

Profiting from innovations: the role of new game strategies in the case of Lipitor of the US pharmaceutical industry

Jina Kang¹ and Allan Afuah²

¹Seoul National University, 599 Gwanangno, Gwanak-gu, Seoul 151-742, South Korea. profkang@snu.ac.kr

²Michigan University, Steven S. Ross School of Business, 701 Tappan St. Ann Arbor, Michigan 48109, USA. afuah@umich.edu

In exploring why innovators often do not profit from their innovations, researchers concentrate on innovators versus imitators and the extent to which owners of complementary assets capture profits from innovations. The literature provides scant attention to factors that sap profits from innovations. This paper argues that an innovator's positioning vis-à-vis customers, suppliers, complementors, and other co-opetitors plays a critical role in the innovator's profitability. The article explores how an innovator can use new game strategies to better positioning, thus capturing rents from innovations and enabling further innovations in the future. The study examines the case of Lipitor, one of the world's best-selling drug, to illustrate how positioning can play in a firm's ability to profit from its innovations.

1. Introduction

Why do innovating firms often fail to profit from their innovations? In answering this question, Teece (1986) argues that the extent to which a firm can profit from its innovation is a function of the degree to which the innovation can be imitated and whether the firm or a potential imitator has the relevant important complementary assets. He focuses on the competition between the innovator and imitators to capture rents from the innovation and who has established prior positions in specialized or co-specialized complementary assets. Subsequent research focuses on new entrants versus incumbents and who has the relevant complementary assets (Mitchell, 1989; Tripsas, 1997; Rothaemel, 2001; Chesbrough, 2003). For example, Tripsas (1997) shows that incumbents are more likely to

maintain their competitive advantage in the face of a radical technological innovation than new entrants if the incumbents have the right complementary assets. Rothaemel (2001) finds that complementary assets are equally helpful to incumbent pharmaceutical companies, while Mitchell (1989) shows that an incumbent firm is more likely to enter a new technical subfield if its core product was threatened, and possessed industry-specialized complementary assets.

This focus on innovator versus imitator, incumbent versus new entrant and complementary assets is understandable given the critical roles these actors and complementary assets play in creating and capturing value. However, *co-opetitors* (suppliers, customers, complementors, followers, imitators, universities, professional bodies, and other institutions with whom an innovator cooperates or competes) also play critical roles in creating and

appropriating value during innovation (Afuah and Bahram, 1995; Brandenburger and Stuart, 1996). In fact, Teece (1986) points out that customers, suppliers, innovators, imitators, and other followers all determine the share of profits captured by the innovator (286).

This paper goes beyond imitability and complementary assets and focuses on the co-opetitors' capturing rents from a firm's innovation and the strategic steps that the innovator-firm can take to protect rents from innovation. This paper explores why and how new game strategies can help an innovator better position vis-à-vis co-opetitors, not only to appropriate rents from innovations, but also to better innovate. Table 1 and Figure 1 show the differences between Teece (1986) and this paper. The main distinguishing characteristic of actors in this model is to attain an advantageous positioning vis-à-vis co-opetitors, using new game strategies.

In detailing why and how new game strategies are applicable to better position an innovator to profit from innovations, this paper goes beyond strategic management's product-market position (PMP) (Porter, 1980; Teece et al., 1997) and the resource-based view (RBV) of the firm (e.g., Barney and Arikan, 2001) in three ways. First, how firms can use new game strategies to attain desired PMPs or to build distinctive resources and capabilities are explored. PMP and RBV say very little about the origins of profitable positions or distinctive capabilities. Second, recognizing positioning to be more than just bargaining power, this paper explores positioning as cooperating. Third, recognizing that the appropriability regime and complementary assets are resources or capabilities, this paper is a reminder that profiting from resources often entails a smooth transition into PMPs. Although the RBV of the firm argues that resources and capabilities are at the root of a

Table 1. Beyond imitability and complementary assets

	Teece (1986)	This paper
1 Actors (primary)	Innovators – imitators	Innovator – co-opetitors (suppliers, customers, complementors, followers, imitators, universities, professional bodies, and other institutions)
2 Constructs (variables)	Imitability of innovation Complementary assets (how important and co-specialized or specialized) Profitability <i>When imitation of innovation is high, rents accrue to the actor with the right complementary assets</i>	Positioning vis-à-vis co-opetitors (suppliers, customers, complementors, followers, imitators, universities, professional bodies, and other institutions) Imitability and complementary assets Profitability <i>When an innovator is well positioned, it can earn economic rents</i>
3 Goal of innovator	Establish a prior position in complementary assets	Establish prior advantageous positioning vis-à-vis co-opetitors
4 Strategy (mechanism)	Collaborate Integrate <i>(So as to obtain complementary assets)</i>	Pursue <i>new game</i> activities. These may include collaboration, vertical integration, and any other activity that better positions the innovator vis-à-vis co-opetitor. Activities take advantage of (1) industry value drivers and (2) co-opetitors' prior commitments (includes acquisition of competitors) <i>New game activities can also impact innovation and complementary assets, not just positioning</i>
5 Conclusion	Complementary assets are critical to profiting from innovation. Therefore establish a prior position in complementary asset through collaboration or integration. Follow-on papers (Mitchell, 1989; Tripsas, 1997; Rothaemel, 2001) focus on incumbent versus new entrant	Positioning vis-à-vis co-opetitors (suppliers, customers, complementors, followers, imitators, universities, professional bodies, and other institutions) is critical to profiting from innovation (or influencing industry structure) Therefore use a new game strategy to establish prior position in bargaining, etc with co-opetitors. <i>Firm can still not make money even when its technology is not imitable or it has the right co-specialized complementary assets</i>

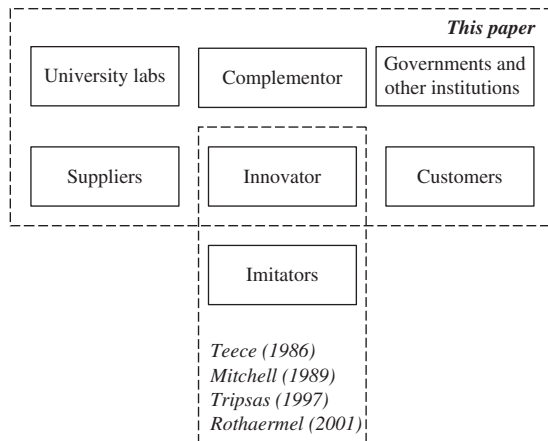


Figure 1. The innovation value-added chain.

firm's competitive advantage, these must still translate into something that customers want.

