The value determinants of new product innovation: An appropriability perspective

Abstract

New product innovations represent a potential commercial value when they are introduced to the market. However, value created by organizations through the introduction of a new product may not be wholly captured by the sponsoring firm. Based on Teece’s three building blocks that affect profiting from technological innovations, we attempt to discuss the effect of value appropriability mechanisms on new product innovations. In addition, we consider the technology sourcing effect on the value appropriability. Therefore, the three building blocks with the technology sourcing modes determine the capability of the value appropriability, and eventually affect the magnitude of profits from innovations.

Introduction

New product innovations are vital for firms to maintain competitive advantage (Lee and Chen, 2009). Previous studies have indicated the positive effect of new product introduction on the market value of firm. Firms that keep on introducing newly innovative products leaf to high profitability for a sustained period (Schumpeter, 1934), that is, new products are helpful to the financial health of sponsoring firms (Sharma and Lacey, 2004; Schumpeter, 1934; Chaney, 1991). Thus, new product
innovation plays an important role in maintaining competitive advantage of firms.

However, value created by organizations through the introduction of a new product may not be wholly captured by the sponsoring firm (Lepak, 2007). Wang and Chen (2010) argued that the amount of final value a firm can appropriate from its innovation is determined by both value appropriation and total value creation. Durand et al. (2008) suggested the value creation and value appropriation are both a firm’s strategic missions that accrue the value. Hence, the benefits derived from innovations is determined not only by the total value created by the resources, but also by the appropriability.

Teece’s (1986) study discussed the determinants of profiting from technological innovation, and asserted three fundamental building blocks: the appropriability regime, complementary assets, and the dominant design paradigm. Based on Teece’s study in 1986, we further discuss the effect of appropriability on market value of a newly innovative product. In addition, we recognize the nature of various technology sources that help to develop a product, and discuss the sourcing effect on the appropriability. The three building blocks with the technology sourcing modes contribute the capability of value appropriability in this current study.

In the following sections, we discuss the role of new product innovation on the value creation. Then, we respectively discuss and extend the three building blocks with
other literature. At last, we consider the relationship between technology sourcing and the appropriability.

**Literature Review and Propositions**

**New product innovation as value creation**

Studies suggest that the new product innovations are necessary activities for firms (Chaney et al., 1991), new products should be highly valued by investors, and new innovations of firms should generate excess returns when compared with market average. The results of previous studies presented the impact of new product innovations on the market value of the sponsoring firms. The more innovation the better signal to the shareholders that the firms are willing to invest substantially in the future.

Chen and his colleagues (2002) examined the role of strategic interaction in explaining the valuation effect of new product announcements. Using event study, their study found that the market values of introductions announced by firms in strategic substitute competition are more favorably than those announced by firms in strategic complements competition. The results showed the notion that the nature of competitive interaction in an industry is important in assessing the effect of corporate product strategies on shareholder value (Chen et al., 2002).

Chen, Ho and Ik (2005) examined the wealth effect of new product introductions on
industry rivals. They argued that the market expansion effect predicts the industry rivals should experience a positive wealth effect, and the market substitution effect predicts that they should experience a negative wealth effect. On average, the results showed that rival firms experience a small but significantly negative share price response. That is, the market substitution effect dominates the market expansion effect (Chen et al., 2005).

To examine the role of organizational form in explaining the economic impact of corporate new product strategies, Chen (2009) tested and compared the efficient investment hypothesis with the internal capital market hypothesis. The results of this study showed that the wealth effects associated with the announcements of new product introductions are more favorable for introducing firms with focused activities than for those with diversified activities. The findings also indicated that the efficient investment hypothesis dominates the internal capital markets hypothesis in terms of the net economic impact of new product introductions on the introducing firms (Chen, 2009).

