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Pohlmann, Tim and Opitz, Marieke

Technical University Berlin, Cerna, Centre d'économie industrielle.  
MINES ParisTech

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# Typology of the Patent Troll Business

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## **Tim Pohlmann**

Cerna, Centre d'économie industrielle. MINES ParisTech, 60 Boulevard Saint Michel, 75272 Paris Cedex 06 – France, Tel. : 33 (1) 40 51 90 00 E-Mail: [tim.pohlmann@mines-paristech.fr](mailto:tim.pohlmann@mines-paristech.fr) and Berlin University of Technology, Chair of Innovation Economics, D-10623 Berlin Germany, Müller-Breslau-Straße 15, VWS 2, Tel: +49 (0) 30 314 76624, E-Mail: [tim.pohlmann@tu-berlin.de](mailto:tim.pohlmann@tu-berlin.de).

## **Marieke Opitz**

University of Marburg, Department of Technology and Innovation Management, [opitz@wiwi.uni-marburg.de](mailto:opitz@wiwi.uni-marburg.de).

### **Abstract:**

Patent trolls have many faces, since the media uses this expression in various ways. The patent troll phenomenon thus seems to be an ambiguous term that is discussed in several directions. This paper reveals that a patent troll as such has no distinct shape or appearance. Our analysis redeems a troll classification solely from firms' market position, such as being non-practicing, and shows that a patent troll business can only be defined by the respective practice to enforce IPR. Using 10 case studies, of which five are treated in detail, the analysis reveals a distinct typology of IPR enforcement mechanisms and suggests a framework to assess the troll business. This paper is furthermore able to identify the nature of troll behavior to be: a) a best practice to enforce IP rights in terms of innovation activities and b) a strategy that may create costs for affected industries. The differentiated troll analysis reveals negative but also positive effects of the troll business on incentives to innovate.

## 1. Introduction

Technological change and market pace have drastically increased during the past decades. This can especially be observed in the field of ICT (Information and Communication Technologies) where product lifecycles have been decreasing and technology develops to be more complex (Blind and Gauch, 2008). Simultaneously firms increasingly file patents as a key strategic mean to compete in ICT markets (Bessen and Meurer, 2008). This development is a challenge for the patent systems and the growing lack of transparency creates legal uncertainty for numerous firms. During the past years statistics have shown a strong concentration of patent files which in some technological fields even yields patent thickets, a web of overlapping patents that protect similar innovations (Shapiro, 2001). ICT technologies are often subject to a fragmented ownership of intellectual property. This allows firms to peruse new strategies to generate revenue from IPR. In this context popular litigation cases have revealed a special bargaining position for NPEs (non-practicing entities) to enforce their rights (Merges, 2009). Two manufacturers which infringe each other's patents often settle and negotiate cross licensing agreements. However, an entity that does not produce or sell products and thus not infringes patented technologies and will not cross license (Lemley, 2007). NPEs new way of enforcing IPR has brought up the rather negative term of "patent troll".

A patent troll is a person or entity who acquires ownership of a patent without the intention of actually using it to produce a product and in many cases did not engage in developing the technology (McDonough, 2006; Ohly, 2008). In most cases trolls are not inventors who pursue their own research, offer it for sale or provide early licenses. They rather defend their rights against infringements. These entities – opportunistically or on purpose – profit from payments by companies that inadvertently infringe on the trolls' intellectual property rights (Henkel and Reitzig, 2008). There is the fear that these in most

cases small entities use courts as a mechanism to extract economic rents from large companies (Ball and Kesan, 2009; Bessen et. al, 2011). The term: “patent troll” is legally not established. It is a negative synonym used for non-manufacturing entities (NPE) and was popularized by the Intel Manager Peter Detkin in 2001, who used the term to describe TechSearch and their lawyers during a patent litigation case. Other related expressions are patent marketer, patent dealer, and patent shark or are pictured by a comparison like David vs. Goliath (Chien, 2009; Niro and Greenspoon, 2007). However, several literature sources criticize these negative associations and demand for a more specific classification of patent trolls (Geradin et al., 2011). This article sheds light on patent troll practices and establishes a typology of the patent troll business.

Most contributions in the literature stereotype the troll business to certain characteristics: being non-practicing or strategically wait and hide to receive higher royalties. This article analyzes and evaluates ten use cases to reveal new insights on characteristics of patent trolls that go beyond broad classifications. In our approach we establish a typology of IPR enforcement mechanisms. We systematically select ten use cases that illustrate different facets of IPR enforcement connected to troll behavior and identify types of practices. We then more precisely delimit troll strategies from other IPR enforcement mechanism and assess whether the troll business can be beneficial or harmful for manufacturers, innovators and industries. Due to our precise analysis of patent troll strategies we are able to stipulate troll behavior and its effects. On the one hand we find evidence that trolls’ practices can be adverse for whole industries and slow down innovation processes. On the other hand however, we reveal that in some cases the troll business constitutes a mechanism to disrupt unbalanced market constellations and thus supports innovation. We claim that the assessment of patent troll activities and its impacts are often subject to complex licensing agreements or competitive market rivalry and have to be evaluated in more detail. Our 10 use cases provide new insights on patent troll activities to better understand and assess the role of patent trolls in

technology markets.

The paper is structured as follows: we first give a review of the literature and reveal implications on trolls' business models. We secondly analyze contributions from the current research and derive our research questions. In our empirical analysis we present our methodology and describe five in-depth case studies to frame our typology. We scale five further cases to our typology and end the paper in a conclusion to deduce our policy recommendations and discuss practical implications.

## **2. The Business Model: Patent Troll**

The troll business seems to follow a defined structure: evaluate, purchase and secure patents, hide until the market for a certain technology develops and the patents become economically indispensable and finally turn patents against manufacturers to obtain high royalty fees (Steiner and Guth, 2005). Trolls are usually solely interested in the exclusion right, not in the underlying knowledge (Fischer and Henkel, 2009). Patent trolls appear when the targeted product has already become a key or basic technology and irreversible investments have been made by the unaware infringer. In this lock-in situation firms are often not able to invent around or even stop using the technology. From an infringer's perspective the cost of not using the patented technology are (a) costs of the loss of future profits and (b) cost of investing in alternative technologies. These costs increase along phases of technology implementation. In most cases, affected companies already infringed the IPR when the troll raises its claims. Trolls avoid the established rationales of understanding firms' patent based cooperation of either exclusion or cross-licensing to co-exist (Henkel and Reitzig, 2008). Hence, they seem to be in a position to negotiate licensing fees that are grossly out of alignment with their contribution to the alleged infringer's product or service. Troll's special bargaining power tends to result in opportunistic behavior so that the troll claims excessive compensation (Sag and Rohde, 2006). However, the troll business is also attached to many

risks. When patent trolls acquire patents from auctions, firm bankruptcy cases or small private inventors, the value and validity of these patents is not always obvious. It is thus difficult to foresee whether a patent would hold in a court decision or not. Especially in the USA litigation cases are expensive for all involved parties. Losing such cases yields significant financial losses (Bessen et. al, 2011). The market for patents is thus subject to unpredictable outcomes. Especially in ICT industries where patents are often closely related to multiple products, it is often unclear to which extent patent claims are infringed or not (Bessen and Meurer, 2008).