The case of Lipitor, the world's best-selling drug in 2005, illustrates these arguments, especially the role that new game strategies can play in the profitability of an innovation, even when the innovation is difficult to imitate and complementary assets are important and tightly held.

2. Background literature: the role of positioning

The creation and appropriation of value in innovations is not limited to innovators and imitators: innovators and some subset of co-opetitors also become involved (Figure 1). For example, value creation in Airbus' A380 Super Jumbo airplane was captured by its networks of suppliers of innovative components, by airline companies that must configure parts of the plane the way they want them, and by the networks of aeronautical and electrical engineers that shared their expertise with Airbus' engineers. The ability of an innovator to profit from innovation is not only a function of innovation imitability and ownership of the relevant difficult-to-imitate complementary assets but also a function of the innovator's positioning vis-à-vis co-opetitors.

2.1. PMP: how co-opetitors can sap innovators' profits

To understand how co-opetitors sap an innovator's profits, consider the role that a supplier plays in an innovator's profitability. If a supplier has bargaining power over an innovator, this can

increase the innovator's cost by charging the innovator higher prices. A powerful supplier can also force the innovator to buy inputs that have lower quality than the supplier would like. In either case, the result is lower profits for the innovator even if scarce co-specialized or specialized complementary assets existed and the innovation was not imitable. A customer that has bargaining power over an innovator can extract price concessions from the innovator, thereby paying the innovator lower prices than deserved. Powerful customers can also force the innovator to deliver higher quality for the price of low-quality products, increasing the innovator's costs. A monopoly complementor who charges very high prices for complements can decrease an innovator's sales. Effectively, an innovator's positioning vis-à-vis suppliers, customers, and complementors plays a critical role in the innovator's ability to profit from innovations.

The effect of an innovator's positioning vis-à-vis co-opetitors on profitability is summarized in Figure 2. The vertical axis depicts the variable 'Complementary Assets' while the horizontal axis depicts 'Innovator's Positioning vis-à-vis Co-opetitors.' If the innovator has a weak position and complementary assets are unimportant or generic, then innovators do not make money, even if the innovation is difficult to imitate (Quadrant I of Figure 2). For example, publishers have power over first-time authors, leading to less money for new authors, even though they may have innovative ideas.

The more common and interesting case is represented in Quadrant II where even though complementary assets are important and tightly held (or co-specialized), the innovator may still not be able to make money because of weak positioning vis-à-vis suppliers, customers, or complementors – even when the innovation is difficult to imitate. Some patented pharmaceutical drugs marketed by established firms fall into this category. These pharmaceutical firms have tightly held complementary assets (such as sales force and distribution channels) but health management organizations have so much power that some innovative drugs have little chance of getting to patients. Moreover, they may obtain licenses from university labs that have enough power to appropriate most of the profits from the drug via high license fees.

Quadrant III shows an ideal situation for an innovator: the innovator has bargaining power over suppliers, customers, or complementors and has the co-specialized complementary assets to

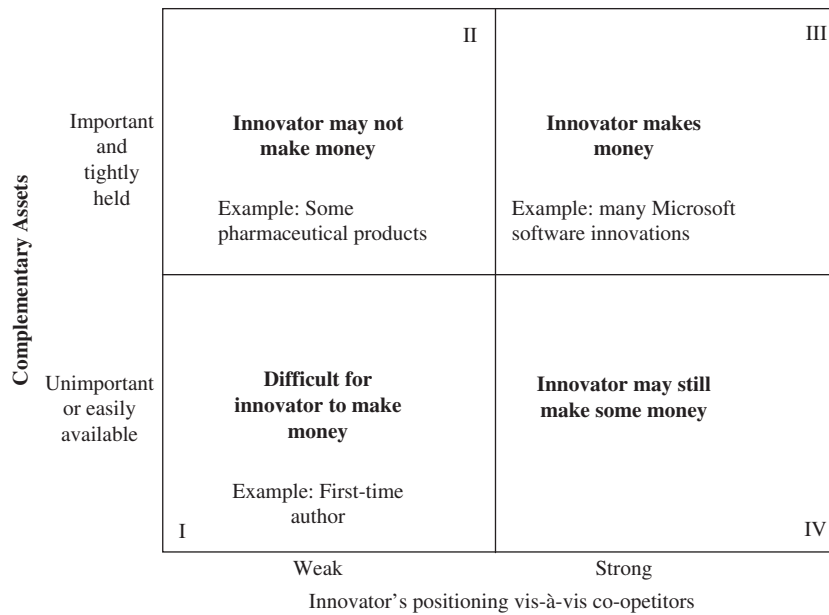


Figure 2. The role of an innovator's positioning beyond complementary assets and imitability.

boot. Software innovations from Microsoft would fall into this category because Microsoft's power over PC makers and end-customers. Moreover, Microsoft has co-specialized complementary assets such as its installed base of customers, brand, and relationships with complementors and customers. Copyright laws protect its software.

The situation represented by Quadrant IV is also interesting. If an innovator has strong positioning – in other words, having bargaining power over suppliers, customers, or complementors – the innovator can make money from innovations even if complementary assets are generic or unimportant.

Effectively, these arguments suggest that, without the right positioning, an innovator can have the right co-specialized complementary assets and still not be able to profit from innovations, even when the appropriability regime for the innovation is tight. Positioning can be just as important as – if not more – appropriability regimes and complementary assets in profiting from an innovation.

2.2. Beyond PMP: the cooperative side of positioning

Another side exists in positioning: the cooperative side. A firm's relationship with its co-opetitors can facilitate reduction in cost and creation of

superior value. For example, Dyer and Nobeoka (2000) show that one of the advantages that Toyota has over its competitors is its relationship cultivated with its networks of suppliers. Rather than exercising the bargaining power over its suppliers and extract low prices for components as its competitors do, Toyota works closely with suppliers to lower their costs. Suppliers' networks are not only able to lower costs collectively than each supplier could alone, but they are better able to develop newer and better components for Toyota. Thus, a firm that is well positioned within a network of co-opetitors can keep its costs low through cooperation and not necessarily through exercising bargaining power, as the PMP view of the firm would suggest.