Sood and Tellis (2009) argued that the evaluation of an innovation project must cover the whole process that from the initiative stage of product development to the end of commercialization. Hence, their study identified three distinct sets of activities in the innovation project: initiation (including alliances, funding and expansions for new
innovation projects), development (including prototype, patents and preannouncements), and commercialization (including new product launch and awards). Thus, total market returns to the entire cycle of innovation project are the sum of returns to all activities during the innovation project. The results of this study showed that returns to the development activities are consistently the highest and returns to commercialization the lowest. In addition, returns to the new product launch are the lowest among all eight events, returns to negative events are higher in absolute value than those to positive events (Sood and Tellis, 2009).

Lee and Chen (2009) demonstrated the supporting role of firm resources and organizational structure on the financial impact of new product introductions. The study found that the marketing resources are critical to promote and launch new products to customers. However, the R&D resources have U-shape effect on market return (Lee and Chen, 2009).

To explore the announcement effect of R&D projects during the process of development, Kelm and colleagues (1995) split the process of R&D projects into two stages: innovation and commercialization. Then they examined the impact of R&D project announcement on the firms’ stock market value separately in the innovation and commercialization stages. They employed technology- and market-related variables as predictors of the wealth impact of R&D announcements. The results
indicated that the stage of the R&D process moderates the relationship between the wealth effect of technology and market variables. The technology variables are more important than market variables in the innovation stage (Kelm et al., 1995).

Draw on Kelm et al (1995) study, Narayanan et al (2000) examined the voluntary disclosure of qualitative information of R&D project announcements in the Wall Street Journal. Their study used two types of qualitative information characteristics: actions of government agencies (including governmental approval and patents granted); and managerial intentions (including technical goal, market share goal, growing market mentioned, and diversification goal). In addition, the context of announcement also affects qualitative information on economic significance. Their study indicated that information regarding government approval and managerial intentions voluntarily disclosed in R&D project announcements interact with industry and firm variables, and provide significant incremental explanatory power in both the innovation and commercialization stages of R&D projects (Narayanan et al., 2000).

In brief, most studies of new product innovation show positive effect on firms’ value, and the results also recognize the value creation role of NPI. Previous studies explore the determinants that may affect the market value (such as the abnormal return in stock price). These factors could be firms’ characteristics (Chaney et al., 1991; Chen, 2002, 2005, 2009; Lee and Chen, 2005), market interactions and competitions (Chen,
The definition of value appropriability

The innovation output can enable a firm to improve performance, however, it does not guarantee that the firm will capture all of the potential benefits from the innovation (Artz et al., 2010; Teece, 1986, 1996). Teece (1986) argued that a regime of appropriability refers to the environmental factors that govern an innovator’s ability to capture the profits generated by an innovation. He defined that the most important dimensions of appropriability regime are the nature of the technology, and the efficacy of legal mechanisms of protection. For the nature of technology, the degree of tacit or codified affects ease of imitation and further influence the appropriability. On the other hand, patents may not work effectively in practice, especially to protect the innovation in process. Therefore, Teece (1986) simplified the appropriability environment by tight and weak, which reflects the nature of the technology and the efficiency of the legal system.

Harabi (1995) argued that one indicator of appropriability is the ratio of private returns to social returns resulting from innovation, and there are three factors affect this ratio: characteristics of the innovation itself, the characteristics of the innovating firm, and the market structures that the incumbent is operating. However, the
protective capacity of patents is very complex (Harabi, 1995). Ceccagnoli (2009) argued that appropriability refers to the degree to which a firm captures the value created when it introduces innovations. Briefly, the strength of strategies used to appropriate innovation rents, such as patenting, secrecy, first mover advantages, and specialized complementary assets, is therefore a key determinant of profitability differences across firms (Ceccagnoli, 2009).

Hurmelinna-Laukkanen and her colleagues (2008) suggested that a primary prerequisite of an incumbent captures profit from innovation is able to prevent the duplication of its intellectual assets and technology from rivals. They defined appropriability as a strategic success factor for organizations that produce R&D results for propriety use. Establishing an effective appropriability regime can facilitate firms to take profit from innovations (Hurmelinna-Laukkanen et al., 2008; Gonzalez-Alvarez and Nieto-Antolin, 2007). When regarding to discrete and complex product industries, differences in the appropriability regimes may also be explained by the dynamism of the business environment, in addition, inventions that cover narrower technological domains (also called stand alone inventions) are easier to protect with patents (Hurmelinna-Laukkanen et al, 2008).