Today's patent trolls seem to place their bets on corporate carelessness or monitoring deficiency i.e. to perform a patent search and have better information at an earlier stage about patents likely to be issued. In industries where patenting is difficult to oversee, it is in some cases more cost-efficient for manufacturers to not pursue patent searches and try to stay under the radar (Luman and Dodson, 2006). However, with multiple overlapping patents, and in a system in which patent applications are secret and patents slow to issue there is a major threat of hold-up problems for manufacturing companies (Shapiro, 2001).

In the context of standardization, strategic patent behavior has also led to contentions. The litigation case of Rambus, the company that was firstly associated with the so called "patent ambush" behavior, raised the attention of antitrust authorities and reinforced the political discussion about IP regulations concerning standards (Tansey et al. 2005; Hovenkamp, 2008; Bessen and Levinson, 2009; Devlin, 2009). Patent ambush accrues when companies that participate in a standardization process withhold information of essential IPR and in hindsight assert that their patents are infringed.

Patent extortion will remain a viable strategy in technologically crowded industries when trolls choose patents on inventions that can be invented around rather easily before infringement, but are sufficiently sophisticated to be upheld in court and create significant mid-term switching costs for manufacturers after infringement (Henkel and Reitzig, 2007).

There also has been a discussion in the U.S. media if universities are patent trolls. Universities are non-practicing-entities that share some characteristics with trolls (McDonough, 2006). Though, the differences are, that (a) the universities do not hide their patents and (b) most universities offer fair license agreements to provide valuable know-how and increase technology transfer (Lemley, 2007).

### **3. Literature on Patent Trolls**

The troll business has been studied in several articles (Magliocca, 2007; Golden, 2007; Lemley, 2007) but provided little empirical evidence on troll type behavior (Lerner, 2006; Reitzig et al., 2010). However, empirical evidence has revealed various troll cases and its sustainability to policy changes (Reitzig et al. 2007; Henkel and Reitzig, 2007, Reitzig et al. 2010). Data on patent troll practices is often scarce since most infringement cases involving patent trolls do not reach court. The infringer rather settles the dispute by paying royalty fees, being afraid of high legal costs and lengthy litigation (Fischer and Henkel, 2009). Reitzig et al. (2007) pick up on the patent troll phenomenon and examine it from a theoretical perspective, encompassing legal, managerial, and economic aspects. The main finding is that the unrealistic high compensation through court ruling is the central stipulation for trolls to operate cost-efficient. Nevertheless, first empirical analyses have revealed that the increase in litigation cases was not necessarily caused by NPEs (Bessen and Meurer, 2008). Chien (2009) gives evidence that NPEs only caused a minority of patent suits: 17 percent of high-tech patent suits in the examined period. However, they often name multiple defendants and sometimes, rather than sue, are sued, for declaratory judgment. Furthermore financial losses of involved parties in these patent suits were significantly high and thus constituted major cases of patent infringement (Bessen et al., 2011). A key finding in the study of PricewaterhouseCoopers is that damage awards for patent trolls are in average twice as high

as those for practicing entities. Nevertheless, NPEs have only been successful in 29 percent of the cases versus 41 percent for practicing entities (Levko et al., 2009). Fischer and Henkel (2009) investigate a dataset of 565 patents acquired by known patent trolls between 1997 and 2007, and compared them to 1,130 patents acquired by practicing firms. They disprove the common belief that patent trolls focus only on minor technologies. Trolls' patents are of significantly higher quality than those in the control groups. This finding provides evidence that the patent troll business method is sustainable in the long run and cannot be terminated by lifting minimum patent quality (Fischer and Henkel, 2009). Reitzig et al. (2010) further find evidence for a transition of the troll business. Patent trolls that acquire or in-license patents decrease, while the number of trolls becoming professional patent exploiters increases. The patent database of infringement litigation information from the Stanford Law School's Intellectual Property Litigation Clearinghouse (IPLC) was evaluated in the article of Shrestha (2010). The analysis tests some of the arguments made in favor and against patent trolls and determines whether these firms have a positive or negative effect on innovation. However the study does not reveal a conclusive result. Patent trolls may contribute to legal uncertainty for innovating manufacturers since unforeseeable royalty payments are often multiple of what the victim, as a legitimate licensee, would have been willing to pay ex-ante (Reitzig et al., 2007). A basic problem is the asymmetric information between trolls and unintentional infringers; companies often do not even know the troll's IP exists. For the last decades R&D multinationals have been building up patent thickets of often rather incremental inventions. However these means of protection itself contributes to the non-transparency of the patent system. It is a challenge to overlook the overlapping thicket of patent rights requiring that those seeking to commercialize new technology obtain licenses from multiple patentees (Shapiro, 2001).

While some empirical findings have shown that also single inventors who sell their patents do not necessarily benefit from patent trolls (Tucker, 2011; Bessen et al., 2011), NPEs



and their supporters claim that patent trolls enhance innovation and competition by providing capital to independent inventors and creating an efficient market for technology (Geradin et al, 2011). A well-functioning patent system relies on a working system of IPR enforcement. From the perspective of small inventors patent filing is no mean to protect products from infringement when the enforcement of rights is financially too risky. In many cases enforcement of patents is only applicable when firms have access to a considerable amount of financial resources. Markets for patents are thus a solution to sell rights or license rights of enforcement to third parties with higher financial capabilities (Rubin, 2007, Schmalensee, 2009; Shrestha, 2010, Tarantino, 2010). Policy makers have given remarkable regard to this topic (e.g. U.S. Federal Trade Commission, 2003; Lemley, 2007) and discuss suggestions for patent reforms based on legal implications and empirical findings.

Current literature contributions are yet far from conclusive in consistently defining patent troll strategies and in estimating potential threads or benefits that accrue from patent trolls' practices. Arguments in the literature are often two minded and there is a lack of articles that consider and compare different perspectives of manufacturing companies, single inventors and NPEs. Furthermore, empirical analyses have only focused on outcomes of patent troll litigation cases without sufficiently investigating a counterfactual scenario or analyzing cases that have not reached courts (Levko et al., 2009; Chien, 2009; Bessen et al., 2011). Comparing litigation cases or enforcement practices of manufacturers and non-manufacturers is not sufficient to measure the effects of patent troll practices. In addition complex market structures have to be analyzed in more detail, especially when considering a dense web of patents and licensing agreements among multiple entities. In this article we therefore seek to shed light on different IPR enforcement practices to more precisely delimit patent troll strategies from other business models. We therefore question:

1. Which IPR enforcement strategies define the patent troll business and delimit trolls' behavior from other IPR enforcement practices?

In regard to current literature findings on possible impacts of patent trolls we seek to investigate in more detail how troll behavior has influenced other market participants. We also seek to analyze patent troll cases that have not reached courts yet. Our goal is to compare and analyze different market structures and enforcement practices of troll cases to answer the following research question:

2. Which troll practices determine positive or negative impacts in regard to financial losses, incentives to innovate and a level playing field for market participants?