A firm's position within a network can better innovation and obtain the necessary complementary assets. Such network can be that of professionals within and outside the firm that trade know-how (Allen, 1984; von Hippel, 1987; Schrader, 1991; Walter et al., 2007) of firms along the innovation value-adding chain (Bekkers et al., 2002; Chesbrough, 2003), or of firms that collaborate with university laboratories and governments. A firm that is well positioned within such a network is likely to have better and earlier access to important new information than its rivals (Burt, 2000; Si and Bruton, 2005). As Funk (2003) demonstrates, a firm with a slight information advantage can exploit them to obtain preferential access to complementary assets or

increase its chances of influencing the resulting dominant design or standard. Since users, suppliers, complementors, and university laboratories can also be sources of innovation (von Hippel, 1987, 2005), a firm that is well positioned vis-à-vis any of these co-opetitors has a better chance of finding out about the innovation first and having the option of being the first to invest in them.

3. Positioning and new game strategies

If co-opetitors can use their power to sap an innovator's profits, an important question arises: What can an innovator do to better position vis-à-vis co-opetitors and prevent profits from dissipating? Or, can a firm move from Quadrants I and II of Figure 2 to Quadrants III and IV? Equally important, can an innovator better position to work with co-opetitors in creating and appropriating value? The answer to both questions is yes: activities exist, which an innovator can perform to better position to profit from innovations.

3.1. The roots of positioning

The concept of positioning is rooted in the assumptions of the neoclassical economic paradigm of perfect competition. Under perfect competition, an innovator buys inputs from suppliers at the suppliers' cost and sells innovations to customers at the cost of innovation. That is, innovators expect to earn zero economic rents under perfect competition. In such equilibrium conditions, no innovator has power over co-opetitors and vice versa. In this perfect competition world, firms make money by minimizing their costs – or as Williamson (1999: 1088) put it, by 'economizing.' However, if an innovator can do something to make the market deviate from perfect competition, the firm potentially can earn economic rents. For example, a firm can differentiate its products by advertising, or create barriers to entry by protecting intellectual property. Effectively, the essence of positioning is about performing activities that allow a firm to create conditions that move the market significantly away from perfect competition and put the firm in a position to collect economic rents from the 'inefficiency' so created. One way to create significant departures from perfect competition conditions, introduced below, is *new game strategies*.

3.2. New game strategies

A new game strategy is a set of activities that differ considerably from those performed by other firms and that stand to redefine the basis of competitive advantage in the industry (Buaron, 1981; Afuah, 2003). Effectively, new game activities differ from the prevailing activities performed by the industry and often overturn existing ways of doing things in the industry or market. When an innovator successfully performs new game activities, innovator distances further from the conditions of perfect competition, thereby better positioning herself to appropriate the value that the innovation creates.

An example of a new game strategy is Dell's decision to sell directly to end-customers rather than through distributors such as CompUSA; so is its decision to introduce build-to-order – taking customer's orders before building computers. Until Dell became successful at selling directly to end-users, PC makers considered distributors indispensable. Bypassing distributors and going directly to end-customers was very different from the way things had been done in the industry. So was build-to-order. More importantly by going direct, Dell was actually increasing its bargaining power over customers since the company was moving from the more concentrated and powerful distributors to the more fragmented end-customers (businesses and consumers).

3.3. Deriving new game strategies

One way to explore an innovator's choices in performing new game activities is to start with the perfect competition assumptions, and analyze what happens when each assumption is 'violated' to move an innovator to a position where it can collect economic rents (Table 2).

3.3.1. Atomicity

The atomicity assumption of perfect competition presumes that a large number of actors (buyers and sellers) with similar strategies and capabilities, each of whom cannot exert significant influence on the market alone. Thus each firm is a price taker. One firm characteristic that exerts significant influence over a market is its size. For example, a large innovator can use buying power to extract concessions from suppliers. Low cost (from say, scale economies) can also enable a large firm to set price at levels that have an impact on the market, especially the ability of imitators to compete. Moreover, as pointed out by

Table 2. Role of new game activities moving an innovator away from perfect competition into profits

Perfect competition assumption	Possible new game activities that innovator can pursue	Benefits to innovator of deviation from assumption	The case of Lipitor
1. Atomicity	Increase size through alliance, joint venture, acquisition of organic growth Move first	First-mover advantages	Alliance with Pfizer that later resulted in acquisition. Beyond complementary assets, it had positioning effects as a result of the bigger new firm. Could affect market considerably by pricing its drug low
2. Homogeneity of products	Invest in R&D or advertising to differentiate product Invest to win dominant design or win a standard	Differentiating a product can establish pull on customers or on suppliers	Direct-to-consumer marketing of prescription drugs had been unheard of until the advent of Lipitor. Established a pull at patients since the latter could tell their doctors what drug they want
3. Free entry and exit	Build barriers to entry Take advantage of competitor's inability to exit old technology market	Barriers-to-entry can allow a firm to exercise some level of 'monopoly' power	Patenting of Lipitor. FDA approval of Lipitor for special condition (hypercholesterolemia)
4. Perfect and complete information	Backward or forward integration can give a firm an information advantage	Partial integration, allows one to collect information about suppliers or distributors and use information during negotiations	Alliance with Pfizer gives Warner Lambert access to Pfizer's large sales force. This means better access to information from doctors. Direct-to-consumer advertising also gives patients more information than they ever had before
5. Equal access to resources	Strategic collaboration or integration	Strategic collaboration gives innovator access to scarce resources	In pharmaceuticals, a sales force is a rare and valuable resource (Mitchell, 1989). By allying with Pfizer, Warner Lambert is making resources more scarce

Schumpeter (1950), large firms are better at innovation because they can afford to undertake many projects and can spread their risks over the many projects, and have marketing resources. They also have manufacturing capabilities (complementary assets) to allow them commercialize their innovations (Grosse, 1992).

