How Patent Assertion Entities Search for their Prey – An Attention-based View

-Blind for Review-

Abstract: The significance of Patent Assertion Entities (also known as «Patent Trolls ») for the patent system has increasingly been gaining momentum in recent years. PAEs’ business activities embrace the search for patents for acquisition, search for infringers of these patents and, finally, enforcement of the respective patent rights. Research on PAEs, especially regarding the first two activities as mentioned before, is widely lacking. Based on ten original qualitative cases and the attention-based view of the firm, this paper, hence, strives to shed light on the question of how PAEs search patents being potentially relevant for them as well as the infringers of these patents. Thus grounded, we develop four archetypes of PAEs from an attention-based view. By doing so, we are offering a more fine-grained view on PAEs and display, how patent holders, potential target firms of PAEs as well as policy makers can act and react towards them.

Keywords: Patent assertion entities, Attention-based view, Patent trolls, Non-practicing entities.

1.1 Introduction

Patents are a core topic in innovation management to protect inventions against competitors. Infringement litigation has encountered a new type of activity that has gained considerable momentum over the last decade (Lemley and Melamed, 2013), as the substance of such litigation has shifted from “infringement suits that were primarily between competitors to suits often driven by the desire of patentees to obtain licensing revenue from non-competitors” (Marco et al., 2015, p. 3). This change is primary driven by the rise of Patent Assertion Entities (further: PAEs; also known as “patent trolls”) (Fischer and Henkel, 2012; Lemley and Shapiro, 2007). PAEs are patent owners whose primary business is to generate profits from third parties that are allegedly infringing their patents (Pénin, 2012; Reitzig et al., 2007). PAEs are typically not developing the technologies being the subjects
The significance of PAEs has increasingly been gaining momentum in recent years – in 2012, PAEs filed 29% more patent lawsuits than in 2010, and 62% of all patent lawsuits were filed by PAEs (Cotropia et al., 2014). Accordingly, they are not only of great significance for industry practice (RPX, 2013; Ellis, 2012; Milone, 2013, 2012; Papst, 2012; Retsky, 2013), specifically for innovation, technology as well as strategic management (e.g., Fischer and Henkel, 2012; Geradin et al., 2011; Hemphill, 2013; Henkel and Reitzig, 2010; Pohlmann and Opitz, 2013; Reitzig et al., 2007), but also for policy makers. The interest of the latter arises from repeated accusations that PAEs are causing collateral damage for R&D manufacturers, being a serious threat for innovation, and inducing significant costs for the economy (Bessen et al., 2012; Federal Trade Commission, 2012; Gleklen, 2013). This is underlined by a statement of the American president Barack Obama, who put PAEs in the center of governmental and legislator’s attention by stating: “[PAEs] don’t actually produce anything themselves. They’re just trying to essentially leverage and hijack somebody else’s idea and see if they can extort some money out of them (Executive Office of the President, 2013, p.2)

Given their topicality and importance, it is about time to bring PAEs out of the shadows of controversial discussions and ignite scientific research that sheds light on the question of how they are actually doing business. We know that PAEs’ activities embrace the search and acquisition of patents, the search for infringers of these patents, and the legal enforcement of the patent rights (Fischer and Henkel, 2012). The latter aspect has been intensively studied in the law literature – noteworthy works in this regard are Allison et al. (2009; 2011) and Lemley and Melamed (2013)\(^1\). The first two aspects as mentioned above, however, are still veiled although being of central importance to understanding PAEs business. The significance of these aspects is straightforward – before PAEs can enforce any patent right, they first have to search for relevant patents for acquisition and the respective infringers (Fischer and Henkel 2012; Reitzig et al. 2007). The question of how PAEs are doing the latter shall be the central research question of our paper. In order to answer this question,

we apply a qualitative multi-case study with ten cases and build on the theoretical argumentation of the attention-based view of the firm (Ocasio, 1997; also see Barnett, 2008; Hansen and Haas, 2001; Hoffman and Ocasio, 2001; Ocasio and Joseph, 2012). This theory is an ideal theoretical underpinning of our work because searching for patents and infringers, and search in general, is a process of purposefully directing attention (Li, Maggitti, Smith, Tesluk, and Katila, 2013). Accordingly, PAEs are unlikely to act on patents or infringers if they do not focus their attention on them (Simon 1947/1997), which makes attention the essential resource for PAEs search endeavors.

Studying the abovementioned subjects poses a great novelty since research on PAEs is widely lacking and the academic literature in this field generally remains in its infancy (Dekkers and Tietze, 2014; Fischer and Henkel, 2012). PAEs typically prefer to remain discrete about their business activities and do not provide researchers with access to original empirical data. Thus, the few studies on PAEs in the domains of strategy, innovation and technology management are on firm-level and are based on secondary data (Dekkers and Tietze, 2014; Reitzig et al., 2010; Shrestha, 2010). These studies have differentiated PAEs from other patent market intermediaries (e.g. Benassi and Di Minin, 2009), analyzed the PAEs’ litigation strategies (e.g. Hemphill, 2013; Reitzig et al., 2010, 2007; Pohlmann and Opitz, 2013), and investigated the quality of the acquired patents (e.g. Fischer and Henkel, 2012; Pohlmann and Opitz, 2013; Reitzig et al., 2010). However, according to our knowledge, none of them have investigated PAEs’ search for patents and infringers.

From an attention-based view, a considerable stream of research has emphasized the relevance of attention and its distribution for outcomes such as subsidiary performance (e.g., Ambos and Birkinshaw, 2010), strategic change (e.g., Cho and Hambrick, 2006), the reaction to external threats (e.g., McMullen, Shepherd, and Patzelt, 2009), the search for innovations and opportunities (e.g., Barnett, 2008; Li, Maggitti, Smith, Tesluk, and Katila, 2013), the timing of product market entry (e.g., Eggers and Kaplan, 2009), and investments in and adoption of new technologies and innovations (e.g., Gerstner, König, Enders, and Hambrick, 2013; Kaplan, 2008; Yadav, Prabhu, and Chandy, 2007). However, to our knowledge, the attention-based view of the firm has not yet been applied to PAEs and their search behavior. Given the strong significance of attention distribution for the business of PAEs, these firms provide an intriguing empirical setting for studies on the distribution of attention and its antecedents, more specifically. This is a promising field of research since antecedents of attention being a core
aspect of the initial outline of the attention-based view (Ocasio, 1997) but are also an under-researched field (with Bouquet and Birkinshaw, 2008; Cho and Hambrick, 2006; Dutton and Ashford, 1993; Hansen and Haas, 2001; Nadkarni and Barr, 2008; Palmie, Lingens, and Gassmann, 2015 being among the noteworthy exceptions).

By addressing our research question and the gaps in literature as mentioned above, our work intends to provide several implications for academia and industry practice. First, our paper is among the first academic works that addresses PAEs in general. More specifically, according to our knowledge, we provide the first description of PAEs’ search behavior, thus being among the first studying PAEs on the sub-firm level. Second, we introduce the attention-based view of the firm to the subject of PAEs and show that doing so yields crucial insights into a better understanding of their behavior. Relatedly, we display how PAEs distribute their attention and, therefore, provide one of the rare investigations on the antecedents of attention. In addition, we posit several propositions for future research and summarize our insights into several implications for industry practitioners and policy makers.

