, business model type, industry and corporate culture, are all examples of elements that some people, either consciously or subconsciously, think about when picturing a startup. When reviewing different definitions of startup, however, the only consistent factor seems to be age, which is why this study adopted Fontinelle's (2017) definition, which is that a startup is a young company that is in the beginning of its development. Young is a term open to interpretation but for this study all companies younger than eight years are considered young. More specifically, the startup indicator was set to indicate companies founded during 2009, or after, as startups.

Since these two indicators merely *indicate* that the entity in question *might* be of a certain kind, the data set was also cross-referenced with lists of known NPEs and known operating companies. The list of known NPEs was collected from a research project done by Cotropia et al. (2012) in 2010 and 2012. This project reviewed and categorized a lot of companies, and for this study, the following categories were isolated and aggregated in a list used for the cross-reference.

- University/College
- Individual/family trust
- Large aggregator
- Failed operating company / failed startup
- Patent holding company
- Technology development company

This list was then used to eliminate known NPEs from this study's list of plaintiffs, in order to narrow the data set.

The list of large/established operating companies was manually collected from Forbes Global 2000[7], Forbes Magazine's list of the two thousand largest[8] companies in the world. This list was then used to eliminate large and established companies from this study's list of defendants, in order to narrow the data set.

The primary tool used for data management was Microsoft Excel, and because of the issue of inconsistent naming, discussed in *Quantitative Data Gathering*, using Excel's direct match functions proved unsuccessful. Therefore, the function of matching partly similar strings (looking for exact matches of the seven first characters of each string) was used.

The data refinement process is outlined from a holistic perspective in Figure 11, and shows, to the left what steps were taken to achieve the goal sample "2016 Litigation data", in the graph denoted as *3. Non-NPE as plaintiff* (operating companies vs. startups), outlined to the right.

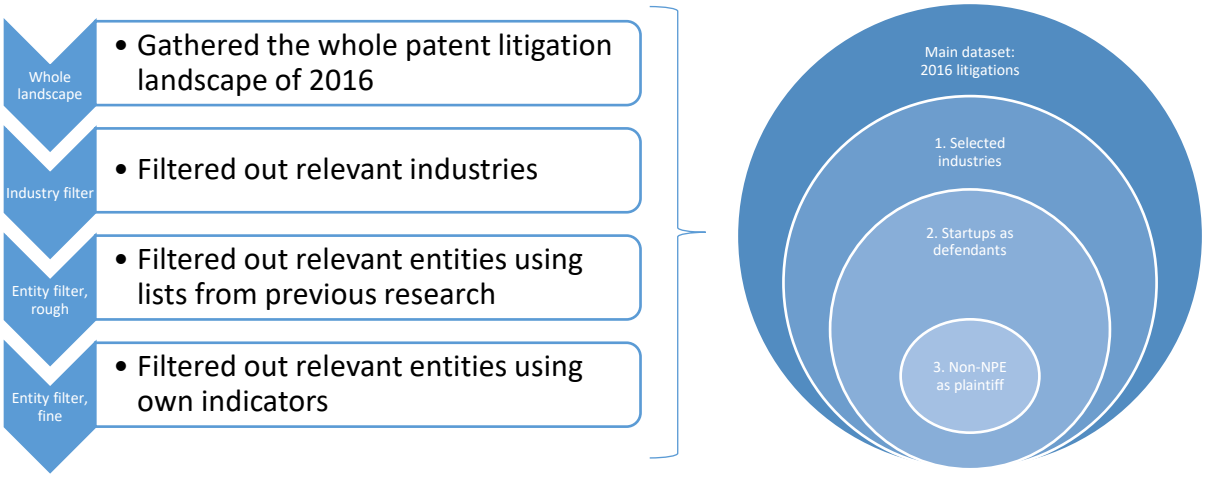


Figure 11 The sequential process of quantitative data processing

Lastly, the construction of the theoretical framework could be described by the following three parts which were iterated throughout the study as findings, hypotheses and results were continuously developed; (1) literature review, (2) identification of relevant theory, and (3) discussion and confirmation with thesis advisor.

The starting point of the theoretical framework lied in the literature review. Although, previous research related to the topic of this thesis was scarce, some neighboring literature was found from which inspiration and ideas, for how the theoretical framework could be built, could be gathered. Concepts and theories for how e.g. motives and impact could be described are examples of take-outs from the literature review, which then transferred into the process of identifying what theoretical concepts and theories that would suit this study and would be needed to describe the phenomenon discussed. Since patent litigation is about competition, Porter's (1979) theories had a central role here. In parallel with all this, supportive discussions with the author's thesis advisor were continuously held to make sure and confirm that relevant theory was used.

[7] https://www.forbes.com/global2000/

[8] "Size is based on a composite score from equally-weighted measures of revenue, profits, assets and market value." (Forbes, 2017)

3.3.3.3 Phase three

It is in the third and final step that the study comes together, and all findings, hypotheses, and results come together and are analyzed against the background of the study's purpose with the aim to answer the stated research questions.

3.4 QUALITY OF RESEARCH

Several criteria and aspects can be considered when assessing the research quality of this study. Bryman and Bell (2015) outlines what they think are the most important metrics to use and suggest *validity*, *reliability*, and *trustworthiness*, taking into considerations what metrics are applicable for this study. Hence, this section will focus on how each of these metrics.

3.4.1 Validity

Validity might be the most important criterion to consider and concerns the integrity of the conclusions made in the study (Bryman and Bell, 2015). There are several facets to validity, but relevant for this study is *internal*, *external* and *measurement validity*.

3.4.1.1 Internal validity

The internal validity mainly concerns the issue of causality, which refers to whether the conclusions made by the authors, based on their findings, actually holds water or not. I.e. if it is a causal relationship between the researched variables in accordance with the authors' conclusions. (Bryman and Bell, 2015)

For this study, achieving internal validity has been challenging. Based on previous research, advice from experts (such as the authors' thesis advisor), and what data is publicly available, the authors has selected the variables used to conduct this study. However, patent litigation is a complex game which is dependent on a wide variety of different factors, which makes it difficult to assure internal validity. Being aware of this from the start, the authors have tried to ensure internal validity e.g. by using complementing and contrasting data sets to test whether a causal relationship between some variables, as hypothesized, can be confirmed by another set of data. An example of this is using two datasets (litigation cases from 2016, and IPO-related litigation) and compare the same variables, and the relation between them, from each set with each other.

3.4.1.2 External validity

External validity concerns whether or not the results of the study can be generalized and applied beyond the specific research content of this study (Bryman and Bell, 2015)

Since the purpose of this study is to shed light one part of the patent litigation landscape, and try to characterize the dynamics of it in regards to certain types of actors (established operating companies vs. startups) the external validity is important, since the study draws conclusion for general behavior based on a small sample of the total number of cases. For example, the fact that only one year (2016) has been studied in-depth (reviewing *all* litigation cases for that year) could lower the external validity of the study. To mitigate this risk, however, the authors have tried to use contrasting data sets (case studies and IPO-related cases) with different sample properties, e.g. in regards to what years they are from. Using cases from different points in time has, furthermore, given rise to additional complexity since some data is hard to backtrack. Finding e.g. the number of patents, or a revenue figure, for a company at a point five years back in time is not as easy as finding the current information.

3.4.1.3 Measurement validity

Measurement validity, furthermore, concerns to what extent the variables subject to investigation for this study actually represents what they are supposed to represent. Does, for example, IQ really measure one's intelligence? (Bryman and Bell, 2015).

In the context of this study, this notion becomes apparent when defining and categorizing companies based on their size. This study uses revenue and patent portfolio size to determine the size of a company. Company size is a diffuse concept, however, that has multiple facets and is dependent on context. It is arguably conventionally acceptable to use revenue as an indicator of company size, but based on how company size is usually measured, having another, complementing, variable seems to be praxis. As described in the *Research Process*, Forbes measures company size with a composite score based on market value, revenue, profits, and assets. However, in this study, the complementing variable to revenue is patent portfolio size, and this is because that arguably is a variable that is more important than e.g. market value when researching an area related to patent litigation.

3.4.1.4 Sampling

In statistical analysis, the term *sampling* refers to the selection of a subset of cases (or e.g. people or observations) from within a statistical population, where the characteristics of the subset are representable for the whole population (Bryman and Bell, 2015). For this study, this type of sampling occurred for the qualitative part where the selection of cases for the case studies was conducted (see section *Case study selection*, below) and for the quantitative part when the time period for which was going to be studied was selected. However, this study is also dependent on another type of sample, which has stemmed from the initial part of the research itself, namely the sample of cases where established operating companies litigate startups.

When initiating the study, the authors searched for information about which, out of all, patent litigation cases regarded established operating companies vs. startups, but since that information was scarce, or close to nonexistent, the first part of the study was devoted to manually reviewing all patent litigation cases for selected industries for one year (2016) in order to obtain the relevant sample of cases (see section *Research Process).* The coming two sections *Quantitative sample selection* and *Case study selection*, outlines further how and why the selections were made.

3.4.1.4.1 Quantitative sample selection

In this study, two types of quantitative samples were selected, one related to time, and another to behavior.

The first sample to be selected was the sample for all US patent litigations (excluding PTAB- and ITC-cases) in 2016 for selected industries. The purpose of the selection was to choose a sample which was representative of modern patent litigation behavior in the US for the selected industries. Due to resource constraints, only all the litigation cases for one full year could be reviewed, and because of the dynamic and evolving nature of the patent litigation landscape, 2016 was chosen because it was the latest full calendar year.

The same reasoning applied to the selection of the second sample, which was the sample of cases related to defendants which had recently IPO'd. At this point, the remaining resources, in terms of time, was the constraining factor to why only two years (2015 and 2016) was selected.

3.4.1.4.2 Case study selection

The selection of case studies was done in collaboration with the thesis advisor**,** and since in-depth case review requires an extensive amount of data, which sometimes is rare to find for patent lawsuits, a criterion when searching for cases was that the publicly available information would be sufficient to build a case around. To comply with the research question, the following delimitations were made:

- Defendant: Startup
- Plaintiff: Operating company
- Industry: Technology

Additional factors that were considered were public recognizability, newness, and industry, and the primary tool to collect information about the cases was online searches.

After a list of interesting cases had been compiled, the authors analyzed these cases in accordance with the following factors (regarding both plaintiff and defendant) to find the cases that were considered to add the most value to the research:

- Revenue
- Number of employees
- Patent portfolio size
- Age
- Business model

The authors also strove to achieve a contrast between the cases, which meant selecting cases where the defendants were startups in e.g. different phases (development stages) and industries.

3.4.2 Reliability

Reliability refers to the consistency of a measure of a concept, and Bryman and Bell (2015) suggests that reliability has three facets; *stability* and *internal reliability* and *inter-observer consistency.*

3.4.2.1 Stability

Stability refers to whether or not the measured dimension is stable over time, so if the study is replicated at another point in time, the measures will not have changed (Bryman and Bell, 2015). Most of the variables used in this study are stable and would yield the same results if the same measures were done e.g. a year from now. An exception, though, is the variables that are time dependent. For example, one variable is whether a patent litigation case is currently (at the time of the study) open or closed. As more time elapses, the cases that are currently open are more likely to close.

3.4.2.2 Internal reliability

Internal reliability refers to the degree to which measures are consistent within itself (Bryman and Bell, 2015). In other words, if research is internally reliable, different variables used to measure the same general construct would produce the same score. In this study, there are a couple of instances where different variables are used to measure the same general construct. The size of a company, for example, is estimated both with the revenue and the patent portfolio size. Since the correlation between number of patents and yearly revenue cannot be guaranteed, it could potentially mislead the results slightly if they indicate way different results from each other.

3.4.2.3 Inter-observer consistency

Inter-observer consistency refers to the possibility that there might be a lack of consistency in results between observations if they come from different observers studying the same subject (Bryman and Bell, 2015).

Since this study involves some rather subjective measures, such as whether or not a company is an NPE (i.e. has a product), and is conducted by two authors, there might be cases where one author would judge differently from another. This means that the measures, to a certain degree, might differ in outcome depending on who investigated the case in question. So, since we had to create subjective constructs to manage the data, we could have some false positives and/or false negatives in the results.

3.4.3 Trustworthiness

Trustworthiness has four facets, which are; (1) *credibility*, (2) *transferability*, (3) *dependability*, and (4) *conformability* (Bryman and Bell, 2015).

Credibility refers to how credible, or believable, the outcomes from the study are and is best assured by following good research praxis (Bryman and Bell, 2015). Utilizing a comparative research design, as well as triangulation, where one compare the same data points collected from different sources with each other to validate the results, are methods one could use to increase the credibility of one's research (Bryman and Bell, 2015), both of which methods have been utilized in this study. One of the most apparent issues related to credibility for this study comes from the fact that online secondary sources are used to gather a significant portion of all data this study is based on. Here is where triangulation has been used, since the authors has tried to get the same data (e.g. revenue data) from several sources, in order to validate them with each other. Some sources are more questionable than others, in terms of credibility, but often (although not always) the data can be validated using a contrasting data source, or by conducting further investigation of the data source to establish *its* credibility. Here follows a list of potential irregularities encountered throughout the study:

- Industry classification occurs on several levels of resolutions, and with different descriptions. E.g. some sources denote software as a separate industry from IT, and some do not. For this study, however, RPX's names/classifications of industry has been used.
- Data gathered from websites could change or get deleted.
- Using secondary sources of information usually means involving more people to interpret information, thus leading to that human error or subjectivity is more likely to occur. For example, company names are sometimes spelled incorrectly and/or inconsistently, e.g. Intaact Corp / Intacct Corp.
- Data quality is generally only as good as the source, and for crowdsourced databases, such as Owler.com that has been used for some revenue data, data quality is hard to validate.
- Some data redundancy can occur. For instance, if a company is doing business under another name, or use abbreviations. E.g. International business Machines is also known as IBM.
- When private persons are listed as plaintiff/defendant, they are excluded from the analysis. When plaintiff/defendant name (e.g. "Lit") does not show as a company after extensive web search (Google, company databases, Cipher), it is concluded to be a

private person. A possible alternative explanation could be human error in inputting the name of the plaintiff/defendant.

- "First 7 letter matches", as used in Excel to match names in lists of e.g. NPEs with plaintiff company names, can give rise to both duplicates (e.g. "BO, Inc." and "BO Inc." would come out as two different entities) as well as mismatches (e.g. "Electronic Ventures" and "Electronic Appliances" would come out as the same entity).
- Industry classifications for IPOscoop.com where used when determining what cases in the IPO-set that were to be included in the sample. For the other cases, industry data was gathered from RPX, which might present a consistency issue.

Transferability regards to whether or not findings hold in another context, or in the same context at another time (Bryman and Bell, 2015). Since qualitative findings to a large extent is contextual, Bryman and Bell (2015) mean the authors should try to provide the reader of the study with a lot of details, referred to as *thick description*, in order to help them determine the transferability, by being able to judge the contextual nature of the conclusions themselves.

In this study, transferability is more applicable to the qualitative parts, such as the investigation and description of the two case studies made. Here, the aim of the authors has been to provide as thick description of the cases as possible. Particularly relevant is the chain of events and the surrounding contexts, but the authors did experience data scarcity which disabled them from sometimes describing something as thick as they would like.

Dependability relates to validation and refers to how well merit of the research is established through documentation of research processes, thus enabling third-party auditing to be done (Bryman and Bell, 2015). Thus, if dependability is achieved, it implies replicability as well. In this study, all processes, both related to data gathering and analysis, have been carefully documented and outlined in e.g. the *Method*.

Lastly, conformability refers to the objectivity of the authors of the study. Even though complete objectivity is close to impossible to achieve in business research, measures can be taken to avoid bias and ensure conformability. (Bryman and Bell, 2015) In this study, the authors strived to achieve conformability, for example, by always discussing hypotheses with each other and one external person (usually the thesis advisor) and using objective public sources whenever possible.

4 EMPIRICAL FINDINGS

The empirical findings for this study have been categorized into what research question each specific finding aims to answer.

4.1 PATENT LANDSCAPE

In order to answer research question 1, "*What are the characteristics of the patent litigation landscape for operating companies vs. startups?*", finding data that described the landscape, was naturally crucial. This was done by isolating the cases where established operating companies litigate startups in two different samples (see *Method* for further elaboration). One sample contains all US litigations in selected industries for 2016 (denoted 2016 Litigation Data), and the other sample contains all cases where the defendant IPO'd either during 2015 or 2016 (denoted IPO-set), for the same selected industries.

Table 2 outlines the case names of each case in both data sets (a total of 29 cases):

Table 2 Showing the cases in each of both data sets.