In any case, the important question here is, what type of new game activities can a firm perform to increase size or build other capabilities that will exert significant influence on the market or its co-opetitors? One answer is new game strategies. Since, by definition, new game activities differ from the prevailing activities performed by industry firms, a firm that performs a new game activity is effectively moving first as far as the activity is concerned. Such a firm can therefore enjoy the first-mover advantages that go with being the first to perform the activity in question. According to Lieberman and

Montgomery (1988, 1998) and Finney et al. (2008), a firm that moves first can accumulate scarce difficult-to-imitate resources and capabilities, start earning important revenues from the technology earlier, establish important relationships with co-opetitors, move up the learning curve for the technology, and increase its chances of winning a standard. These can enable an innovator to better position relative to co-opetitors. For example, Dell's new game strategy of selling directly to end-customers and building computers to their customers' orders established important relationships with business customers and to moved up the learning curve of running a build-to-order system.

In markets that exhibit network externalities, new game activities can allow a firm to win a standard or dominant design and enjoy the associated benefits. Sun Microsystems was the first company in the computer workstation industry to

make its reduced instruction set computer (RISC) technology readily available to any firm that wanted to adopt the new technology (Garud and Kumaraswamy, 1993; Afuah, 2000). This helped the company's version of RISC to win the standard. Sun was at the center of the network, having more access to important technology and complementary asset information than other members of the network. Effectively, new game activities can enable an innovator to build the right capabilities, thereby making the market less 'perfect' and collect economic rents from innovations.

3.3.2. Homogeneity of products

In perfect competition, the product is a non-differentiated commodity. An innovator can differentiate products in two ways: through R&D activities that produce distinctive product features during innovation or through advertising activities that change the way customers perceive the product. By performing new game R&D or advertising activities, a firm can better position itself relative to the co-opetitors. This is illustrated by Intel's 'Intel Inside' campaign in which the firm advertised directly to end-users, bypassing the PC makers who bought their microprocessors. The goal in advertising to end-users, one stage downstream the value chain, is to establish a pull on one's direct customers thereby reducing their power. That is, if Dell's customers want PCs with Intel Inside, Dell would rather buy microprocessors from Intel than from AMD. Bypassing one's customers to advertise directly to end-customers was a new game activity for the microprocessor industry because this has never been done in the industry before. As an Intel executive would confide: 'Intel Inside was our best innovation.'

For products that exhibit network externalities, a large network size can also differentiate a product since the larger the size, the more valuable the network becomes to each user. Therefore, any new activity that can enable a firm to win a standard, thereby increasing the size of its network, can override the homogeneity assumption by differentiating the firm's products through the resulting larger network size.

3.3.3. Free entry and exit

Innovators would rather avoid the 'no barriers to entry or exit' conditions of perfect competition by erecting barriers to entry. An innovator can use some of the same new game activities to gain first-mover advantages as well as to erect barriers to entry. Difficult-to-imitate resources and capabilities, important relationships with

co-opetitors, experience, and the potential to win a standard are all potential formidable barriers to entry. Both the PMP and the RBVs of the firm suggest that a firm that moves first often can erect some barriers to entry into the market segments in which they compete, even if they are temporary. If in moving first, an innovator develops scarce and valuable capabilities that are difficult to imitate, the innovator stands to profit from them since, by definition, potential imitators cannot replicate such capabilities. When imitators try to catch up with an innovator in a limited period of time by investing massive resources, low innovation performance vis-à-vis invested resources occurs, often called *time compression diseconomies*. Also, strong complexity may occur during the innovation process due to causal ambiguity in the process and interconnectedness amongst necessary resources and competencies involved. These problems act to make it difficult for imitators to catch up once an innovator moves first (Dierickx and Cool, 1989).

Dell's direct sales and build-to-order new game strategy are made up of many activities that range from the way the firm interacts and manages suppliers, to the internal manufacturing operations activities that are fine-tuned to turn around orders in 1.5 days, to how the firm and its suppliers interact with end-customers (Fishburne, 1999). As Kevin Rollins, Dell's CEO, puts it: 'the entire value chain has to work together to make it efficient and effective' (Fishburne, 1999: 59) making it difficult for potential competitors to replicate what Dell does.

3.3.4. Perfect and complete information

In interacting with co-opetitors in the face of an innovation, information is usually anything but complete or perfect as would be suggested by the perfect competition model. An underlying assumption in the postulation that actors have perfect and complete information is that these actors are rational and that such information can costlessly move between actors. However, most individuals and organizations are boundedly rational, not perfectly rational (Nelson and Winter, 1982). It is difficult for cognitively limited actors to transfer knowledge, especially when such knowledge is tacit or is of large quantity (e.g., von Hippel, 1994). Therefore, transferring tacit knowledge between boundedly rational actors often entails in-person, face-to-face learning by doing or by experiencing. Thus, new game activities that put an innovator in a position to more closely interact with co-opetitors

during innovation that requires the transfer of tacit knowledge might help the innovator's profitability.

Being boundedly rational in the face of an innovation also means more room for opportunism that can lead to high transaction costs when some actors take advantage of information asymmetries (Williamson, 2002). Such opportunism can be mitigated by relationships that build trust since trust reduces opportunism. Thus, any new game activities that can put a firm in a position to build trust would also help.

In the PMP view of strategy, a co-opetitor with an information advantage can use it to advantage during bargaining. Thus, one thing that a firm can do to reduce such information asymmetries is to integrate vertically partially into the co-opetitor's activity. By doing so, a firm can obtain better information about the cost of components and is in a better position to negotiate with suppliers. Finally, since a slight information advantage can give an actor preferential access to important complementary assets (Funk, 2003), an innovator may want to position in the so-called 'structural holes' giving the innovator information advantage (Burt, 1992; Zaheer and Bell, 2005).

3.3.5. Equal access to resources

In the face of an innovation, firms usually do not have equal access to all resources as assumed by the perfect competition paradigm. Several reasons exist for unequal access to resources. First, each actor's initial endowments may be different. Such endowments include absorptive capacities and since it takes related knowledge to absorb knowledge (Cohen and Levinthal, 1990; Nielsen, 2005), firms with lower absorptive capacities are at a disadvantage as far as access to knowledge-based resources is concerned. Much research is available on alliances and cooperations through external sourcing and competencies (Hagedoorn, 1993, 2002; Belderbos et al., 2004; Aschhoff and Schmidt, 2008). According to these studies, firms with various and plentiful partnerships have better access to valuable resources for winning in the market. Recently much research has focused on firms reaching beyond firm boundaries to access external knowledge, technology, resources, and competencies, in order to innovate, and in cases successfully bringing innovations to the market by delegating to external organizations altogether (Keil, 2002; Chesbrough, 2003). These studies show that traditional boundaries are becoming blurred and external partnership networks are becoming more expedient in achieving technological innovations and its market success.

Second, resources may be scarce and difficult to replicate or transfer. Third, it may be difficult to identify just what exactly the resources are all about. An innovator that has better access to resources stands to better profit from innovations than those that do not. One way for a firm to have unique access to resources is to perform new game activities that give it first-mover advantages. To illustrate why, consider again the Dell example. By moving first to direct sales and build-to-order, Dell was able to build relationships with large businesses. Once these businesses lock into Dell's system, other PC makers find displacing Dell very difficult.

4. Drivers of new game strategy effectiveness

The fact that new game activities can put an innovator in a better position to profit from innovation raises an interesting question: What would make some new game strategies more effective in positioning an innovator than others? Two factors determine the effectiveness of a new game activity: (1) the extent to which the innovator takes advantage of industry's value drivers, and (2) the degree to which co-opetitor's prior commitments prevent them from imitating the innovator.

4.1. Industry's value drivers

Every industry has some characteristics that stand to have a significant impact on the value that firms can create in the industry. For example, in the video game industry, network externalities are critical to the value that each gamer derives from owning a particular game console. Thus, new game activities that take advantage of such value-driving characteristics stand to have a significant impact on value in the industry. To illustrate this point further, take the Dell example earlier. In the PC industry, the technology quickly becomes obsolete while prices drop. A direct sales and build-to-order strategy enabled Dell to get PCs to end-consumers rapidly.

4.2. Co-opetitor's prior commitments

In performing its activities in an industry, a firm usually makes commitments in the form of investments, contracts, network relationships, agreements, and understandings with co-opetitors.

Such commitments can prevent an imitator from performing new game activities when an innovator moves first, and vice versa. Compaq's case offers an interesting example. To compete with Dell, Compaq wanted to adopt a build-to-order model and sell directly to consumers, bypassing distributors. Citing previous agreements, distributors refused to cooperate and Compaq had to give up its new business model.

5. The case of Lipitor

This section introduces and briefly describes the Lipitor case to provide practical implications for the execution of new game strategy. The type of technological environment in which a product is developed can play an important role in the type of new game activities that an innovator can perform effectively. In the face of a radical technological change (in the organizational sense), most new innovation activities are likely to be new game since, by definition, a radical innovation usually involves fundamentally different skills (e.g., Henderson and Clark, 1990). Moreover, in the face of a radical innovation, an incumbent's capabilities might not only become obsolete, they may actually handicap the incumbent's efforts to exploit the change (Leonard-Barton, 1992). Thus, a firm that performs new game activities in the face of a radical technological change is likely to have less of a challenge from incumbents since their efforts can be handicapped by prior commitments in the old technology. Lipitor is a cholesterol-reducing drug that belongs to a family of cholesterol drugs called statins. New drug development in pharmaceutical industry is a typical case of radical technological change. Lipitor is a late mover because it is the third or fourth drug from a drug family such as statins. Therefore, the success of Lipitor is a suitable case to explain and demonstrate the new game strategy framework.

The story of Lipitor has elements of appropriability, complementary assets, and positioning and therefore serves as a good case to use to illustrate the role of positioning in the face of a technological innovation. Lipitor was the fifth statin to be introduced and yet went on to become the world's best-selling drug. This is striking because until Lipitor, the third or fourth drug from a drug family such as statin usually had a very small chance of surviving, let alone of capturing a

substantial market share. A major reason for Lipitor's success despite being such a late member of its family was the new game activities that the inventor, Warner Lambert (and later, Pfizer), sought to improve its position. In Figure 2, the cholesterol drugs that preceded Lipitor are in Quadrant II. By performing new game activities, the Warner Lambert/Pfizer team was able to move Lipitor from Quadrant II to III. More detailed description of the new game strategy of the Warner Lambert/Pfizer team is described in the next section.

5.1. Direct-to-consumer marketing

In direct-to-consumer (DTC) marketing, a pharmaceutical company markets (advertises, promotes, etc.) a drug directly to patients, instead of to doctors. While direct promotion and advertising to customers has been commonplace with over-the-counter drugs, it had never been practiced in prescription cholesterol drugs until Lipitor. Prescription drug marketing had targeted doctors, not patients. By taking its message directly to patients, Warner Lambert was bypassing the more powerful doctors to go directly to the less informed and more fragmented patients. Conceptually, direct-to-patient marketing makes sense because of an important characteristic of the market in question: Having high cholesterol levels is a non-symptomatic disease where people who suffer from it do not usually feel any pain until it may be too late. Thus, by appealing directly to consumers, a firm is more likely to get patients to have their cholesterol levels checked and become customers. By deviating from perfect competition conditions, DTC further differentiated Lipitor in the eyes of patients, thereby reducing product homogeneity (Table 2). More importantly, it established a pull at the patient level of the value chain, thereby eroding at the power of doctors. Note that DTC takes away some of doctor's power.

5.2. Alliance with Pfizer

According to Mitchell (1989), a sales force is a critical co-specialized complementary asset in pharmaceuticals. When Warner Lambert introduced Lipitor, it already had a sales force that it had used to sell an earlier non-statin cholesterol drug. But the company decided that a larger sales force might be better and sought an alliance with Pfizer. The latter had a large sales force with

access to cardiovascular specialists but had no cholesterol drug. Pfizer and Warner Lambert formed a strategic alliance that would later lead to Pfizer's acquisition of Warner Lambert. The combined marketing and sales resources gave the team the largest sales force and marketing resources dedicated to cholesterol. Although, on the surface, this alliance appears to be a textbook case of a firm with an invention teaming up with one that has complementary assets (Teece, 1986), there is more to this union than what meets the eye. Since Warner Lambert already had a cholesterol sales force, the primary effect of the alliance with Pfizer was to increase the size and quality of the sales force. By teaming up with Pfizer, Warner Lambert was effectively increasing size in the cholesterol drug market and its ability to influence the market. Thus, teaming up with Pfizer constituted a 'violation' of the atomicity and equal access to resources assumptions.

5.3. Head-to-head trials

For a drug to be marketed as a cure for a particular ailment in the United States, the drug must undergo clinical testing and be approved by the US Food and Drug Administration (FDA). During Lipitor clinical trials, Warner Lambert ordered head-to-head comparison of the drug's attributes against those of the four statins that had already been approved by the FDA and were in the market. The ability of each drug to reduce total cholesterol, bad cholesterol [low-density lipoprotein (LDL)] and triglycerides as well as the ability to raise the level of so-called good cholesterol [high-density lipoprotein (HDL)] was measured and a comparison made between Lipitor and competing drugs. Head-to-head comparisons of a new drug by a pharmaceutical company had been unheard of before Lipitor. The results of the testing showed Lipitor to reduce LDL by 40–60% compared with the best-selling drug in the market at the time, Zocor, which reduced LDL by only 40%. Lipitor also reduced triglycerides by 19–40% compared with 17% for Zocor. One reason why the third, fourth, and fifth drugs to be introduced in a market usually do not do very well is because doctors do not like to switch medications unless for compelling reasons. By pursuing head-to-head trials and demonstrating that Lipitor was superior in several performance measures, Warner Lambert gave doctors compelling reasons to switch.

5.4. Additional clinical trials

One of Warner Lambert's early decisions was to focus on the bad effects of triglycerides (brother/sister apoproteins to cholesterol). Although triglycerides were believed to be another culprit for coronary artery disease, the focus of previous makers of cholesterol drugs had been on total cholesterol and LDL as the culprits. Earlier statins were approved by the FDA for total cholesterol and LDL but not triglycerides. Thus, by targeting triglycerides, the Warner Lambert/Pfizer team was also able to better position itself as the first for the 'illness' as far as statins were concerned.

During clinical testing, Warner Lambert also performed clinical testing for a fatal hereditary condition that resulted in extremely high cholesterol levels called familial hypercholesterolemia (Leafstedt et al., 2003). This allowed Lipitor to be qualified for so-called 'fast track' review since no drug had been approved to treat the condition before. This shortened the review process by 6 months. By obtaining approval for the drug 6 months earlier, Warner Lambert was effectively extending Lipitor's patent life – the time over which the company could collect monopoly rents on the drug before the patent expired – by 6 months.

5.5. Low entry prices

The Warner Lambert/Pfizer team also decided to set the price of Lipitor lower than all but one of the cholesterol drugs in the market at the time, despite the drug's much higher performance attributes. This was unusual since pharmaceutical companies usually follow a skimming pricing strategy for products with superior performance so as to extract profits before their patents run out. Lipitor's lower price allowed it to be placed in the formularies of Pharmaceuticals Benefits Managers, the organizations that manage costs for Management Health Organizations. Patients are not reimbursed for a drug by an HMO's insurance company if the drug is not on the formulary.

5.6. Interrelatedness of new game activities for Lipitor

Each of the activities improves Lipitor's positioning somewhat. Taken together as a system, these activities are even more effective in improving

Lipitor’s positioning. Getting on fast track FDA review not only gave Warner Lambert an extra 6 months during which it could earn revenues before the Lipitor patent expired, it also gave the company the option to set other new game activities into motion 6 months earlier. In a market segment with both technological and market uncertainty, 6 months has an option value (Bowman and Hurry, 1993). For example, with an extra 6 months, Warner Lambert has more options as to when, how and which tools to use in launching its DTC marketing. Options in finding a partner to team up with are also larger.

DTC may have been effective alone, but it was more effective when combined with a large sales force (from the Warner Lambert /Pfizer alliance). On the one hand, having a larger sales force meant that patients who went to their doctors to ask for a cholesterol drug were more likely to find a doctor who could prescribe Lipitor rather than another statin. On the other hand, having a large sales force that tries to sell a fifth non-symptomatic drug to doctors might not help as much if DTC marketing influences patients. Effectively, both actions are reinforcing. Setting Lipitor’s price low took advantage of a health management community that was becoming increasingly price conscious. But the low prices would not be as effective if not enough patients and doctors wanted the drug. The large sales force and DTC marketing helped the effectiveness of the low price strategy.

Effectively, these new game activities made a difference between Lipitor and the four preceding statins. Each of the first four statins – Mevacor by Merck, Pravachol by Bristol Myers Squibb, Zocor by Merck, and Lescol by Novartis – were patented and therefore had a tight appropriability regime. Their owners also had the right co-specialized complementary assets (sales force, etc.). Therefore the difference between Lipitor and earlier drugs rests largely in factors beyond the appropriability regime and having complementary assets. Warner Lambert/Pfizer’s new game activities appear to have made a difference. Figure 3 shows the positioning of Lipitor.

6. Discussion and conclusion

Invention and innovation are completely different concepts. Invention refers to the discovery of new knowledge. Innovation, on the other hand, refers to attempts to commercialize inventions (Freeman and Soete, 1997). Development of a new drug such as Lipitor is an example of invention. New game strategy of Warner Lambert/Pfizer team transformed an invention to an innovation and drove a successful marketing of Lipitor in the pharmaceutical industry. Although many high-tech firms invent and develop new technologies and products continuously, they are not brought to market successfully and finally perish because of marketing myopia (Levit, 1960). High-tech