1.2 Literature review on the attention-based view of the firm

Resting upon previous work (Simon, 1947; March and Simon, 1958; Cyert and March, 1963; Weick, 1979; Cohen, March and Olsen, 1972), Ocasio (1997) describes an attention-based view of the firm. This theory portrays firms as systems of structurally distributed attention – defined as “the noticing, encoding, interpreting, and focusing of time and effort” on information and decision alternatives (Ocasio, 1997: 189). The attention-based view claims individuals can solely focus their attention on a limited set of information and decision alternatives (Ocasio, 1997; Simon, 1947/1997). Only these will influence their decisions and behaviors and, ultimately, the course of the firm (Fiol and O’Connor, 2003; Starbuck and Milliken, 1988; Weick, 1979). This makes attention to one of the most significant resources in firms (Hansen and Haas, 2001; Simon, 1947/1997) and raises the question of how firms can make sure individuals focus their scarce and valuable attention on the most relevant information (Ocasio, 1997).
The selective focus on individuals’ attention is not purely negative – in fact, it leads to a concentration of a manager’s energy and effort on relevant decision alternatives and, as such, enhances speed and accuracy of perception and action (Ocasio, 1997). On the other hand, if managers do not attend to relevant information or decision alternatives they might neglect potentially promising business opportunities (Barnett, 2008; McNamara and Bromiley, 1999; Yates, Jagacinski and Faber, 1978). Mastering this trade-off poses a great challenge for firms. In this regard, the attentional structures of a firm are of central importance since they focus individuals’ attention (Joseph and Ocasio, 2012; Ocasio and Joseph, 2005). Among other resources, the knowledge of the people involved is of great significance since it strongly influences on what information individuals focus their attention on (Cohen and Levinthal, 1990; Ocasio, 1997).

Another major influencing factor on individuals’ attention lies in the information themselves. The greater their importance and the interest of people for the information under consideration, the greater the likelihood of people actively focusing their attention on the latter, even before the respective stimuli actually occurs. This is called preparatory attention, enhancing the speed and accuracy of peoples’ perceptions and actions (Ocasio, 1997). In the case of information of minor significance, people are less likely to actively direct their attention towards a stimulus prior to its occurrence. Instead, they might passively react to it (Ocasio, 1997).

1.3 Methodology

1.3.1 Methodological difficulties of research on PAEs and research setting

It is particularly difficult to obtain primary data on PAEs. These firms are reserved and secretive in regard to revealing information about their business. Moreover, their business model is relatively new in modern industries, and specialized databases are particularly rare. As a consequence, empirical research on PAEs is very scarce and original insights into these firms is widely lacking (Dekkers and Tietze, 2014; Reitzig et al., 2010).

As a consequence of the above, the very few empirical studies on PAEs mainly use publicly available information. For example, Kiebzak et al. (2016) studied the effect of patent litigation on venture capital investments and Reitzig et al. (2010) analyzed 132 patent lawsuits from 44 PAEs to empirically explore how PAEs exploit patents. Both studies rest upon patent data available on the worldwide web. Another noteworthy study, Stern and Doyle (2011), analyzed patent infringement brought by PAEs to reveal where the PAEs
originally acquired the patents. Fischer and Henkel (2012) analyzed a dataset of U.S. patents acquired by known PAEs with regard to patent quality. Only very few studies are based on primary empirical data. These works are based on very small samples. For example, Benassi and Di Minin (2009) conducted interviews with thirteen patent brokers, including only one PAE, Larson (2013) used a total of only six interviews with representatives from PAEs, and Pohlmann and Opitz’s (2013) article uses four original cases of PAEs with one interview per case. The obstacles of deriving original empirical data on PAEs led to the development of a tailored approach for our qualitative study.

1.3.2 Research design and data analysis

We apply a multi-case study approach, which is particularly suitable if a phenomenon is novel or if a new perspective on a previously researched topic is required (Eisenhardt, 1989; Yin, 2014). Our paper is one of the few empirical studies of PAEs and the first study in this regard on sub-firm level, to the best of our knowledge. Moreover, we believe that this paper is the first to apply the attention-based view of the firm on the subject of PAEs, thus establishing a novel theoretical perspective on this subject. In addition, a case-study approach is appropriate to analyze processes (Eisenhardt, 1989) and a suitable approach to explore patterns (Creswell, 2003). Also, given the constraints of empirical research on PAEs as discussed above, a quantitative empirical or large-scale study on the specific subject of PAEs’ search behavior might be difficult and perhaps even impossible to apply. Finally, since we are striving to analyze the process of attention distribution of PAEs and to identify patterns in their search behavior, a case study seems to be an ideal approach. As such, we use a multi-case study, since we intend to rest our work upon rich empirical insights (Eisenhardt, 1989). Given the difficulties in obtaining original data on PAEs, we specified our case study on the special characteristics of the subject under consideration. Thus, we combined original interview data with external data from different sources and insights from theory to increase the reliability of our findings and enrich our data. Despite the reticence of the industry, we managed to gain access to case representatives as interview partners, and we were thus able to provide rare and valuable first-hand information for each case.

Based on these considerations, our research is based on a five-step approach and comprises information from 33 interviews. To our knowledge, no empirical study on PAEs has been based on such rich original insights
yet. Our case-study approach resembles the theory-based case study approach of Yin (2014) and the extended case method of Burawoy (1991). The ultimate goal of these approaches is to extend and apply an existing theory to a novel subject, instead of building novel theory from scratch (Burawoy, 1991). Therefore, the theory shall guide the researcher in collecting and analyzing the data under consideration and is enriched by these data as well (Yin, 2014).

In the first phase of our research, we collected background information on PAEs based on 4 interviews with PAE experts and patent managers of several firms affiliated with PAEs. These practitioners agreed that it is essential to understand PAE’s search behavior to understand PAEs in general. Therefore, we gathered additional insights on PAEs’ search behavior and the potential antecedents of such behavior, including press releases and media reports.

In the second stage, we strove to illuminate a deeper understanding of PAEs’ search behavior. This stage of our research can be seen as the first cycle of confrontation between data and theory as suggested by Borawoy (1991). To this end, we conducted 14 interviews with former PAE executives, intellectual property managers and patent attorneys based on the insights gained in the first stage. We did not directly ask about search behavior. Instead, we discussed PAEs’ overall strategy and background and their approaches to searching for patents and infringers in an iterative manner. We asked both open and closed questions. With this approach, we prevented our results from becoming biased by the personal opinions of the respondents. These interviews generated valuable insights regarding how PAEs search for cases and how this search is affected by the general characteristics discussed above. An initial coding showed considerable differences in PAE search behaviors. Moreover, these investigations hinted at PAEs size, origin of the portfolio, portfolio size, funding structure and technology focus as potential antecedents to particular search behaviors. These insights also indicated that the attention-based view of the firm (Barnett, 2008; Ocasio, 1997; Ocasio and Joseph, 2005) might be a suitable theory to explain PAE search behaviors.

In the third stage, we followed Yin’s (2014) recommendation and built a theoretical framework and patterns of expected results before collecting our data in stage four. Such an approach is beneficial because it “will enable the complete research design to provide surprisingly strong guidance in determining the data to collect and the

---

2 Similar approaches are also used by works published in the very best journals (e.g. Eisenhardt and Tabrizi, 1995; Tushman and Romanelli, 1994; Fey and Birkinshaw, 2005).
strategies for analyzing the data” (Yin, 2014 p. 38). In addition, another “benefit is a stronger design and heightened ability to interpret your eventual data” (Yin, 2014 p.38). Moreover, this approach might be particularly beneficial for our research on PAEs. Given the difficulties of obtaining original in-depth data regarding PAEs, it is important to strongly focus the search for these data on those aspects that are most promising. Thus, we used the initial empirical findings obtained in stages one and two of our research, particularly the potential antecedents of PAE search behavior (the existence of an initial portfolio, portfolio size, technology focus, number of employees, shareholder structure, and personal affiliations as well as in the background of PAE employees). In addition, we discussed these initial findings with the attention-based view of the firm. On these grounds, we built our theoretical framework and the patterns of expected results as a basis for the next stage of our research (Yin, 2014).

In the fourth stage, based on the framework and patterns of expected results from stage three, we searched for data that shed light on the search behavior of PAEs, its antecedents and the manner in which these antecedents influence search behavior. Therefore, this stage of research can be seen as the second cycle of Burawoy (1991), in which an intensive and iterative confrontation of data and theory takes place. To this end, we collected an initial sample of 391 PAEs with different sizes and industry focuses. We collected publicly available information about these PAEs to test our initial findings and considerations from the first three research steps. Moreover, we attempted to build up our initial contact with these firms and sent repeated requests for interviews. Most firms were not willing to provide information about their businesses. Others did not fulfill the criteria for our theoretical sampling particularly well, which included the following: (1) PAEs acquire patented technologies to generate profits through licensing and asserting their patented technologies against companies infringing the patents (Reitzig et al., 2007); (2) PAEs acquire ownership of patents (McDonough 2006); (3) PAEs do not pursue their own research (Pohlmann and Opitz, 2013); and (4) PAEs defend their acquired patent rights against infringements (Pohlmann and Opitz, 2013). Finally, 15 firms were chosen for our case sample.

We are well aware that our sample might be biased because our sets of data come only from those firms willing to answer our requests. However, our research is not focused on those aspects that might be biased, such as particularly controversial discussed practices in which PAEs might engage, for instance using weak and invalid patents to support frivolous litigation (Allison et al., 2011), the supposed lack of value they add to society
(Bessen and Meurer, 2014; Merges, 2009) or how they function as a tax on innovation (Dekkers and Tietze, 2014; Magliocca, 2006; Tucker, 2013; Wang, 2010). Moreover, the overall goal of this research is to provide a deeper theoretical understanding of PAEs’ search behavior and to therefore assist in the generalization of theory and concepts. Thus, the sample does not have to be representative to generalize our results to a larger population (Eisenhardt and Graebner, 2007; Wright et al., 2012) but should facilitate the development of the theory at hand (Yin, 2014).

In all of these cases, we studied the characteristics of the PAEs discussed above using data from different sources. We ascertained the number of employees, the nature of the portfolio, portfolio size and the technology focus using data from Patent Assignment Alerts and business reports withdrawn from the U.S. Securities and Exchange Commission and from companies’ webpages. To obtain insights into the corporate and shareholder structure and personal affiliations as well as background information regarding PAE employees, Bloomberg, CorporationWiki, Wysk and SEC filings from the U.S. Securities and Exchange Commission were used. To obtain an understanding of PAEs search behavior, we used several data sources. First, we analyzed deeper the patent portfolio of the PAEs using Patent Assignment Alerts. This database allows determining current as well as former owners of the patent since the patent grant. Second, we obtained insights regarding the patents litigated and the companies accused for infringement from data sources such as Patexia and Justia Dockets and Files. In addition, we drew upon media reports and press releases regarding infringer cases. Based on these data, we were able to obtain a comprehensive understanding of the selected PAEs’ search behavior and the potential antecedents to such behavior. Moreover, these data were obtained from sources that are not particularly prone to be biased toward the interests of PAE employees.

Finally, we conducted interviews with executives of the PAEs studied, such as Chief Executive Officers, Presidents and Managing Directors, Founders, Vice Presidents of Business Development, Vice Presidents of Corporate Development, Licensing Executives, and Vice Presidents of Investor & Public Relations. Such high-level interview partners are typically particular knowledgeable and have a broad overview about relevant activities of their respective firms, thus typically offering highly accurate information (Kumar, Stern and Anderson, 1993). These interviews enriched our study with original in-depth information and allowed us to triangulate the findings gained in prior stages of our research (Mayring, 2007; Yin, 2014). The interviews typically lasted
between 60 and 90 minutes, for an average of 78 minutes. We asked questions such as “What is the business your company is primarily operating in? How would you describe your role in the patent market? How do you learn about potential licensors/sellers? How do you learn about potential licensees/buyers?” as a starting point to discussing their search behaviors. We did not mention any element of our emergent theoretical insights to interviewees to control for potential respondent bias. Moreover, we asked additional short questions regarding the company’s history, for example, or the patent market in general to additionally distract the respondents’ attention from the core questions of our study. Also, we supplemented our interview data with closed questions. The interviews were digitally recorded and transcribed immediately afterwards to increase the reliability of the study (Mayring, 2007). The data obtained in stage four were independently coded by the authors. We were able to easily identify the constructs under consideration since our theoretical framework provided us with patterns of expected results and strategies for analyzing the data (Yin, 2014). For our analysis, we read through the interview transcripts several times and tried to reveal themes and patterns (Eisenhardt and Graebner, 2007). We open coded important aspects and compared our interpretations among the researchers (Locke, 2001). To diminish recall and rationalization bias and to enhance the consistency of our results, we triangulated our collected interview data with data from the other sources described above (Davis and Eisenhardt, 2011). To the same end, we conducted brief follow-up interviews with the respondents to double-check some of their statements. We used these interviews as well as some of the answers to the closed interview questions to search for explanations if previously gained insights were seemingly lacking internal consistency (Ozcan and Eisenhardt, 2009).

Our triangulation revealed that in five cases, the information obtained from the interviews showed significant derivations from the data previously obtained, making these interviews less reliable and potentially prone to the hidden agendas of the respondents. Therefore, we excluded these five cases from our sample. Finally, our sample consists of ten firms, which vary significantly in terms of size, workforce, technology focus and search behavior. Even with excluding five case, our sample embraces ten cases, which is considered a suitable sample size (Eisenhardt, 1989; Yin, 2014). Our cases are shown by Table 1.
<table>
<thead>
<tr>
<th>Case</th>
<th>Number of employees</th>
<th>Role of interviewee</th>
<th>Length of interview</th>
<th>No. of patents the firm holds</th>
<th>Additional data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-1</td>
<td>Co-founder</td>
<td>1h 13min</td>
<td>-25</td>
<td>- Website documents (&quot;Entire cell phone industry&quot;, &quot;Insured’s Participation in Investment Scheme&quot;, &quot;Inventor at center&quot;)</td>
</tr>
<tr>
<td>B</td>
<td>-1</td>
<td>Partner</td>
<td>1h 08min</td>
<td>-4</td>
<td>- Website documents (&quot;Netflix, Target, Macy’s Sued For Patent Infringement&quot;, &quot;Acquisition and Licensing of Technology and Patent Rights&quot;)</td>
</tr>
<tr>
<td>C</td>
<td>-10</td>
<td>CEO</td>
<td>1h 43min</td>
<td>-200</td>
<td>- Website documents (&quot;We assume all cost and risks&quot;, &quot;Our reputable Partners&quot;, &quot;Company profile&quot;, &quot;We transform opponents to licensees&quot;)</td>
</tr>
<tr>
<td>D</td>
<td>-50</td>
<td>Senior Director</td>
<td>1h 11min</td>
<td>-18000</td>
<td>- Website documents (&quot;Unmatched Track Record&quot;, &quot;Leading Licensing Firm Sees Tremendous Value&quot;) - Internal presentation (&quot;A (Risk-Adjusted) Investor Perspective On IP Valuation &amp; Value Extraction&quot;) - Blog (&quot;Another big financial player moves into IP space&quot;)</td>
</tr>
<tr>
<td>E</td>
<td>-50</td>
<td>Vice President</td>
<td>1h 02min</td>
<td>-3000</td>
<td>- Blog (&quot;Fine-tuning lawsuits&quot;, &quot;First enforcement actions&quot;) - Website documents (&quot;Business insider&quot;, &quot;Sells patents&quot;, &quot;Star man&quot;)</td>
</tr>
<tr>
<td>F</td>
<td>-50</td>
<td>Vice President</td>
<td>1h 22min</td>
<td>-1500</td>
<td>- Website documents (&quot;Patent Assignment Abstract of Title&quot;) - SEC filing (&quot;Form 10-K&quot;) - Internal presentations (&quot;Annual report 2014&quot;, &quot;Patents issued worldwide&quot;)</td>
</tr>
<tr>
<td>G</td>
<td>-50</td>
<td>CEO</td>
<td>0h 59min</td>
<td>-1500</td>
<td>- Report (&quot;Out Innovating: Initiating With an Overweight&quot;) - SEC filing (&quot;Form 10-K&quot;) - Website documents (&quot;Corporate Presentation&quot;)</td>
</tr>
<tr>
<td>H</td>
<td>-70</td>
<td>CEO</td>
<td>1h 20min</td>
<td>-4000</td>
<td>- Website documents (&quot;History&quot;, &quot;Licensing Principles&quot;, &quot;Licensees&quot;) - Blog (&quot;Big in numbers, but low on price&quot;, &quot;Confirms acquisition approaches&quot;) - SEC filing (&quot;Annual information form&quot;)</td>
</tr>
<tr>
<td>I</td>
<td>-100</td>
<td>President &amp; Managing Director</td>
<td>1h 30min</td>
<td>-1500</td>
<td>- Website documents (&quot;History&quot;, &quot;Licensing programs&quot;, &quot;Submit patents&quot;, &quot;Sells patents to patent troll&quot;) - Blog (&quot;Evolution of the Patent Troll&quot;, &quot;NPEs vs Patent Trolls&quot;) - Report (&quot;Reverse trolls&quot;)</td>
</tr>
<tr>
<td>J</td>
<td>-250</td>
<td>CEO</td>
<td>1h 15min</td>
<td>-5000</td>
<td>- Internal presentations (&quot;Move forward to Monetization&quot;) Assignment search (&quot;Search Condition: Assignee Name OR Assignor&quot;) - Website documents (&quot;Patent Predictions&quot;)</td>
</tr>
</tbody>
</table>

Table 1: List of firms studied and data sources
In the fifth and final stage of our research, we used pattern matching to link PAEs’ characteristics and their search behavior (Yin, 2014). To this end, we relied on both cross-case and within-case comparisons (Eisenhardt, 1989), which was performed in an iterative manner, moving backwards and forwards between our data and the assertions of the attention-based view to enhance the internal validity of our results (Miles and Huberman, 1994; Locke, 2001). Additionally, we challenged our insights by discussing their application to other empirical information, particularly those obtained in the prior stages of our research (Gibbert, Ruigrok and Wicki, 2008).

1.4 Findings

Our cases indicate considerable differences between the PAEs with regard to their particular approaches to find patent cases. Following Fischer and Henkel (2012), we describe the findings of our sample based on two groupings. Firms in the PAE_PROD group began as producing companies and became PAEs later, whereas firms in the PAE_TRAD group have been doing business as PAEs from the outset of their business activities.

1.4.1 Background Information about the firms studied

PAE_PROD: Firms that originated in producing companies

PAE_PROD_A has its origins in a producing company. After bankruptcy, approximately twenty-five patents were transferred to a PAE formed by the inventor and former Vice President of the producing company specifically to exploit these patents.

PAE_PROD_C has its roots in a producing company that developed its patents internally. When the company was sold in the early 90’s, its patent portfolio was bought by the original owners. They founded a patent monetizing company and began monetizing patents originally developed by their former employees. Today they monetize approximately 200 patents.

PAE_PROD_E was founded specifically to acquire a particular patent portfolio and the employees of a bankrupt company to monetize patents from that formerly producing company. Therefore, the employees of this PAE consisted mainly of former employees from the bankrupt company with a technical background and licensing experts and lawyers – approximately 50 employees.
PAE_PROD_F was also formerly a producing company. After selling a major business unit, they changed their name and business model. Due to the high returns of patent monetization, they focused their efforts on this new model for revenue generation. The company stresses that it continues to invest in research and development and performs functions other than merely monetizing its patents. However, according to their Standard Industrial Classification (SIC) Code, their business consists primarily of patent buying and licensing.

**PAE_TRAD: Firms that always pursued PAE business**

PAE_TRAD_B was founded in 2009. The company originally acquired patents to develop patent licensing models and to develop products. However, because the company was not successful in this undertaking, its management decided to specialize in enforcing patents. At present, the company owns only four patents but has instituted more than 30 litigation cases.

PAE_TRAD_D was founded in the beginning of this century and is financially supported by two major investment companies. The portfolios of PAE_TRAD_D consist exclusively of patents acquired from external sources. A team of fewer than fifty employees generates cash revenues mainly from licensing acquired patents. The interviewee did not want to make any comments regarding portfolio size. However, publicly available information reveals that the company manages almost 20000 patents.

PAE_TRAD_G began as a technology incubator. In the late 1990s, the internet bubble forced the company to rethink its business model. Many of the companies supported by the incubator went bankrupt, leaving it with patents as its sole asset. At this point, the incubator decided to acquire and monetize the patents. Today, PAE_TRAD_G has several subsidiaries around the world and more than 50 employees.

The company forming PAE_TRAD_H was founded in the early 1990s. They control approximately 4000 patents and generate their revenues entirely from licensing, mostly without litigation. Approximately 70 employees are on the company’s payroll.

PAE_TRAD_I is the oldest company in our case sample, founded in the early 1980s. The company has six subsidiaries in various countries and more than 100 employees. It describes itself as a licensing administrator who develops licensing strategies, analyzes clients’ portfolios, identifies infringers, and collects royalties on behalf of patent owners. Currently, the company monetizes approximately 1500 patents.
PAE_TRAD_J was founded in the early 2000s. For its first eight years, PAE_TRAD_J searched for patents to acquire. Once their business model proved successful, big and small patent holders began offering their patents for monetization. Today, subsidiaries have been formed to acquire patents and the parent company provides know-how and financial resources. The parent company employs more than 25 employees, mainly with technology backgrounds, and more than 200 employees are on subsidiaries’ payrolls.

1.4.2 Case description: The search of PAEs for patents and potential infringers

The case search: PAE_PROD

In PAE_PROD_A’s business history, no patents other than those from the inventor were ever acquired, and the PAE focuses exclusively on the technological fields of this portfolio. However, this existing portfolio is exploited to the maximum extent possible. Therefore, there are no resources allocated to searching for additional patents to acquire. In terms of manpower, the PAE is small. Only part-time employees are on its payroll, and these employees search for potential infringers of the PAE’s patent portfolio. When scouring the market, both big and small potential infringers are targeted. With regard to the patent infringer search process, the co-owner of the PAE stated as follows: “We went about doing research on the internet to locate companies that appeared from their websites would be likely to need a license, so we identified those companies”. Outside lawyers and technical experts are used to prove infringement of those companies and thus force them to acquire licenses. Initially, only larger infringers are ask to reimburse their use of the PAE_PRODs patents, and then smaller infringers are included.

PAE_PROD_C began monetizing patents originally developed by its employees. Thus, their initial technology portfolio was developed internally and the PAE’s employees have good knowledge of the patents in the portfolio. To generate additional cash-flow the initial portfolio was extended by filing, acquiring and monetizing new patents. The initial portfolio was focused in a certain technological field. By contrast, the PAE’s decision to acquire new patents that extend the portfolio is not limited by any technological focus. They do not actively search for patents with in-house resources. Instead, patent owners and patent brokers offer them ad-hoc opportunities. From these ad-hoc opportunities, only one-half to three percent are acquired. Today, the company has roughly ten fulltime employees and employs additional external technical experts and lawyers to exploit its
200 patents. When conducting a potential infringer analysis, they focus on infringers fulfilling certain size criteria. The CEO of the company stated as follows: “We only focus on the real big companies - the ‘Who’s Who’”. He further indicated that potential infringers are already named by the brokers that offer the patents to the company in the first place. The additional search for potential infringers is conducted by internal and external experts. Reverse engineering to prove infringement is mostly conducted in-house. However, if the expertise is not available in-house, external engineers and search analysts are used.

PAE_PROD_E’s internally developed portfolio is not extended with any new patents. Instead, it focuses on exploiting its existing portfolio of almost 3000 patents to the maximum extent possible. The Vice President of Corporate Development of the company stated as follows: “If you think about [our] business, most of the focus is definitely on capturing the value of what we had”. Thus, no resources are required to search for new patents to acquire, and the company focuses its monetization efforts solely on the predetermined technology fields of its existing portfolio. The search for potential infringers of its portfolio is mainly conducted internally. The Vice President of Corporate Development of company indicated that its employees already know who is infringing because they were employees of the producing company before bankruptcy. When choosing infringers to target, they apply criteria that the infringers must fulfil and only target infringers that are Fortune 500 affiliated.