#### **4. Methodology**

We use a qualitative data analysis approach since our research goal is to understand underlying relationships of current theory and quantitative literature findings (Mintzberg, 1979). The case study research design was chosen to obtain a detailed picture of patent troll behavior. Qualitative case studies are a favorable approach to explore patterns of specific processes (Creswell 1994; Stake 1995). In order to precisely study distinct mechanisms of a troll's strategy to enforce IPR we chose 10 cases from the public media but also from non-public interviews to illustrate a comprehensive picture of the troll phenomenon. Eisenhardt (1989) suggests 10 cases to be an adequate number for a research setting while less than four cases are often unconvincing and more than 10 cases increase complexity. We systematically added cases as long as the incremental improvement of information was high enough to answer our research question.

Even though we seek to identify yet not analyzed troll specific strategies, the choice of cases was done in regard to theory based descriptions of troll behavior. To investigate

transparent and observable strategies of patent trolls, we chose cases that present extreme situations and polar types of troll practices. Furthermore we chose cases from different industries with involved firms of different size and market share. We use this heterogenic population of cases to better answer our research question and to be able generalize our findings. As to Eisenhardt (1989) a heterogenic research sample of use cases is beneficial if specific processes are analyzed and the research seeks to account for extraneous variation.

In order to reveal insights from different perspectives on patent trolls, in-depth analysis of five selected cases was conducted by interviewing multiple involved parties. The choice and performance of interviews, recording methods such as alignment and analysis followed an interpretative case study approach (Walsham, 1993). Interviews were held by a team of two investigators where one interviewer was responsible for the questions and one was taking notes. This enables the interviewer to focus on the questions while the second investigator remains to have an observing and rather distant view (Eisenhardt and Bourgeois, 1988). We followed a multiple investigator approach to gain complementary insights. Different perspectives increase the likelihood of novel insights and convergence of observations from multiple interviewers enhances the confidence in the findings (Yin, 2009).

All 15 interviews were transcribed and the use of information was permitted by all participants. Since all cases are very specific and allow implications in several directions, a standard questionnaire was used but extended on a case by case basis. In order to take advantage of the uniqueness of each case it is legitimate to add or change questions in theory building research. This enhances the understanding of individual cases and allows investigation in as much depth as feasible (Eisenhardt, 1989; Yin, 2009). If it was not possible to talk to both sides (plaintiff and defendant) other concerned parties were interviewed. For instance we discussed with non-involved attorneys and experts about possible implications of cases that were public in the media. Thus, all cases build upon comprehensive sources of information (table1).

Table 1. Cases and interviews used in our analysis

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Insert Table 1 about here

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Using techniques and analyzing methods by Miles and Huberman (1994) we were able to compare, relate and classify different statements and expert estimates. We were thus able to identify distinct patterns and themes to conduct the following case reports (Stake, 1995).

## **5. Case Study Analysis**

The commercialization and enforcement of patents is a rather complex issue which, as one could observe over the last years, can be practiced in many ways. Patent owners who are trying to enforce their claims face several alternatives. Not every commercialization of patents, even by companies without innovating or manufacturing activities, is an example for typical patent-troll behavior. There is a clear need to differentiate between various ways of how patent owners proceed. Our five in-depth case studies outline popular strategies and business activities of patent commercializing companies.

### **5.1 Case Study: Papst Licensing GmbH & Co. KG**

The first case describes the company Papst Licensing GmbH & Co. KG. Papst Licensing is a globally operating patent licensing company which has dealt with property rights since 1993 and has since signed up more than 130 licensing agreements. The licensees include companies such as Sony, IBM, Toshiba and many other big players. There are no outside investors involved yet. The firm is specialized on the sectors of electrical engineering and precision engineering. These industries are very suitable because products in these markets often use a variety of patented technologies. Papst Licensing describes its activities as the detection of patent infringement and thereby usually follows a common practice. The company has about

15 employees, including patent attorneys, lawyers, engineers and economists. On the one hand the company searches for patent auctions in insolvency registers or the press. On the other hand it also approaches medium-sized companies that want to enforce their rights. Papst Licensing represents mostly German companies that operate internationally and which patents have already been infringed.

In a first step Papst Licensing validates the legal characteristics of the patent. The patent has to be registered in a formally correct way and must not already belong to the so called state of the art.<sup>1</sup> Afterwards, potentially infringing products are decomposed into components and tested in technical laboratories. Technical analysis is done by engineers; patent attorneys afterwards ascertain a possible patent infringement. In an economic evaluation procedure products are later examined for their market potential and the technology for its potential degree of standardization. Papst Licensing refers to this as “infringement volume”. Papst Licensing works with external service providers, especially with patent law offices and market analysts in the respective countries.

After this thorough assessment Papst Licensing buys the patents to have a stronger bargaining position in court. Papst Licensing takes over the risk of commercialization; although the original patent holder receives a cash sum that consists of fixed and variable components. Papst especially targets companies that are active in the US, due to larger markets and hence a higher infringement volume. After asking infringing firms for royalty payments, they are pressured with injunctions. About 10- 20% of all cases are taken to court. The high court costs and the extent of triple damages in US courts are effective means of to obtain out of court settlements.

In the following we describe the case of Papst Licensing versus Minebea Co. Ltd in more detail. Minebea is a Japanese manufacturer of miniature ball bearings, which for

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<sup>1</sup> In some cases patents are filed and accepted by patent office even though non detected prior documents exist. Especially in the field of ICT most court decisions that drop the claims of infringed patents are due to existing prior art (Bessen and Meurer, 2008).

instance can be found in CPU fans. The company has been active in this field since 1968. It operates globally with more than 49,000 employees and has its own large R&D department. Last year it generated sales of 2.1 billion USD. Prior to the dispute with Minebea, Papst Licensing had sued several major manufacturers, including IBM and Western Digital, for patent infringement on computer hard drives. Western Digital, for example, has paid Papst Licensing 24 million USD for a license; the sum total of the licenses is estimated to range over 100 million USD. In response, Minebea, which serves these manufacturers as supplier of motors, sued Papst Licensing for violation and abuse of license agreements. Through Papst Licensing's longtime experience in patent evaluation and enforcement in U.S. courts, the U.S. District Court in Washington dismissed the action of Minebea after ten years of hearings in 2006. During trials in the US, Minebea was advocated by Welsh & Katz Ltd. law firm. Minebea had to drop the claims of 500 million USD and had to pay Papst Licensing a compensation of 5 million Euros.

Papst Licensing interprets this as a lawful confirmation of both its business model and its licensing programs.

## **5.2 Case Study: Alliacense (TPL group)**

The next case study describes the US company Alliacense which accused German end-producers in the electronic and electrical industry of patent infringement, mainly members of the ZVEI (Central Association of Electrical and Electronic Manufacturers Germany). Alliacense is a wholly owned subsidiary of the TPL Group, which has been active in developing, marketing and licensing intellectual property rights since 1988. The TPL Group also includes the manufacturing company IntellaSys, which was founded in 2005 and develops and produces processor solutions. It is believed that the manufacturing subsidiary company was founded to counter accusations of the TPL Group being a patent troll.