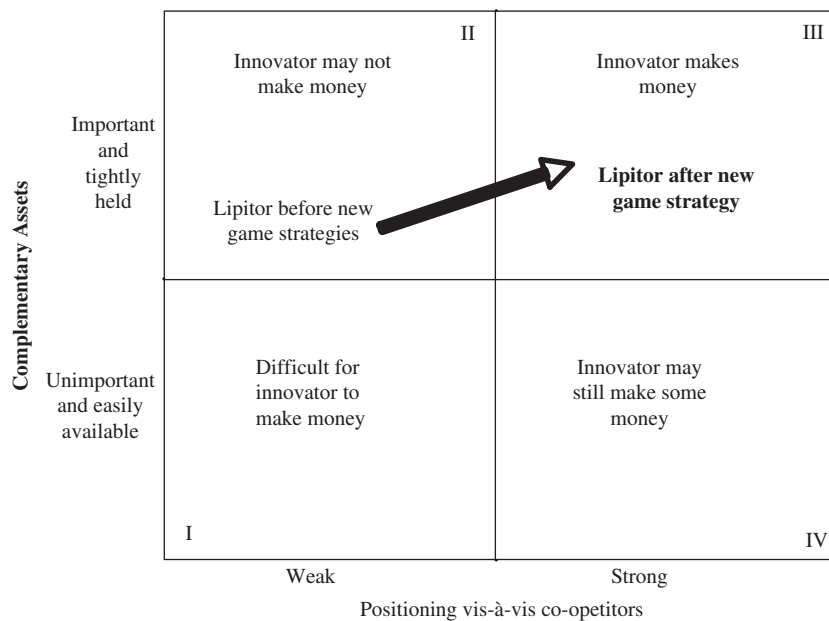


Figure 3. Result of new game activities for Lipitor.

firms tend to focus their resources and capabilities on invention. However, firms should execute appropriate strategies for successfully commercializing their invention. The new game strategy framework can be a useful guideline for the success of invention in market and the accomplishment of innovation.

This paper showed that, beyond appropriability regime and complementary assets, an innovator's positioning vis-à-vis co-opetitors can also determine whether the innovator can profit from innovations. First, even a firm with an innovation that is difficult to imitate and has relevant critical complementary assets may still not be able to profit from the innovation if such a firm is not well positioned vis-à-vis co-opetitors. Second, an innovator can attain the right positioning by performing new game activities. Starting with the underlying assumptions of the neoclassical economics' ideal world of perfect competition as the theoretical anchor, this paper showed how an innovator can use new game strategies to better position to profit from innovations. New game strategies enable firms to rewrite the rules of the game in an industry or market. A new game strategy works best when the player takes advantage of industry value drivers and co-opetitors' prior commitments prevent them from replicating the player's game. One implication of this framework is that imitators can win, not so much because of their complementary assets or the high imitability of the innovation, but because of the new game strategies that they pursue to give them an advantageous position vis-à-vis co-opetitors. The case of Lipitor demonstrated the importance of positioning in profiting from an innovation. In particular, Warner Lambert's new game activities may have played a role in making Lipitor the world's best-selling drug.

Three types of positions can help an innovator better profit from innovations. The first is the PMP-type positioning in which the innovator seeks to attain and exercise bargaining power while being protected by high barriers to entry. The second is positioning within a network of co-opetitors in which, rather than using the position to exercise bargaining power, an innovator uses it to cooperate more effectively to lower costs for both the innovator and co-opetitors, and to create value for the value chain. The third type of positioning is when a firm's position within a network gives better access to information than does competitors. Such a privileged position for information not only leads to better access to

innovations (since co-opetitors are often sources of innovation) but also to better access to complementary assets.

Implications for managers of innovation activities include the following points. Profiting from innovation takes more than the right innovation and associating complementary assets. Positioning also plays a critical role and therefore new game activities that better position an innovator to profit from innovations should receive as much attention as complementary assets acquisition and innovation activities. Policy makers are also better off taking the role of positioning into consideration during decision-making time than at a later phase, or as in many cases, not given any considerations at all.

References

- Afuah, A.N. (2000) Do your co-opetitors capabilities matter in the face of a technological change. *Strategic Management Journal*, **21**, 378–404.
- Afuah, A.N. (2003) *Business Models: A Strategic Management Approach*. New York: McGraw-Hill.
- Afuah, A.N. and Bahram, N. (1995) The hypercube of innovation. *Research Policy*, **24**, 51–76.
- Allen, T. (1984) *Managing the Flow of Technology*. Cambridge, MA: MIT Press.
- Aschhoff, B. and Schmidt, T. (2008) Empirical evidence on the success of R&D cooperation: happy together? *Review of Industrial Organization*, **33**, 41–62.
- Barney, J. and Arian, A.M. (2001) The resource-based view: origins and implications. In: Hitt, M.A., Freeman, R.E. and Harrison, J.S. (eds), *The Blackwell Handbook of Strategic Management*. Oxford, UK: Blackwell Press, pp. 124–188.
- Bekkers, R., Duyster, G. and Verspagen, B. (2002) Intellectual property rights, strategic technology agreements and market structure: the case of GSM. *Research Policy*, **31**, 1141–1161.
- Belderbos, R., Carree, M., Diederer, B., Lokshin, B. and Veugelers, R. (2004) Heterogeneity in R&D cooperation strategies. *International Journal of Industrial Organization*, **22**, 8–9, 1237–1263.
- Bowman, H. and Hurry, D. (1993) Strategy through the option lens: an integrated view of resource investment and the incremental-choice process. *Academy of Management Review*, **18**, 4, 760–782.
- Brandenburger, A.M. and Stuart, H.W. (1996) Value-based business strategy. *Journal of Economics and Management Strategy*, **5**, 1, 5–24.
- Buaron, R. (1981) New-game strategies. *McKinsey Quarterly*, Fall, 24–40.
- Burt, R.S. (1992) *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