PAE_PROD_F employs approximately 50 employees and owns more than 1500 patents, some internally developed and some externally acquired. The company began monetizing patents originally developed by their own inventors. Thus, their initial technology portfolio was internally developed and the employees have good knowledge about the patents in the portfolio. Thus, this portfolio is being financially exploited. To generate additional cash flow, the initial portfolio was extended by filing, acquiring and monetizing new patents. The initial portfolio had a certain technology focus. By contrast, the new patents acquired to extend the portfolio are not from a specific technological area. To acquire new patents, the company does not actively search for patents with in-house resources. Instead, the company offered ad-hoc opportunities by patent owners and brokers. At this PAE, all patent and infringement analysis is performed by employees. The Chief Technology Officer takes the initial lead in evaluating the patents. If he sees a market opportunity, he brings in the licensing team to conduct due diligence. When conducting the potential infringer analysis, the company focuses on infringers of a
certain market size. According to the Vice President of the company, major companies like Sharp, Fujitsu and Panasonic are the types of companies that have become licensees.

**The case search: PAE_TRAD**

PAE_TRAD_B builds and extends its portfolio by acquiring patents from external sources. The search for patents does not actively take place in-house; instead the company receives ad hoc opportunities from other firms, brokers, and/or individuals to buy or license patents. For example, with regard to the question how patents to acquire are found, the CEO of the company answered: “They offer them, brokers do”. This PAE acquires patents in any technology with sufficient market volume. A sufficient market volume is reached when the patent’s potential to monetize it justifies the investment. PAE_TRAD_B is a one-man company and has restricted financial resources to spend on an infringement case. The company therefore relies on lawyers working on a contingency fee basis. Thus, before the company acquires any patent, the patent’s claims are checked by external law firms that would be hired on a contingency fee basis. If no contingency fee agreement with a law firm can be made prior to acquisition, the patent is not acquired. As the CEO of the company stated, potential infringers are already named by the brokers that offer the patents to him in first place. Further search for potential infringers is conducted by external firms from the US and India because the company does not have the manpower to conduct the search in-house. The search for potential infringers is restricted to infringers fulfilling certain criteria with regard to size. As the CEO of company states: “…Certainly Fortune 500 companies…or else there won’t be enough damages”.

PAE_TRAD_D generates revenues mainly from licensing its acquired patents. When it evaluates patents to acquire, the technological field plays a major role. For example, the Senior Director of Business Development of the company says that generally high-tech patents of all types of technologies have the potential to be monetized but mobile phone and medical device technologies are of major interest for the company at this juncture. The search for patents actively takes place in-house or in combination with ad hoc opportunities offered from patent holders. Furthermore, the company buys patents from firms abandoning certain technological fields. At this PAE, the search for potential infringers is only conducted by external experts. To enforce patents, the
company hires engineers (to reverse engineer) and law firms. The potential infringers targeted must have a sizeable market volume that provides a chance to make significant revenue.

PAE_TRAD_G only acquires patents. For each portfolio acquired, the company founds a separate subsidiary. Currently the company has approximately 5000 patents and 40 active patent portfolios that are being enforced. The search for new patents to acquire does not actively take place in-house. The CEO of the company indicated that five years earlier, they had to search for patents themselves but that they are now offered patents for sale (or license) by other firms, brokers or individuals. The technological area of the patents they acquire is irrelevant to them. Instead of restricting themselves to a certain technology, the company evaluates the patents and runs litigation analyses to determine the market volume and value of the patents. The company’s CEO states that investment in the patent is justified when the return is three times the size of the investment. Their search for potential infringers is restricted to those infringers fulfilling certain size criteria. In the past, they have made over 90 percent of their revenue from companies that earn over one billion dollars annually. Internal staff members are commissioned with the task of finding potential infringers. However, the company also relies on external experts. The CEO of the company states as follows: “It’s insufficient to ask a very skilled engineer who works for us to tell us whether the patent is valuable, and we also can’t hire a new person every time we get new technology because we’re involved in many, many, many technologies. So, what we end up doing is that we have a core team of a very skilled, experienced engineers that are generalists … and then they would basically have a list of contacts who are experts in narrow fields … We are perpetually delving into that list of contacts to get expertise from them … At any given time, we’re probably hiring from 200 to 400 people who are working on our matters.”

The portfolios of PAE_TRAD_H consist solely of patents acquired from external sources. When it evaluates patents to acquire, the technological field plays a major role. For example, the CEO of the company states as follows: “Markets that we are in with respect to licensing and patents would include medical, it would include auto motors, and it would include semi-conductors, to name a few”. The search for patents actively takes place in-house or in combination with ad hoc opportunities offered by patent holders. For example, the CEO of the company says: “…Some of them we may get offered…We are scouring the patents more ourselves all of the time”. The company relies on internal workforce and support from externals to search for infringers. As the CEO
of the company said: “It is always us that find them, but sometimes we get assistance from the patent owner”. In their search for potential infringers, the company does not have any criteria. The CEO of the company says with regard to infringers: “Some have been smaller companies, but most of our revenues anyway come from the larger companies”.

When PAE_TRAD_I evaluates patents to acquire, the technology field plays a major role. The Managing Director of the company indicates that the company is focusing on consumer electronics. The search for patents actively takes place in-house or in combination with ad-hoc opportunities offered by patent holders. With regard to how patents are found, the Managing Director of the company states as follows: “We identify patent owners with interesting portfolios either by ourselves, by intermediaries or companies contact us directly.” At PEA I, the search for potential infringers is not completely outsourced. They use a combined approach consisting of internal and external searchers. In this regard, the Managing Director of the company states as follows: “The most likely ‘users’ are identified by the company… Licensees also tell us that competitors are infringing patents too, all of the time…There is no honor amongst them”. In their search for potential infringers, they do not indicated that that have criteria for the selection of infringers.

The portfolio of PAE_TRAD_J consists of 5000 patents solely acquired from external sources. When it evaluates patents to acquire, the technological field plays a major role. For example, the CEO of the company states that the technology of interest must have rising margins, i.e., “…You want to be looking at more relevant, larger areas like cloud technology or new areas in medical devices, and you want to avoid entering a market in which margins are falling”. Their infringement analysis is restricted to infringers fulfilling certain size criteria. The CEO of the company indicated that they only target Fortune 100 companies and have a policy of not pursuing smaller companies. He furthermore indicated that some reverse engineering is performed in-house but most is outsourced. Thus, the company uses a combined approach consisting of internal and external experts to find potential infringers.
1.5 Discussion and propositions

From the case sample analyzed, we find that attention in PAEs' search for patents and potential infringers and thus the locus of search (internal vs. external) is primary influenced by three antecedents: the existence of an initial portfolio, the focus of patent acquisition, and the size of the PAE in terms of manpower. In addition, the search for potential infringers seems to depend on whether the PAE has set up internal selection criteria for potential infringers. The findings from the previous section are summarized in the following Table 2, which provides the basis for this section.