Cases from 2016 Litigation Data	Cases from IPO-set
WordLogic Corporation et al v. Fleksy, Inc.	TeleSign Corporation v. Twilio, Inc.
BlackBerry Limited v. BLU Products, Inc.	NVE Corporation v. Everspin Technologies, Inc.
STRIKEFORCE TECHNOLOGIES, INC. v. DUO SECURITY INCORPORATED	Ariba, Inc. v. Coupa Software Inc.
S3G Technology LLC v. UniKey Technologies, Inc.	Cooper Notification Inc. v. Twitter Inc. et al
SCVNGR, Inc. d/b/a LevelUp v. DailyGobble, Inc. d/b/a Relevant	Viasat, Inc. v. Acacia Communications, Inc. et al
InsideSales.com v. SalesLoft	Vivint v. Alarm.com
Activision Publishing, Inc. v. xTV Networks, Ltd. et al	iControl Networks, Inc. v. Alarm.com Incorporated et al
Free Stream Media Corp. d/b/a Samba TV v. Alphonso Inc.	Open Text S.A. v. Box, Inc. et al
FatPipe, Inc. v. Viptela, Inc.	Valencell, Inc. v. Fitbit, Inc.
Zeus Enterprise Ltd. v. Bounce Exchange, Inc.	Aliphcom et al v. Fitbit, Inc.
Timekeeping Systems, Inc. v. DwellingLive, Inc.	EMC Corporation et al v. Pure Storage Inc.
CertiCable, Inc. v. Cleerline Technology Group, LLC	Beacon Power, LLC v. SolarEdge Technologies, Inc. et al
SOLARLARE COMMUNICATIONS, INC. v. EXABLAZE PTY LTD.	Callidus Software, Inc. v. Xactly Corporation et al
IPC Systems, Inc. v. Cloud9 Technologies LLC	
Media Bridge, LLC v. Eye Corp (USA) Inc.	
Weight Watchers International, Inc. v. Gossain Software, LLC et al	

Because of the significant difference in characteristics of the cases and actors in the two different samples, the authors chose to present and study them separately. This section outlines the characteristics of the cases, plaintiffs, and defendants.

4.1.1 Characteristics of cases

When working to identify the characteristics of a set of cases, most of the study is conducted on a case basis. Below are some findings that can be used to describe this dataset.

4.1.1.1 Duration

One attribute of a case is the litigation duration, i.e. the time from the original litigation filing date to the point where the suit is either settled, dismissed or convicted in court. Table 3 shows, in months, the duration of each of the 29 cases. Since 2016 Litigation Data is from 2016, most of the cases are still open, which means that the time from filing to the time of writing counts as duration. Since almost all open cases are already longer in duration than the closed ones, it seems like a litigation process could either be relatively quick or very slow, and not somewhere in between. Regarding 2016 Litigation Data, the average duration for the 6 closed cases is 4.8 months, while the average duration for the 10 open cases is more than double, 10.5 months. The average age for all 39 cases combined is 6.2 years.

Regarding the cases from the IPO-set, since this sample is from 2015 and 2016, some of the cases are still open, which means that the time from filing to the time of writing counts as duration. The average duration for the 8 closed cases is 22 months, while the average duration for the 5 open cases is only slightly lower, 19.8 months.

Table 3 Case duration

Open	Closed	Open	Closed
Cases from IPO		Cases from 2016 Litigation Data	
23	32	11	3
16	29	9	5
22	16	11	6
15	20	14	2
23	28	4	6
	6	12	7
	29	9	
	16	14	
		12	
		9	
Avg: 19.8	**Avg: 22**	**Avg: 10.5**	**Avg: 4.8**

4.1.1.2 Forum

The district court distribution, for where each suit was originally filed, is illustrated in Figure 12 and 13. For 2016 Litigation Data, even though the spread is fairly wide, some concentration towards the traditionally patent-owner friendly courts such as Eastern District of Texas and District of Delaware (RPX, 2016; Barry et al., 2017) can still be observed. For the IPO-set, however, a clear concentration towards the three district courts of California can be observed, likely much thanks to the high-density of startups in places like Silicon Valley, Los Angeles, and San Francisco.

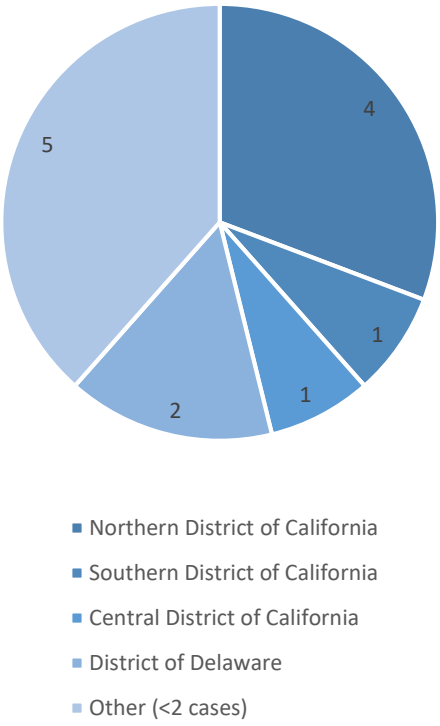


Figure 12 Number of cases per court (IPO-set)

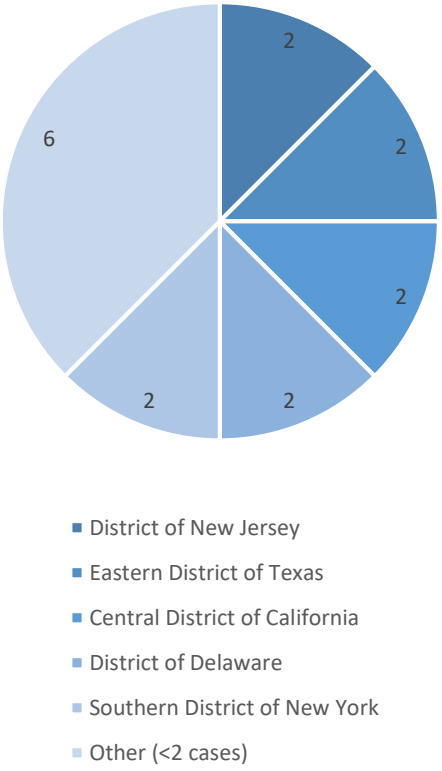


Figure 13 Number of cases per court (2016 Litigation Data)

4.1.1.3 Industry

RPX[9] categorize the industry of every patent litigation case, where the patent is the focal point of the categorization and determines what industry the case belongs to, regardless of what industry the plaintiff and/or the defendant primarily operates in. Figure 14 and Figure 15 show the distribution of the cases over the five *selected industries.*

Furthermore, in regards to industry, the core industry for the plaintiff and defendant was respectively collected in order to see if suits are filed across industry borders or not. As stated in Table 4, the majority of all plaintiffs litigated companies active within the same industry for 2016 Litigation Data, while all plaintiffs litigated companies active within the same industry for the IPO-set.

Table 4 Shows whether or not plaintiff and defendant operate (primarily) in the same industry

Cases from IPO		Cases from 2016 Litigation Data	
Yes	**No**	**Yes**	**No**
13	0	11	5
100%	**0%**	**69%**	**31%**

[9] https://search.rpxcorp.com/

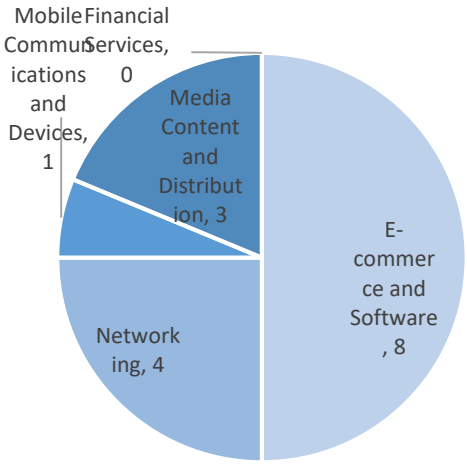


Figure 15 Industry split (2016 Litigation Data)

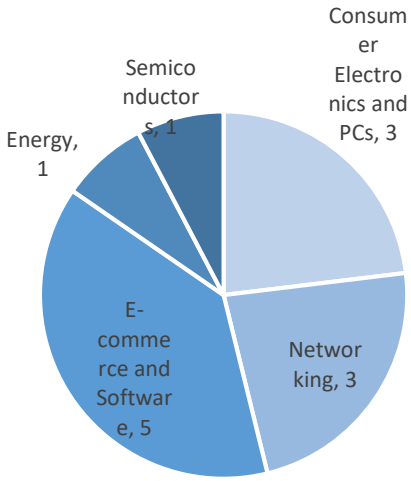


Figure 14 Industry split (IPO-set)

4.1.2 Characteristics of plaintiff

To establish the characteristics of each plaintiff at the time of suit, a number of observations, purely in regards to the companies named as plaintiffs, has been made.

4.1.2.1 Revenue

Table 5 shows how much revenue each plaintiff had at the time of suit. Data were available for 12 of the 16 plaintiffs for 2016 Litigation Data, and for all plaintiffs in the IPO-set. As can be observed, for 2016 Litigation Data, some (around half) of the plaintiffs have relatively low revenue, while each of the plaintiffs in the remaining half has several times more annual revenue than the ones in the first half combined. For the IPO-set, approximately half of the plaintiffs have relatively low revenue (below $30M).

Table 5 Plaintiff revenue at time of suit, in $M

Cases from IPO-set	Cases from 2016 Patent Litigation
6	0.4
10	1
18	5
20	9.7
28	10
74.7	16
112	25
200	64
444	560
1,363	1,200
1,400	2,160
11,000	4,664
23,200	
Avg: 2,913	**Avg: 726**

4.1.2.2 Patent portfolio size

Table 6 shows how many patent families each plaintiff had at the time of suit. As can be observed, for 2016 Litigation Data, the majority of the plaintiffs were assigned to relatively few patents (<10) at the time of the suit, while for the IPO-set, the majority had more than 10 patent families.

Table 6 Shows how many patent families each plaintiff had at time of suit

Cases from IPO-set	Cases from 2016 Patent Litigation
0	1
7	1
8	1
10	1
23	1
28	2
41	3
44	6
68	7
317	8
456	11
2,819	12
3,439	16
	35
	313
	7390
Avg: 558	**Avg: 488**

4.1.3 Characteristics of defendant

To establish the characteristics of each defendant at the time of suit, a number of observations, purely in regards to the companies named as defendants, has been made.

4.1.3.1 Revenue

Regarding what revenue each defendant had at the time of suit, data were available for 13 of the 16 cases in 2016 Litigation Data, and for all cases in the IPO-set, and Table 7 shows the findings. As can be observed, for 2016 Litigation Data, the majority of the companies have $10M or less in annual revenue when the suit was filed against them, while for the cases in the IPO-set, the majority of the companies (7 of 13) have $100M or more in annual revenue when the suit was filed against them.

Table 7 Defendant revenue at time of suit, in $M

Cases from IPO-set	Cases from 2016 Patent Litigation
6	0.3
7	2.6
25	3
25	5
30	7
60	9
130	10
133	10
167	13
184	29
239	67
1,600	114
1,900	345
Avg: 347	**Avg: 47**

4.1.3.2 Patent portfolio size

Table 8 shows how many patent families each defendant had at the time of suit. As can be observed, for 2016 Litigation Data, the majority of the defendants had zero patents at the time of the suit, while for the IPO-set, the majority had below 25 patent families.

Table 8 Shows how many patent families each plaintiff had at time of suit

Cases from IPO-set	Cases from 2016 Patent Litigation
0	0
1	0
4	0
5	0
7	0
19	0
20	0
22	0
47	0
49	1
125	1
157	2
179	2
	3
	8
	17
Avg: 49	**Avg: 2**

4.1.3.3 Funding

Another attribute used to characterize the defendant is its funding situation in regards to total amount at the time of suit. Crunchbase[10] keeps track of what funding rounds companies have gone through, and how big they have been, and that data was used to create Table 9.

Data were available for 8 of the 13 defendants in 2016 Litigation Data, and the vast majority (6 of 8) had funding below $15M, which was also the average amount for all 8 cases, at the time of the suit. For the IPO-set, data were available for all 13 defendants, and the average was almost eight times as high ($115M).

Table 9 Shows how much funding each defendant had received at time of suit, in $M

Cases from IPO-set	Cases from 2016 Patent Litigation
9	0.3
23	2
27	6
34	8
66	11
66	13
78	34
97	49
163	
163	
234	
246	
285	
Avg: 115	**Avg: 15**

4.1.3.4 Age

Another attribute used to characterize the defendant was the age at the time of suit. Table 10 shows the age of the defendant, rounded to whole years for all 29 cases. For 2016 Litigation Data, the average age is here 4.6, while the average age for the cases in the IPO-set is almost twice as high (8.3) when they got litigated against.

[10] https://www.crunchbase.com/

Table 10 Shows the age of each defendant, rounded to whole years, at the time of the suit

Cases from IPO-set	Cases from 2016 Patent Litigation
4	2
4	2
6	3
7	4
7	4
7	4
8	4
9	4
9	5
9	5
10	5
13	6
15	6
	6
	7
	7
Avg: 8.3	**Avg: 4.6**

4.1.3.5 Time to IPO

For the cases in the IPO-set, the time from litigation filing to IPO was measured, and the findings are presented in Table 11. As can be observed, in all cases but one, the litigation was filed prior to the IPO. On average, the defendant was litigated against almost two years prior to its IPO.

Table 11 Shows the time, in months, from the date of litigation filing to the date of IPO for each defendant

Cases from IPO-set
-6
0
1
2
3
14
19
20
23
34
52
55
82
Avg: 23

4.2 MOTIVES AND IMPACT

To further understand the patent litigation landscape of when operating companies litigate startups, two case studies were conducted. This, to gain a deeper understanding what the impacts for the startup/defendant, and the motive(s) of the plaintiff might be. The case studies also provide insight into how a whole litigation process could look. The cases are *Verizon Service Corp. vs. Vonage Holdings*, and *1-800 Contacts vs. Ditto Technologies.* The cases were chosen due to them having the properties that place them within the scope of the study. Although they are part of the same patent litigation landscape, their case properties are rather different from each other, e.g. in terms of what industry they are active in, when the suit was filed, defendant size, etc. Choosing two cases that are different from each other was a deliberate choice in order to portray the wide spectrum of the landscape. One important aspect of choosing the cases was also that there was sufficient public information available for constructing the case studies.

4.2.1 Verizon Service Corp. vs. Vonage Holding

The Actors in the *Verizon Service Corp. vs. Vonage Holdings* are Verizon Service Corp., and Vonage Holdings, hereafter called *Vonage*. Verizon is an incumbent in the telecom industry and saw its revenue from domestic telecom dwindle at the same time as VoIP-companies were gaining more and more customers. Vonage, a five-year-old startup, had managed to gain 1.2 million subscribers to its VoIP service and conducted their IPO in 2006. Just weeks after Vonage's IPO, Verizon filed a patent infringement lawsuit in the Easter District of Virginia[11]. The outcome was a settlement where Vonage agreed to pay Verizon $120 million (The Mercury News, 2007). During the litigation process, customer growth decrease, the stock price of Voyage dropped substantially, and the outlook on whether Vonage would survive or not was unclear.

4.2.1.1 Plaintiff

The plaintiff, Verizon Service Corp., is a subsidiary of Verizon Wireless Telecommunications and Services, hereafter called *Verizon*[12]. Verizon was founded in 2000 through the merger of Bell Atlantic Corp. and GTE Corp. in one of the largest business mergers in the history of the United States. Verizon had an operating revenue of $88 billion and 242,000 employees at the point of litigation in 2006 (Verizon, 2006).

4.2.1.1.1 Business model

In its annual report of 2016, Verizon describes itself as "... a holding company that, acting through its subsidiaries, is one of the world's leading providers of communications, information and entertainment products and services to consumers, businesses and governmental agencies." Verizon is an incumbent actor, both on the US, but also to a certain degree the international, telecom market. Their business model consists of providing customers with an internet connection, residential telecommunications, mobile telecommunications, tv-subscriptions, etc. They deliver this through both the public and the private network, as well as through a network supported by Verizon. (Sichelman, 2014; Verizon, 2016)

[11] Information gathered from the database RPX ligation data (search.rpxcorp.com)
[12] Cipher (https://cipher.aistemos.com)

4.2.1.1.2 Litigation history and patent portfolio

Verizon, as a legal entity, has been the defendant in 521 cases, and the plaintiff in 18 cases, at the time of writing. Additionally, Verizon subsidiaries have been involved in litigation under their own names. Therefore, the total number of cases Verizon, as a whole (including all its subsidiaries), has been involved in is likely higher than the aforementioned figure.

At the time of the suit, Verizon had a relatively large patent portfolio, consisting of 2000[13] patents. These patens were foremost within software and telecommunications[14].

4.2.1.2 Defendant

The defendant, in this case, is *Vonage Holdings Corp*., hereafter called Vonage, with headquarters in Holmdel, NJ. Vonage was founded in 2001 and provides VoIP services for both businesses and consumers (Vonage holding corp., 2006). Up until 2006, Vonage received $372 million in venture capital investments.[14] The prospect[15] states that Vonage had 1393 employees, approximately $220 million in annual revenue, and substantial losses at the time of the IPO. Vonage IPO'd at a price of $17 per stock[16], with ca. 31 million[16] stocks offered which raised ca. $530 million[16].

4.2.1.2.1 Business model

In its IPO prospective, 2006, Vonage described itself as "…a leading provider of broadband telephone services with over 1.6 million subscriber lines as of April 1, 2006. Utilizing our innovative Voice over Internet Protocol, or VoIP, technology platform, we offer feature-rich, low-cost communications services that offer users an experience like traditional telephone services. While customers in the United States currently represent over 95% of our subscriber lines, we continue to expand internationally…"[15]. Vonage offered its customers "unlimited" calls for a fixed cost of $40 per month. To create this service, Vonage layers its service on top of the available infrastructure provided by the incumbents. This by using the customers' current internet connection (that was provided by other companies, for example, an incumbent such as Verizon) to carry the calls. Vonage could take customers from the incumbents' land line telephone subscriptions without having to build, maintain and carry the cost of a network to the same extent as the incumbents. Another advantage of Vonage business model was that it was not classified as a traditional telephone service and therefore could escape certain regulation and taxes in relation to telecommunication companies. (Sichelman, 2014)

4.2.1.2.2 Litigation history and Patent Portfolio

At the time of the suit, Vonage had previously had two separate patent litigations filed against them. One was by Sprint Communications Company LP, and one by Rates Technology. Both suits ended after the Verizon suit against Vonage was filed. Rates Technologies is categorized as an NPE[1,] whereas Sprint is an incumbent similar to Verizon.