- Burt, R.S. (2000) The network structure of social capital. In: Staw, B.M. and Sutton, R.I. (eds), *Research in Organizational Behavior*, Vol. 22. New York: Elsevier Science, pp. 345–423.
- Chesbrough, H. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, MA: Harvard Business School Press.
- Cohen, W. and Levinthal, D. (1990) Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 128–152.
- Dierickx, I. and Cool, K. (1989) Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35, 1504–1513.
- Dyer, J.H. and Nobeoka, K. (2000) Creating and managing a high performance knowledge-sharing networks: the Toyota case. *Strategic Management Journal*, 21, 345–367.
- Freeman, C. and Soete, L. (1997) *The Economics of Industrial Innovation*. Cambridge, MA: MIT Press.
- Finney, R.Z., Lueg, J.E. and Campbell, N.D. (2008) Market pioneers, late movers, and the resource-based view (RBV): a conceptual model. *Journal of Business Research*, 61, 9, 925–932.
- Fishburne, F. (1999) Hardware winner. *Forbes Online*. April 5. Available at <http://www.forbes.com/asap/1999/0405/066.html> (accessed April 1999).
- Funk, J.L. (2003) Standards, dominant designs and preferential acquisition of complementary assets through slight information advantages. *Research Policy*, 32, 1325–1341.
- Garud, R. and Kumaraswamy, A. (1993) Changing competitive dynamics in network industries: an exploration of sun microsystems' open systems strategy. *Strategic Management Journal*, 14, 351–369.
- Grosse, R. (1992) Competitive advantages and multinational enterprises in Latin America. *Journal of Business Research*, 25, 1, 27–42.
- Hagedoorn, J. (1993) Understanding the rationale of strategic technology partnering: interorganisational modes of co-operation and sectoral differences. *Strategic Management Journal*, 14, 371–385.
- Hagedoorn, J. (2002) Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy*, 31, 477–492.
- Henderson, R. and Clark, K.B. (1990) Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Sciences Quarterly*, 35, 9–30.
- Keil, T. (2002) *External Corporate Venturing: Strategic Renewal in Rapidly Changing Industries*. Westport, CT: Quorum Books.
- Leafstedt, M., Marta, A., Marwaha, J., Schallwig, P. and Shinkle, R. (2003) Lipitor: at the heart of Warner-Lambert. In: Afuah, A. (ed.), *Business Models: A Strategic Management Approach*. New York: McGraw-Hill/Irwin, pp. 356–370.
- Leonard-Barton, D. (1992) Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal*, 13, 111–126.
- Levit, T. (1960) Marketing myopia. *Harvard Business Review*, 38, 45–56.
- Lieberman, M.B. and Montgomery, D.B. (1988) First mover advantage. *Strategic Management Journal*, 9, 41–58.
- Lieberman, M.B. and Montgomery, D.B. (1998) First-mover (dis)advantages: retrospective and link with the resource-based view. *Strategic Management Journal*, 19, 1111–1125.
- Mitchell, W. (1989) Whether and when? Probability and timing of incumbents entry into emerging industrial sub fields. *Administrative Sciences Quarterly*, 34, 208–230.
- Nelson, R. and Winter, S.G. (1982) *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
- Nielsen, B.B. (2005) The role of knowledge embeddedness in the creation of synergies in strategic alliances. *Journal of Business Research*, 58, 9, 1194–1204.
- Porter, M.E. (1980) *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: The Free Press.
- Rothaemel, F.T. (2001) Complementary assets, strategic alliances, and the incumbent's advantage: an empirical study of industry and firm effects in the biopharmaceutical industry. *Research Policy*, 30, 1235–1251.
- Schrader, S. (1991) Information technology transfer between firms: cooperation through information trading. *Research Policy*, 20, 153–170.
- Schumpeter, J.A. (1950) *Capitalism, Socialism and Democracy*, 3rd edn. New York: Harper.
- Si, S.X. and Bruton, G.D. (2005) Knowledge acquisition, cost savings, and strategic positioning: effects on Sino-American IJV performance. *Journal of Business Research*, 58, 11, 1465–1473.
- Teece, D.J. (1986) Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy*, 15, 285–306.
- Teece, D.J., Pisano, G. and Shuen, A. (1997) Dynamic capabilities and strategic management. *Strategic Management Journal*, 18, 509–533.
- Tripsas, M. (1997) Unraveling the process of creative destruction: complementary assets and incumbent survival in the typesetter industry. *Strategic Management Journal*, 18, 119–142.
- von Hippel, E. (1987) Cooperation between rivals: informal know-how trading. *Research Policy*, 16, 291–302.
- von Hippel, E. (1994) 'Sticky information' and the locus of problem solving: implications for innovation. *Management Science*, 40, 4, 429–439.
- von Hippel, E. (2005) *Democratizing Innovation*. Cambridge, MA: MIT Press.
- Walter, J., Lechner, C. and Kellermanns, F.W. (2007) Knowledge transfer between and within alliance partners: private versus collective benefits of social capital. *Journal of Business Research*, 60, 7, 698–710.

- Williamson, O.E. (1999) Strategy research: governance and competence perspectives. *Strategic Management Journal*, **20**, 1087–1108.
- Williamson, O.E. (2002) The theory of the firm as governance structure: from choice to contract. *Journal of Economic Perspectives*, **16**, 3, 171–195.
- Zaheer, A. and Bell, G.G. (2005) Benefiting from network position: firm capabilities, structural holes, and performance. *Strategic Management Journal*, **26**, 809–825.

Jina Kang is a professor of the Technology Management Economics and Policy Program and Industrial Engineering Department of Seoul National University. She received her PhD in strategic management from the University of California, Los Angeles (UCLA). Her works have appeared in *Asia Pacific Journal of Management*, *International Journal of Innovation Management*, *Management Research*, *Research in Management Education*, and *Journal of Knowledge Management*. Her current research focuses on strategic alliances, innovation performance, and knowledge transfer in green technology and service industries. She teaches strategy and innovation to undergraduate, Master, PhD students and executives.

Allan Afuah is an associate professor of Strategy at University of Michigan. He received his MS and PhD from MIT. His teaching awards include Best Professor in the MBA program in 1999. His second book, *Internet Business Models and Strategies* (co-authored with Christopher Tucci) has been translated into nine different languages, and has been adopted by dozens of schools to teach business models. His latest book, *Strategic Innovation: New Game Strategies for Competitive Advantage*, explores how firms can use new game strategies to profit from strategic innovations – innovations in products, business models, business processes, and positioning vis-à-vis competitors. His research has been published in *the Academy of Management Journal*, *Academy of Management Review*, *Strategic Management Journal*, *Research Policy*, *Economics of Innovation and New Technology*, *Industrial and Corporate Change*, and *IEEE Transactions on Engineering Management*. His latest research focuses on how the concept of value creation and capture can be used to explain not only the present financial crises but also why Africa has remained desperately poor despite being heavily endowed with natural resources.