<table>
<thead>
<tr>
<th>PAE</th>
<th>Initial portfolio</th>
<th>Focus of patent acquisition</th>
<th>Size (employees)</th>
<th>Criteria infringer selection</th>
<th>Locus of patent search</th>
<th>Locus of infringer search</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAE_PROD_A</td>
<td>yes</td>
<td>narrow technology focus</td>
<td>-1</td>
<td>no criteria</td>
<td>no patent search</td>
<td>internal search by the PAE</td>
</tr>
<tr>
<td>PAE_TRAD_B</td>
<td>no</td>
<td>broad technology focus</td>
<td>-1</td>
<td>Fortune 500 companies</td>
<td>externals offer patents</td>
<td>externals search for infringers</td>
</tr>
<tr>
<td>PAE_PROD_C</td>
<td>yes</td>
<td>broad technology focus</td>
<td>-10</td>
<td>big companies - the &quot;Who's Who&quot;</td>
<td>externals offer patents</td>
<td>externals and internals search for infringers</td>
</tr>
<tr>
<td>PAE_TRAD_D</td>
<td>no</td>
<td>narrow technology focus</td>
<td>-50</td>
<td>big-sized market volume companies</td>
<td>external offers and internal search for patents</td>
<td>externals search for infringers</td>
</tr>
<tr>
<td>PAE_PROD_E</td>
<td>yes</td>
<td>narrow technology focus</td>
<td>-50</td>
<td>Fortune 500 companies</td>
<td>no patent search</td>
<td>internal search by the PAE</td>
</tr>
<tr>
<td>PAE_PROD_F</td>
<td>yes</td>
<td>broad technology focus</td>
<td>-50</td>
<td>major companies</td>
<td>externals offer patents</td>
<td>externals and internals search for infringers</td>
</tr>
<tr>
<td>PAE_TRAD_G</td>
<td>no</td>
<td>broad technology focus</td>
<td>-50</td>
<td>revenue over one billion dollars a year</td>
<td>externals offer patents</td>
<td>externals and internals search for infringers</td>
</tr>
<tr>
<td>PAE_TRAD_H</td>
<td>no</td>
<td>narrow technology</td>
<td>-70</td>
<td>no criteria</td>
<td>externals offer and internals</td>
<td>externals and internals search</td>
</tr>
</tbody>
</table>
1.5.1 **PAEs’ search for patents**

According to our sample and as shown in Table 2, some PAEs (PAE_PROD_A, PAE_PROD_C, PAE_PROD_F and PAE_PROD_H) have an initial patent portfolio. These PAEs were initially founded to exploit their existing patent portfolios and to maximize the returns from these portfolios. PAE_PROD_A and PAE_PROD_E have refrained from acquiring new patents and have fully focused on exploiting existing patents. The same applies to PAE_PROD_C and PAE_PROD_F. They began acquiring patents only after having almost fully exploited their original portfolios. The attention-based view supports these findings: Firms typically focus their limited attention either on the efficient exploitation of existing business options or on the acquisition of new opportunities for future businesses however, the activities conflict with one another when they are performed simultaneously (Ocasio, 1997; Simon, 1947/1997). If firms focus their attention on existing opportunities, they are likely to overlook potentially relevant opportunities for future business. If they search for the latter, they are less efficient in conducting their current business (Barnett, 2008; Ocasio, 1997; Zahra and George, 2002). The PAEs with an initial portfolio in our sample were initially established to obtain a maximum return from exploiting these patents. Because the acquisition of new business opportunities, i.e., patents, would distract their attention from the goal of exploiting their initial patent portfolio and decrease their efficiency in exploiting these patents, it is thus reasonable for them to refrain from searching for and acquiring external patents as long as their initial patents are not fully exploited. Thus, we propose the following:

**Proposition 1:** As long as the initial portfolio is not fully exploited, PAEs with an initial portfolio tend to exploit their patents without acquiring additional patents.
The size of a PAE might also influence the patent search of a PAE. As shown by PAE_TRAD_B, PAE_PROD_C, PAE_PROD_F, and PAE_TRAD_G, smaller PAEs typically rely on offers and rarely actively search for potentially relevant patents to acquire. By contrast, larger PAEs (PAE_TRAD_H, PAE_TRAD_I, and PAE_TRAD_J) apply combined searches, meaning that they receive offers of patents to acquire but also search for available patents by themselves. The attention-based view provides an explanation for this observation. First, if a PAE searches for patents by itself he literally must suspect that millions of patents are potentially relevant (Henkel and Reitzig, 2010). In 2013 alone, 1.17 million patents were granted worldwide (WIPO, 2014). This huge number of patents leads to an information overload, making it particularly difficult for a PAE to focus its attention on those patents with the most potential (Hansen and Haas, 2001). However, an offer can be understood as a pre-selection of patents provided to the PAE, which allows it to focus its attention solely on the most relevant patents. Second, as revealed by PAE_TRAD_B, PAE_PROD_C, and PAE_PROD_F, PAEs use pre-defined processes to address such offers. Such a pre-defined process facilitates preparatory attention by allowing for “directing attention to a particular stimulus prior to the time that stimulus occurs” (Ocasio, 1997: 201; also see LaBerge, 1995), which enhances speed and accuracy of perception and action (Ocasio, 1997). Both effects imply that passively reacting to offers for patents requires less attentional capacity than a company’s own search. Therefore, reacting to offers might be more reasonable for smaller PAEs that are constrained in terms of manpower and, thus attentional capacity. However, if a PAE acts only on those offers proposed to it, it does not act on patents that are not offered to it by definition. Therefore, it is likely to neglect potentially relevant patents and business opportunities. Following this reasoning, it seems reasonable that larger PAEs, which are able to employ more manpower than smaller PAEs, conduct their own searches for patents as a complement to patent selection by offers. Thus, we state the following propositions:

**Proposition 2a:** For a PAE, selecting patents by reaction to offers requires less attentional capacity than selecting patents by own search but increases the likelihood of overlooking potentially relevant patents.

**Proposition 2b:** All things equal, smaller PAEs merely rely on offers while larger PAEs tend to conduct additional searches for patents by themselves.

According to our cases, in addition to the size of a PAE and the origin of the patents, another important antecedent for a patent search seems to be the technological focus of the patents acquired. As PAE_TRAD_D,
PAE_TRAD_H, PAE_TRAD_I, and PAE_TRAD_J reveal, some PAEs solely focus on patents that stem from a certain technological field, which leads to an assemblage of knowledge, routines, and team structures that are aligned to this particular technology focus (Cohen and Levinthal, 1990; Cyert and March, 1963). Such a focus facilitates focusing attention on novel information related to existing knowledge and experiences (Cohen and Levinthal, 1990; Prietula and Watson, 2000). Therefore, if a PAE engages in a technology focus, it might be easier for it to identify novel patents being potentially relevant. However, if a PAE is lacking such a focus, it might have difficulties in effectively and efficiently focusing its attention on relevant patents. As a consequence, it is reasonable that PAEs without a technology focus refrain from own patent search and merely rely on offers, whereas PAEs with such a focus conduct own searches as well. Accordingly, all PAEs of our cases with no technology focus solely rely on offers (i.e., PAE_TRAD_B, PAE_PROD_C, PAE_TRAD_G, and PAE_PROD_F). Moreover, all PAEs in our sample with a narrow technology focus search for patents by themselves (i.e., PAE_TRAD_D, PAE_TRAD_H, PAE_TRAD_I, and PAE_TRAD_J).

**Proposition 3:** The patent searching of PAEs without a technology focus is solely based on offers while PAEs with a technology focus will conduct an own search.

### 1.5.2 PAEs’ search for infringers

As our cases reveal, the initial patent portfolio of a PAE seems to significantly influence its search for potential infringers. PAE_PROD_A and PAE_PROD_E have an initial portfolio and do not acquire any further patents. They search for potential infringers by themselves, without external support, which indicates that their initial and non-extendable portfolio might require only the focusing of the PAE’s attention and enhances the PAEs’ ability to focus effectively on potential infringers because these PAEs apparently do not need external help for the infringer search. As discussed above, PAEs with an initial and non-extendable portfolio not only own the patents but also have access to the inventors and their specific knowledge related to these patent. In addition, the entire business of these PAEs is based on the limited number of patents they own. As a result, it is likely that they have built up extensive knowledge related to these patents. Both aspects might lead these PAEs to develop extensive knowledge and experience related to their patents. This prior related knowledge facilitates the perception of novel information (Cohen and Levinthal, 1990) and supports the focusing of attention on this information (Cho
and Hambrick, 2006; Gavetti et al., 2012). Thus, it is likely that PAEs with an initial and non-extendable portfolio can distribute their attention particularly effectively across potential infringers of the patents they own. Moreover, a PAE with an initial and non-extendable portfolio might be interested in making the most out of the limited number of patents it owns. Thus, it is likely that such a PAE searches for potential infringers extensively and over a longer period of time, giving it the opportunity to focus its attention sequentially on one potential infringer after another. This process facilitates preparatory attention, which, in turn, supports a fast and accurate search for infringers (Carter, 1971; Monteiro, Arvidsson, and Birkinshaw, 2008; Ocasio, 1997).