At the time of suit, Vonage had only one granted patent[13].

[13] Information gathered from Aistemos database cipher (cipher.aistemos.com)
[14] Data gathered from crunchbase (crunchbase.com)
[15] Information gathered from Vonage prospectus in the database edgar (www.sec.gov/Archives/edgar/data/)
[16]Information gathered from nasdaq (www.nasdaq.com/markets/ipos/company/vonage-holdings-corp-609883-48521)

4.2.1.3 Context

Voice-based telecommunications infrastructure was based on a mix of analog and digital infrastructure up until the mid-1990s. The mix consisted of public analog PSTN ("public switched telephone network") networks, and private digital networks, which carried traffic long-distance between the local PSTN points (Sichelman, 2014). As for many other industries, the Internet had a significant impacted on the telecommunications industry. This impact was partly due to the development of gateway technology that made it possible to call from the Internet to the standard telephone network and vice versa (Sichelman, 2014). This opened the industry to VOIP companies that offered telephone services over the Internet at reduced prices compared to the incumbents (Sichelman, 2014).

4.2.1.3.1 The rise of VoIP and the demise of domestic telecom

The direct impact the rise of VOIP-related technology had on Verizon, and how well this impact was recognized within the organization, is difficult to exactly establish by the authors, but indications of that it did have some impact, and that it was recognized internally to some extent, exist. Verizon's annual report of 2005 states that from 2000 to 2005, the revenue from domestic telecom fell from $43.3 billion to $37.6 billion. During the same period, operating expenses for domestic telecom remained stable at approximately $32.8 billion. (Verizon Communications, 2007; Verizon Communications, 2004) During that same period, Vonage acquired 1.2 Million customers that paid accumulated $480 per customer annually and grew at over 300% per year (Sichelman, 2014). There were some incumbents that were gaining VoIP market share, and existing cable companies had 52% of the VoIP market in the USA at that time. After Vonage, the second largest VoIP provider in the US at the time was Time Warner Cable with 1.1 million subscribers and a higher growth rate than Vonage. (Redmond Channel Partner, 2006) The are signs indicating that Verizon recognized the rise of VoIP as the main reason for its fall in revenue and profitability, one of which is the following excerpt from Verizon's 2005 annual report: "These efforts will also help counter the effects of competition and technology substitution that have resulted in access line losses that have contributed to declining Domestic Telecom revenues over the past several years.". The fact that Verizon litigated Vonage, but not Warner Cable, although Warner Cable arguably was a bigger threat than Vonage, could indicate that the perceived risk of litigating Warner Cable was higher compared to the risk of only litigating Vonage. This, probably due to Warner Cable having a large patent portfolio[17] covering a range of technologies (not only within VoIP) that could read on, and threaten, the operations of Verizon, as well as more financial resources available to put up a fight in court.

4.2.1.4 The lawsuit

On June 12th, 2006 Verizon filed a patent infringement lawsuit against Vonage alleging that Vonage infringed seven of their patents[4]. The suit was filed in the Eastern District of Virginia[4] which has been considered a "rocket docket" (Sichelman, 2014). A "rocket docket" is a court that is known for disposing cases quickly and having fast processes[18]. The verdict of the jury, after several weeks of trial, was that Vonage infringed on three out of Verizon's seven patents. Verizon argued that the caused damage from this was severe and would not be covered by Vonage paying a royalty alone (Vonage Barred From Using Verizon Patents, 2007). Vonage, therefore, had to pay $58 million in royalties for past sales, in addition to the 5,5% royalty rate on all future sales (Sichelman, 2014). The court also granted an injunction against Vonage in

[17] Information gathered from Aistemos database cipher (cipher.aistemos.com)
[18] Definition found in us legal database (definitions.uslegal.com/)

regards to further infringement. Vonage appealed the district court's decision, but the ruling on two of the three patents was upheld by higher instances, and the injunction was kept in place (Sichelman, 2014). According to Sichelman (2014), it appears that all, or nearly all, of the seven patents mentioned in the suit, was likely not infringed, and/or invalid or in any other way unenforceable. Due to the comparatively limited resources of Vonage, and their lack of experience from lawsuits like these, they did not have the best means to defend themselves to the best extent possible. (Vonage Barred From Using Verizon Patents, 2007)

4.2.1.4.1 The patents

Verizon argued that Vonage infringed on seven of its patents[19]. These patents covered technology related to networking, wireless/cordless handsets, and other features of VoIP, for example how voicemails are managed (Prinz, 2007). The patents priority dates are between 1997 and 1999, which is at least two years before Vonage was founded. A short summary of the seven patents is outlined in Table 12.

Table 12 Shows the litigated patents

Patent Number	US. 6,137,869	U.S. 6,430,275	U.S. 6,359,880	U.S. 6,128,304	U.S. 6,298,062	U.S. 6,104,711	U.S. 6,282,574
Technology	Network Technology	Network Technology	Public wireless handset	Feature patent (e.g. voicemail in VoIP)	Feature patent (e.g. voicemail in VoIP)	Feature patent (e.g. voicemail in VoIP)	Feature patent (e.g. voicemail in VoIP)
Priority date	1997-09-16	1997-09-16	1999-07-30	1998-10-23	1998-10-23	1997-03-06	1997-03-06

4.2.1.4.2 Outcome

Vonage chose to agree to the settlement, which meant them having to pay Verizon $120M (The Mercury News, 2007). Why Verizon chose to settle was potentially because they knew how little merit some of their claims had, and that there was an imminent risk of them losing the lawsuit, should Verizon have pursued the case further. Secondly, the settlement was greater than the royalties for past infringements.

4.2.1.5 Consequences for Vonage

The direct consequences of the Verizon lawsuit were the financial impact the ordeal had on Vonage. Vonage's direct cost of the lawsuit were $120 million in settlement cost (The Mercury News, 2007), and $6 million in legal fees (Prinz, 2007). The indirect costs are difficult to quantify, but one could assume that a substantial amount of management resources and time was required. The element of risk added by dealing with a patent infringement suit, may likely also have affected the growth and financial performance of Vonage. For example, new subscribers dropped from 256.000 in Q1 of 2006 to 57.000 in Q3 2007 (Prinz, 2007).

4.2.2 1-800 Contacts vs. Ditto Technologies

The case of *1-800 Contacts vs. Ditto Technologies* is a case where a large actor in an adjacent segment enters the same segment as a small startup. The startup/defendant has superior technology, but far less resources than the plaintiff. The plaintiff is more familiar with how the

[19] http://www.lexology.com

"litigation game" is played, and uses this to its advantage, resulting in substantial negative consequences for the startup.

4.2.2.1 Plaintiff

The plaintiff in *1-800 Contacts vs Ditto Technologies* was glasses.com, a subsidiary of 1-800 Contacts. 1-800 Contacts' parent company was WellPoint Inc. that today is Anthem Inc. (Japsen, 2014). WellPoint sold Glasses.com to the private equity fund Thomas H. Lee Partners LP in 2014 (WIRE, 2014), but at the time of the suit, WellPoint was the owner of 1-800 Contacts and will, therefore, be viewed as the parent company. WellPoint Inc. had a revenue of $71 Billion in 2013 (Wellpoint, 2014).

4.2.2.1.1 WellPoint Inc.

WellPoint described itself as "…one of the nation's leading health benefits companies. We believe that our health connects us all. So we focus on being a valued health partner and delivering quality products and services that give members access to the care they need. With nearly 68 million people served by our affiliated companies including nearly 36 million enrolled in our family of health plans, we can make a real difference to meet the needs of our diverse customers.".(WellPoint, 2014, p.25) WellPoint's main area of business is offering healthcare insurance across the United States. (Wellpoint, 2014)

4.2.2.1.2 1-800 contacts

1-800 Contacts was founded in 1992[20] and IPO'd on NASDAQ in 1998[21]. At the point of the suit, 1-800 Contacts had approximately 1000 employees[22] and an annual revenue of more than $400 million[5]. 1-800 Contacts describes itself as:

"…the world's largest contact lens store, 1-800 CONTACTS is dedicated to providing you with a simple, hassle-free way to replace your contact lenses. At 1-800 CONTACTS, you will receive the exact same contact lenses your doctor prescribed, delivered to your door, at a great price. And with an inventory of more than 15 million contacts, we are more likely to have your prescription in stock than anyone else, which means you'll receive your contacts fast. 1-800 CONTACTS has filled more than 30 million orders for over 8 million customers. In a single day, we deliver more than 200,000 contact lenses to customers. Our large volume and central distribution facility help keep costs down…".[23]

Their business model originally consisted of selling contact lenses over the phone. This was done by customers calling 1-800 CONTACTS to purchase contact lenses that then were shipped to the customer. After a while, an e-commerce web page was also deployed and added as a channel for reaching customers.

4.2.2.1.3 Glasses.com

Glasses.com was founded in 2011[20] as a subsidiary of 1-800 Contacts. The domain name "glasses.com" had been purchased at least 10 years before the foundation of glasses.com. Glasses.com resells other brands' frames in combination with its own sourced lenses online.

[20] crunchbase.com
[21] Nasdaq.com (nasdaq.com/markets/ipos/company/1-800-contacts-inc-11704-4720)
[22] www.bloomberg.com/research/stocks
[23] www.1800contacts.com/the-company.html

On glasses.com, customers can get help with both style and medical aspects of the purchase. 1-800 CONTACTS, 2013)

4.2.2.1.4 Litigation history and patent portfolio

Neither WellPoint Inc. nor Glasses.com, had been involved in offensive patent litigation at the time of the suit. 1-800 Contacts, however, had been involved in two offensive and five defensive lawsuits prior to this suit.[26] Furthermore, while 1-800 Contacts had one patent, neither WellPoint nor Glasses.com had any patents at the time of suit.

4.2.2.2 Defendant

The defendant in the case is DITTO Technologies, Inc., hereafter called Ditto, a California Corporation with headquarters in Mountain View, California. Ditto was founded in 2011 by Kate Endress, Dimitry Kornilov, and Sergey Surkov. Prior to the lawsuit Ditto had raised $3M in seed funding from August Capital and The Perkins fund in September of 2011.[24]

4.2.2.2.1 Business Model

Ditto's business model, at the time of suit, was to sell glasses online to consumers. It resold frames from brands such as Ray-Ban, Tag Heuer, and Vera Wang. Dittos price range was from $110 to $1,800 per item, and they offered free shipping (Lunden, 2012). The technological advantage Ditto had over competitors was that a potential customer *virtually* could try on any glasses online, to see how they looked. By having the potential customer upload a video of his/her moving head to the site, the site could layer a 3d model of the glasses chosen by the potential customer on top of the video. The customer could thereafter view a digital, interactive, 3D image how the customer would look with the glasses on. An example of how this could look is shown in Figure 16, which is taken from Ditto's website in 2014[25]. (Duryee, 2012)

Figure 16 Example pictures demonstrating Ditto's user experience

4.2.2.2.2 Litigation history and patent portfolio

At the time of suit, Ditto had no granted patents[26] but was involved in other patent infringement cases. These other cases did not have a great impact on Ditto in comparison to the 1-800 contacts case.

[24] crunchbase.com
[25] Dittos 2014 website was extracted through the database web archive (web.archive.org)
[26] Information gathered from Aistemos database cipher (cipher.aistemos.com)

4.2.2.3 Context

The emergence of e-commerce has impacted many different industries, including the eyewear retailing industry. Before the Internet, eyewear was purchased at brick and mortar locations, but thanks to the Internet, customers can choose to purchase glasses online, from the comfort of their home. From a customer perspective, some of the positive consequences from this are the lowered cost and an increased level of convenience from doorstep delivery. The downside of purchasing glasses online is that the customer is unable to physically try the glasses on before purchase, which is possible in a physical store.

4.2.2.3.1 The Entrance of Glasses.com and Ditto

Glasses.com started to offer glasses online in 2011. The offering consisted of different brands and included "clear" glasses (i.e. glasses without any correction) and sunglasses. Customers could chat with an optician, or "Glasses Guru", for advice regarding a purchase. Figure 17 shows a screenshot from glasses.com in 2011, and this illustrates a part of the customer experience when browsing for eyewear. The main difference from a brick and mortar store is the inability for a customer to try the glasses on.

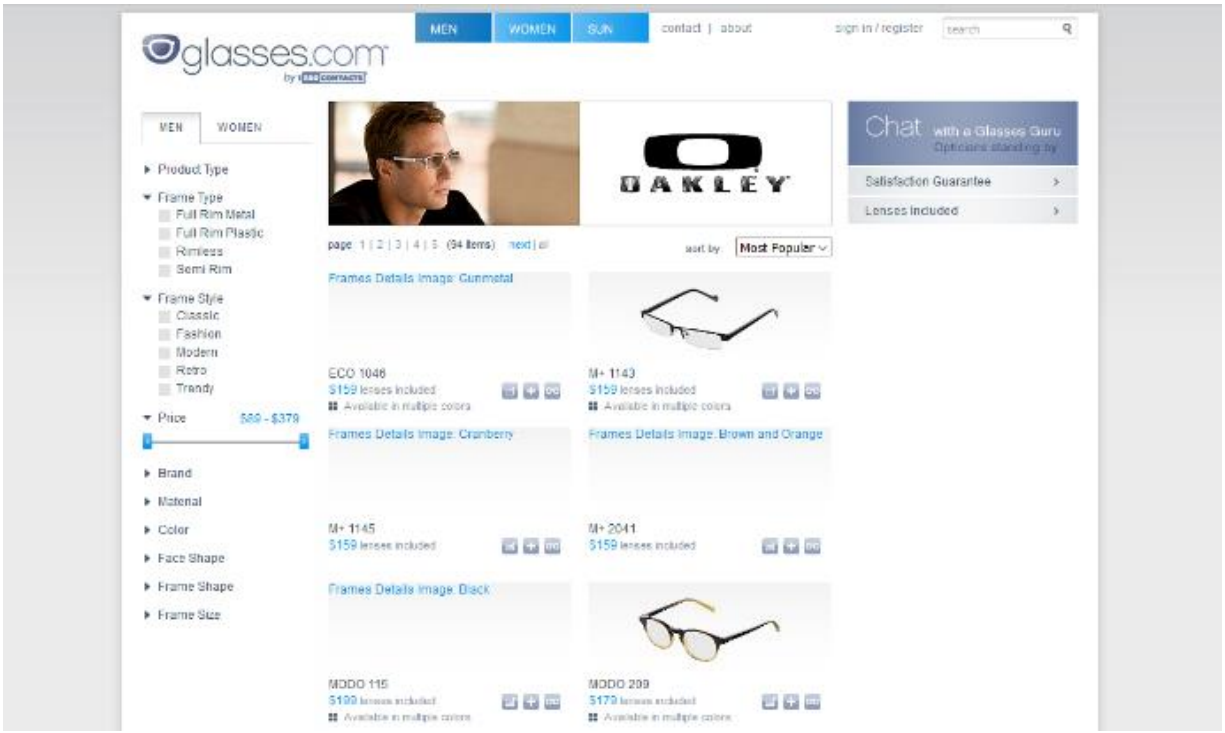


Figure 17 Illustrates Glasses.com's user experience

Several initiatives were made by different actors to make it possible for customers to emulate the experience of trying on glasses. One way of doing this is to have the customer upload a portrait picture of oneself to the website. Images of glasses would thereafter be superimposed onto of the customer's picture. This was helpful but not optimal since the glasses were layered on top of a 2D image, showing the face of the customer statically from the front (Sanders, 2012). Ditto, however, set out to create a new way for customers to try on glasses online. By having the customer upload a video of them turning their head 180 degrees, Ditto was able to create a 3D model of the customer's head and face, on which glasses could be added onto. This allowed customers to see an avatar of themselves wearing different glasses, from different angles (illustrated in Figure 16). This required technology development by Ditto, whose two out of its

three co-founders were engineers[27] with no prior connection to the eyewear or e-commerce industry. Glasses.com revealed their plans to compete with an application similar to Ditto's, one year after Ditto entered the market (Statt, 2013). This application went live in May of 2013 (Vision Monday, 2013). Since Glasses.com entered the market long after Ditto, it could be argued that Glasses.com's application was a reaction to Ditto's application.

4.2.2.4 The Lawsuit

The suit was filed on February 26th, 2013 in the United States District Court in Utah[4]. Glasses.com argued for "28. Plaintiff is entitled to an injunction prohibiting DITTO from further use of the infringing 3D VTO platform without permission or license from Plaintiff…to recover all damages caused by DITTO's infringement…DITTO's infringement is found to be willful or otherwise exceptional."[28] If the court ruled in favor of Glasses.com, Ditto would face both operational and financial consequences, in terms of damages and paying for Glasses.com's legal fees. According to Per Michael Mattioli, Associate Professor of Law at the Indiana University, the lawsuit could go either way (Campell, 2013). The company IPNav took on the cost and responsibility for defending Ditto in return for one million dollars' worth of equity in Ditto (Campell, 2013).

4.2.2.4.1 Outcome

The suit was settled in 2016[29], and the details of the settlement have not been found by the authors.

4.2.2.4.2 The Patent

The patent Glasses.com accused Ditto of infringing on was U.S. Patent No. 7,016,824, and it has the following description:

"Techniques and systems that provide interactions between a 3D representation of a selected pair of glasses and a fully-textured 3D face model are disclosed. Per one embodiment, an interactive platform is displayed to allow a user to select a pair of glasses and try the selected glasses on a user-provided 3D face model. The interactions provided in the platform include spatial adjustments of the glasses around the face model, various perspective views of the 3D face with the glasses on and other cosmetic alternations to the selected glasses. Per one application, when the user finishes the try-on process, the information about the glasses can be transmitted to a business that can subsequently produce a pair of customized glasses for the user."

