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A Classification of Open Innovation and Open Business Models

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3.1 INTRODUCTION

Open innovation and open business models have received a lot of attention during the last decade both from practitioners and academia since Henry Chesbrough launched the two concepts respectively in 2003 and 2006 (Chesbrough, 2003a and 2006a). Careful observation of publications about these two concepts reveals that most researchers as well as practitioners do not make a proper distinction between them. In this chapter, we intend to clarify the distinction between the two concepts and, more importantly, to extend the range of potential innovation strategies by combining open innovation and open business models in different ways. This should lead to a comprehensive classification of possible innovation strategies in which open/closed innovations are combined with open/closed business models.

The classification starts with simple combinations of open or closed innovations and traditional vs. open business models in their new product development. Combinations of open innovation and open business models generate interesting models to create and capture value, which to our knowledge are not specified before in the open innovation literature. The classification will also illustrate that (open) innovation targeting new product or new business development is just one possible strategy how firms can create a competitive advantage. Product innovation may not be an option for companies producing commodities (e.g. crude oil) but the competitive drivers in these industries (e.g. finding the best oil wells) may be affected by the product innovations of their (technology) partners (e.g. new technologies to explore oil wells more effectively). Reframing open innovation in this way allows us to shed light on innovation networks in which the instigators of the network are not the innovators themselves, but they nevertheless form the hubs in a broader innovation ecosystem in which they benefit from the innovations of their technology partners.
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In sum, this approach in which we define open innovation and open business models more carefully, in combination with a change in focus from new product development to (other) competitive drivers will result in a rich classification of different types of open innovation research. The clarity of the structure should make it attractive as a starting point for several new developments in open innovation research.

The rest of this chapter is structured as follows. The next section clarifies open innovation and open business models. The third section develops our proposed categorization combining the two concepts. The fourth section illustrates each of the resulting cells in the classification with numerous examples. The fifth section summarizes some thoughts about how this classification may lead to new developments in research about open innovation.

3.2 A CLARIFICATION OF OPEN INNOVATION AND OPEN BUSINESS MODELS

Open innovation and open business models are the titles of the two first books of Henry Chesbrough (2003a; 2006a). Although both concepts have been clearly defined, there is no explicit analysis of the difference between open innovation and open business models in the second book. Chesbrough (2006a) states that the first book treated the business model as static, and utilized open innovation to create more ways to create and capture value within the given business model. In the second book, the business model itself could be innovated, enabling new ways to obtain more value from the company's innovation activities. However, Chesbrough did not explicitly combine choices of open or closed innovation with choices of alternative closed or open business models as we do in this chapter.

Nowadays, practitioners and researchers tend to use both concepts interchangeably. Scholars (and managers) need to be careful in defining open innovation and open business models. Making the difference between the two concepts explicit allows us study a broad range of phenomena that have not been related to open innovation or open business models so far. Using a precise and specific definition for both concepts will lead to a more concise study of the two concepts and when we should utilize them.

3.2.1 What is Open Innovation?

There are many definitions of open innovation available. This issue has already been discussed at length in Chapter 1 of this volume. For the purpose of this chapter, we prefer to stick to the original definition. Chesbrough (2003a, p. XXIV) defines open innovation as "a paradigm that assumes that
firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology”. This is the most common definition used in the literature, and it underscores that valuable ideas emerge and can be commercialized from inside or outside the firm. This definition is echoed in Chesbrough, Vanhaverbeke, West (2006, p. 1): “Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.” The business model concept is not included in the definition of open innovation but is tightly related to it. Chesbrough (2003a, XXIV) writes for instance: “Open innovation combines internal and external ideas into architecture and systems whose requirements are defined by a business model. The business model utilizes both external and internal ideas to create value, while defining internal mechanisms to claim some portion of that value.” There is no way to conceive open innovation without business models: The value of an idea or technology depends upon the business model. There is no inherent value in technology per se. The value is determined instead by the business model used to bring it to market. The same technology taken to market through two different business models will yield a different return. This link between technology and business model is further strengthened by the intensive use of the open innovation funnel where business models are prominently represented at the right-hand side of the funnel. They determine which external technologies have to be sourced because they are indispensable for the business model and which technologies have to be monetized externally because they are not aligned with a firm’s business model.1