**Proposition 4:** PAEs with an initial and non-extendable portfolio conduct a particularly comprehensive search for potential infringers of their patents. Due to their specific in-depth knowledge in their field they typically do not make use of external help for this search.

All PAEs in our sample with a broad technology focus apply a combined type of search (i.e., an internally as well as externally supported search) when acquiring new patents. PAEs in our sample with an initial portfolio and extendable portfolio have a broad technology focus when acquiring new patents (PAE_PROD_C and PAE_PROD_F). They apply a combined search. As discussed above, their initial portfolio provides them with the prior knowledge related to the patent (as part of the initial portfolio) and related to the respective infringers, which allows for an effective and efficient search for infringers of these patents. Thus, they typically conduct this search by themselves. However, PAE_PROD_C and PAE_PROD_F additionally acquired new patents without a specific technology focus. As they do not have particular knowledge related to these novel patents, they require external firms to help them find infringers. Furthermore, not only the PAEs with an initial portfolio and a broad technology focus, but also all other PAEs with a broad technology focus use external experts for their infringer searches.

**Proposition 5:** Ceteris paribus, PAEs with a broad technology focus use additional external support to search for infringers of patents.

Our cases reveal that the smaller PAEs in our sample typically have pre-defined criteria for the selection of potential infringers. In our case sample, such criteria always pointed toward the infringers with large market volumes (e.g., multinational companies, Fortune 500 companies, or Fortune 100 companies). Because the legal enforcement of a patent can be expensive and cost amounts equivalent to several million US dollars (Kingston,
2010; Luman, John and Dodson, 2006; Weatherall and Webster, 2014), it might be reasonable for a PAE to search for infringers with market volumes that are sufficiently large to justify this investment.

According to Ocasio (1997), pre-defined criteria for infringers can be understood as the “rules of the game”, which are important antecedents of attention (Ocasio, 1997). Such pre-defined criteria help PAEs to focus their attention on only those infringers that might be particularly interesting for them. This pre-definition of attention based on criteria, i.e., the rules of the game, also reduces the attentional capacity required for the search for infringers and increases the speed and accuracy of perception and action (Ocasio, 1997). Thus, it might be particularly interesting for smaller PAEs that have constraints in terms of manpower, i.e., attentional capacity. However, the larger PAEs also choose smaller infringers, which can be explained by the difference in automatic versus controlled attentional processing (Shiffrin and Schneider, 1977; also see Ocasio, 1997). Automatic processing of attention means that people attend to certain activities without active control, i.e., they distribute their attention unreflectively. Automatic processing of attention is based on long-term learning, routines and behavior. It is highly routinized and requires that less of its limited attentional capacity be devoted to a particular task (Ocasio, 1997; Shiffrin and Schneider, 1977; Simon, 1947). According to our cases, larger PAEs are engaged in many infringer cases and, as a consequence, use routinized and pre-defined processes for the infringer search. Moreover, given their large portfolios and frequent searches for infringers, it is likely that they have built up long-term learning, routines and behaviors in searching for infringers, which may lead to automatic processing of attention. Thus, they might be able to process their infringer searching with less attentional capacity than smaller PAEs. As a consequence, even infringer cases that do not lead to major earnings might be worth pursuing for them because the smaller returns from such an infringer case might still be valuable based on their lower search costs (i.e., PAE_TRAD_H and PAE_TRAD_J). This reasoning leads to the following propositions:

**Proposition 6a:** Pre-defined criteria for potentially relevant infringers reduce the search costs that a PAE must invest in the infringer search. Routinized and frequent infringer searching has a similar effect.

**Proposition 6b:** All things equal, smaller PAEs are more likely to focus the search for infringers on larger companies while larger PAEs are more likely to focus their searches for infringers on smaller companies as well.
At first glance, PAE_PROD_A seems to be an exception from the general rule stated in Proposition 6b. While the PAE in this case is relatively small, it also searched for smaller infringers. However, it should be borne in mind that this PAE has a fixed portfolio and initially focused on large infringers only, as stated by Proposition 6a. In later phases of the exploitation of its patent portfolio, it began to sue smaller firms as well. Thus, it is likely that its experience and related knowledge for its patents that have built up over the previous infringer searches enabled it to distribute its attention particularly efficiently across potential infringers, thus making its search more efficient. Based on the foregoing, we posit as follows:

**Proposition 6c:** If a smaller PAE has an initial and not extendable portfolio, it is likely that he will additionally search for smaller infringers in later stages of portfolio exploitation as well.

### 1.6 Implications

#### 1.6.1 General implications: Classifying PAEs from an attention-based view

Based on our findings and the propositions developed in the previous section, we define four archetypes of PAEs from an attention-based view, as shown in Figure 1. These archetypes can be differentiated by the following antecedents of PAEs’ attention. All of them are externally observable, whether in company reports or in patent assignments: (1) the existence of an initial portfolio, (2) the focus of patent acquisition, and (3) the size of the PAE in terms of manpower.

The archetype that we call “Maximizer”, located on the top right side of the framework, describes PAEs with an initial portfolio specialized in a certain technology area. These PAEs are typically focused on generating maximum returns from their initial patent portfolio. Thus, all of the Maximizers’ attention is strictly focused on exploiting these existing assets to the maximum extent possible without acquiring new patents (see Proposition 1). They have expert knowledge regarding not only their portfolio but also the market. Consequently, potential infringers are well known by internal staff (see Proposition 4). Furthermore, smaller Maximizers will likely search for smaller infringers in later stages of portfolio exploitation (see Proposition 6c). The bottom left archetype, which we call “Generalizer”, has a portfolio consisting only of externally acquired patents in any technology field. Thus, this type of PAE is interested in generally searching for different types of patents. These PAEs’ attention in patent searching is not guided by any initial portfolio or technology focus. To guide their attention, they rely on
external offers in patent searching (see Proposition 3) increasing the likelihood of overlooking potentially relevant patents (see Proposition 2a). Furthermore, whereas all Generalizers use external support to find potential infringers (see Proposition 5), in particular the smaller Generalizers refrain almost completely from engaging in patent infringement searches by themselves.
Figure 1: Archetypes of PAEs from an attention-based view

The top left archetype, “Evolver”, describes those PAEs with an initial portfolio that is extended by the acquisitions of new patents. The Evolvers typically begin as Maximizers and become Generalizers after having fully exploited their initial portfolio. While exploiting their initial portfolio, their attention is focused on their patents and its potential infringers (see Propositions 1 and 4). When beginning to acquire new patents for exploitation,
they focus on patents and infringers offered to them, covering a broad technology area (see Proposition 3 and 5). Thus, whereas at the beginning the technology focus of the initial portfolio seems to play a minor role in guiding their attention; instead, the potential of the technology to generate revenues prevails when acquiring new patents. Furthermore, their reliance on offers might require less attentional capacity than selecting patents by own search but increases the likelihood of overlooking potentially relevant patents (see Proposition 2a).

The bottom right archetype, “Specializer”, has no initial portfolio but exhibits a technology focus. These PAEs do not randomly collect promising patents as the Generalizers do but instead focus their attention on patents in certain technological fields and actively search for them internally (see Proposition 3) to decreases the likelihood of overlooking potentially relevant patents (see Proposition 2a). Since their portfolio is not internally generated but entirely acquired, their infringer searches are not as comprehensive as those conducted by Maximizers (see Proposition 4). Bigger Specializers are very likely to target smaller infringers (see Proposition 6c).