Alliacense holds four IP portfolios and is responsible for the management of the license rights. The portfolios include technologies from the vast field of electronics. The patents are usually acquired through purchase or merger of the companies that have invented the technology. In the case known to us, Alliacense has used the mmp-portfolio which is one out of the four portfolios. The patents protect fundamental design techniques for improved performance of microprocessors that are used in products of many industries such as mobile phones, home appliances and cars. The mmp-portfolio includes seven U.S. patents as well as their German and Japanese equivalents, which are valid until 2015.

The accused German companies are small and large system manufacturers which install microprocessors into their devices. So far, Alliacense asked only those companies, which distributed their products on the American market to pay royalties. Alliacense specifically targets end-producers on downstream markets and not the microprocessor manufacturers directly. It proceeds cross-industry against infringers and communicates clearly that companies which are the first to pay a license, get significant discounts compared to their competitors. The procedure of Alliacense can be illustrated by using a simplified sketch of a possible value chain (figure 1).

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Insert Figure 1 about here

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Figure 1. Troll strategy to enforce IPR in the value chain.

The potential patent troll, in this case Alliacense, does not address the component manufacturer, whose microprocessors infringe the patent, but the system manufacturer (OEM), which implements these processors in its devices. The reason why Alliacense chooses this strategy could firstly be due to the fact that higher license fee payments can be demanded from an OEM because the processor is installed in a product of higher quality. In contrast, the

built-in microprocessor itself usually has a smaller value. Alliacense also uses the potential pressure from retailers and customers, since OEMs are bound to deliver their products to a downstream market. If, due to patent infringements, OEMs are not able to supply, retailers may threaten them with terminating existing contracts.

Following a strategy by offering lower royalties to first-movers, Alliacense is able to build up considerable pressure between competing market participants. Similar to a prisoner's dilemma cooperation – i.e. everyone not paying license fees – would be the best strategy for all patent infringing competitors. However due to risk aversion, pressure from retailers and strong incentives to be the first and get favorable licensing terms, one company might choose to free-ride to firstly apply for a license. In consequence, others are also urged to enter license agreements, especially if the first-mover is an influential company. This way Alliacense benefits from additional market pressures between competing potential licensees.

Alliacense's patents are of high quality and grounded on patent law. However, in some cases the scope of the patent claim does not affect the technology of the accused company. Since potential infringers are under great pressure, the license is in many cases paid without further analyses of patent claims. These reactions are subject to the conflicting interests of departments within a company. Given an infringement charge, the legal department usually considers more time to carefully check whether there are legal ways to bring down the patent or whether the patent is actually infringing by the company's technology. A company's sales division however fears the pressure of customers and is therefore interested in a quick solution by means of a payment.

If the OEM does not agree to royalty claims, Alliacense usually sues these companies in court. Some German companies are currently involved in litigation in the US. Affected OEMs often try to make the component manufacturer recede. Thus, on the one hand transaction costs accrue for the OEM. On the other hand, some microprocessor manufacturers have already passed over to withdrawing guarantees on their products being free of third party



rights. Based on these observations it can be shown that for enforcing its IPR, Alliacense opportunistically makes use of market pressures and competition among competing infringers.

It is expected that Alliacense will also accuse OEMs on the German market. In a message from 02.02.2009, the German Patent Court in Munich confirmed the validity of a patent from the MMP portfolio. This suggests that Alliacense is planning to increase its presence on the German and European market.

### **5.3 Case Study: IP Com**

The next case study describes the Munich-based company IP Com, which describes itself as a patent management company.

IP Com GmbH & Co KG was founded in 2007 and currently has 10 employees. They are highly skilled economists, engineers and legal academics. The company works with more than 10 outsourced firms and employs several engineers and research agencies to conduct detailed market and company inquiries. Funding source is the US investment company Fortress, which currently maintains 34 billion USD. It acts as a general partner in the GmbH & Co KG.

The business model of the company focuses on two groups of customers that IP Com can serve due to their particular market position. The activities of the company are limited to the management of patents; implementation or research is not part of the business model. A future goal is to serve the customer group of small innovative inventors and entrepreneurs. Due to the lack of financial resources and experience, these SME cannot enforce patented innovations. The big players in the market normally innovate in-house and show little interest in small inventors. IP Com is trying to fill this gap and communicate promising innovations to manufacturing companies. In this case, licensees would be enlisted which have not yet infringed the relevant patent. The customer group of small inventors is not yet served and it remains open whether this will be taken into account in the future business model. The second

group of customers are large manufacturing companies, which are vertically integrated and often possess unused patent portfolios. Some big companies cannot use their patents as a result of specific market dependencies. Vertically integrated players often conduct so called silent cross-licensing agreements, where IPR among other manufacturers is mutually used without paying royalties. Due to powerful market positions of large companies, these market-sharing strategies are not necessarily equally balanced. Being a non-innovating and non-producing company, IP Com buys these unlicensed patents in order to enforce them profitably. Since IP Com is not active in the market, it is not vulnerable to attack or blackmail by them with market power. The ownership transfer of patents from vertically integrated companies to IP Com enables IP Com to take advantage of this independent market position.

In 2007, IP Com purchased a patent portfolio of the Bosch GmbH for an unknown amount. The portfolio has over 1,000 patents in the mobile communication area. One fourth of these patents are essential to standardized wireless technologies like GSM, GPRS or UMTS. These patents are essential to widely adopted standards in the industry and are used by almost all market participants in the mobile communication sector. The patents are all registered in Europe and 50% of them in the most relevant markets such as in the US, Japan, China and Korea. Bosch developed this patent portfolio between 1983 and 2000 and was, in these early stages of mobile technology, seen as a pioneer in the field. Bosch was involved in the development of transmission standards and has participated in many standardization committees. For the development of these innovations Bosch spent an estimated 8 billion EUR. Bosch was only active in the mobile industry until 2000 and then sold its mobile sector to the Siemens AG. Bosch retained the patent portfolio, since it was difficult to assess patents on their economic benefits at this time and Siemens could not make an acceptable offer. Because Bosch had turned away from the mobile communication industry, it tried to exploit the unused patents and requested licenses. Nokia had uses many of the innovations concerned. Bosch however was not able to get Nokia to pay license fees. Nokia threatened Bosch with

counter lawsuits, and even with the reversal of computer chip orders. For Bosch, Nokia is an important customer and thus, Bosch had no economically lucrative way to enforce their patents. In 2007 it was decided to sell the portfolio, but Nokia was not interested in buying it at that time. It is believed that Nokia expected a sell to another market participant. During that time Nokia held a market share of around 40% and was by far the strongest player in the market. This market power could have helped Nokia not pay any licenses, like with Bosch. The purchase by IP Com was a surprise to Nokia.

Since the acquisition of the patent portfolio, IP Com is enforcing these patents worldwide. The procedure follows a very professional strategy. In a first step, the patents are legally examined with the help of the attorney office Frohwitter Munich. The second step is an economic assessment. About 35 out of 160 patent families could be identified as essential patents to communication standards. Therefore the whole market volume in the telecommunication sector reflects the value of these patents. Violation of the remaining patents is determined by using engineer consultants. The relevant mobile devices are set apart and examined very carefully in their individual components. The second phase is technical negotiation with the infringing companies. IP Com meets worldwide with the engineers of the companies to technically introduce the patents. All information about the patents in question is disclosed so that the affected companies have an accurate picture of the scope, duration or even counter-patents. Usually, the technical negotiations do not exceed three to five meetings. From this point on commercial negotiation begins. IP Com conducts previous thorough research in order to reveal all business activities of the respective company. This is done by so-called research offices, mandated by IP Com, which claim to be reading up to 160 analysts' reports per week. The main focus is to identify the future strategy of the infringing companies and thus observe their activities in each country accurately. Therefore, relevant markets are constantly monitored, to be able to enforce license payments effectively. If the

commercial negotiations are not successful IP Com has to assert its intellectual property rights by legal action. Probably the best known litigation case in the media is Nokia versus IP Com.

After the purchase of the patent portfolio, IP Com tried to agree on a royalty payment with Nokia. However, Nokia was not willing to pay and IP Com had to enforce its patent rights. It is particularly interesting that for the first time the amount of the royalty was negotiated in court. Courts often only decide on the patent infringement. For cost reasons, the license amount is usually negotiated out of court. The case with Nokia is currently being heard at the patent courts in Mannheim and Dusseldorf. For determining the amount of the license right, there are two methods of calculation. Firstly, IP Com can present a report prepared by Nokia themselves, by which one can calculate licenses due to the importance of the patents for the whole product. This report was commissioned by Nokia in an earlier case where Nokia was the plaintiff. This report states that one can demand 1-1.5% revenue share per essential patent. The calculation flattens towards the top, because of the cumulative license. As to the report for 4-5 infringed essential patents one can demand a revenue share of approximately 4-5%. In the Nokia case one can thus calculate an amount of 12 billion EUR. But Nokia did not agree with its own calculation model and pleaded for distortion of competition. Secondly, the two patent courts will determine a FRAND<sup>2</sup> (Fair, Reasonable and Non-Discriminating) license. This form of royalty calculation is used particularly in industries and sectors with technology standards that are used by all market participants. A license determination can thus be uniformly established for essential patents on standards. "Fair" is to ensure that the license does not support competitive dominance of a market participant. "Reasonable" is aimed at a proportionate license, which especially considers the importance of the patent for the whole product. "Non-Discriminatory" stands for equal treatment of each

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<sup>2</sup> As a member of the European Telecommunications Standards Institute ("ETSI"), Bosch took part in the GSM and UMTS (WCDMA) standard setting processes and therefore granted irrevocable licenses under FRAND conditions. IP Com confirmed to the EU Commission to take over Bosch's previous commitment to grant irrevocable licenses on FRAND terms.

licensee. However, especially the term reasonable is criticized to be a rather vague definition (Rysman and Simcoe, 2007).

The lawsuit will still be running for at least one or two years until an accurate determination of the license is complete. It costs several million USD per month. With a positive court decision, IP Com expects other infringing companies to accept the amount of a FRAND license too.

#### **5.4 Case Study: Sisvel S.p.A.**

Sisvel S.p.A. is an Italian based company that started as a manufacturer of televisions in 1982 and has dealt with IPR since 1986. Sisvel also acts as a patent pool administrator e.g. for the MPEG audio patent pool and is currently planning a patent pool for LTE technologies. Sisvel focuses on the entertainment industry and holds a portfolio of almost 500 patents. Major clients including firms like Phillips, Apple or Creative Labs, have outsourced their patent commercialization activities to Sisvel. The firm became famous for pushing the claims on a patent on a volume bar in TV sets, which visually increases according to the sound volume.

Since several years, Sisvel manages patents protecting MP3- and MPEG4-technologies for companies such as France TeleCom, Telediffusion De France, Philips Electronics and the Institut für Rundfunktechnik (IRT). The following case shows how Sisvel proceeds to enforce and effectively license those patents. The case study particularly stresses the strategies used to commercialize patents and shows how licensees are being coerced to immediate release high royalty payments.

Just a few days prior to the CeBIT 2008 fair in Hanover, Sisvel S.p.A. sent requests for license payments to more than 40 exhibitors. Requests were up to a three-digit-million USD range and could therefore not be incurred immediately. Since IPR infringement is a crime in Germany, Sisvel was able to sue nearly 40 electronics manufacturers and their COEs. As a consequence, more than 200 constables confiscated products like MP3-players, DVD-

players with MP3 function, GPS devices and mobile phones at the CeBIT in 2008. The accused firms are large manufacturers like Sagem or Hyundai. Several of the affected firms are from Asian countries. In the course of this incident the respective firms were termed as product pirates in the media, which, especially due to their Asian origin, damaged their image rigorously. Moreover, the prosecution not only accused the corporate body but also the responsible executives, since infringement is also a crime in German civil law.

According to German law, firstly the patent infringement has to be ascertained and in a second step the license fees are set. The infringing firms were aware of the validity of the patents because of earlier paid royalties and the disclosure of the IPR portfolios of Sisvel. Thus, the trial was not even started, since the situation seemed to be clear. Due to public pressure and the accusation by the prosecutor of Lower Saxony, it came to a swift out of court settlement which committed the offending companies to pay licensing fees. Patent infringement claims are usually not held in civil courts. The strategy of suing executives personally for up to 5 years imprisonment has to be examined with regard to the proportionality of the situation. Although the violation of property rights is a crime, the civil prosecution has yet not investigated patent infringement claims. Accusing the violating companies at the time of the Hanover exhibition resulted in two important strategic advantages for Sisvel. First, it is very difficult to get an injunction in Asia and court procedures are lengthy and complicated. The location advantage of Germany and the legal context are important foundations for the effective enforcement of property rights. Secondly, another advantage is the use of the press as a pressurizing medium. The CeBIT is the largest IT fair in the world and the seizure of the stands imposed public pressure on the respective firms. The affected companies operate globally and have their own large R&D departments. The public accusation of being product pirates is therefore strongly damaging the firm's image. Starting a trial in a civil court and using the public pressure during the CeBIT created a strong negotiating position for Sisvel. They were thus able to force the infringing companies

to pay licensing fees in a very effective and quick manner. Sivel's activities to enforce their rights can be classified as so called "forum shopping", a strategy of litigants that choose a court in a most preferable country or district.

## **5.5 Case Study: EpicRealm**

The next case deals with the American based company EpicRealm Licensing which is a medium-sized company that can be considered as being a pioneer in dynamic content delivery for web pages. This technology was one of the first to permit up-to-the-second content delivery.

