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The relationship between patent attributes and patent litigation: Considering the moderating effects of managerial characteristics

Chia-Yi Liu ^a, Hsueh-Liang Wu ^b, Cheng-Yu Lee ^{c,*}

^a Department of Food Science (Management Division), Tunghai University, Taichung, Taiwan, ROC

^b Department of International Business, National Taiwan University, Taipei City, Taiwan, ROC

^c Department of Management and Information Technology, Southern Taiwan University, Tainan, Taiwan, ROC

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ABSTRACT

Patent litigation is not only a battlefield of intellectual property rights, but also a context in which patent value becomes more transparent to the parties concerned. Integrating the resource-based theory with the attention-based view, this study argues that a focal patent's attributes and its assignee's cognitive constraints may result in confounding effects on the odds of patent litigation. In a sample of patent infringement lawsuits involving 520 patents granted in the computer chipset industry, the results show that a patent's pendency time and scope of claims both have positive effects on the odds of patent litigation. Furthermore, we found that the main relationship is negatively moderated by the assignee's inward-looking and managerial attention dilution, respectively. This study confirms the need for a dual-theoretical view, and highlights the context-bound nature of patent litigation.

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1. Introduction

The literature on the importance of patents has long been accumulating. The patent stock or patenting intensity of a firm is usually viewed as a reflection of its innovativeness (Oldham & Cummings, 1996; Simonton, 2012), its absorptive capability (Dushnitsky & Lenox, 2005), or its knowledge-creating capacity (Acs, Anselin, & Varga, 2002) because patents not only refer to their assignees' investment in proprietary knowledge, but are also a monopoly right on the claimed domains (e.g., Lippman & Rumelt, 2003; Markman, Espina, & Phan, 2004).

However, the value of a patent remains empirically mixed because converting a patent into a successful product and consequently generating revenue usually require considerable efforts (Rafiqzaman, 1987). Even if the value of a patent is enhanced through the commercialization process, technological spillover may allow competitors to free-ride on such efforts, and quickly imitate or "invent around" the claimed domain of the original

invention (Chadha & Oriani, 2010; Fung & Chow, 2002). Therefore, by confirming a patent's excludability through court orders, litigation becomes a means to verify the protective scope of a patent, as well as to make patent value more transparent. The effect of patent litigation has been widely examined in the literature. For example, the major goals of patent litigation include obtaining market share (Ginarte & Park, 1997), deriving licensing revenues (Thursby, Jensen, & Thursby, 2001) and preventing competitors from bringing similar products to market (Raghu, Woo, Mohan, & Rao, 2008). In a well-known lawsuit of Apple against Samsung, some litigation strategies, such as preliminary injunction and settlement, were used to restrain the rival's market share based on a better understanding of the potential benefits and cost of initiating litigation (Meurer, 1989). A patent involved in a lawsuit also implies the relevant parties' concern over the claimed domain of the patent in dispute (Somaya, 2003). Few empirical studies even attest that the value of litigated patents is higher than that of non-litigated ones (e.g., Allison, Trunkey, Moore, & Lemley, 2004; Markman et al., 2004).

In this vein, some studies have attempted to discover the causes of why a patent is involved in litigation from different theoretical perspectives. The determinants of patent involvement in a lawsuit may be explicable firstly by the resource-based view (RBV), which contends the value-adding effect of certain resources. The RBV,

* Corresponding author.

E-mail addresses: ciliu@thu.edu.tw (C.-Y. Liu), hlwu@ntu.edu.tw (H.-L. Wu), cylee@mail.stust.edu.tw (C.-Y. Lee).

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based on a hyper-rational assumption, suggests that resources with value, rarity, inimitability and non-substitutability contribute to the competitive advantage of resource owners (Barney, 1991). Numerous RBV studies attempted to identify the unique characteristics of litigated patents. For example, a patent that tends to trigger litigation is generally shaped by some attributes, including the profiles of assignees (inventors), patent counts, backward/forward citations, the number of claims, patent domain and pendency time (Lanjouw & Schankerman, 2001; Su, Chen, & Lee, 2012), but our understanding why these attributes affect the likelihood of patent litigation remains limited. Based on the RBV, a patent with long pendency time (the duration for a patent being examined by the patent office before it was granted) refers to a more firm-specific investment, making it a more inimitable resource (Berger, Blind, & Thumm, 2012), while the patent with larger scope of claims is viewed as a non-substitutable resource. In other words, these two explicit attributes of a patent not only imply its holders' exclusive commitment or the uniqueness, but also signal the patent's potential value to outsiders and make it more likely to be involved in litigation. The first objective of this study is to investigate the influences of a patent's pendency time and scope of claims on the likelihood of patent litigation.