In general, we found that smaller PAEs focus their attention less often on small to medium-sized enterprises (see Proposition 6b).

These archetypes have managerial implications for producing companies that are potentially infringing patents and for patent holders who are willing to use PAEs to monetize their patents. Furthermore, implications for policy makers can also be derived from our results.

1.6.2 Managerial implications

Implications for producing firms

Our results reveal several implications for companies developing and producing goods that are prone to infringe a patent held by a PAE. Since “Patent lawsuits are disruptive, unpredictable, and costly” (Chien, 2011, p. 1), it is essential for these firms to understand PAEs’ search behavior that determines who becomes a target and to thus anticipate their own patent litigation exposure. For producing companies, the “Maximizer” and the “Evolver” are the most predictive. The “Maximizer” and the “Evolver” have an initial portfolio specialized in a certain technology area. Their attention is focused on exploiting these existing assets. Thus, the “Maximizer” and the “Evolver” are only a threat for producing companies when they operate in the same technological field as the producing company. If the producing company’s technology and PAE’s patents fall into the same technological
field, staying undetected is rather unlikely because the latter are well aware of potential infringers. Furthermore, smaller “Maximizers” are likely to target smaller infringers. In contrast to the “Maximizer”, the “Evolver” can become unpredictable as soon as it extends its portfolio with new patents acquired in other technology fields than the initial portfolio. The “Generalizer” PAEs are the least predictive. These PAEs’ attention in patent search is neither guided by any initial portfolio nor technology focus. This manifests in a diversified patent portfolio of which any producing company might become an infringer. Thus, for producing companies, these PAEs pose a major threat. A producing company can hardly predict whether this type of PAE might enter into its technological field and if so, whether infringement will be detected. Infringement might well remain undetected because the high diversification of these PAEs portfolio in combination with restricted resources lowers their effectiveness in searching for infringers. We found that PAEs of the archetype “Generalizer” tend to get help from external experts when searching for potential infringers. PAEs of the “Specializer” archetype are more predictable than “Generalizer” PAEs. “Specializers” do not randomly collect promising patents but rather monetize patents with a certain technology focus. Thus, they only pose a threat when being active in the same technological field as a producing company. Even though their portfolio is not internally generated but entirely acquired, as the Generalizers’, they are more effective in the infringer search due to their technology focus and the chance to remain undetected by this PAE is lower than with Generalizers.

Implications for patent holders

In addition, the results reveal several implications for patent holders willing to monetize their patents through a PAE. According to our findings, PAEs with a broad technology focus, such as the Evolver as well as the Generalizer, do not actively search for patents to acquire. Rather they only react on patent offered to them and the Maximizers do neither search for patents nor react on offers. The only PAEs actively searching for patent holders with valuable patents are the Specializers. Our findings only partially support the finding of Fischer and Henkel (2012) that “anecdotal evidence [holds] that NPEs try to actively contact [smaller firms] in particularly interesting technology fields to acquire patents” (p.1532). Instead, our results indicate that patent holders rather have to actively offer their patents to PAEs.

Furthermore, PAEs with relatively high external expenditures in infringer search might be rather unattractive because costs decrease the returns for the patent holder when participating in patent profits. All PAEs with
acquired patents (i.e., “Evolver”, “Generalizer” and “Specializer”) rely on external support in their infringer search. However compared to the other two types the Specializers’ is more specialized due to its narrow technology focus, rather possessing prior knowledge about potential infringers. In addition, a “Specializer” is only interested if a patent holder’s patent is from its specialized technology field. A “Maximizer” might be the most interesting type for a patent holder because these types of PAEs are the most effective in the infringer search. However, these PAEs do not acquire patents externally, and selling the patents to one is therefore not an option. Thus, from a pure infringer search perspective, a patent holder willing to monetize his patents should try to find a special purpose vehicle and monetize the patents itself. One must bear in mind that these implications only include search costs occurring before enforcement and thus to not take other relevant costs that occur at a later state, such as lawyer costs, into the equation.

1.6.3 Policy implications

PAEs are accused of claiming indemnification for patent infringement and that they do not maximize welfare but rather cause loss of social welfare (Bessen et al., 2012). Although we did not measure any welfare effects in our study, we believe that our findings are useful for a more fine-grained discussion of policy-related aspects of PAEs. Our results show differences in the patent monetization capabilities of different PAE types, and imply that, from a policy perspective, a one size fits all approach might not reach the goal that “…an optimal patent indemnification rule should maximize welfare generated for all parties, including sharks [PAEs], R&D intensive manufacturers, and consumers” (Reitzig et al., 2007, p. 149).

Two policy implications are directed at policy recommendations to repress PAEs from targeting infringers. First, whereas Chien (2013) claims that start-ups are a typical target of PAEs and therefore promotes the exemption of micro businesses from patent infringement, our findings show that start-up companies seem to be a rather unattractive target. Our study reveals that most PAEs primarily focus their attention on larger infringers whilst almost entirely neglecting smaller firms. Only smaller Maximizers and larger Specializers enforce their patents against smaller infringers to exploit their portfolio to the maximum. Thus, exempting start-ups from patent infringement will not decrease the litigation activity of PAEs.
Second, in contrast to most authors deeming PAEs to affect the market for technology negatively, some authors proclaim that PAEs are especially valuable for patent holders (Lu, 2012). Our result contributes to this discussion by creating a more fine-grained understanding of PAEs and their search behavior. We found that the PAEs identifying infringers the best (i.e. Maximizers) are not acquiring any patents and are thus not accessible for patent holders. Of all the PAEs acquiring patents from patent holders, the Specializers’ specialization enables them to better distribute their attention, decline search cost and thus can more efficiently search for cases than the Evolvers and the Generalizers. This implies that specialized PAEs have a comparative advantage in searching, monitoring, and screening patents and infringers (see Parchomovsky and Wagner, 2005) and might affect the technology markets more positively than the others.

Finally, our results do not support the argument of Fischer and Henkel (2012) that PAEs in general should be superior to practicing firms in patent monetization. In contrast, our study reveals, that all PAEs acquiring patents rely on external support in their case search. This raises the question whether PAEs are really superior to patent holders in the search for patents and infringers or if patent holders could be equally or even more effective when using external search providers by themselves.

1.7 Conclusion, Limitations and Future Research

Based on a study of ten original cases and the attention-based view of the firm (Ocasio, 1997), this paper investigates how PAEs search for patents and infringers of these patents. In doing so, we not only provide one of the first empirical in-depth studies of PAEs but are likely to be the first to shed light on the essential question of how PAEs find both patents and infringers. We summarize our findings in several propositions that link the specifics of the PAEs studied (i.e., size, portfolio, technology focus and criteria for infringer selection) with their search behavior. Thus grounded, we develop an attention-based view of PAEs that offers several contributions for scholars as well as for industry practitioners and policy makers. The latter might find the classification of PAEs particularly valuable because it offers a more-fine grained view of PAEs and specifies previous policy-related findings regarding PAEs. Industry practitioners might also profit from this classification because it allows them to make better use of PAEs as a vehicle for enforcing their patents. Further, it might help them to gain a better understanding of the type of PAEs that are particularly dangerous for them when infringing patents. For
researchers, our propositions open up several promising pathways for future investigations. First, our findings link the specifics of PAEs with the way these firms focus their attention across patents and infringers and provide one of the rare studies on the antecedents of attention. Second, while the classification of PAEs improves the understanding of PAEs and is therefore valuable per se, future research might substantiate the identified archetypes further. Third, the qualitative character of our study does not allow us to test our findings statistically. Thus, we would like to encourage further empirical testing of our results, although it might be aggravated by the difficulties of collecting empirical data about PAEs as described in the methods section. Finally, we found that some types of PAEs are more effective in patent and infringer search than others. In addition, literature assumed PAEs being more effective than patent holders themselves. Thus, as a fourth pathway for future research we encourage researchers to follow the question if PAEs are really superior to patent holders in enforcing patents.
References