In the years of 1996 and 1999 the U.S. Patent and Trademark Office (USPTO) granted two website patents filed by EpicRealm. The protected technology was a program code for the dynamic construction of web pages that was used by almost all companies that provided websites that can produce custom responses to individual visitors or users. In the beginning of 2005 EpicRealm sued more than a dozen online players, including matchmaking sites such as eHarmony.com and Friendfinder.com, day-planner specialist FranklinCovey, weight-loss drug company Herbalife, and automobile-glass repair company SafeLite. All of these companies can be considered as being rather small, since EpicRealm feared attacking big players at first. But the SafeLite case had a surprising dimension, as Safelite is an "Oracle e-Business Suite" customer. Oracle is a much bigger target, one with larger financial resources. The "Oracle e-Business Suite" is used in conjunction with the delivery of dynamic web pages. EpicRealm did not accuse Oracle in the first place, but attacked its customers that used the technology without paying royalties. Oracle was not only under pressure because they were infringing a patent, but they were accused by their own customers. This created pressure, especially when taking into account Oracle's reputation and customer relationship. Oracle had to face reduced credibility, a damage that may cause immeasurable costs. The suits were filed in the U.S.

District Court of the Eastern District of Texas, which has a reputation for being friendlier towards patent holders.

EpicRealm's aggressive assertion caused substantial public harm by threatening the way in which most useful aspects of the web were provided to the public. PUBPAT, a legal group whose directors include free and open-source software advocates, heard about this case and tried to challenge these patents. In 2006 PUBPAT filed a request to the USPTO, which argued that the PTO was not aware of existing prior art technology when it granted the two patents to EpicRealm in 1996 and 1999. PUBPAT found that IBM also applied for a patent in 1995 that covers a method of fulfilling requests of a web browser. In the end the PTO granted the request made by PUBPAT and reviewed the two patents held by EpicRealm. In theory, the re-examination process should have taken several months, but in reality it often takes years. Oracle feared losing customers during the time the case was not solved and might decide to pay the patent license right away next time since the costs of fighting trolls are not only monetary.

## **6. Typology: IPR enforcing companies**

After reviewing different patent troll cases our goal is to compare the identified patent enforcement practices to theory implications. Eisenhart (1989) suggests that results of case study research should be compared to the framework of current theory. One approach is building evidence that defines and describes a research construct. Our literature review of the patent troll business has revealed three main characteristics that possibly qualify an entity to be a patent troll. First, the entity has not invented the technology, secondly it has no intention to practice the patent a thirdly the enforced patent was trivial. We make use of this rather broad classification and construct a matrix that defines the three different IPR enforcement strategies. In the lines, the classification distinguishes between combinations of innovating / non-innovating and producing / non-producing; based on the activities of the patent owner



concerning only the patent of observation. The characteristic “producing” implies the implementation of the technology or the intention to do so in the future. The characteristic “innovating” stands for the conduction of research and development with regard to the patented technology. In the columns of our matrix we distinguish between the use of trivial and non-trivial patents. We condense two appearances that would qualify a patent to be trivial. Firstly we understand a trivial patent to be of trivial technological input and which should have never been accepted by the regarded patent office, e.g. when prior art exists. Secondly we also consider a patent to be trivial in a case were the patent might be of sufficient quality but where patent claims do not affect the infringers technology in question. We believe that a classification only needs to take into account companies’ activities concerning the respective patent of observation. Other patents of the firms’ patent portfolio might be connected to manufacturing or other licensing strategies and are not taken into account. We thus assume that a manufacturer who owns a patent but has no intention of producing it and therefore might even operate in a different market, has a comparable position to non-practicing entities.

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Insert Figure 2 about here

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Figure 2. Typology of IPR enforcing companies.

Attributes in italics reflect the motivation and reason for the company to enforce their IPR:

The **technology-blocker** tries to defend its technologies from imitation. The manufacturing and innovating company’s main goal is to protect its market share and block its competitors. In most cases these companies would probably prohibit the use of the protected technology. However, in some cases, when the technology is essential to a standardized technology, the

company has to declare the patent to be licensed und FRAND<sup>3</sup> terms. Examples for these companies are usually medium-sized or big companies such as IBM, Siemens, Nokia or Motorola or small companies that operate in niche markets.

The **trivial technology-blocker** owns IPR on technologies which are already state of the art and therefore do not contain a new technological step. Such trivial patents are enforced in order to gain market share or protect entire markets. Since trivial patents may cover a wide range of constructive technologies, whole industries can be blocked or forced to pay royalty fees.

In practice, there are several case examples of companies that tried to enforce trivial patents. The following cases are briefly presented in order to illustrate this type of IPR enforcement. The first case concerns the company Amazon.Com Inc., which filed the so-called "1-Click" patent in 1999 at the USPTO. This patent protects the function of storing customer information, for repeated on-line purchase. The direct competitor Barnesandnobel.Com LLC used the same technique of customer data storage for the web based purchase of books. Amazon moved for an injunction to omit the usage of the "1-Click" technology. In parallel the USPTO initiated a repeated evaluation of the patent but still grants it as valid. The European Patent Office in contrast reviewed the patent and rejected it in 2007.

Another case discusses the American telecommunications giant AT&T which received a patent in 1994 for a billing systems that can be used in voice mail messages. The patent protects the function to differentiate between long-distance and short-distance calls and thereupon adjusting the billing system. The competing company Excel Communications used the same accounting technique and was therefore sued for an injunction. However, the District Court of Della Ware identified the patent as being invalid.

The **patent-enforcer** does not want to produce the innovated technology, but still economically enforce its IPR to compensate for efforts and investments in innovation. These

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<sup>3</sup> Fair, Reasonable and Non-Discriminatory

companies usually sell or license their IPR. A blocking strategy is usually not pursued since these non-practicing entities do not operate in downstream markets. Exemplary companies are Qualcomm or Inter Digital. Individual inventors can also be classified as patent-enforcers. These inventors have in most cases not the capacities to produce the invention themselves. Thus inventors need to cooperate with manufacturing companies. Multinational firms in most cases only have internal research and development departments and do not accept external contributions. In the case of the “HIPPO” invention, a team of University researchers invented a clinical horse to cure back pain. They filed a PCT patent application PCT/DE97/00255 in 1997 but failed to find sufficient investors to produce their invention. In 2007 Panasonic launched the “Core Trainer” a product that apparently made use of the HIPPO technologies. HIPPO then pursued efforts to enforce their IPR (Ann, 2009).

Another case is about MercExchange, a company that tried to enforce a patent covering the “Buy it now” function of eBay in 2003. MercExchange did not practice the patented invention itself, but the Virginia jury trial adjudged eBay to willfully infringe the patent. In the following verdict the District Court however denied an injunction. In 2006 the Supreme Court of the United States determined that an injunction cannot automatically be issued when the infringement is proved. The outcome was especially addressed to non-practicing entities and thus drastically decreased the leverage potential of an injunction to enforce IPR of non-practitioners (Diessel, 2007).

**Trivial patent-enforcer** are in most cases small innovative companies or individuals. The inventions are not current state of the art and do not contain a new technological step. In other cases the IPR does not sufficiently affect the technology of the infringer. Nevertheless, granted patents can be enforced under the cloak of innovative technologies. The aim is mainly to receive royalties using the pressure of injunction. As the patents are not legally valid, judicial processes are usually avoided. The licensees are in most cases not aware of the patent quality, or simply not able to afford litigation financially.

A good example is the EpicRealm case which was discussed before. Another case is about NTP a one man company that became famous by suing RIM. However, the intended injunction on a technology that would have omitted the use of all Blackberry smart phones in North America was not approved by the court. In later cases NTP also sued Palm for infringement, but patents were re-examined by the PTO and identified as being prior art.