3.2.2 What is an Open Business Model?

A business model is a framework to link ideas and technologies to valuable economic outcomes. At its heart, a business model performs two key functions: (1) it creates value, and (2) it captures a portion of that value. Organizations can create value by defining a range of activities that will yield a new product or service valued by a (target) customer group. Organizations also capture value by establishing a unique resource, asset or position within that series of activities where the firm enjoys a competitive advantage. Business models can be analyzed in great detail and different frameworks have been generated to develop new business models or change existing ones. As other authors have examined business models extensively,2 we choose to focus directly on the specific characteristics of open (and closed) business models.

In explaining open business models, Chesbrough (2006a) starts with the current trend towards the “division of innovation labor”. In this type of
division of labor one party develops a novel idea but does not carry this idea
to the market itself. Instead, it sells it to other parties, who carry the idea to the
market. The division of labor is a new and powerful way to speed up innova-
tion and improve R&D productivity. An open business model uses the divi-
sion of labor to create greater value by leveraging more ideas (external ideas)
and to capture greater value by using key assets, resources, or positions not
only in the company’s own business but also in other companies’ businesses
(Chesbrough, 2006a, pp. 2–3). An open business model is thus a powerful
organizational model of innovation. Open business models may lead to better
financial performance by reducing the costs of innovation on the one hand
and generating extra revenues on the other hand by monetizing technologies
through licensing agreements and spin-off activities when the technology can-
not be adopted profitably in the product markets of the company. In this way,
open business models are still tightly linked to innovation activities of a firm
or its external innovation partners. It is not by accident that the open business
model is also called “open innovation business model” or “new business model
of open innovation.”

This interpretation of the concept “open business models” has proven to be
a valuable extension of the original open innovation idea, which was launched
in 2003. In the following sections we will combine closed/open innovation with
two different types of business models—the stand-alone and the linked busi-
ness models. Stand-alone business models reflect the idea of closed business
models and linked or networked business models have a lot in common with
open business models. In our view, combining different ways of innovation
with different business models in a systematic way, will broaden our under-
standing about the strategic value of open business models and will extend the
range of business contexts where “openness” can be applied as viable strategies.

3.3 CLASSIFYING COMBINATIONS OF OPEN
INNOVATION AND OPEN BUSINESS MODELS

Open innovation and open business models can be considered separately.
As we will see, it is a viable strategy to engage in open innovation and stick
to a closed business model. A company can also “open” its business model,
but rely on a closed innovation strategy. Yet, in our view more interesting
strategies emerge when companies combine an open innovation strategy
with open business model thinking. A systemic analysis of the possible com-
binations will lead to an unexpected variety of possibilities, linking “open
innovation” and “open business model” strategies to phenomena such as
innovation ecosystems.
In Table 3.1 we offer a simple model to combine different types of innovation with open and closed business models. Innovation is here defined as the activities during the innovation process (or in different stages in the innovation funnel). Accordingly, *open innovation* can be defined as before: firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology. Open Innovation combines internal and external ideas to develop products, services or processes whose requirements are defined by firms’ business models. Open innovation requires the knowledge input from external sources, but it does not necessarily imply that external partners help create value—that is, innovation partners are involved in the development of the product not in the commercialization of the new offering.

In contrast, *open business models* are intrinsically related to the value creation and value capture and delivery through the introduction of new products and services in the market. Once research and development of an R&D project are successfully finished a company still has to launch the new product and grow sales over the next years. Companies can produce and distribute offerings on their own or they can rely on existing transactions with value chain partners. Most companies indeed take products to market without the help of strategic partners. It is of course always necessary to involve channel partners, but these relationships can be handled by (standard) transactional agreements. Therefore, *closed or stand alone business models* refer to the situation where companies market a product using their own assets and relying
on other value chain partners through market transactions. However, the introduction of a new offering in the market can be a complex process where companies need critical inputs from strategic partners. In these cases, value is created *jointly* with strategic partners and they have to come to an agreement how to share the pie (as the distribution of the value among the partners has to be managed guaranteeing that all partners stay on board). Many innovations have not made it to market because the innovating company did not manage the ecosystems of market partners. Open or linked business models thus refer to the situations where the innovating company relies on its partners’ competencies to jointly create value for customers and share that value according to agreements they have negotiated prior to the collaboration.

