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Patents, trademarks, and their complementarity in venture capital funding

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ABSTRACT

This paper analyzes the effects of patents and trademarks in the financing of start-ups through venture capitalists (VCs). Patents and trademarks signal a start-up's technological and marketing capabilities. We find that patents and trademarks not only have direct effects on venture capital financing but also have complementary effects. Start-ups that apply for both patents and trademarks yield higher VC funding than do those firms that apply for only one of the two IP rights. Furthermore, we find that the complementarity between patents and trademarks exists only in initial VC funding rounds. Our results suggest that early-phase start-ups seeking their initial VC funding do best when stressing both their technology and marketing capabilities. Accordingly, entrepreneurship policy should encourage start-ups to build both technological and marketing capabilities.

1. Introduction

This paper considers the complementary effect of patents and trademarks on the amount of venture capital (VC) funding that a start-up receives. VC is an important source of funding for innovative start-ups (Luukkonen et al., 2013; Pandey and Jang, 1996). However, the relationship between start-ups and venture capitalists (VCs) is characterized by information asymmetries because it is difficult for VCs to evaluate the true potential and behavior of start-ups (Baum and Silverman, 2004; Neher, 1999). VCs rely on quality characteristics to approximate a start-up's quality before making investment decisions (Zacharakis and Meyer, 2000). One example of such observable quality signals is the intellectual property (IP) portfolio that a start-up holds (Gredel et al., 2012; Hoenig and Henkel, 2015; Veer and Jell, 2012). Research shows that patents are an indicator for technological innovation (Ayerbe et al., 2014; Chang, 2012) and that VCs value patents as quality signals (Haeussler et al., 2012; Hsu and Ziedonis, 2008). Furthermore, though they have been less explored, trademarks seem also to have a positive influence on the valuation of start-ups by VCs (Block et al., 2014a).

Prior research, however, has investigated the role of IP rights in VC financing from an isolated point of view. The interaction between the different IP rights has been overlooked. The question on how patents and trademarks might complement each other from a VC perspective remains unexplored. This open research question is at the core of our paper. We investigate how patents and trademarks complement each other in VC funding. As VC financing typically consists of several funding rounds, we further explore how the complementarity between patents and trademarks changes from initial to later funding rounds.

Patents and trademarks serve two different purposes: patents have the goal to protect inventions or technologies; trademarks exist to protect marketing assets or brands. Even though these purposes differ from each other, patents and trademarks may complement each other in many ways. As Schwiebacher and Müller (2009) stated, “inventions do not speak for themselves but

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do benefit from the support of brands in the communication with customers" (p. 1). Trademarks, in turn, may also have stronger effects when combined with patents. Erdem et al. (2006), for example, argue that brands are particularly effective as signals of product positions and product quality when they are credible. In particular for firms with innovative products patents can give credibility and thus strengthen the effects of trademarks as legal anchors of brands. We argue that VCs understand this complementarity between patents and trademarks and provide higher amounts of financing to start-ups which apply for both patents and trademarks.

VCs do not typically provide financing in a single, upfront investment (Lauterbach et al., 2014). VC is typically provided over several funding rounds. Such staged financing allows VCs to reduce information asymmetries and agency problems (Sahlman, 1990; Wang and Zhou, 2004). During the financing cycle, VCs learn about the quality of start-ups by observing several tangible and credible signals, e.g., whether the start-ups are able to meet a set of predefined performance targets or milestones (Block et al., 2014a; Hellman and Puri, 2002; Lauterbach et al., 2014). We shall argue that the value of patents and trademarks as quality signals becomes less important as the start-up moves further along the financing cycle. Accordingly, the direct and complementary effects of patents and trademarks on VC financing should decrease from initial to later funding rounds.

To investigate the effects of patents and trademarks on VC funding, we use a combination of four different data sources: an online survey to collect information about the business model and characteristics of start-ups, the PATSTAT database for patent applications, the USPTO database for trademark applications, and Crunchbase to collect funding data about the start-ups that took part in the survey. Building on a sample of 427 funding rounds received by 299 start-ups, we show that in addition to the direct effects of patent and trademark applications on the amount of VC financing, a complementary effect exists between the two IP rights. Start-ups that apply for both patents and trademarks yield higher funding amounts than do those firms that apply for only one of the two IP rights. Furthermore, we observe that the complementarity between patents and trademarks exists only in the initial and not in later VC funding rounds.