The **patent-implementer** uses the technology for its products without pursuing the effort of invention. For this purpose, companies can either purchase a license or buy the patent. Widely adopted technological standards such as GSM, UMTS, MPEG or the IEEE 802 standards are protected by thousands of patents belonging to a various number of patent owners (Pohlmann and Blind, 2011). Most innovative products build upon these standards and therefore even highly innovative firms may pay licenses to others.

The **trivial patent-implementer** is a company that buys trivial patents or pays royalties to trivial patent owners. These companies are not aware of the missing quality of these patents, or are simply not in the financial position to fight in litigation cases. In some cases the plaintiff's patents do not even affect the technology of the accused infringer. Affected companies lack of knowhow and financial resources to prove these claims. It is in most cases cheaper and especially less risky to "blindly" pay royalty fees.

## **7. Typology: The patent troll business**

Graph 2 illustrates the typology of IPR enforcing companies. Since we need to pay special attention to non-manufacturing and non-innovating firms we classify them in a sub typology of patent trolls (figure 3). We are thus able to differentiate cases where the licensee has formerly infringed or is initially buying a license and we furthermore distinguish between extortive and fair, reasonable and non-discriminatory IPR enforcement. The latter categories are differentiated by the leverage potential of the licensor. We study our cases and derive characteristics such as asymmetric information, legal uncertainty, high court fees and time

pressure due to media attention, pressure from downstream markets and retailers and pressure from competitors. Our case studies show that the pursued approaches to enforce IPR may differ among the patents of one company. We therefore categorize the different enforcing activities of one firm to several classifications in our typology.

We learned from the case studies, that even though the so called “patent trolls” are all non-manufacturing and non-innovating, activities in enforcing their IPR differ from case to case. In our analysis we precisely value and categorize the troll’s activities to show that a) the troll business can be a best practice to enforce IPR in terms of innovation activities and b) troll activities may cause excessive royalties or excessive litigation costs.

We firstly differentiate two types of licensees, one that has already infringed and one that can choose to buy a license. The latter case of a **license supplier** has yet been discussed very sparsely in literature and there is little knowledge about how reasonable such situations are in practice. Learning from our five cases, we can at least conclude that IP Com and Papst Licensing pursue businesses where they offer and license innovative IPR to manufacturers ex ante.

Especially in the context of standard setting, we have evidence that trolls can extort companies to pay royalties even though they have not infringed the patent yet (**license extortionist**). When technological standards are widely adopted, companies have to implement this technology in order to ensure interoperability among other products or applications. However, most standard bodies or standard consortia use F/RAND licensing terms, which is a binding commitment for essential patent holders to license under fair, reasonable and non-discriminating terms (Rysman and Simcoe, 2007; Salant, 2007).

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Insert Figure 3 about here

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Figure 3. Typology of patent trolls.

Most troll definitions not only characterize a troll by being non-innovative and non-practicing, but also link the troll behavior to a wait and see tactic. Thereby the troll hides until the patented technology is implemented or even standardized and then appears to claim royalties (Henkel and Reitzig, 2007). Nevertheless, the use cases of IP Com and Sisvel show that in many cases these patents are known by all market participants and are in practice since several years. These patents are often essential to technological standards and therefore licensed under F/RAND conditions. In our typology we classify companies that practice ex post IPR enforcement of known patents as **royalty claimants**.

Certain market constellation may prevent IPR enforcement by patent owning companies or individuals (Bosch, SMEs in the Papst case, SMEs in the Alliacense case) since they possess no means to exert pressure on infringers. The use cases of Papst Licenses, Alliacense, IP Com and Sisvel have shown that the patent troll business can be a best practice to enforce IPR in terms of innovation activities and burst uneven market constellations. In some cases initial inventors and IPR owners have offered to license or even sell their patents to infringing manufacturing companies. However, they were either too small or too dependent, e.g. a supplier that relies on the manufacturer's orders, to enforce their IPR. In future investment decisions these IPR owners may expect lower revenues from patent rights due to a lack of leverage potential. This may decrease incentives to innovate and prevent a socially optimal level of innovation activities (Diessel, 2007). Patent trolls who buy these patents may thus increase the value of IPR and stimulate incentives for innovators. Even though firms have no means of enforcing their own IPR, selling these patents to trolls would be a mechanism to generate returns from earlier investments.

Situations where the infringer does not even know about the patent in question and where trolls strategically hide their IPR are different. The Alliacense and Papst cases also show that these companies serve or even acquire SMEs and enforce their IPR ex post

technology adoption to demand higher fees. The Sisvel and EpicRealm cases further reveal specific strategies how patent trolls are able to use public media and infringers fear of bad reputation to extort excessive royalties. Especially the cases of Sisvel and PapstLicensing revealed a common practice called “forum shopping”, where the plaintiff strategically chooses a certain court in a certain country or district that might allow a more favorable judgment. The Alliacense case illustrated tactics such as first mover pricing discounts or suits on OEMs to increase the pressure and boost royalty amounts for infringers. This behavior classifies the companies of our cases as **excessive royalty extortionists**.

## **8. Conclusion**

The phenomenon of patent trolls is often considered as being overrated, but has still caused significant litigation cases and therefore drawn the attention of economic research. However, we believe that most troll cases are not public and the fear of being accused of infringement might influence firms’ innovation activities. This paper is the first to provide evidence of specific patent troll strategies and methods to enforce IPR. We are able to precisely exemplify a patent trolls approach to identify infringement, conduct technological tests, estimate the market share and then pursue optimal enforcement tactics. We thus find evidence for a new professional business model that might still incorporate risks (Bessen and Meurer, 2008), but minimizes the failure margin by a diverse set of enforcement strategies.

As to our typology we believe all trivial patent cases to have negative effects on technology markets and the optimal level of R&D investment. Therefore we urge patent authorities not only to increase the quality of patent files but also to more precisely delimit broad patent claims. We show that patents of good quality may also harm affected companies who are not aware that their technologies do not infringe the accused claims. These information asymmetries especially apply for small and medium size companies, which lack of financial resources to screen the patent landscape. These cases are often not public and

small companies have no means and lobby to push this topic. USA based SMEs are able to apply court fee reduction to decrease legal costs. We support these regulations to balance legal power among firms and further suggest efforts to increase transparency and ensure legal certainty.