There is a major difference between open innovation and open or linked business models. Tapping into external technologies and setting up collaborative deals in open innovation is usually temporary: Collaboration with partners comes to an end once the research project is finished. This is not the case with linked business models: because value is jointly created, partners usually team up during the whole product lifecycle according to agreements set up at the start of the cooperation.

In Table 3.1 we combine open and closed innovations with stand alone (closed) and linked (open) business models. This results in a classification scheme with six different situations. First, business models can be stand-alone or linked. Second, innovations can be categorized as closed and open, but we prefer in line with existing definitions of open innovation to make a distinction between inside-out and outside-in open innovation.

(1) In the outside-in process open innovation activities enrich the company’s own knowledge base through the integration of knowledge of external partners.

(2) In the inside-out process a company earns extra profits by bringing internal ideas to market, selling and licensing IP, and spinning off ventures whose business model is not aligned to that of the company (Gassmann & Enkel, 2004).

We discuss each of the six cells in Table 3.1 in the following section.

### 3.4 A CLASSIFICATION OF DIFFERENT TYPES OF OPEN AND CLOSED STRATEGIES

#### 3.4.1 Closed Innovation Model

The closed innovation model represents the classical case of the closed innovation paradigm described by Chesbrough (2003a). In large companies, the adage
was for a long time that successful innovation requires control. In this type of strategy companies generate their own ideas, develop them, build them, market them, and service them on their own. This is exactly what this cell describes. Closed innovation implies that a firm looks for ideas in its own R&D labs since the brightest people in the industry are working for the company. The ideas are also developed internally. The company has state of the art research infrastructure and test facilities which, in turn, guarantee control, secrecy, and if necessary an acceleration of the development. The closed business model implies that the company markets it through its own (global) sales channels. Developing new products is a routine in large companies leveraged by their leading edge R&D-infrastructure, massive manufacturing system, and global sales reach.

The development and commercialization of Nylon at DuPont illustrates this situation. In 1928, the DuPont chemical company opened a research laboratory for the development of artificial materials, deciding that basic research was the way to achieve and sustain competitive advantage. In the lead of Wallace Carothers a team of scientists investigated the acetylene family of chemicals. In 1931, DuPont started to manufacture neoprene, a synthetic rubber. The research team then turned their efforts towards a synthetic fiber that could replace silk. Japan was the United States’ main source of silk, and trade relations between the two countries were breaking apart at that time. By 1934, they developed a synthetic silk by producing fibers formed by a polymerizing process. In 1935, DuPont patented the new fiber known as nylon.

Nylon was introduced to the world in 1938. It was first used for fishing line, surgical sutures, and toothbrush bristles. DuPont first announced and demonstrated nylon stockings to the American public at the 1939 New York World’s Fair and began commercial production in late 1939. From the time nylon went on sale to the general public in May 1940, nylon hosiery was a huge success. In 1942, nylon went to war in the form of parachutes and tents. Today, it is still used in all types of apparel and is the second most used synthetic fiber in the United States.

Nylon is a typical case of closed innovation: research, development, and commercialization have been realized within and financed by DuPont. Everything was done within the corporate boundaries of the company, from the first detection of the silky fibers till the highly successful B2C applications. It is also a typical example of a closed or stand alone business model. Value is created and captured by DuPont by leveraging its manufacturing infrastructure and global sales apparatus. DuPont was not relying on any strategic partners to develop, manufacture or sell nylon.