In contrast to the RBV, the attention-based view (ABV), drawing on the bounded rationality of decision makers (Simon, 1947), may serve as a complementary view to what makes a patent more likely to be involved in litigation. While the concept of human attention (in regard to the span of managerial attention) is considered critical in explaining the limited information processing capacity of decision makers in the real world (Ocasio, 1997), the value transparency effect of a resource should take into account the ways in which it is perceived and exploited by its owners (Styles, 2006). Therefore, this study is particularly concerned with two forms of cognitive constraints on the part of patent owners: attention dilution and managerial inward looking. Attention dilution, caused by information overload, prevents managers from organizing and aligning a patent portfolio (Lavie, 1995; Ocasio, 2011), and consequently reduces their attention paid to specific patents. Managerial inward looking, characterized by the extent to which a firm's innovation search (in terms of patent citations) is limited within the areas common to its competitors, may hinder managerial ability to fully explore the potential beyond its comfort zone (Kaplan, 2008), thereby reducing the odds of one of its patents being involved in litigation. Thus, the second objective of this study is to ascertain whether attention dilution and managerial inward looking moderate the influences of a patent's pendency time and scope on the likelihood of patent litigation.

The computer chipset industry was chosen for this study mainly because of intensive patenting activities in this concentrated and competitive industry (Tseng, Chang Pai, & Hung, 2011). Also, patent wars in this industry are so frequent that patent litigation often takes place for either strategic or tactical considerations (Cohen & Merrill, 2003). The outcome of lawsuits thus clarifies not only the scope of patent claims, but the market value to all the parties concerned (Schliessler, 2015). These facts make the computer chipset industry a suitable research context.

In a sample of patent infringement lawsuits involving 520 patents granted in the computer chipset industry, our findings show that a patent's pendency time and scope have positive effects on the likelihood of patent litigation, while attention dilution and managerial inward looking negatively moderate the main relationship, respectively. This study helps to elucidate what attributes of a patent make it easier to be involved in a legal dispute; furthermore, this study extends the current stream of patent research by the constrained-efficiency logic to develop a more sophisticated framework. The foundational logic of RBV demonstrates

that certain resource attributes are associated with value creation by the resource owner, but it still leaves some issues unaddressed, such as the lack of consideration of cognitive constraints upon the process by which resource value is perceived and exploited (Mahoney & Pandian, 1992). Using the perspective of ABV to complement the insufficiency of RBV, our findings elucidate the interactive effects between patent attributes and managerial constraints on the odds of patent litigation, and provide empirical results to strengthen the trustworthiness of our framework.

The rest of this article is organized as follows: Section 2 presents a literature review and develops the research hypotheses; Section 3 describes the data, measures and method used to test the hypotheses; Section 4 shows the empirical results; Section 5 provides a discussion of the key findings and conclusions, and offers recommendations for further research.

2. Theoretical review and hypotheses

Competitive advantage is always based on various ways to achieve value creation and appropriation. Firms in knowledge-intensive industries usually aggressively patent innovation outputs so as to shield them from any stealing or copying by the competition. Furthermore, engaging in a patent lawsuit is undertaken for the relevant parties to clarify the scope of patent claims and to signal its value relative to the firm's investment in innovations, i.e. patent litigation could be a lens to make patent value transparent. In light of all the objective and subjective factors which make a patent more likely to become involved in a lawsuit, RBV researchers have already made great strides in identifying the influences of patent attributes (e.g. Lanjouw & Schankerman, 2001; Cohen & Merrill, 2003; Markman et al., 2004). Nevertheless, a complete picture of the probability of a patent being involved in litigation remains unclear without considering managerial attention, which is channeled and distributed heterogeneously within an organization (Ocasio, 1997). This study therefore seeks to expand the current body of knowledge regarding patent litigation by integrating the perspectives of RBV and ABV, whereby the combined efforts can enable us to develop a more comprehensive understanding. The following sections will first discuss the influence of the pendency time of a patent and its synergistic effect with managerial inward looking on the odds of patent litigation. Then we will explore the effect of patent scope and the moderating effect of attention dilution on the likelihood of subsequent patent litigation.

2.1. Patent pending time and patent litigation

Resources become valuable when they make managers to conceive of, and implement, strategies that help to exploit opportunities and neutralize threats (Barney & Clark, 2007). Similarly, the merit of a patent only results when managers can see its advantage and invest accordingly in it. Patent pendency occurs when assignees invest more resources in a specific invention after perceiving its future opportunity, thereby showing the inimitable quality of the invention (Cohen & Merrill, 2003; Igami & Subrahmanyam, 2013). Pendency time reflects the patent-specific investment of the assignee(s), for example, the cost of hiring lawyers and engineers which each patentee must engage for the patent application (Alcácer, Gittelman, & Sampat, 2009; Somaya, 2003; Somaya, Williamson, & Zhang, 2007). As Miele (2001) suggests, the assignees are usually unwilling to engage an enormous amount of resources for their inventions unless the benefits from patent protection are clear and significant. In other words, the assignee may not be willing to invest time and commit to the patent application unless they perceive more potential of their inventions. Some investigations may further reveal facts supporting the

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