Our use cases show that good quality patents which are verifiably infringed should in most cases be enforced to sustain incentives to innovate. However, we especially pay attention to patent holders which are non-producing and non-innovating and further differentiate four categories. We reject the common believe that these firms by default decrease incentives to invest in innovation even though they are not innovative themselves. When comparing our use cases to our typology we find evidence that depending on the timing of enforcement and the leverage potential of the plaintiff, only one category of non-producers and non-innovators may cause negative effects on the innovation system. We call these firms excessive royalty extortionists, since they extort licenses due to their leverage potential. This leads to excessive royalty fees or lengthy litigation. However, we show that firms which offer their IPR ex ante to be licensed or even disclose IPR ex post but do not exploit their market position, might increase incentives to innovate. IPR owners who are not able to enforce their IPR can sell their patents to new interconnected markets, for instance the patent trolls. This allows enforcement by non-practitioners where royalty rates are only dependent on the patent quality and claims, but independent from other market dependencies. The analysis of our five use cases and the typology of patent trolls can be used to answer both of our research questions. We believe that our case study provides evidence that the patent troll business is able to break open unbalanced market constellations. A patent troll is not vertically integrated and not active on product markets and therefore has a certain bargaining position. Patent owning companies are in some cases either too small or too dependent on other market participants to enforce their IPR. We conclude that the patent troll business can be a best practice to enforce IPR. In line with the literature we find that the existence of non-practicing-



entities in competing technology markets may disrupt anti-competitive behavior and thus even increase innovative contributions (Diessel, 2007; Schmalensee, 2009; Tarantino, 2010; Geradin et al., 2011). Especially in the case of Bosch, IPR is now licensed that has been used since decades without the payment of royalties. Cross-licensing solutions have to be seen critical in cases of asymmetric market dependencies. Patent trolls may thus even cure the system to enforce rights and increase incentives to innovate for weak or dependant market participants who sell their patents (e.g. Bosch, HIPPO, SMEs in the PapstLicensing case, SMEs in the Alliacense case). Without the possibility to enforce IPR these companies might undervalue returns from IPR. This might prevent a socially optimal level of future investments in R&D (Diessel, 2009). However, we believe that patent trolls create additional costs, e.g. evaluation, negotiation and litigation costs, compared to cross-license agreements. These costs might thus be rediscounted by higher royalty fees. Even though patent trolls generate these costs, we still believe that some cases have proven the patent troll business to be beneficial for the patent system and IPR enforcement. Other literature contributions further stress that the influence of vertical integration on royalty rates is ambiguous. Manufacturing firms may have the same means to request excessive royalties, for instance to new market entrants or vertically non integrated firms (Layne-Farrar and Schmidt, 2010).

However, we also find evidence for our second question and find proof from our cases that patent trolls' strategies to enforce IPR may also lead to excessive royalty fees and increasing negotiation costs. We identified leverage methods such as influence on infringers' image through the media (Sisvel, EpicRealm), forum shopping (Sisvel, Alliances, PapstLicensing, IP COM), first mover incentives to take early licenses, pressure by accusing OEMs, retailers, consumers and executives (Alliances, Sisvel) and the move to sue injunctions (Sisvel, Alliances, PapstLicensing, IPCom). These methods combined with an uncertainty about the patent scope and qualities often yielded excessive royalties, lengthy negotiation and costly litigation. However, most of these strategies just exploit faults of the

patent system such as heterogenic legislation among countries, non-transparency of the patent system, filing of trivial patents, unjustified broad patent claims, unjustified injunctions and a general legal uncertainty due to legislation that draws on proportionality principles.

This paper constructs a distinct typology of IPR enforcing companies and in particular of patent trolls. Future cases in the context of IPR infringement can be classified by applying our framework and typology. Policymakers, business leaders and innovators are hence able to assess the troll business and anticipate its possible effects. Even though we only analyze ten patent troll cases, we believe that our empirical results are able to add value to findings in the literature and that our typology can be applied to a various number of cases. We are further able to differentiate possible effects of the patent troll business, which might still be diverse but easier to assess when applying our findings.

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Table 1. Cases and interviews used in our analysis

<b>Cases</b>	<b>Plaintiff</b>	<b>Defendant</b>	<b>Third party</b>
Papst Licensing GmbH & Co. KG	Members of the board (2 Interviews)	No Interviews conducted	Non-involved attorney (1 Interview)
Alliacense (TPL group)	Members of the board (1 Interview)	One Affected company (1 Interview)	German Association (1 Interview)
IP Com vs. Nokia	Members of the board (2 Interviews)	Attorney (1 Interview)	Non-involved attorney (1 Interview)
Sisvel S.p.A.	Members of the board (1 Interview)	Attorney (1 Interview)	Non-involved attorney (1 Interview)
EpicRealm	No Interviews conducted	Attorney (1 Interview)	International Association (1 Interview)
Amazon Inc. vs. Barnesandnobel LLC	No Interviews conducted	No Interviews conducted	Non-involved attorney (1 Interview)
Excel Communications vs. AT&T	No Interviews conducted	No Interviews conducted	Non-involved researcher (1 Interview)
NTP vs. RIM	No Interviews conducted	No Interviews conducted	Non-involved attorney (2 Interviews)
eBay Inc. v. MercExchange, L.L.C.	No Interviews conducted	No Interviews conducted	Non-involved attorney (2 Interviews)
HIPPO vs. Panasonic	Affected company (1 Interview)	No Interviews conducted	No Interviews conducted

Figure 1. Troll strategy to enforce IPR in the value chain.

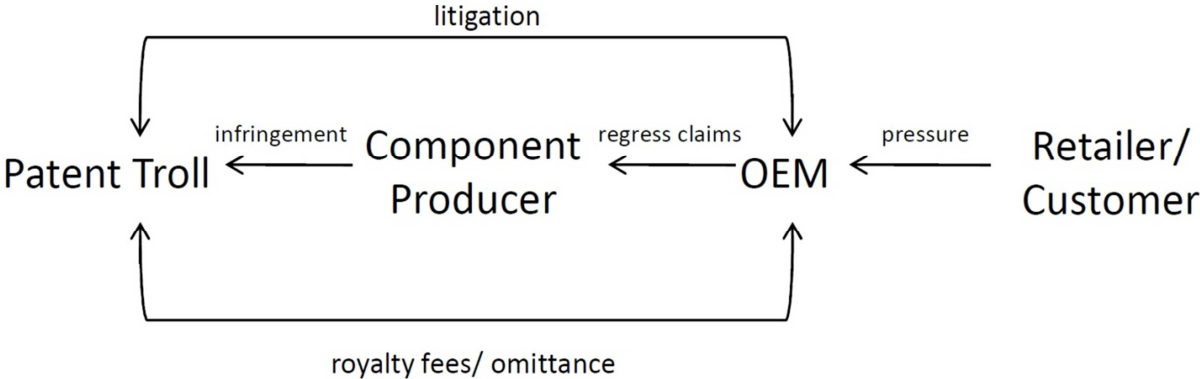


Figure 2. Typology of IPR enforcing companies.

activities concerning the patent \ patent-quality	non-trivial patent	trivial patent
innovative / manufacturing	technology <i>blocker</i>	trivial-technology <i>blocker</i>
innovative / <b>non</b> -manufacturing	patent <i>enforcer</i>	trivial-patent <i>enforcer</i>
<b>non</b> -innovative / manufacturing	patent <i>implementer</i>	trivial-patent <i>implementer</i>
<b>non</b> -innovative / <b>non</b> -manufacturing	patent <i>troll</i>	trivial-patent <i>troll</i>



Figure 3. Typology of patent trolls.

leverage potential	license recipient	initial licensee	infringer
F/RAND IPR enforcement		license supplier	royalty claimant
extortive IPR enforcement		license extortionist	excessive royalty extortionist