The remainder of the paper is organized as follows: Section 2 develops our hypotheses. Section 3 describes our sample and the corresponding data sources. Section 4 shows the results of descriptive and multivariate data analyses. Section 5 discusses the results and connects them to previous research. Section 6 provides conclusions, discusses limitations, and suggests further areas of research.

2. Theory and hypotheses

The primary purpose of this paper is to investigate the complementarity between patents and trademarks regarding VC funding. This is our main contribution to the literature. To develop hypotheses regarding the complementarity between the two IP rights in the context of VC funding, however, we first need to establish the direct relationships between patents, trademarks, and the amount of VC funding. We acknowledge that prior literature to some extent has already investigated the direct effects of patents and trademarks on VC funding (e.g., Block et al., 2014a; Haeussler et al., 2012; Hsu and Ziedonis, 2013).

Accordingly, we develop four hypotheses. Hypotheses 1 and 2 are about the direct effects of patents and trademarks on the amounts of VC funding, functioning as base line hypotheses. Hypotheses 3 and 4 are our core hypotheses concerning the complementarity between patents and trademarks in the context of VC funding.

2.1. Patents and their influence on the amount of VC funding

Prior research has shown that patents influence the valuation of start-ups positively (e.g., Haeussler et al., 2012; Hsu, 2004; Hsu and Ziedonis, 2013). This can be explained in two ways: patents have both a signaling and a protection function. Regarding the signaling function, VCs can interpret patents as a quality signal reflecting the firm's technological advancement and innovation capabilities (Ayerbe et al., 2014; Chang, 2012). Patents show that a firm possesses an invention or technology that is worth being protected (Ernst, 2001). During the patent application process, patent applications are assessed against prior art regarding their degree of novelty and technological advancement. Regarding the protection function, patents as an IP right allow the owner to exclude others from the use of a particular technology. This is of high importance in (cross) licensing (Wang and Ying, 2014). This protection function of patents is independent from the start-up and does not lose its value when the start-up ceases to exist. In such a case, VCs could still try to commercialize the patented invention through selling or licensing.

Based on the signaling and protection functions of patents, we formulate the following hypothesis:

Hypothesis 1. : Start-ups with patent applications receive higher amounts of VC funding than do start-ups without patent applications.

2.2. Trademarks and their influence on the amounts of VC funding

Trademarks have a signaling value because they indicate a start-up's degree of advancement regarding marketing (Mendonça et al., 2004), readiness in product or service development (Greenhalgh and Longland, 2005; Greenhalgh and Rogers, 2006a; Helmers and Rogers, 2011), and level of market orientation and market access (Block et al., 2014a, 2015). VCs value it when start-ups have begun to conduct marketing activities to commercialize their products and services (Douglas and Shepherd, 2002; Hills, 1984). Furthermore, the ability to build a sustainable brand can be one of the most crucial success factors for a start-up (Aaker, 2004); thus, VCs are more ready to finance start-ups that have proven to be successful not only in technology development and management abilities but also in marketing activities (Wright et al., 2004).

In addition to supporting the commercialization of (high-tech) inventions and technologies in manufacturing industries (Malmberg, 2005; Mendonça et al., 2004), trademarks are important for service and low-tech innovations, where patents are not applicable as a means of IP protection (Millot, 2011). Specifically, the service sector seems to be strongly connected to trademark filings (Jensen and Webster, 2011), and trademarks can be considered an appropriate innovation indicator for service firms (Schmoch and Gauch, 2009). Moreover, for service firms, there is a positive association between trademark intensity and productivity growth (Greenhalgh and Rogers, 2007) and an even stronger one between trademarks and stock market value compared with manufacturing firms (Greenhalgh and Rogers, 2006a). Innovation in service firms is often not as groundbreaking, or at least not as clearly distinguishable, as it is in high-technology firms. For this reason, trademarks are often the only effective way to protect a service firm's IP rights (Davis, 2009). Therefore, service firms often turn to trademarks to protect their IP rights (Elsmore, 2008), and VCs value such behavior.

These considerations lead us to formulate the following hypothesis: