

HOSTED BY



Contents lists available at ScienceDirect

Asia Pacific Management Review

journal homepage: www.elsevier.com/locate/apmr

Complementary assets, appropriability, and patent commercialization: Market sensing capability as a moderator

Jie-Heng Lin ^a, Ming-Yeu Wang ^{b,*}^a Graduate School of Business Administration, National Taiwan University, Taipei, Taiwan^b Department of BioBusiness Management, (Formerly known as Department of Bio-industry and Agribusiness Administration), National Chiayi University, Taiwan

ARTICLE INFO

Article history:

Received 17 February 2014

Accepted 22 September 2014

Available online 30 March 2015

Keywords:

Appropriability

Complementary asset

Market sensing capability

Patent commercialization

ABSTRACT

Based on the framework of profit from innovation, the factors affecting patent commercialization performance include innovation appropriability and firms' complementary assets. The framework of dynamic capabilities illustrates that appropriability and complementary assets are seizing capabilities underlying firms' dynamic capabilities, and market sensing capabilities are one type of sensing capabilities. This study argues that not only seizing capabilities but also interactions between seizing and market sensing capabilities affect patent commercialization performance. Based on the surveyed data from Taiwanese firms owning biotechnological patents, this study finds that complementary assets and patented innovation appropriability significantly positively affect patent commercialization performance. Market sensing capabilities significantly positively moderate the relationship between complementary assets and patent commercialization performance, whereas their moderating effect on appropriability and commercialization performance is not significant. Finally, this study provides suggestions for patent management practitioners.

© 2015, College of Management, National Cheng Kung University. Production and hosting by Elsevier Taiwan LLC. All rights reserved.

1. Introduction

Commercializing patented innovations (hereinafter patents) is an important stage of improving organizational performance. The definition of patent commercialization is similar to that of commercializing a technology (Shane, 2001; Svensson, 2007; Teece, 1986), which includes selling, transferring, or licensing out patented technologies to existing firms, to establish new firms on the basis of patented technologies or to implement patented technologies in patentees' products or manufacturing processes. Although the definition of patent commercialization is similar to that of technology commercialization, the costs of holding patents make commercializing patents more critical. During the period of holding a patent, firms have to pay considerable fees, such as filling and maintenance fees. Moreover, maintenance fees increase during the granted duration (Bessen, 2008). Effectively commercializing their

patents by evaluating the determinants of patent commercialization increases returns and thereby improves firm performance.

Prior studies have identified factors affecting the performance of patent commercialization. These studies have typically investigated patent-level or technology-level factors, such as patent scope, patent age, citations, and science linkage (e.g., Dechenaux, Goldfarb, Shane, & Thursby, 2008; Nerkar & Shane, 2007). However, products are complex artifacts that consist of different underlying technologies and knowledge that interact with one another (Peine, 2009), and creating products that address customer needs and achieve market success requires the combination of multiple technologies (Somaya & Teece, 2007). Because this complexity requires investigation of firm-level influential factors, this study focuses on the effects of firm-level organizational capabilities by examining previous technology commercialization studies.

Teece (1986) proposed the well-known profiting from innovation (PFI) framework to explain how organizations can capture profits from technology commercialization. This framework uses appropriability and complementary assets as two crucial determinants. Appropriability indicates the imitability of the innovation. A technology with strong appropriability is hard to imitate, enabling innovators to monopolize the profits from its

* Corresponding author. Department of BioBusiness Management, (Formerly known as Department of Bio-industry and Agribusiness Administration), National Chiayi University, Number 580, Sinmin Road, Chiayi City 60054, Taiwan.

E-mail address: mywang@mail.ncyu.edu.tw (M.-Y. Wang).

Peer review under responsibility of College of Management, National Cheng Kung University.

commercialization. Applying for patents establishes legal impediments that prevent imitating technologies. Given a firm's establishing of legal barriers and paying for disclosing technology knowledge to the public, that knowledge's inherent replicability by other firms further explains how patentees can capture the value from their own innovations (Levin et al., 1987). This study extends the concept of appropriability to firm-level patentees and investigates whether the firm's capability to generate highly appropriate patent knowledge can advance its patent commercialization performance.

Complementary assets refer to the firm's assets or capabilities [rather than technology or intellectual property (IP)] necessary for successfully commercializing technologies, which include manufacturing capacity, distribution channels, after-sales service, brands, and complementary technologies (Teece, 1986). Complementary assets strongly shape firms' strategies and evolution paths, potentially affecting returns on innovations.

In Teece's framework of dynamic capabilities, appropriability and complementary assets relate to seizing decisions and capabilities underlying firms' dynamic capability as key elements in selecting enterprise boundaries and eventually affecting firm performance (Teece, 2007). Firms require sensing capabilities to identify opportunities and threats from their business ecosystem. Market sensing capability is one type of sensing capabilities, which involves the capabilities of gathering and filtering market information from outside and inside the firm, determining its meaning, and drawing implications for action that can reduce commercialization process uncertainty and increase opportunities for successful commercial innovation (Day, 1994; Teece, 2007). The probability of an innovation's commercial success correlates highly with the developers' understanding of customer needs (Brown & Eisenhardt, 1995; Kahn, 2001) and top managers' sensitivity to markets (Day, 2002). The ability to sense markets enables firms to anticipate new technologies' potential, leading to successful development activities (Teece, 2010). Therefore, on the basis of the PFI framework, this study investigates the effects of firms' complementary assets and patents' appropriability on patent commercialization performance. Supplemented by the framework of dynamic capabilities, this study further investigates the moderating effects of market sensing capability on the relationship between seizing capabilities, specifically complementary assets and appropriability, and patent commercialization performance.

We empirically surveyed Taiwanese firms with biotechnological patents granted by either the United States Patent and Trademark Office (USPTO) or Taiwan Intellectual Property Office (TIPO) 2000–2009, and applied partial least squares (PLS) structural equation modeling to analyze the effects. The results contribute to understanding the relationships among complementary assets, appropriability, market sensing capability, and patent commercialization performance. Finally, this study addresses the implications of dynamic capability and patent commercialization for academia and offers suggestions to patent management practitioners for increasing profits from patent commercialization.

2. Theoretical background and hypotheses

Firms can earn great benefits from patent commercialization, which include increasing revenue and market share, maintaining growth and competitiveness, and creating new opportunities and new firms (e.g., Dechenaux et al., 2008; Shane, 2001). The present study contributes to understanding firm-level influential factors of patent commercialization performance based on the PFI framework. The framework explains that appropriability determines the

success of technology commercialization. During the process of patent commercialization, a firm may encounter uncertainties and rivals' imitations. For an innovation, high appropriability frees the owner from imitation by rivals, thus reducing uncertainties in commercializing patents and providing patentees greater bargaining power for successful commercialization (Dechenaux et al., 2008; Levin et al., 1987; Teece, 2000; Teece, Pisano, & Shuen, 1997). The owners of innovations with strong appropriability might have the confidence to engage more widely with their external environment, and therefore, would be better off contracting with incumbents (Laursen & Salter, 2014). Moreover, successfully commercialized products typically comprise multiple technologies (Somaya & Teece, 2007); therefore, this study extends the perspective of appropriability to the firm level and argues that when firms possess the capabilities to create stronger appropriability of their patents' technological knowledge, their patent commercialization performance increases. Thus, we propose the following:

H1: Firms with stronger levels of appropriability in patents have higher patent commercialization performance.

Commercialization of innovative outcomes requires complementary assets. Complementary technologies, channels, competitive manufacturing capabilities, and service are all important ones. Insufficient necessary complementary assets may direct innovation profit flow to rivals, suppliers, distributors, or clients (Teece, 1986).

Previous studies have reported the effects of complementary assets when commercializing innovations in technology or product markets. For example, Rothaermel (2001) found that incumbent biopharmaceutical firms owning complementary assets critical to commercializing new technology can adopt new technology and radical technological change through alliances with new entrants. The new entrants that lack commercialization experience can learn and accumulate experiences through participation in the commercialization process, thereby benefitting subsequent commercializations, either through self or joint development (Hsu & Wakeman, 2013). Helfat and Lieberman (2002) concluded that complementary assets are more important than core resources to new entrants. Rothaermel and Hill (2005) revealed that an incumbent firm's financial strength has a stronger positive effect on firm performance in the postdiscontinuity period if the new technology can be commercialized through generic complementary assets. Taylor and Helfat (2009) reported that incumbent firms attempting to transition to a new technology require linkages between organizational units responsible for developing the new technology and units in charge of complementary assets for commercializing the innovation.

Commercializing a patent enables capturing profits from it. Similar to technology commercialization, firms may possess insufficient capabilities or assets to introduce the patents to markets. For example, a research-oriented laboratory's core competence of research and development may leave it with inadequate marketing and distribution capabilities; thus, it encounters high risk in introducing new products to the market. Another example is patentees with insufficient manufacturing capacities or complementary technologies already owned by other firms find it difficult to commercialize their innovations. Currently, the necessary resources and capabilities for commercializing an innovation have increasing complexity and involve multiple disciplines; hence, firms need more diversified complementary assets. Therefore, analogous to the effects of complementary assets on firm performance when commercializing innovations, this study asserts that possessing more complementary assets benefits firms' patent commercialization. Thus, we propose that

Download English Version:

<https://daneshyari.com/en/article/1024229>

Download Persian Version:

<https://daneshyari.com/article/1024229>

[Daneshyari.com](https://daneshyari.com)