Based on the perspective of RBV, Wand and Chen (2010) suggested that a high level specificity of innovative knowledge can help to appropriate a greater share of the
innovation value. Organizational routines facilitate firm-specific innovating activities, hamper the imitation by rivals, and eventually increase a firm’s ability to appropriate its innovation value. In addition, a firm’s specificity that accumulated by increasingly occupies contiguous spaces in related technological domains and thus limits the spaces available for competitors to invent around is one of appropriability regimes (Wang and Chen, 2010).

To emphasize the importance of appropriability by comparing the value of resources and outcome of using these resources, Dahlander (2005) defined appropriability as the possibility the owner of a resource has to capture return equal to more than the value created by that resource. An appropriability regime is related to the features of the core knowledge in the innovation and the institutional protect. Similarly, Sattler (2003) asserted that a firm must be able to sufficiently appropriate returns from the product innovation. If the competing firm can imitate an innovation with a lower cost than the original innovator, that may undermine incentive for the innovator to innovate continuously.

In sum, the discussion of appropriability that mentioned above can define the appropriability as a kind of organizational capability. The appropriability, therefore, affect level of benefit that a firm can capture from using resource (Dahlander, 2005), or innovation (Ceccagnoli, 2009; Hurmelinna-Laukkanen et al., 2008; Sattler, 2003;
Teece, 1986; Wang and Chen, 2010), and eventually decide the ratio of private return to social return (Harabi, 1995). Therefore, a firm with better appropriability can induce R&D efforts, eliminate imitations from rivals, and enhance profits.

The appropriability regimes

Following the discussion of appropriability in last section, a series of studies addressed the effectiveness of protection on patent regulatory (Ceccagnoli, 2009; Cohen et al., 2000; Harabi, 1995; Hurmelinna-Laukkanen and Puumalainen, 2007; Levin et al., 1987). Albeit the appropriability of an innovation is determined by the effectiveness of legal mechanisms such as patents (Artz et al., 2010), however, Cockburn and Griliches (1988) argued that the effectiveness of patent mechanism to appropriate the returns from R&D is not so constant. They suggested that the value of returns to a firm from inventing in patent protection differs in different industry conditions and firm-specific factors (Cockburn and Griliches, 1988).

According to Levin and colleagues’ (1987) study, they discussed the mechanism of appropriating returns from industrial R&D and suggested that patents do not always work effectively. The findings of their study are congruent with Teece’s conclusion in 1986 (Teece, 1986: 287). Therefore, to enhance the appropriability of firm, innovators may rely on other mechanisms, i.e. lead time, secrecy, learning advantage, and sales/service efforts to provide additional protection from imitation. In general, their
study confirmed that the other means of appropriation are more important than the patent system (Levin et al., 1987).

Drawn on Levin and colleagues’ (1987) study, Harabi (1995) investigated the effectiveness of different means of protecting the competitive advantaged of technical innovations in Switzerland. Harabi asserted that the most popular means of appropriability are patents, secrecy, lead time, moving quickly down the learning curve, superior sales or service efforts, and imitation barriers. The primary results of his study are as follows (Harabi, 1995).

1. The most effective means of appropriability for process innovation is lead time, meanwhile innovations superior sales and service efforts are the most effective means for product innovation.

2. Comparing with the other means of appropriability, the patents are the least effective means of appropriability. In addition, patents are not effective enough but in the drug industry.

3. The two factors mainly affect the effectiveness of patents: the competitors invent around the patented innovations, and the patentees disclose too much information in the patent document.

The findings of Harabi’s study in 1995 are similar with Levin and colleagues’ study in 1987. Both they emphasize the importance of other appropriability mechanisms, and
recognize the effectiveness of patents is industry specific.

In addition, Cohen and colleagues (2000) using survey questionnaire to R&D labs in the U.S. manufacturing sector, and found that firms typically protect the profits due to invention with a range of mechanisms, including patents, secrecy, lead time advantages and the use of complementary marketing and manufacturing capabilities. Similar with the previous studies, their findings also indicated that the patents tend to be the least emphasized by firms in the majority of manufacturing industries, and secrecy and lead time tend to be emphasized most heavily (Cohen et al., 2000).

In line with previous studies, Ceccagnoli (2009) indicated that firms are used to increase appropriability by secrecy, patent protection, being first to market, and the ownership of specialized complementary marketing, and manufacturing assets (Ceccagnoli, 2009). Also, firms attempt to protect some valuable invention may need to invent around it, by introducing substitutes that may present improvements upon the original product. Based on the perspective of knowledge mobility, Hurmelinna-Laukkanen and Puumalainen (2007) pointed out that the appropriability mechanisms have the potential of making knowledge more protected, but some of them may also make the know-how more transferable and tradable. The requirement of patent granted is to clearly disclose the information about the invention, and in general it may not be the first choice to prevent imitation. The findings of their study showed
that the existence of an appropriability mechanism does not guarantee competitive advantage, but choosing the right ways of utilizing them is relevant (Hurmelinna-Laulkanen and Puimalainen, 2007).

Exploiting 805 commercialized inventions that are licensed from the Massachusetts Institute of Technology (MIT) between 1980 and 1996, Dechenaux and colleagues (2008) explored the influences of appropriability mechanisms on the commercialization and termination of projects. The appropriability mechanisms are patent strength, patent scope, and secrecy separately and it is rational to infer that these mechanisms can raise the cost of imitation the technology. Hence, an increase in the effectiveness of these mechanisms should result in a higher value for the technology. The results of their study show that better appropriability in the sense of more effective patent strength and secrecy has a strong negative effect on the hazard of license termination. In contrast, the patent scope has a positive effect on the possibility of commercialization (Dechenaux et al., 2008).

According to the discussion above, firms may rely on diverse mechanisms to protect innovations and appropriate reasonable profit. Although patents may be not the most dominant means to protect a new product from imitation and key driver of innovation in the pharmaceutical industry (Grabowski, 2002; Mahlich, 2010). However, firms could rely on other mechanisms, i.e., shorten lead time and invent around, to enhance
the appropriability.

Proposition 1: Through the mechanisms of shortening the lead time and inventing more relevant patents, firms can enhance the appropriability of a new product innovation, and eventually increase the market value.

The complementary assets

To capture profit from innovation, firms may rely on the combination between the technological resources and the complementary assets (Lee and Chen, 2009; Sorescu et al., 2003; Teece, 1986). Teece (1986) assumed that when the core technology is easy to imitate, the successful commercialization of an innovation may require using in conjunction with other capabilities or assets. Furthermore, Teece defined these capabilities and assets as the complementary assets, services such as marketing, competitive manufacturing and after sales support are almost always needed (Teece, 1986). In addition, De Carolis (2003) argued that three types of competences, respectively technological, marketing and regulatory, are valuable on the development of new drugs and successful commercialization in the pharmaceutical industry (Bogner and Thomas, 1994; De Carolis, 2003). Rothaermel (2005) also argued that manufacturing and marketing assets are required for commercializing an innovation. Both manufacturing and marketing assets are immobility and time consuming, while firms with competencies in manufacturing or marketing will benefit from
technological change (Rothaermel, 2001; Rothaermel and Hill, 2005).

Previous studies suggested that the complementary assets increase the value of R&D in two ways. First, marketing resources can enable the successful commercialization of innovation. Second, marketing resources and advertising expenditures are a means of appropriating value for a firm’s technological resources (King et al., 2008; Mizik and Jacobson, 2003). Therefore, an innovator with specialized complementary assets should be able to profit more from a larger market than an innovator lacking such assets (Arora and Ceccagnoli, 2001). For instance, Lee and Chen (2009) suggested that marketing resources and advertising promote new product quality, reduce uncertainty, and expand their current market. Firms without marketing resources may not be able to draw attention from the market, even if a new product is technically innovative (Lee and Chen, 2009). Similarly, Sorescu and colleagues (2003) also recognized that firms derived benefits from the combination of appropriability mechanism and complementary assets. The results of their study indicated that a string set of patents along cannot increase the sales of a radically new product if the marketing resources necessary to create awareness and increase the speed of adoption are lacking (Sorescu et al., 2003: 86).

When the complementary assets in marketing and distribution are important to capture returns from innovations, firms with more complementary assets are expected
to generate better wealth effect on innovation (Shane, 2001). Swaminathan and colleagues (2008) argued that the strategic emphasis alignment can provide an important clue and imply it to the firm’s financial performance. To increase the appropriability, firms invest in marketing expenditures to strengthen brand names (reputation), increase loyalty of consumer and decrease vulnerability of competition (Swaminathan et al., 2008). The marketing activities require incumbents maintaining substantial investment in development, distribution channels, platform, and market segments. Consequently, the development of brand, marketing communication, and promotion could build up barriers to isolate competition (Mizik and Jacobson, 2003; Swaminathan et al., 2008). For instance, Yeoh and Roth (1999) argued that sales force expenditures will be a more durable source of competitive advantage than R&D expenditures. This is because the sales force involves the accumulation of customer and competitor knowledge, meanwhile the sophisticated sales force is specialized and hard to capture through market transactions.

In the pharmaceutical industry, incumbents need to effectively commercialize their new products. The success of new drugs depends on how well a company can differentiate the drug particularly to physicians. Therefore, the market share and revenues of a particular drug primarily depend on a strong and educated marketing sales team (De Carolis, 2003). Teece (1986: 288) also argued that the
commercialization of a new drug is likely to require the dissemination of information over a specialized information channel. In brief, the expertise positively affects the odds of new product development (Chandy et al., 2006).

In addition, some studies suggested the complementary assets as sources of the appropriability. For instance, Mizik and Jacobson (2003) suggested that the advertising investment facilitates value appropriation because it extends the duration of competitive advantage. Swaminathan and colleagues (2008) focused on the contribution of marketing activities on firm value, and confirmed that investments in marketing resources can help firms to appropriate value from innovations. Finally, when discussing the effectiveness of appropriability mechanisms for innovations, Cohen and colleagues (2000) found that the complementary sales/services and manufacturing are more effective than patents, whether in product or process innovations. The studies mentioned above can enhance the role of complementary assets in capturing benefits from innovation.

Proposition 2: Through investing in marketing and other complementary assets, firms can enhance the appropriability of a new product innovation, and eventually increase the market value.

The market competitions

Product innovations may allow the innovator to earn monopoly profits briefly, that is,
An innovatively new product initially face little direct competition and are able to generate high profits (Artz et al., 2010). Roberts (1999) indicated that an innovative new product tends to face low competition at the point of introduction and earns relatively high profits. Thus, when the competition is increasing, firms may reduce the profits from the products. Kelm and colleagues (1995) once employed the degree of industry concentration to operationally define appropriability, and showed that the benefits from R&D efforts positively associated with high market concentration.

The appearance of the paradigmatic design may be presented as the proxy of competition. Teece (1986) argued that there are two stages in the evolutionary development of a given branch of a science: the preparadigmatic stage and the paradigmatic stage. The difference between these two stages is the emergence of a dominant design, that is, the standard of the technology signals the maturity and acceptance of the technology. Therefore, when firms compete in the standard or design of invention, they provide the customers somehow distinct products. Once the dominant design or standard product has been introduced, competition shifts to price and away from design (Teece, 1986: 288). In the circumstance of price competition, firms forced to sell substitutable products and the profitabilities are vulnerable.

Drawn on the perspective of market substitute and complementary, Chen and his colleagues (2002) considered the role of competitive interaction on the wealth effect
of new product innovation. The results of their study indicated that the nature of competitive interaction in an industry is an important consideration when regarding the new product innovation and only firms compete in strategic substitutes positively affects the market value of NPI. In another study, Chen and colleagues (2005) argued that firms suffer unfavorable wealth impact when rivals introduce more new products, especially in the high-competitive industry. That is, due to the nature of tough competition in an industry, introducing new products is an important capability for incumbents to build up differentiation and competitive advantage (Chen et al., 2005). Hendricks and Singhal (1997) estimated the magnitude of the economic impact of being late to the market and argued that consumers are more likely to have the option of buying a competing product from a number of firms in a highly competitive industry. Furthermore, when competition is tougher, the capacity to introduce new products faster and on time is likely to be an important source of differentiation and competitive advantage (Hendricks and Singhal, 1997). In conclusion, the new product innovation may provide competitive advantage, but such advantage is temporary and vulnerable. Firms encounter raising competitions from the threat of imitations or substitutions by rivals. The Industrial Organization economists have well discussed the negative relation between market competition and firm performance.

*Proposition 3: Firms introduce new products in a tough market suffer vulnerable*
appropriability from competitions by rivals, and eventually decrease the market value.

The technology sourcing modes

It seems difficult for any single firm to develop all relevant technological advances exclusively through internal technology sourcing (Hagedoorn, 1993; Powell et al., 1996; Rothaermel and Alexandre, 2009). Firms may lack ownership of all the essential technologies they are developing is popular (Cohen et al., 2000). A firm’s innovation strategies are highly firm-specific and complex, and often including both internal innovation activities and the involvement of external partners (Nootboom, 1999). For example, an incumbent in the pharmaceutical industry desire to commercialize a pharmaceutical product may face the following choice: develop the required R&D capabilities in-house or procure the necessary R&D services from a new biotechnology firm (Pisano, 1990). In addition, Huang and colleagues’ (2011) study found that the pharmaceutical firms require relevant patents for new drug application, and nearly 40% of patents are outside of the boundary of the firm.

In general, R&D behaviors can be organized in different ways. Schmiedeberg (2008) categorized R&D behaviors as follows: in-house R&D activities, contracting of R&D projects, and R&D cooperation with other identities. Steensma and Corley (2001) suggested that organizations have three basic alternatives for acquiring technological
know-how: developing the technology independently, acquiring another company, and entering into a technology sourcing arrangement (Lambe and Spekman, 1997; Steensma and Corley, 2001). Drawn on the perspective of acquisitive learning, Van de Vrande and colleagues (2009) suggested that the acquisition of external knowledge is an integral part of acquisitive learning, in which firms acquire and internalize knowledge external to their boundaries. Hence, firms may emphasize on strategic alliances, joint ventures, license agreements and mergers and acquisitions (abbreviated M&As) to acquire external knowledge (Van de Vrande et al., 2009; Hitt et al., 2000).

Previous studies discussed the reasons to firms acquire technological knowledge through internal or external and a series of studies drew on the perspective of transaction cost economics (TCE) to elaborate a firm’s make or buy decision on technology sourcing. For instance, Williamson (1985) asserted that firms decide to produce internally when the costs of market exchange increasing due to opportunism and bounded rationality, asset specificity and uncertainty. Bonesso and colleagues (2011) investigated by the transaction costs approach to explore the determinants of internal-external technology sourcing decisions. The transaction cost approach shows that external sourcing may be precluded by barriers such costs of partner selection and coordination, and risks of knowledge leakages and imitation. Their study contributes
towards understanding the efficient governance modes.

Therefore, a firm’s technology sourcing activities reveal its preference for how to combine internal and external sources of new and known knowledge. A manager may choose to source a certain technology internally or externally, based on TCE and knowledge considerations (Kogut and Zander, 1992; Pisano, 1990; Rothaermal and Alexandre, 2009; Williamson, 1985). Therefore, conditionally, the greater internalization will solve the monitoring problems and remove the potential of opportunism, by contract, the greater outsourcing will enhance the effectiveness of operation. For example, new biotechnology firms could do R&D more efficiently than inexperienced in-house team, external R&D procumbent would seem to be a more economically rational alternative (Pisano, 1990). Innovating companies can choose between internal and external knowledge sourcing modes in order to react in a flexible way to new technological developments and changing market conditions (Van de Vrande et al., 2009).

**The value appropriation of technology sourcing modes**

Studies dealt with the knowledge sourcing mode may congruently recognize the performance enhancing role of the ambidexterity (Rothaermal et al., 2006; Rothaermal and Alexandre, 2009; Vanhaverbeke et al., 2002). An excessive focus on either internal or external technology sourcing is likely to lead to inferior performance
due to the risks of obsolescence and competence loss (Leonard-Barton, 1992; Teece, 1986; Teece et al., 1997). By sourcing of internal and external technology concurrently, firms will have a wider range of knowledge sources and adaptive responses, enabling them to exploit their cumulative knowledge and explore a broader set of technologies from outside (March, 1991; Parmigiani, 2007).

That is, internal and external R&D activities are not independent from each other (Schmiedeberg, 2008). It appears necessary for firms to pursue both sourcing strategies simultaneously to generate important knowledge spillovers between internal and external technology sourcing (Vanhaverbeke et al., 2002; Veugelers, 1997), and contribute to performance (Rothaermel et al., 2006; Rothaermel and Alexandre, 2009). However, the appropriability of a firm may depend on the technological knowledge sourcing mode. Hereon, this current study discusses the appropriability of firm by the circumstance of alliance, licensing, and M&As as follows.

Alliance and licensing

Due to inherently incomplete contracts in strategic alliances, Das and colleagues (1998) argued that the partners within strategic alliances cannot anticipate all future contingencies at the time of writing the contracts. Therefore, the flexibility in the contracts that associated with alliance output and future income may not be well defined. Such arrangements expose each firm to opportunistic exploitation by its
partner that could lead to unequal gain sharing and decreasing the appropriability. To the extent, strategic alliances become less valuable to stockholders (Das et al., 1998). In addition, Steensma and Corley (2001) argued that the licensing presents a market contract option for technology sourcing, and a firm can purchase the rights to another organization’s patents or technology for a lump sum payment and royalties. Therefore, technology form licensing provides the sourcing firm less control over the technology (Steensma and Corley, 2001). The adverse selection and moral hazard problems that derived from information asymmetries inherent in inter-organizational relationships also make it difficult for the sourcing firm to write comprehensive contracts with a licensee (Aulakh et al, 2010).

*Proposition 4a: A firm’s appropriability decreased when the technology sourcing from strategic alliances or licensing, and eventually undermine the market value of a new product.*

**M&As**

An acquisition is defined as one firm buying another firm and intent to capture the acquired firm’s technology, which is a common and important method in high-technology industries (Ruckman, 2005; Steensma and Corley, 2001). Through M&As, the acquiring firm can hierarchically control the technology, personnel, and, other assets of the acquired firm, and to enhance the technology or apply it (Folta, 1998;
Steensma & Corley, 2001). Pharmaceutical firms also need to supplement internal R&D efforts through acquisition (Higgins and Rodriguez, 2006).

M&As help firms to acquire, exchange, or deploy resources and enhance learning to extract value by combining with newly and existing resources (Swaminathan et al., 2008). Therefore, through acquisitions, the acquiring firm may obtain the property rights of technological assets from acquired firms. To Compare with strategic alliances, the M&As allow the acquiring firm to control a value asset and maximize the value gained from the knowledge by not having to share profits with a partner firm (Inkpen, 2000).

Proposition 4b: Technology that sourced through M&As will lead to greater appropriability than through license.

Conclusion

This current study addressed the appropriability on the role of capturing profits from new product innovations. In addition to the fundamental building blocks (Teece, 1986), we also considered the technology sourcing effect on the appropriability. We suggest that these four mechanisms determine the appropriability of a firm, especially in high-technology industry, and consequently affect the capability to capture profits from innovations.

Reference