The first original assignee is Geometrix Inc., and the priority date is the 6th of February 2001.[30] The patent was acquired by Glasses.com on the October 28th, 2012 (Slind-Flor, 2013), just one month prior to the filing of the suit.

4.2.2.5 Consequence for Ditto

The lawsuit had substantial consequences for Ditto, both during and after the litigation, and they were affected both financially and operationally. Per Kate Endress, the CEO of Ditto, stated that Ditto had to stop all marketing spending and funnel those resources towards defending the lawsuit instead (Chien, 2013). Ditto also had to lay off four out its fifteen

[27] Linkedin.com
[28] search.rpxcorp.com/lit/utdce-88008-glasses-com-v-ditto-technologies
[29] cipher.aistemos.com
[30] Google patents (https://patents.google.com/)

employees for the same reason (Campell, 2013). At one point, the CEO even started a sales process for the company, but because of the shadow cast on the company from the lawsuit, he was unable to find a buyer at a reasonable valuation. The valuation dropped by $3-$4 million, which is a substantial amount for a startup of Dittos proportions. The long-term operational impact on Ditto is difficult to estimate precisely, but from the time of suit into the case was settled, management's focus was, at least partly, directed towards the lawsuit instead of towards developing the company. The direct financial impact was all the costs that occurred until the collaboration with IPNav took place, as well as all the potential cost of the actual settlement. The indirect financial cost was that Ditto had to give away an equivalent of one million dollars in equity to IPNav. (Campell, 2013)

5 ANALYSIS AND DISCUSSION

In this chapter, the research questions will be investigated by using the theoretical framework and empirical findings. The purpose of the analysis is to shed light on the patent litigation landscape in regards to operating companies litigating startups.

5.1 LANDSCAPE CHARACTERISTICS

Throughout this study, a significant amount of data has been gathered, some of which have been outlined in the empirical findings. Because of the nature of research question 1, regarding the landscape characteristics, some of these data points will not need to be elaborated on further in the analysis but will be answered directly in the empirical findings (e.g. distribution of cases over district courts). There are some characteristics, however, that have shown interesting differences between different samples. One of the largest contributing factors to these differences is likely related to the nature of the set themselves. Since one set contains only companies that have IPO'd, and the other a selection of *all* companies litigated in 2016 (regardless of if they IPO'd or not), the populations of the samples have been chosen on different grounds. Consequently, the underlying difference is that companies that have IPO'd arguably are more successful, generally, at the point of the suit than those in 2016 Litigation Data, since it is highly unlikely that all startups litigated in 2016 have, or are about to, IPO. So, in this section, a few selected attributes where the sets differ will be looked further into.

5.1.1 General characteristics

To answer research question one and shed light on the patent litigation landscape characteristics, the authors chose to analyze defendants and plaintiffs separately in order to get a more in-depth understanding of each category. Hence, this section outlines a description of how the authors interpret the empirical findings in terms of how they describe the general attributes of the defendant and plaintiff.

5.1.1.1 Characteristics of plaintiff

This section outlines the characteristics of the plaintiffs in terms of revenue, number of patents and industry. The plaintiffs analyzed in the study had vastly different characteristics from each other, in regards to size, when using revenue and patents as a proxy for size.

In 2016 Litigation Data, for example, one-third of the plaintiffs, for which revenue data was available, had at least $500M in annual revenues, while another third had $10M, or below, in yearly revenue, as can be observed in Figure 18.

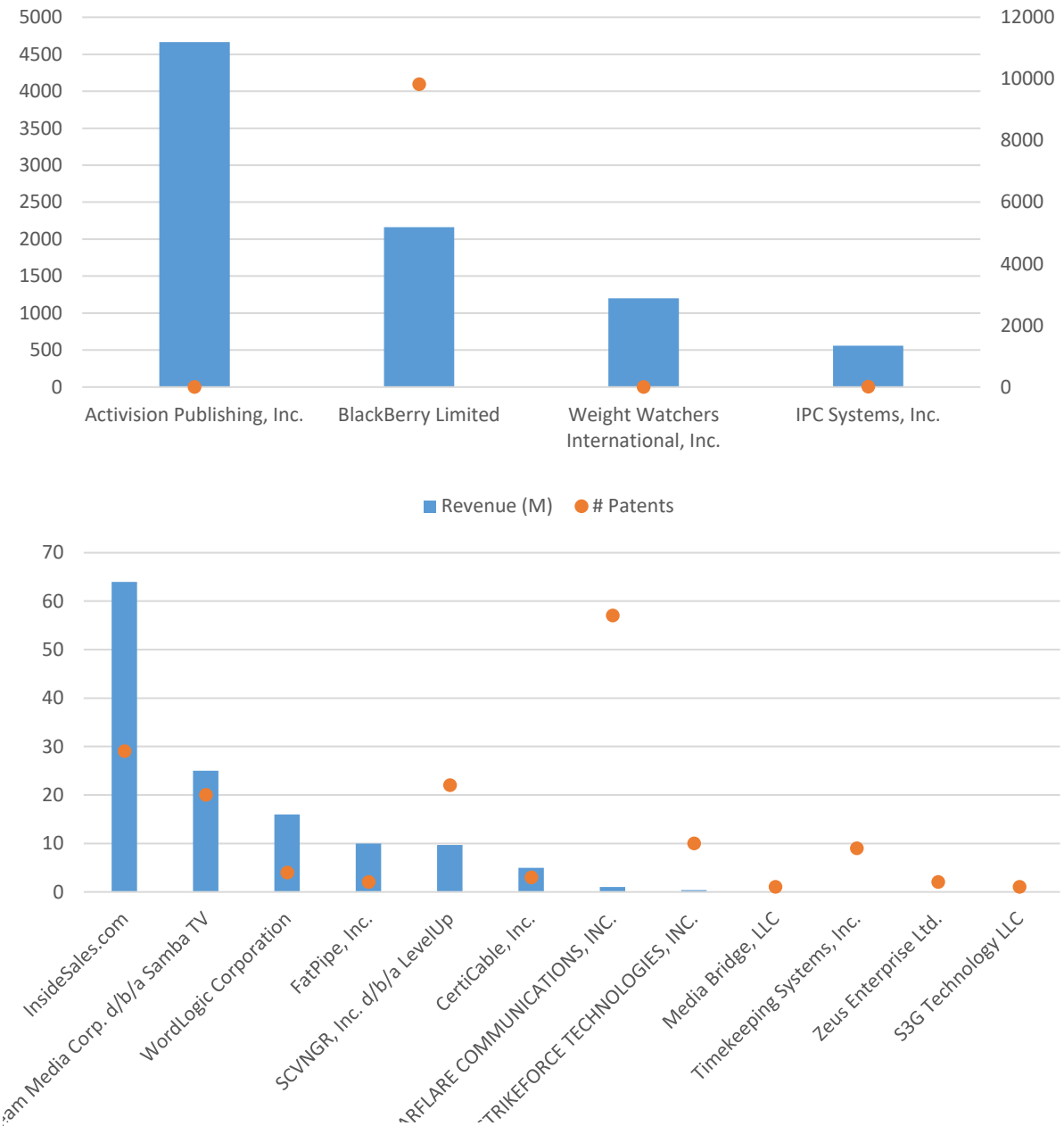


Figure 18 Illustrates the absolute values of, and relation between, funding and revenue for the plaintiffs of 2016 Litigation Data

In the IPO-set, the revenue relation between plaintiffs is approximately the same, with a third of them having more than $500M in revenue, and another third having $20M or less in revenue, which can be observed in Figure 19.

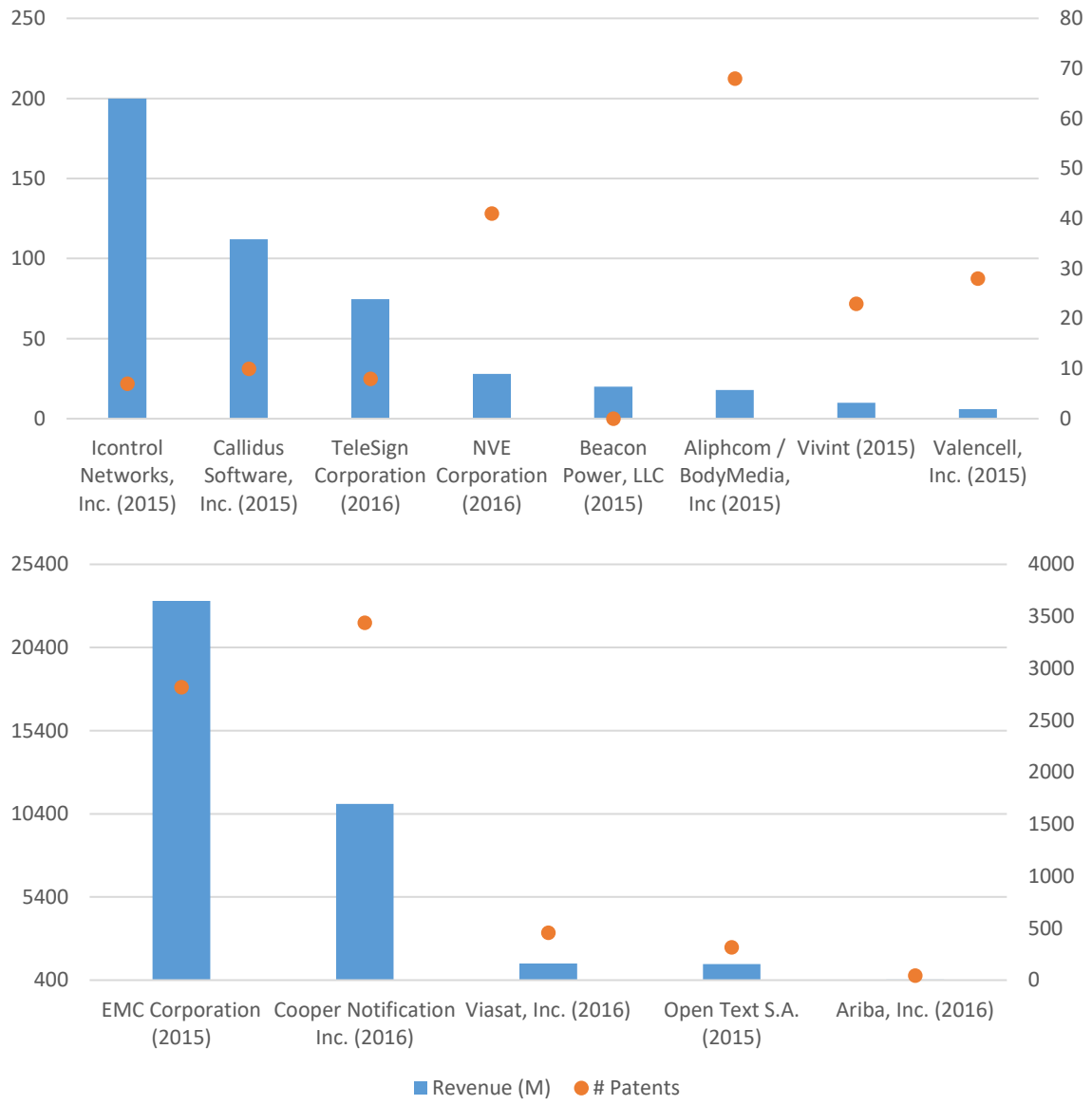


Figure 18 Illustrates the absolute values of, and relation between, funding and revenue for the plaintiffs of the IPO-set

Furthermore, in regards to patent portfolio size, one can observe that the number of patent families each plaintiff has at the time of suit, differ greatly from plaintiff to plaintiff, for both sets, with a high of almost 10,000 and a low of 1. Moreover, there seem to be to be a weak correlation (correlation coefficient 0.3) between patent portfolio size and revenue for the 2016 Data Litigation sample, while the correlation is rather strong for the IPO-set (correlation coefficient 0.8).

Consequently, it is difficult to generalize the characteristics of the plaintiffs in regards to revenue and patent portfolio size. Tying this together, the authors are unable to distinguish an apparent and consistent difference of plaintiffs between the IPO-set and 2016 Litigation Data. This could indicate that there is, in fact, no specific difference in characteristics between the plaintiffs and that it is the same type of companies that litigate startups in general and startups that are about to IPO.

Another interesting dimension to investigate is the industry in which the plaintiffs operate, and in particular if this is the same industry as the industry of the defendant. One could argue that if the plaintiff and defendant operate in the same industry, it would be more likely that it is a competitor litigating another competitor. This, in turn, means that the motive of the plaintiff more likely is strategic, rather than financial. If they are in different industries, however, one could argue that the litigation is driven by a financial motive. The plaintiffs contained in the IPO-set were all from the same industry as the defendant, but for the plaintiffs contained in 2016 Litigation Data, five out of sixteen were active in another industry than the defendant. Consequently, this could indicate that strategic motives are more common in both samples, and especially for when companies are about to IPO.

5.1.1.2 Characteristics of defendant

This section outlines the characteristics of the defendants in terms of *Financial maturity*, *Patent portfolio size,* and *Timing of litigation.*

5.1.1.2.1 Financial maturity

Both revenue and financial funding arguably indicate financial maturity for a startup, which is why these two dimensions are discussed and analyzed in this section.

The defendants from the cases of the IPO-set *all* had a revenue at the time of suit. Furthermore, all companies, except one that had a revenue of $60M, can be grouped into the following three categories; (1) small revenue, (2) substantial revenue, and (3) high revenues. Ergo, four companies had relatively small revenue (< $30M), four companies had substantial revenues (between $30M and $240M), and two companies had a high revenue (> $600M). Two companies were defendants in two cases each, and have thus only been counted once, which leads to the sum adding up to 11 defendants instead of 13. Figure 20 outlines the absolute values of, and the relation between, funding and revenue for all 13 defendants of the IPO-set.

To further understand the financial profile of the defendant, or startups, it is of interest to understand the amount of venture capital they had received at the time of litigation filing. All of the startups had gone through at least one round of financing at the time of the suit. The investments received are positively correlated with the categorization mentioned in regards to revenue. However, one company, Pure Storage, Inc., had only $6M in revenue at the time of suit but had raised $246M in capital. Therefore, one could argue that Pure Storage, Inc. was financially more mature than indicated by its revenue.

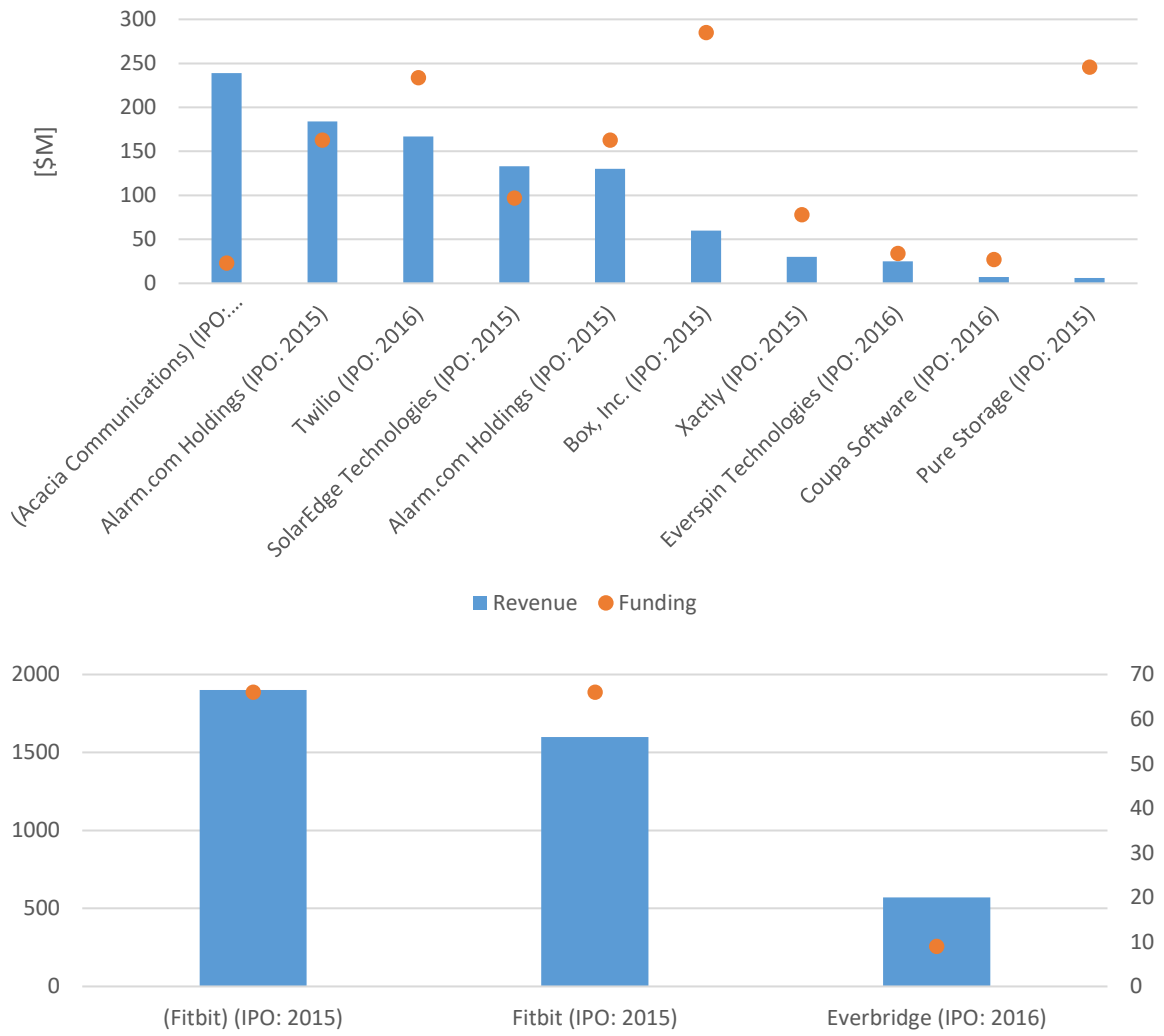


Figure 20 Illustrates the absolute values of, and relation between, funding and revenue for the defendants of the IPO-set

Furthermore, in regards to the other set of cases, in 2016 Litigation Data, two-thirds of the companies where revenue data was available had a revenue below, or equal, to $13 million. In addition to that, none of these startups had raised more than $13 million in venture capital funding.

Figure 21 outlines the absolute values of, and the relation between, funding and revenue for the defendants of 2016 Litigation Data, and as can be observed some revenue and/or funding data was unavailable for a number of defendants. In the case of funding, if no information is available, it is likely that these companies had not received any funding. In the case of revenue, though, it is harder to generalize if the companies had incurred revenue or not, or if the data was just unreachable.

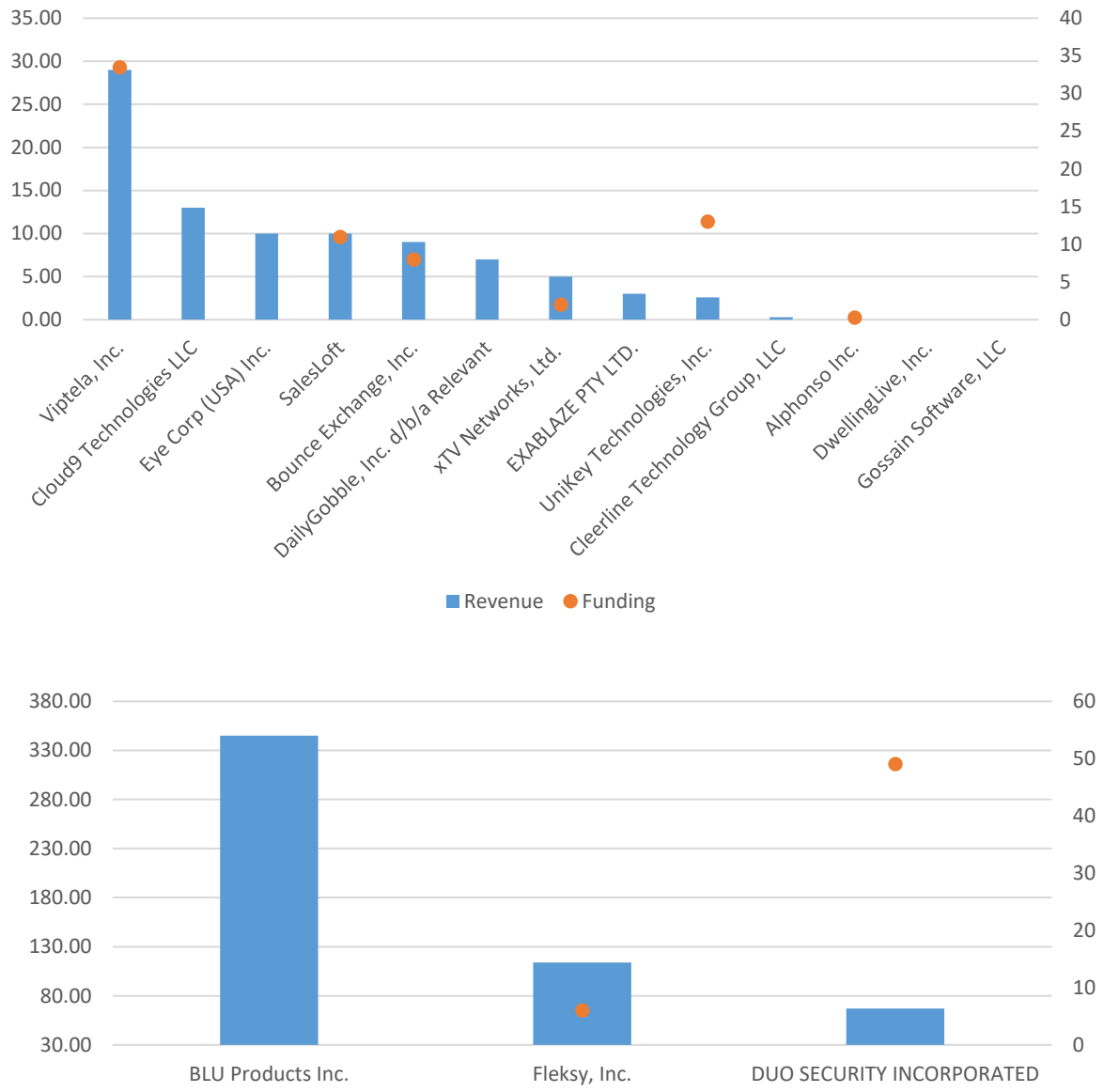


Figure 19 Illustrates the absolute values of, and relation between, funding and revenue for the defendants of 2016 Litigation Data

To summarize the analysis of the financial maturity of the defendants, it seems like the defendants, or startups, of the IPO-set, in general, were more financially mature than those in 2016 Litigation Data. A commonality is that most defendants in both sets had some form of either revenue or funding when litigated. This could indicate that potential plaintiffs become interested in litigating first once a company has gained a certain degree of financial resources.

5.1.1.2.2 Patent portfolio size

It is of interest to understand the defendant's patent portfolio to deepen the understanding of the litigation landscape towards startups and to get an indication of the startups' relation to intellectual property. As stated by Lanjouw and Schankerman (2004), having access to a patent portfolio, the larger the better, enables the defendant to threaten the plaintiff with a countersuit, which results in the plaintiff running a higher risk when litigating a startup with many patents, compared with litigating one with few or none.

The size of each defendant's patent portfolio at the time of suit is illustrated in Figure 22 and Figure 23, for the cases in the IPO-set and 2016 Litigation Data respectively. As for the IPO-set, there are several interesting observations to be made in these figures. For example, whilst the size of the patent portfolio differed substantially, every defendant had at least one patent at the time of suit.

Furthermore, the defendant with the largest portfolio at the time of suit for 2015 was Fitbit, with a portfolio size of 125 patent families for their first litigation, and 157 at the second instance it was litigated. None of the companies that IPO'd in 2016 had more than 22 patents at the time of the suit, and in approximately two-thirds of the cases, the defendant had less than 22 patents. The startup with the most patent families is Everspin Technologies which is also the only company active in the semiconductor industry. In 2015, the two actors that were the largest recipients of US patents throughout the year are both active in the semiconductor industry (Yinug, 2016). This could indicate that the semiconductor industry is patent-intense and that startups active within that industry are more likely to have a large patent portfolio.

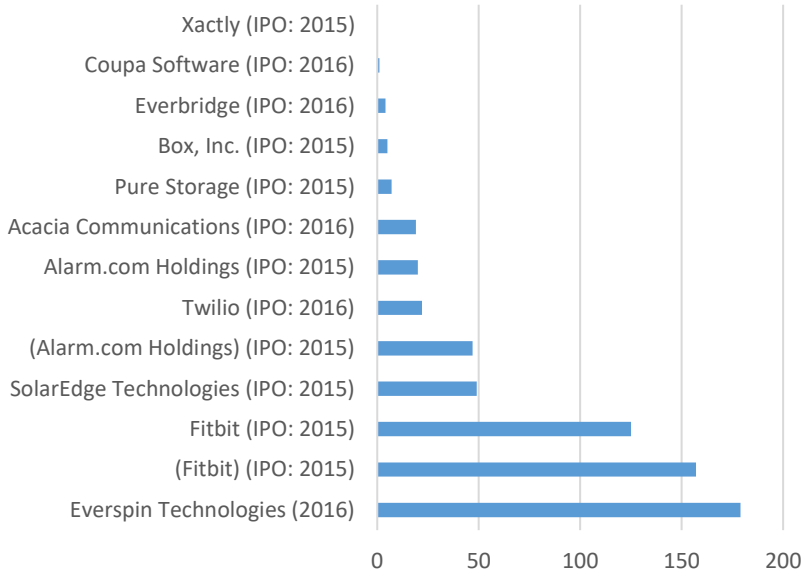


Figure 20 Shows the number of patent families each defendant from the IPO-set had at time of litigation filing

Moving on to 2016 Litigation Data, the defendants in the cases of this dataset shows slightly different characteristics, as illustrated in Figure 24. 9 out of 16 defendants have *zero* patents at the time of the lawsuit, and only two have a patent portfolio consisting of more than eleven patents. The difference between the two sets is most likely due to the difference in nature of the defendants that are part of the different sets, as discussed in the first section of *Analysis.*

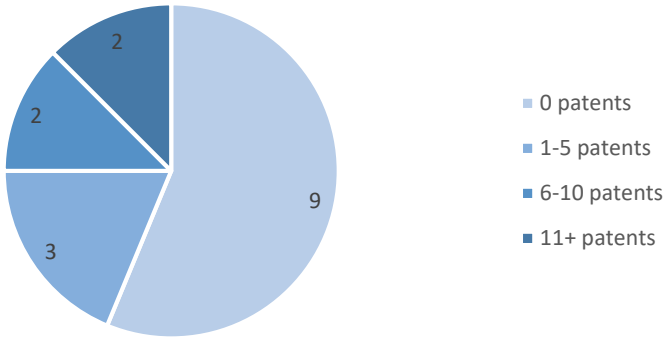


Figure 21 Illustrates how many patents defendants of 2016 Litigation Data have by grouping each defendant in a category based on a span of a number of patents.

To summarize and conclude *Patent Portfolio Size*, one can observe yet another difference that indicates that the defendants who are about to IPO or have recently IPO'd, are more developed than the ones from 2016 Litigation Data, if one would consider the number of patents as an indicator how far a company has developed. The majority of the defendants in 2016 Litigation Data had zero patents, and few had more than 10 patents, while in the IPO-set, the majority had more than 7 patents, and only one company had zero patents. The average number of patents from each set differ by a factor of 25 (2 for 2016 Litigation Data, compared to 49 for the IPO-set). So this could indicate a difference in success/degree of development/maturity, or that the majority of any given startup (i.e. those represented in 2016 Litigation Data) have little or no IP-focus.

5.1.1.2.3 Timing of litigation

In order to understand and assess in what stage the defendants were, in terms of how developed the company was, when they got a patent litigation filed against them, the authors chose to analyze the age of the defendant, and the time from litigation filing to IPO, illustrated in Figure 24 (only for the IPO-set). The age of the startup at filing was between six and fifteen years, for the IPO-set. Furthermore, around half of them were litigated when they were between five and ten years old.

When it comes to the time from litigation to IPO, the majority of the startups were litigated within two years of their IPO, and only one company had already IPO'd at the time when litigation was filed, as can be observed in Figure 25. According to the article *Roadmap To An IPO*, published by PwC in 2015 (PwC, 2011), the key to a successful IPO is to plan for it 1-2 years before going through with it. Tying this together, this could indicate that the companies were sued around the same time that they were starting to plan for an IPO.

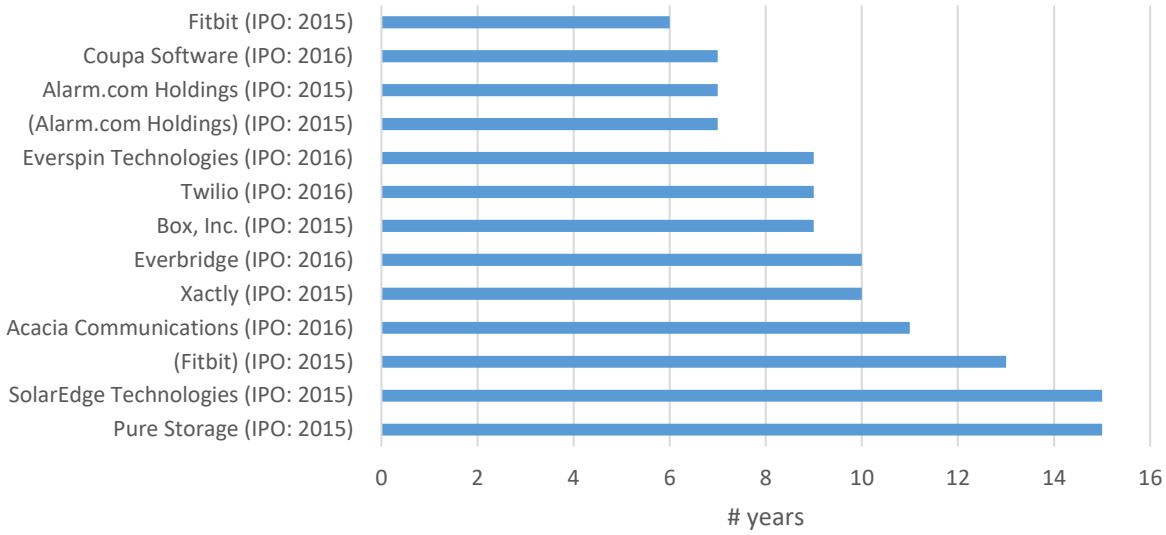


Figure 22 Illustrates the time that elapsed, in months, from when patent litigation was filed, to the official IPO.

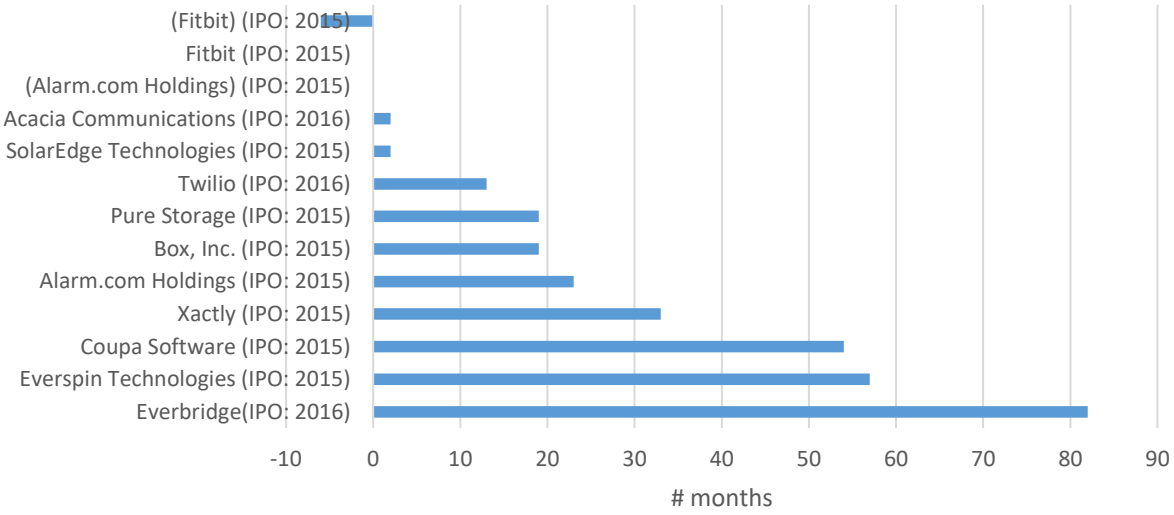


Figure 23 Illustrates the age of the defendant, in years,

Moving on to 2016 Litigation Data, half of the defendants were 4 years old, or younger, at the time of the suit, while the oldest defendant was seven years. It is worth noting that no defendant was litigated in the first year following its foundation.

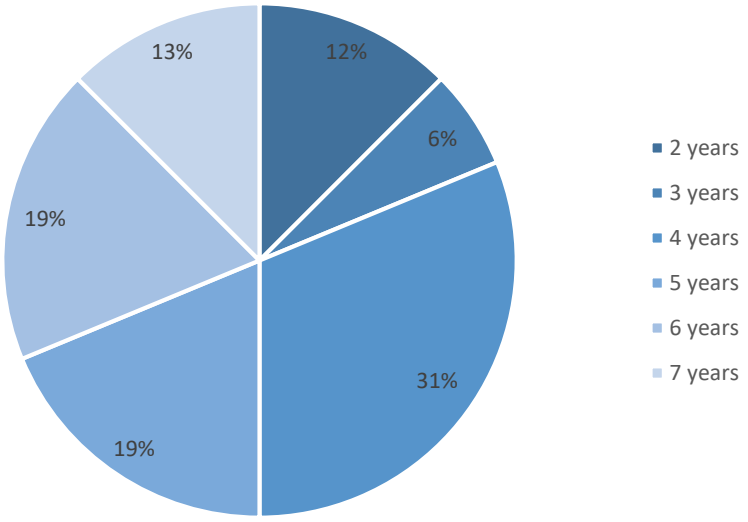


Figure 24 Age at time of filing of litigation

Obviously, time from litigation to IPO cannot be measured for the defendants in 2016 Litigation Data (since they have not IPO'd), but to summarize *Timing of Litigation*, it can be concluded that there is a significant difference in age between the defendants in 2016 Litigation Data (4.6 years old in average), illustrated in Figure 26, and the defendants in the IPO-set (8.3 years old in average). This likely depends on the fact that startups who IPO are more developed than those with no plans to IPO, as discussed in the first section of *Analysis.*

5.1.2 Relation between plaintiff and defendant

As elaborated on earlier, this thesis has focused on studying the potential power asymmetries that exist between plaintiff and defendant. Power can be measured in several dimensions, but this study has focused on revenue and size of patent portfolio.

As Graham and Sichelman (2010) concluded, patent litigation is costly, and small and young companies are often at a disadvantage if the litigating party, the plaintiff, is are financially stronger. There are several indicators of financial strength, and people might argue that a combination of several measures, such as a liquidity measure or credit rating score, might had been the best indicator of financial strength. For data availability reasons, however, this study uses revenue (at the time of litigation filing) as an indicator of financial strength, which in turn indicates a power position.

Furthermore, as Lanjouw and Schankerman (2004) concluded, the more patents a company have access to, the bigger are the chances of that company finding a patent that reads on something the plaintiff does in his business, which provides the company with leverage (i.e. ammunition for a countersuit). So, by having access to a bigger pool of patents, the company run a bigger chance of being able to settle, either by a quid pro quo IP-trading or by threatening to countersue. For this reason, this study uses patent portfolio size (number of patent families at the time of litigation filing) as a power indicator.

Relating this to the cases, to get a better grasp of how all cases where established operating companies litigate startups relate to the question of power asymmetries, Figure 27 and Figure 28 (presented in the coming sections) outlines the relationship between plaintiff and defendant in regards to revenue and patent portfolio size, first separately, and then combined. Each graph

illustrates four quadrants, supposed to divide the cases of each sample into four different categories. The aim is to distinguish the four following categories:

- Quadrant 1: Big vs. big
- Quadrant 2: Small vs. big
- Quadrant 3: Small vs. small
- Quadrant 4: Big vs. small

Furthermore, a reference line indicating a ratio of 1:1 has been inserted across the plotted area of the figures in order to get a visual comprehension of whether a power asymmetry exists, and if so, in what way (plaintiff bigger than defendant or vice versa). I.e. cases placed on the line are equally big, either in terms of revenue and patent portfolio size. Each case's distance from the 1:1 ratio line thus represents how big the power asymmetry is – the greater the distance, the bigger the asymmetry. Henceforth, the ratio line should be used as a complement to the quadrant categorization to determine what type of power asymmetry, if any, existed in the sampled cases.

The reasoning behind how the threshold separating big from small was defined is elaborated on in the *Method.*

5.1.2.1 Revenue relation

Figure 27 illustrates the revenue relation between plaintiffs and defendants in the 23 out of the 29 sampled cases where revenue data was available. The horizontal and vertical dividing line is set on $100M in revenue (at the time of suit) and separates big from small. The reasoning behind why $100M was chosen as the revenue threshold separating small from big was twofold. Firstly, since the authors wished to achieve categories where cases could be contrasted with each other, the $100M threshold created quadrants amongst which the cases were distributed rather evenly since it was relatively close to the average revenue value for the defendants. Furthermore, several secondary sources, such as articles found on Kauffman.org[31] seem to back the fact that $100M is some sort of "magic" line which only a small percentage out of all companies founded in the US reach.

Quadrant 4 and 3 contain seven cases each, while Quadrant 1 contains three cases, and Quadrant 2 six cases. In other words, the biggest blocks of cases are Q3 and Q4, which are the quadrants representing "small vs. small" and "big vs. small".

Revenue, in contrast to patent portfolio size, is probably a better indicator of a company's size, i.e. that there is a positive correlation between revenue and e.g. market cap and/or number of employees, which means that the description *small vs. small* and *big vs. small* is probably more accurate in the case of revenue compared to the case of patent portfolio.

[31] http://www.kauffman.org/newsroom/2013/06/number-of-us-companies-that-reach-100million-in-annual-revenues-remarkably-stable-over-past-20-years-according-to-kauffman-paper

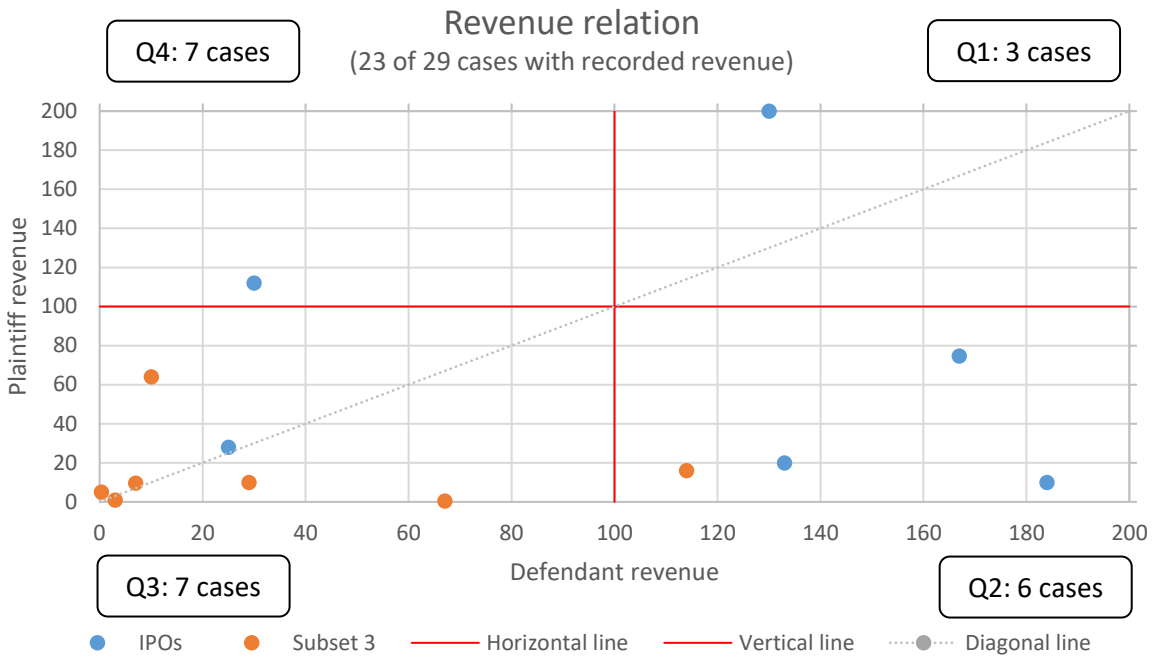


Figure 25 Revenue relation between defendant and plaintiff (some cases are outside the plotted area)

5.1.2.2 Patent portfolio size

Figure 28 illustrates the relation between plaintiffs and defendants in regards to their patent portfolio size (number of patent families at the time of suit). The horizontal and vertical dividing line is set on 15 patent families in revenue (at the time of suit), and separates big from small. The reasoning behind why 15 patent families were chosen as the threshold separating big from small is basically only grounded in the fact that that value was close to the average value, which made the distribution of cases across the different quadrants rather equal. The author's own experience and knowledge were then used to determine that the threshold was reasonable.

Quadrant 1 and 2 contain five cases each, while Quadrant 3 contains nine cases, and Quadrant 4 10 cases. In other words, the biggest block of cases is Q4, which is the quadrant representing "big on small", and accounts for more than a third of all cases. Comparing with the revenue relation, one can see that the proportion of big vs. small is bigger for patent relation.

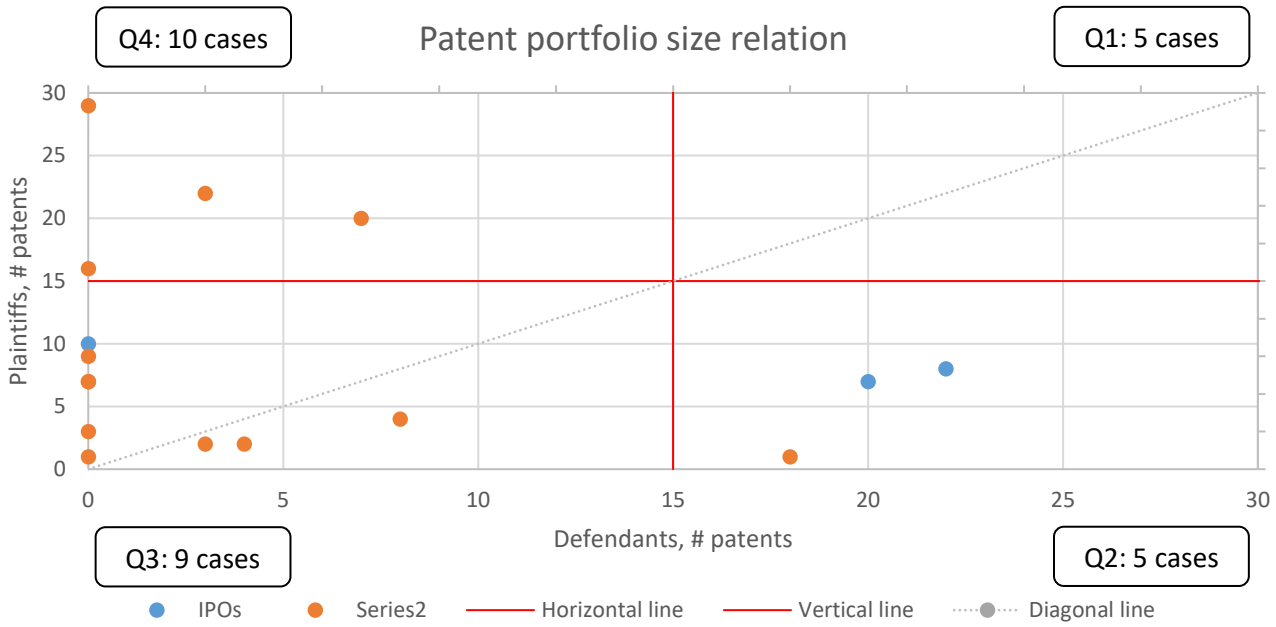


Figure 26 The relation of patent portfolio size between plaintiff and defendant (some cases are outside the plotted area)

5.1.2.3 Revenue and patents combined

Since patent data was available to a greater extent than revenue data, for this section keep in mind that there is a slight difference in sample size (29 compared to 23 cases).

Comparing the results for the relation analysis for revenue and patent portfolio size, we see that there is a greater number of cases with power asymmetries that work *against* the defendant/startup, i.e. big vs. small, in regards to patent portfolio size (10 cases) compared to the power asymmetries that regards revenue (7 cases). This might indicate that it is of greater importance for the defendant/startup to have a bigger patent portfolio than to be big in terms of revenue.

Furthermore, as illustrated in Figure 29, it shows that in 5 cases, the defendant is outnumbered *both* in terms of revenue and patent portfolio size. This, however, only makes out around a sixth, or 17%, of the total 29 cases, so it seems like it is more likely to be outnumbered in one of the two metrics, than in both. 7 out of 23, as for revenue, gives a probability of approximately 30% while 10 out of 29, as for patent portfolio size, gives a probability of approximately 34%.

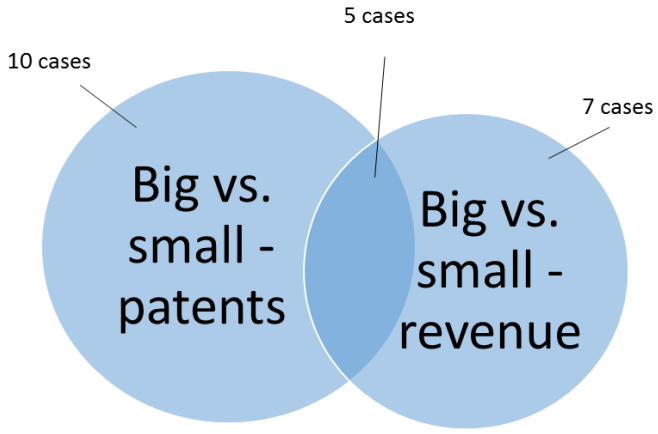


Figure 27 Venn-diagram showing the relationship between cases where it is big vs. small

5.2 MOTIVES OF PLAINTIFF

It does exist theory regarding motives of an operating company litigating its patents towards a startup, but it is not all encompassing. Therefore, the theory is contrasted with the empirical findings and analyzed in this section.

The different motives found in theory have been grouped into *Strategic motive* and *Financial motive*. The findings of potential motives are shown in Figure 30. In this figure, the suspected motives found in the two case studies are also indicated. The findings indicate one case where the plaintiff, Verizon Service Corp, has both strategic and financial motives. This results in a category called *mixed-motives* which is a combination of s*trategic* and f*inancial* motives.

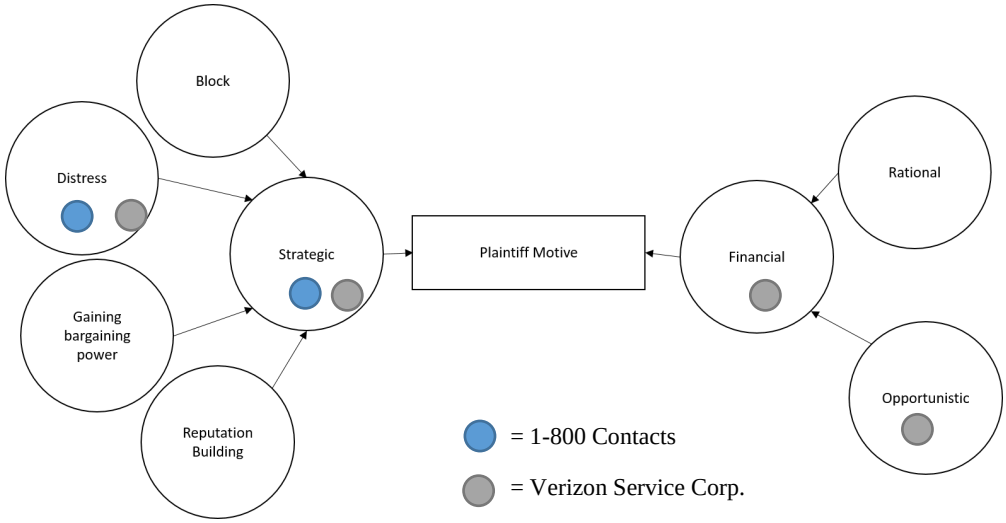


Figure 28 Potential plaintiff motives

5.2.1 Financial motives

A financial motive is when the main motive of the plaintiff is to extract financial resources from the defendant. This can occur either through *damages* or *settlement*, which is further discussed later, in *Post litigation*. In the case of Ditto Technologies, it is unlikely that 1-800 Contacts had a *financial motive*, since the financial resources of Ditto were relatively limited, and it could be argued that the cost for 1-800 Contacts to litigate Ditto is higher than the potential payoff. In

the case of Verizon vs. Vonage Holdings, it is likely that Verizon had, amongst others, a financial motive. This due to that Vonage had large financial resources and the domestic telecom division of Verizon had experienced reducing profitability leading up to the suit. Therefore, Verizon could both cause financial distress, putting Vonage at a competitive disadvantage, and at the same time gain financial resources through a settlement. That this is opportunistic and not rational is indicated by the patent in question being arguably weak and that Verizon chose to accept settlement at a late stage of the litigation process.

5.2.2 Strategic motives

A large part of the theory revolves around motives that can be grouped into s*trategic motives*. Through the analysis of the case studies, it is shown that the foremost strategic motive seems to be to impair the defendant by causing distress. This is indicated by the defendant/startup, in both cases, posing a competitive threat to the plaintiffs, but without there being any clear indications related to the other three strategic motives; to block, gain bargaining power or build a reputation. That there is an emphasis on strategic motives is strongly indicated in the case of 1-800 Contacts vs. Ditto since there is no substantial financial motive.

In the theory, a distinction has been made between the motivation of *blocking* a competitor (Galasso et al., 2013), the other strategic motives. In both studied cases, it seems that the motive of the plaintiff was not to block the defendants. This is indicated by both plaintiffs using questionable, and potentially unenforceable, patents as grounds for the litigation.

Reputation building can be a strong underlying motive for patent litigation (Lanjouw and Schankerman, 2001) since it could deter other actors from competing in the shared market (Agarwal et al., 2009). The authors have not found clear indications, in the case-studies, of that this has been an underlying motive for the plaintiffs. Nor has the authors found clear indications of that *gaining bargaining power* has been an underlying motive for the plaintiffs. Chien (2013) suggests that the motive of gaining bargaining power can act as an enabler of license or acquisition negotiations with the defendant. Neither in the case of Verizon Vs. Vonage- or 1-800 Contacts vs. Ditto, have the plaintiffs indicated that they intend to acquire the defendant or license their patents to the defendant.

The motive to create distress for a competitor with smaller resources by involving them in patent litigation has been discussed by Chien (2009). This motive is supported by Meurer (2003), who discusses the motive of a plaintiff trying to impair or exclude a defendant from the shared market. In both studied cases, this type of motive has been identified. This is shown by the substantial impact (discussed in *Impact* in the theoretical framework) it had on the company, together with that no other strategic motive has been identified.

Furthermore, rationale that supports that the actor's motive was to cause distress, is the state of *the entry barriers* and that the companies were competing in a *red ocean*. Both defendants were strong competitors of the plaintiffs. This creates an incentive for the plaintiffs to conduct actions that will impact the defendants negatively and thereby create an advantage for the plaintiff.

The impact of the knowledge economy on the nature of competition has resulted in that certain entry barriers, that had been substantial in the industrial economy, have had their importance reduced (see Section *1.1.5.2 Impact on competition (entry-barriers*)). This was the case in both case studies. In the telecommunication industry (in regards to Verizon vs. Vonage) it was not necessary for VoIP companies to own and maintain network infrastructure, which lowered the

Economics of Scale and *Capital requirements* barrier to entry. In regards to the other case, in the eyewear retailing industry, it was not necessary to have brick-and-mortar locations, salesforce, etc. which reduced the *Economics of Scale* and *Capital requirements* barrier to entry as well. The barrier *Cost Independent of Size* has gained importance in the knowledge economy. Within this barrier lies patents, which enabled litigation as a competitive strategy that could be used by the plaintiffs.

Companies are competing in a red ocean if they take market share from incumbents rather than creating new demand and not breaking the cost-value trade off (Kim and Mauborgne, 2005). Both cases fulfilled these criteria and are thus set in red oceans. For example, Vonage was taking market share from Verizon, which can be seen by the reduction of Verizon's customer base compared to the increase of customers Vonage experienced during the same period. Vonage also did not offer greater value, but rather the same value at a lower price. Another indication of that the defendants were active in red oceans was that both startups were sued within a couple of years of their foundation. This contrasts with when a company is active in a blue ocean, and competitors first become aware of the threat after 10-15 years (Kim and Mauborgne, 2005).

5.3 IMPACT ON DEFENDANT

The different impacts mentioned in the theory have been categorized into *Impact during litigation* and *Impact post litigation.* The two studied cases have been analyzed in accordance with the theory presented in *Impact of patent litigation on a startup*. The impacts found through analyzing the empirical findings is here combined with the potential impacts discussed in the theoretical framework, as is graphically presented in Figure 31. Both cases show that the litigation had a substantial impact on the defendants/startups, both during and after the litigation.

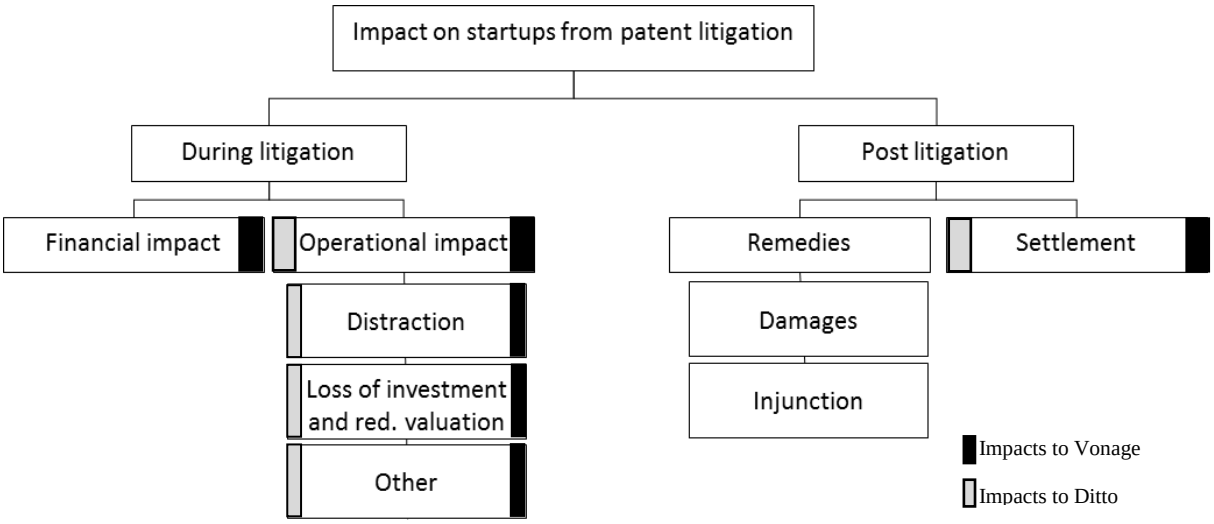


Figure 29 Illustrates different types of patent litigation impacts for startups being litigated against

5.3.1 During litigation

The impacts during litigation have been divided into *Financial impact* and *Operational impact*. The authors found that the financial impact was stronger in the case of Ditto compared to the case of Vonage. A likely explanation to this is that patent litigation has a disproportionally

larger impact on smaller companies compared to larger companies, as discussed in the theory. The operational impact was substantial in both cases but manifested itself in different ways.

5.3.1.1 Financial Impact

In section *2.2.1.4 Process cost* it is discussed that the direct cost of being involved in patent litigation can be substantial. During the active time of the lawsuit Ditto experienced substantial impact due to the consequences of being tied up in litigation. This is indicated by it having to redirect all marketing spend towards litigation cost. To further be able to fund the defense Ditto had to lay off four of its fourteen employees. Vonage in comparison did not experience an impact due to direct cost proportional to Dittos. This due to that Vonage at the time of suit was substantially larger than Ditto and could absorb the cost of litigation in a different way. This is supported in accordance with Feldmans (2014) observations, startups can relative to their size experience substantial direct cost due to patent litigation. The reason being that litigation cost seem to on average be contained within a certain interval (as discussed in *2.2.1.3 Cost*). This disproportional impact due to company size ought to be generalized to the impact from a direct suit in regards to a plaintiff as well. A large plant if compared to a small defendant ought to have a proportionally smaller impact due to the litigation both parties are involved in.

5.3.1.2 Operational Impact

Operational impact can be divided into the following three subcategories that are outlined below; *distraction, loss of investment and reduced valuation, and other.*

5.3.1.2.1 Distraction

Being involved in patent litigation requires time and resources, which can cause distractions amongst management and employees leading to a negative operational impact (Feldman 2014). To what extent the suit was distracting in the case of Vonage has been difficult to determine. In the case of Ditto, however, it seems to have been a large distraction from the ordinary business activities for everyone at the company. This is indicated by how the nature of the activates the company conducted changed when the company got litigated, an example of which was laying off employees. That the impact from litigation was bigger for Ditto, compared to the impact for Vonage, could indicate that the operational impact caused by distraction affects smaller companies more than larger ones.

5.3.1.2.2 Loss of investment and reduced valuation

The cases investigated in this study support the findings of previous research in regards to the financial impact a patent lawsuit has on a startup. A pending patent infringement lawsuit can cause a reduction of the startup's market value and increased difficulty with raising capital (Feldman, 2014; Chien, 2013). Ditto experienced both of these impacts and had to postpone its efforts to raise capital until after the litigation process was closed. Ditto also experienced that potential acquirers of the company lowered the valuation substantially due to the pending lawsuit. As discussed in the theory, not being able to raise capital when needed can lead to significant consequences in a critical face of a startup. It reduces the resources available to grow and drive the company forward. In the other case, Vonage had already IPO'd at the time of litigation, thus did not have plans to raise further capital. Vonage's stock price (i.e. their market value), however, dropped significantly during the lawsuit. The lawsuit was probably not the only factor causing this drop, but certainly a contributing one.

5.3.1.2.3 Other

Other operational impacts include e.g. preliminary injunctions, which was a concern for Vonage, but not Ditto, at one point but did not impact the company in the end. Operational impacts that are not mentioned in the theory, is the loss of customers that Vonage experienced.

5.3.2 Post-litigation

Potential impacts after the litigation can amongst others stem from remedies, damages, or the terms of the settlement. There was no *post litigation* impact on Ditto due to damages since the case seems to have been settled. Since settlement terms are rarely disclosed (Hovenkamp, 2017), the terms of the settlement have not been found by the authors. One impact that occurred post litigation was that Ditto had to give equity equal to one million dollars to IPNav in return for helping with the lawsuit. In the case of Vonage, the settlement terms were that Vonage had to pay Verizon $120M, which had a substantial impact on Vonage. This due to the settlement cost being approximately 25 percent of the total amount that Vonage raised in its IPO.

6 CONCLUSION

The purpose of this thesis is to understand the U.S. patent litigation landscape in regards to operating companies litigating startups. To fulfill the purpose, it was deconstructed into to three main research questions. The conclusions are presented in the regards to the three research questions.

6.1 WHAT ARE THE CHARACTERISTICS OF THE PATENT LITIGATION LANDSCAPE FOR OPERATING COMPANIES VS. STARTUPS?

This research question was answered in part, both in the empirical findings and in the conclusion. This due to the nature of the question being to characterize the landscape, i.e. find out what it consists of. Therefore, the empirical findings themselves answer the research question to a certain degree. For example, *what cases does the landscape consist of* and in *which jurisdictions are the suits filed* characterizes the landscape, and further analysis of those parameters would not add further value to the answer of the research question. Further analysis was conducted in areas where it contributed to the characterization. These areas were analysis of the *plaintiff*, the *defendant* and the *relationship* between these two actors.

In regards to the *defendants*, characterized as startups, several conclusions were made. First off, the defendants of the IPO-set were generally more mature and established at the point of litigation, indicated by larger financial and patent resources and a higher age. Secondly, very few defendants/startups, were *pre-revenue* (which was the case for both datasets) bearing in mind that revenue data was not found for a few defendants. Thirdly, several litigations took place in close time prior to the IPO, indicating that a financing event, such as a plan to IPO, could attract litigation.

The *plaintiffs* that the landscape consists of are difficult to generalize. This due to them having a large spread in characteristics, both in terms of revenue and patent portfolio size. One key finding in regards to plaintiffs, however, is that almost all plaintiffs (in both datasets) are active in the same industry as the defendant. This indicates that the plaintiffs are competitors and more likely to have strategic motives.

Furthermore, in regards to the relation between plaintiff and defendant, the observed power asymmetries in regards to revenue was equally distributed between plaintiffs and defendants. This means that it is as common for the plaintiff to have larger revenue than the defendant, as it is for the defendant to have larger revenue than the plaintiff. In the cases where power asymmetries exist in regards to patent portfolio size, it was much more common for a plaintiff to outnumber the defendant, than the other way around, putting the defendants at a disadvantage. Taking into consideration that it is more likely for plaintiffs to file a lawsuit when they have an advantage, this leads to the conclusion that a having a bigger patent portfolio is a stronger advantage than having larger financial resources. A reason for this could be that the disadvantage of having low financial resources exist up to a certain limit since litigation cost often is contained within a fixed interval and is not proportionate to the financial resources of a company.

6.2 WHAT ARE POSSIBLE MOTIVES FOR AN OPERATING COMPANY TO LITIGATE A STARTUP?

The second research question was answered through combining previous research with the observations of the cases studied. The main finding was that there are six potential motives for an operating company to litigate a startup. These individual motives can further be grouped into *Strategic* and *Financial Motive*, shown in Figure 32. A strategic motive is when a company has a motive that aims to fulfill a business objective actions and allocation of resources to reach this goal. This is different from financial motive, which is a motive for extracting financial resources from the defendant.

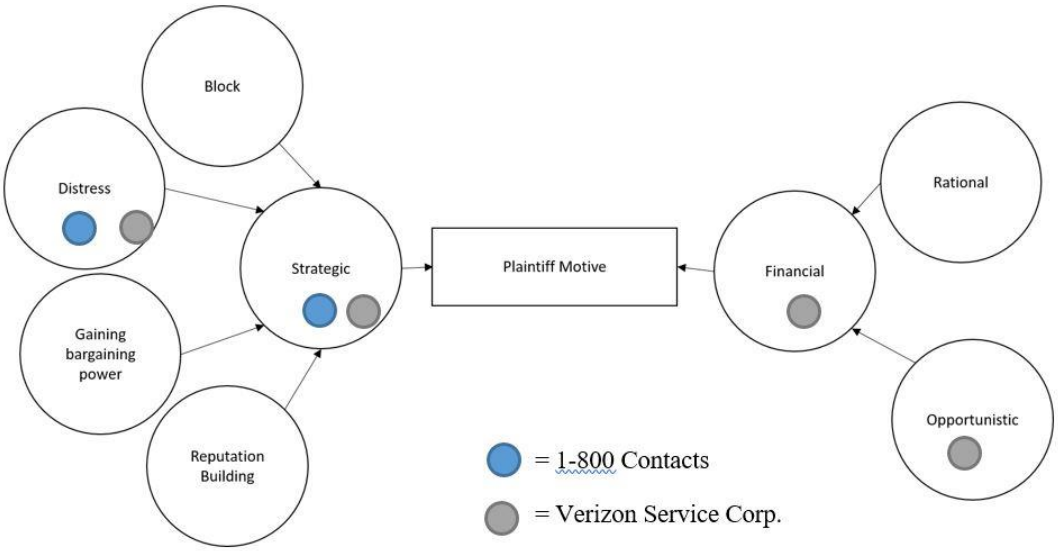


Figure 30 Outlines the potential motives of an operating company when litigating a startup.

The major finding from the case studies was that in both cases the plaintiffs motive was, at least partly, strategic. In both cases, their motives were to create distress for the defendants in order to handicap them in their capacity as a competitor on a shared market. A second finding was that the plaintiff in one case had *both* a strategic and financial motive, with the financial being a result of seeing a possibility to extract financial value and create, also, a *financial* disadvantage for the competitor.

6.3 WHAT IS THE POTENTIAL IMPACT OF PATENT LITIGATION BY AN OPERATING COMPANY ON A STARTUP?

Through a review of previous research, the study first explores different potential impacts of litigation on startups. This was then contrasted with the impact observed in two conducted case studies. The main finding here was that the impact can be divided into i*mpact during litigation* and *Impact post litigation*. These could further be broken down in accordance with Figure 33.

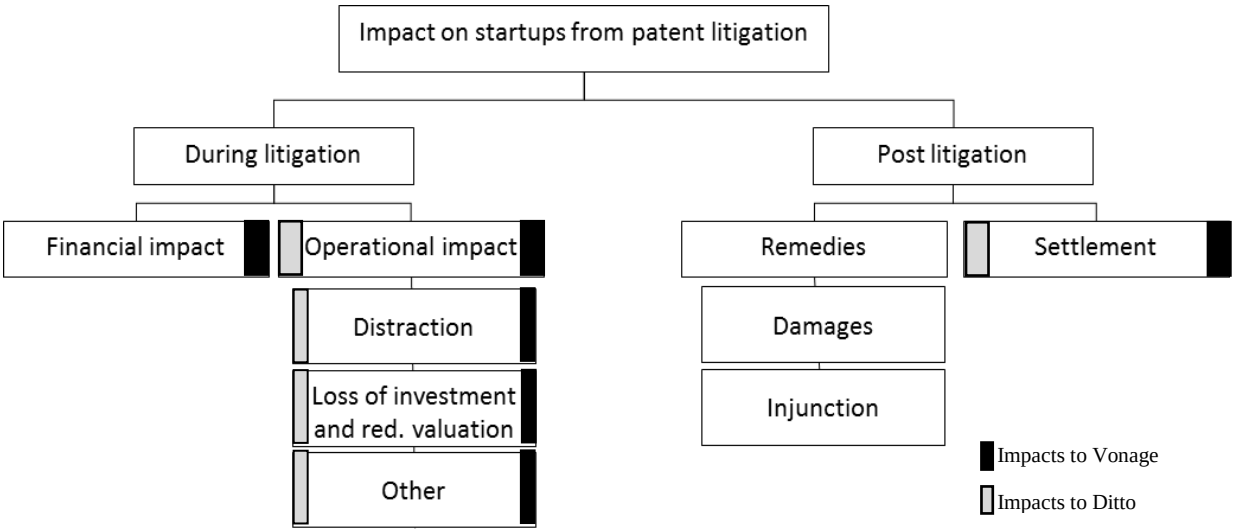


Figure 31 Potential impact from patent litigation on startups

The authors have observed that a startup is negatively impacted in multiple ways and the impact can be substantial, and potentially threaten the survival of the startup. Another conclusion in regards to the case studies, was that a smaller company is disproportionally impacted by the *direct costs* of litigation. This due to that the direct cost of being involved in patent litigation is, to a large degree, fixed within a certain interval. The impact caused by *direct cost* is, therefore, easier to bear if the startup has larger financial resources. A third conclusion is that the impact can occur independently of how valid the plaintiff's claim is. This is due to the nature of the U.S. Patent Litigating System and process.

7 BIBLIOGRAPHY

Agarwal, Rajshree, Martin Ganco, and Rosemarie H. Ziedonis. "Reputations For Toughness In Patent Enforcement: Implications For Knowledge Spillovers Via Inventor Mobility". *Strategic Management Journal* 30.13 (2009): 1349-1374. Web.

Alois, JD. "Vidangel Just Crowdfunded $10M Using Reg A+ & Now Court Orders Video Streaming Business To Shut Down - Crowdfund Insider". Crowdfund Insider. N.p., 2016. Web. 24 May 2017.

Anderson, JJ 2015, 'COURT COMPETITION FOR PATENT CASES', *University Of Pennsylvania Law Review*, 163, 3, pp. 631-698, Business Source Premier, EBSCO*host*, viewed 18 May 2017.

Barry, Chris et al. 2016 Patent Litigation Study. PwC Forensics, 2017. Web. 27 Apr. 2017.

Birnbaum-More, Philip H., Andrew R. Weiss, and Russell W. Wright. "How Do Rivals Compete: Strategy, Technology And Tactics". Research Policy 23.3 (1994): 249-265. Web.

Bryman, A. and Bell, E., 2015. Business research methods. Oxford University Press, USA.

Campell, Alex. "Hoosier'S Startup Ditto Fights For Its Life Against Surprising Foe: Wellpoint". Indianapolis Star. N.p., 2013. Web. 10 Apr. 2017.

Chandler, 1962, Strategy and Structures: Chapters in the History of the Industrial Enterprise, MIT Press, Cambridge, Mass

Chien, Colleen V., Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents (April 28, 2009). North Carolina Law Review, Vol. 87, 2009; Santa Clara Univ. Legal Studies Research Paper No. 09-13.

Chien, Colleen V., Patent Assertion and Startup Innovation (September 5, 2013). New America Foundation, Open Technology Institute White Paper, September 2013. Available at SSRN: https://ssrn.com/abstract=2321340

Christopher Cotropia, Jay P. Kesan & David L. Schwartz, 2012 Patent Holder and Litigation Dataset (last updated Oct. 28, 2013).

Chyi Lee, Ching, and Jie Yang. "Knowledge Value Chain". Journal of Management Development 19.9 (2000): 783-794. Web.

Council Of Economic Advisers, Issue Brief: The Patent Litigation Landscape: Recent Research And Developments (March 2016), available at: https://obamawhitehouse.archives.gov/sites/default/files/page/files/201603_patent_litigation_issue_brief_cea.pdf

Damages. *Casetext.com*. N.p., 2017. Web. 19 May 2017.

de Soto, H. (2000) The Mystery of Capital; Why capitalism triumphs in the West and fails everywhere else. New York: Basic Books.

Diana Heger & Alexandra K. Zaby (2017): Patent breadth as effective barrier to market entry, Economics of Innovation and New Technology.

Duryee, Tricia. "Ditto Raises $3 Million For 3-D Tech That Lets You Virtually Try On Before You Buy". AllThingsD. N.p., 2012. Web. 19 May 2017.

Feldman, Robin. "Patent Demands & Startup Companies: The View From The Venture Capital Community". *SSRN Electronic Journal* (2014): n. pag. Web. 18 May 2017

Fontinelle, Amy. "What Exactly Is A Startup?". Investopedia. N.p., 2017. Web. 5 Apr. 2017.

Forbes. Forbes.com/global2000/. N.p., 2017. Web. 19 Feb. 2017.

Galasso, Alberto, Mark Schankerman, and Carlos J. Serrano. "Trading And Enforcing Patent Rights". *The RAND Journal of Economics* 44.2 (2013): 275-312. Web.

Glasses.Com Releases 3Dfit Technology | 1-800 CONTACTS. 1-800 Contacts Connect. N.p., 2013. Web. 19 May 2017.

vision monday. 2013. *Glasses.com to Launch Proprietary 3D Virtual Try On App in May*. [ONLINE] Available at: http://www.visionmonday.com/article/glassescom-to-launch-proprietary-3d-virtual-try-on-app-in-may-40340/. [Accessed 17 May 2017].

Glasses.Com To Launch Proprietary 3D Virtual Try On App In May. Mobile.visionmonday.com. N.p., 2013. Web. 21 May 2017.

Goldstein, R. Divine D. A., 2015 Report of the Economic Survey. Arlington: American Intellectual Property Law Association, 2015. Print. 1.

Graham, S.J. and Sichelman, T.M., 2010. Patenting by entrepreneurs: an empirical study.

Granstrand, Ove. *Industrial Innovation Economics And Intellectual Property*. 1st ed. Göteborg: Svenska kulturkompaniet, 2010. Print.

Guangliang Zhang, Remedies for Patent Infringement: A Comparative Study of U.S. and Chinese Law, 1 J. Marshall Rev. Intell. Prop. L. 35 (2001)

Halt, Gerald B et al. *Intellectual Property And Financing Strategies For Technology Startups*. 1st ed. Cham: Springer, 2017. Print..

Heiden, B. (2016) Intellectual asset and property management in the business arena. Seminar. September 7th 2016.

Heiden, Bo, and Ulf Petrusson. "Theoretical Challenges, Practical Consequences". *IAM Magazine* (2007): 38. Print.

Hovenkamp, Erik N. "Predatory Patent Litigation". *SSRN Electronic Journal* n. pag. Web. 18 May 2017.

Jaffe, Adam B, and Manuel Trajtenberg. *Patents, Citations And Innovations*. 1st ed. Cambridge, Mass.: MIT, 2005. Print.

Japsen, Bruce. "Forbes Welcome". Forbes.com. N.p., 2017. Web. 16 Apr. 2017.

Kim, W. C., & Mauborgne, r. (2005). *Blue ocean strategy: how to create uncontested market space and make the competition irrelevant*. Boston, Mass, Harvard Business School Press.

Langinier, Corinne. "Are Patents Strategic Barriers To Entry?". *Journal of Economics and Business* 56.5 (2004): 349-361. Web.

Lanjouw, J. and Schankerman, M. (2001). Characteristics of Patent Litigation: A Window on Competition. *The RAND Journal of Economics*, 32(1), p.129. (Lanjouw and Schankerman, 2001)

Lanjouw, J.O. and Schankerman, M., 2004. Protecting intellectual property rights: are small firms handicapped?. The journal of law and economics, 47(1), pp.45-74.

Lanjouw, Jean, and Josh Lerner. "Tilting the Table? The Use of Preliminary Injunctions." *Journal of Law & Economics* 44, no. 2 (October 2001).

Lateef, I. A., and Marko R. Zoretic. "The U.S. Patent Litigation Process | December 2010". *Knobbe Martens Intellectual Property Law*. N.p., 2010. Web. 18 May 2017.

Lemus, J. and Temnyalov, E., 2015. Patent privateering, litigation, and R&D incentives.

Levin, M. (2011) Lärobok i immaterialrätt. Tionde upplagan. Vällingby: Nordstedts Juridik.

Lunden, Ingrid. "Ditto Picks Up $3 Million From August Capital, Others For Its Virtual, 3D Eyeglasses Sales Site". TechCrunch. N.p., 2012. Web. 19 Apr. 2017.

McGinn, Daniel. "Michael Porter'S Five (And A Half) Forces". Harvard Business Review. N.p., 2010. Web. 24 May 2017.

Michael J. Meurer, Controlling Opportunistic and Anti-Competitive Intellectual Property Litigation, 44 B.C.L. Rev. 509 (2003), http://lawdigitalcommons.bc.edu/bclr/vol44/iss2/7

Mintzberg, H., & Quinn, J. B. (1996). *The strategy process: concepts, contexts, cases*. London, Prentice-Hall International.

Petrusson, U. & Pamp, C. (2009) Intellectual property, innovation and openness | Intellectual Property Policy Reform, Fostering Innovation and Development, red. Arup, C., and van Caenegem, W. Intellectual property policy reform: fostering innovation and development. 154-171. Edward Elgar Publishing Limited, Cheltenham, UK.

Petrusson, U. (2004) Intellectual Property & Entrepreneurship; Creating Wealth in an Intellectual Value Chain. Center of Intellectual Property Studies, Chalmers University of Technology, Gothenburg, Sweden.

Phneah, Ellyne. "Patent Lawsuits Impact Companies Negatively | Zdnet". *ZDNet*. N.p., 2011. Web. 17 Apr. 2017.

Piekkari, R., Welch, C. and Paavilainen, E., 2009. The case study as disciplinary convention: Evidence from international business journals. Organizational research methods, 12(3), pp.567-589.

Porter, m. e. "strategy and the Internet." harvard business review 79, no. 3 (march 2001): 62–78

Porter, M. E. The Competitive Advantage: Creating and Sustaining Superior Performance. NY: Free Press, 1985.

Porter, Michael E. *Competitive Strategy*. 1st ed. New York: Free Press, 1998. Print.

Porter, Michael E., and Michael; ilustraciones Gibbs. "Strategy and the Internet." (2001): 63-78.

Powell, Walter W., and Kaisa Snellman. "The Knowledge Economy". *Annual Review of Sociology* 30.1 (2004): 199-220. Web. 17 Apr. 2017

Prinz, Kristie. Verizon V. Vonageandsprint V. Vonage: A Tale Of Two Patent Infringement Cases And Their Impact On The Voip Industry. 2017. Web. Sept. 2007.

PwC, 2011. “Roadmap for an IPO A guide to going public”

Sandberg, J. and Alvesson, M., 2011. Ways of constructing research questions: gap-spotting or problematization?. Organization, 18(1), pp.23-44.

Sanders, Lorraine. "Do These Glasses Make Your Clone Look Smarter?". Fast Company. N.p., 2012. Web. 16 Apr. 2017.

Shifley, Charles, and Joseph Berghammer. *Building & Enforcing IP Value*. 2017. Web. 15 May 2017.

Slind-Flor, Victoria. "Monsanto, Merck, Tata, Kraft: Intellectual Property". Bloomberg.com. N.p., 2013. Web. 5 Apr. 2017.

Statt, Nick. "Weaponizing The Patent System: A Tiny Startup Faces Financial Extinction - Readwrite". ReadWrite. N.p., 2013. Web. 10 May 2017.

Ted Sichelman, The Vonage Trilogy: A Case Study in "Patent Bullying", 90 Notre Dame L. Rev. 543 (2014).

Teece, D.J. (1998) "Capturing Value from Knowledge Assets: The New Economy, Markets for Know-How, and Intangible Assets", California Management Review, vol. 40, no. 3, pp. 55-79.

The Mercury News - Vonage To Pay $120 Million To Settle Verizon Patent Case. Mercurynews.com. N.p., 2007. Web. 24 May 2017

Towns, R. W. 2010, “U.S. Contingency feed – a level plaining field?”, WIPO Magazine (IP litigation costs), Februari, pp. 3-6. Towns 2010

(Voip Triples In 2005 -- Redmond Channel Partner. Redmond Channel Partner. N.p., 2017. Web. 28 Apr. 2017.)

Redmond Channel Partner. 2006. *Survey: VoIP Triples in 2005 -- Redmond Channel Partner*. [ONLINE] Available at: https://rcpmag.com/articles/2006/03/01/survey-voip-triples-in-2005.aspx. [Accessed 26 June 2017].

Verizon Communications, 2006. 2005 Annual report

Verizon Communications, 2004. 2003 Annual report

Vonage Barred From Using Verizon Patents. Phys.org. N.p., 2007. Web. 21 May 2017.

Wellpoint Annual Report. Corporate-ir.net. N.p., 2014. Web. 15 Apr. 2017.

Wilson, J., 2014. Essentials of business research: A guide to doing your research project. Sage.

WIRE, BUSINESS. "Wellpoint Enters Agreement To Divest Of 1-800 CONTACTS Subsidiary". Businesswire.com. N.p., 2014. Web. 8 Apr. 2017.

Yinug, Falan. "U.S. Semiconductor Companies Dominate List Of Top Patent Recipients". Blog.semiconductors.org. N.p., 2016. Web. 23 May 2017.

Yoon J. C., Goodrich W. S., 2016. IP *Litigation in United States* [PowerPoint presentation]. Stanford University

Zabeth, Ei, and P Offen-Brown. ""Convenient Forum" V. "Friendly Forum": Transfer Of Venue In Patent Litigation: Federal Courts. Transfer Of Venue. Forum-Shopping. Declaratory Judgment In Patent Litigation". *Stanford Law Review* 10.2 (1958): 367. Web.

8 APPENDIX

8.1 APPENDIX I – BACKGROUND DATA FOR EMPIRICAL FINDINGS

Case name	Filed date	Jurisdiction	Status	Only defendant?	Duration (in months)
Cases from IPO					
TeleSign Corporation v. Twilio, Inc.	4/30/2015	Central District of California	Open	Yes	22
NVE Corporation v. Everspin Technologies, Inc.	1/3/2012	District of Minnesota	Open	Yes	29
Ariba, Inc. v. Coupa Software Inc.	3/23/2012	Northern District of California	Closed	Yes	29
Cooper Notification Inc. v. Twitter Inc. et al	11/13/2009	District of Delaware	Open	No	32
Viasat, Inc. v. Acacia Communications, Inc. et al	2/19/2016	Southern District of California	Open	No	15
Vivint v. Alarm.com	6/2/2015	District of Utah	Open	Yes	23
iControl Networks, Inc. v. Alarm.com Incorporated et al	7/10/2013	Eastern District of Virginia	Closed	No	6
Open Text S.A. v. Box, Inc. et al	6/5/2013	Northern District of California	Closed	No	20
Valencell, Inc. v. Fitbit, Inc.	1/4/2016	Eastern District of North Carolina	Open	Yes	16
Aliphcom et al v. Fitbit, Inc.	6/10/2015	Northern District of California	Open	Yes	23
EMC Corporation et al v. Pure Storage Inc.	11/26/2013	District of Delaware	Open	Yes	28
Beacon Power, LLC v. SolarEdge Technologies, Inc. et al	1/9/2015	Western District of Texas	Closed	No	5
Callidus Software, Inc. v. Xactly Corporation et al	8/31/2012	Northern District of California	Closed	No	16

Case name	Filed date	Jurisdiction	Status	Only defendant?	Duration (in months)
Cases from 2016 Litigation Data					
WordLogic Corporation et al v. Fleksy, Inc.	12/29/2016	Northern District of Illinois	Open	Yes	4
BlackBerry Limited v. BLU Products, Inc.	08/16/2016	Southern District of Florida	Open	Yes	9
STRIKEFORCE TECHNOLOGIES, INC. v. DUO SECURITY INCORPORATED	06/20/2016	District of New Jersey	Open	Yes	11
S3G Technology LLC v. UniKey Technologies, Inc.	6/5/2016	Eastern District of Texas	Open	Yes	12
SCVNGR, Inc. d/b/a LevelUp v. DailyGobble, Inc. d/b/a Relevant	03/18/2016	District of Rhode Island	Open	Yes	14
InsideSales.com v. SalesLoft	4/8/2016	District of Utah	Open	Yes	9
Activision Publishing, Inc. v. xTV Networks, Ltd. et al	2/2/2016	Central District of California	Closed	No	6
Free Stream Media Corp. d/b/a Samba TV v. Alphonso Inc.	5/7/2016	Eastern District of Texas	Open	Yes	9
FatPipe, Inc. v. Viptela, Inc.	03/22/2016	District of Delaware	Open	Yes	14
Zeus Enterprise Ltd. v. Bounce Exchange, Inc.	04/29/2016	Southern District of New York	Closed	Yes	3
Timekeeping Systems, Inc. v. DwellingLive, Inc.	06/29/2016	Central District of California	Closed	Yes	2
CertiCable, Inc. v. Cleerline Technology Group, LLC	4/4/2016	Eastern District of New York	Closed	Yes	6
SOLARLARE COMMUNICATIONS, INC. v. EXABLAZE PTY LTD.	5/4/2016	District of New Jersey	Open	Yes	12
IPC Systems, Inc. v. Cloud9 Technologies LLC	06/16/2016	District of Delaware	Open	Yes	11
Media Bridge, LLC v. Eye Corp (USA) Inc.	03/18/2016	Western District of Texas	Closed	Yes	5
Weight Watchers International, Inc. v. Gossain Software, LLC et al	03/28/2016	Southern District of New York	Closed	No	7

8.2 APPENDIX II – TABLE OF THE CASES WHERE POWER ASYMMETRIES EXIST (BIG ON SMALL)

Big on small, patents:
Open Text S.A. v. Box, Inc. et al
EMC Corporation et al v. Pure Storage Inc.
Ariba, Inc. v. Coupa Software Inc.
Cooper Notification Inc. v. Twitter Inc. et al
BlackBerry Limited v. BLU Products, Inc.
SCVNGR, Inc. d/b/a LevelUp v. DailyGobble, Inc. d/b/a Relevant
InsideSales.com v. SalesLoft
Free Stream Media Corp. d/b/a Samba TV v. Alphonso Inc.
SOLARLARE COMMUNICATIONS, INC. v. EXABLAZE PTY LTD.
IPC Systems, Inc. v. Cloud9 Technologies LLC
Big on small, revenue:
Open Text S.A. v. Box, Inc. et al
EMC Corporation et al v. Pure Storage Inc.
Callidus Software, Inc. v. Xactly Corporation et al
Ariba, Inc. v. Coupa Software Inc.
Cooper Notification Inc. v. Twitter Inc. et al
Activision Publishing, Inc. v. xTV Networks, Ltd. et al
IPC Systems, Inc. v. Cloud9 Technologies LLC
Big on small, both for revenue and patents:
Open Text S.A. v. Box, Inc. et al
EMC Corporation et al v. Pure Storage Inc.
Ariba, Inc. v. Coupa Software Inc.
Cooper Notification Inc. v. Twitter Inc. et al
IPC Systems, Inc. v. Cloud9 Technologies LLC

8.3 APPENDIX III – INDUSTRY ANALYSIS FOR 2016 LITIGATION DATA

plaintiff	defendant	plaintiff industry	defendant industry	Same industry?
WordLogic Corporation	Fleksy, Inc.	Application software	Content sharing platform	Yes
BlackBerry Limited	BLU Products Inc.	Telecommunications	Consumer Mobile Devices	Yes
STRIKEFORCE TECHNOLOGIES, INC.	DUO SECURITY INCORPORATED	identification protection software	Cyber Security	Yes
S3G Technology LLC	UniKey Technologies, Inc.	N/A	Smart locks	No
SCVNGR, Inc. d/b/a LevelUp	DailyGobble, Inc. d/b/a Relevant	mobile payment platform	Dining loyalty program	No
InsideSales.com	SalesLoft	Sales Acceleration Platform	Internet software	Yes
Activision Publishing, Inc.	xTV Networks, Ltd.	Game development	Movies and entertainment	No
Free Stream Media Corp. d/b/a Samba TV	Alphonso Inc.	TV Software	Mobile TV solutions	Yes
FatPipe, Inc.	Viptela, Inc.	IT services	Networking equipment	Yes
Zeus Enterprise Ltd.	Bounce Exchange, Inc.	N/A	Digital advertising	No
Timekeeping Systems, Inc.	DwellingLive, Inc.	Guard Patrol Supply Manufacturing	Home electronics / software	Yes
CertiCable, Inc.	Cleerline Technology Group, LLC	Cable manufacturing	Electronic Installations Services	Yes
SOLARFLARE COMMUNICATIONS, INC.	EXABLAZE PTY LTD.	Telecommunications	Network hardware	Yes
IPC Systems, Inc.	Cloud9 Technologies LLC	Trading communication systems	Online Business Support Services	Yes
Media Bridge, LLC	Eye Corp (USA) Inc.	Online marketing	Advertising and marketing	Yes
Weight Watchers International, Inc.	Gossain Software, LLC	Consumer products	N/A	No