### 3.4.2 Unused Knowledge Used by Others

The inside-out mode of open innovation has been well documented in several case studies. What most case descriptions do not mention is the business
model behind these agreements. The underlying business model of most licensing agreements and spin-offs is a stand-alone business model: the recipient of the technology (licensees or corporate spin-offs) will further develop the technology, manufacture the product and launch it in the market. The firm who originally developed the technology is no longer involved in the commercialization of the technology. The recipient uses the insourced technology to bring an offering to the market without relying strategically on the innovator (or other organizations) to market the product. This situation illustrates cell 2 in Table 3.1.

Take for example the licensing and capabilities agreement between P&G and ConAgra Foods. The latter was established in 1919 and has been growing in the last decades through purchasing over one hundred prepared food brands. It moved heavily into the frozen food business and the packaged meat industry, and picked up a selection of other brands from firms like RJR Nabisco and Beatrice Foods among others. ConAgra Foods is selling different types of food products than P&G but can use the unique nutrition-enhancing food ingredients and packaging capabilities of P&G, creating unique competitive advantages for their business. However, the licensing agreement with P&G is not interfering with the business model of ConAgra foods. The company is producing and distributing the products on its own, creating and capturing value without relying on P&G.8

The classification scheme in Table 3.1 is not a straight jacket and some situations can be labeled as hybrids. We illustrate this with the Glad case.9 P&G developed a promising plastic film technology through diaper research. It was proved successful in test markets but it was not strategic for P&G to become a new player in such a well-established market where market leaders are protected by strong brands. Clorox is one of P&G’s competitors, who already had a leading plastic wrap business—Glad. In 2002, both companies established a joint venture. P&G brought in marketing expertise and IP behind Press’n Seal as well as future innovations such as ForceFlex. Clorox brought in brand equity, focused R&D in plastics and resins, and was responsible for the manufacturing and distribution of the new plastic film products. This set up allows continuing collaboration on additional initiatives in the plastic film business and proves competitors can work together successfully. The continuing collaboration turns the Glad example into a hybrid between cell 2 and cell 5 in Table 3.1. It is an obvious case of inside-out open innovation but the business model is not entirely closed as both companies continue to work together as strategic partners to deliver value to the market. Joint ventures tend to be acquired over time by the dominating partner—here Clorox. Therefore, it is not excluded that Clorox acquires the joint venture when the innovation dynamics and the market sales run out of steam. In that scenario, the Glad case would move back to cell 1.
3.4.3 Use Other’s Knowledge to Develop a New Offering

Companies frequently combine outside-in open innovation with a stand-alone business model. The strategy is very similar to the one discussed in the previous section. The only difference is that the company is now looking for external knowledge which can be used in developing its new products or services within its own business model. A company is systematically searching for proven technologies or ideas that can improve existing or introduce new products. In this strategy it is important to know exactly what the company wants, based on carefully defined targets. It is crucial that the company focuses on ideas and technologies that can create value through the application of internal knowledge, marketing and distribution skills, or other capabilities because the company who is sourcing external knowledge has to manufacture and sell the new product on its own.

If we return to P&G the most successful products developed by external partners but brought to market by P&G are Clean Magic Erasers, TidePods, Olay Regenerist, Swiffer Dusters, and the Crest SpinBrush.

Take Swiffer Duster as an illustration. Procter & Gamble wanted to produce a duster as a follow-up to its successful Swiffer mop but the internally developed prototype was not appealing. The Japanese company UniCharm had developed an attractive duster which it sold only in Japan. UniCharm did not have the manufacturing, distribution, or marketing strength to take the innovative product into other markets. P&G’s research team recognized the superiority of UniCharm’s duster and saw an opportunity to work together. P&G signed a licensing deal with UniCharm to distribute the duster under the P&G name everywhere in the world except Japan. The Duster hit the market in 2003 and has made millions of dollars for both P&G and its Japanese partner. This case illustrates how a large company can insource external knowledge and innovative products to drive sales growth. It leads to a win for both partners: UniCharm had the right innovation but not the strength to market it globally. P&G is globally operating but did not have the same innovative product as UniCharm. Note that once the innovation was insourced P&G relied completely on its own manufacturing and distribution strengths to launch the product and grow the market. P&G uses a stand-alone business model.

Another example can be found in P&G’s skin care products organization. This organization was looking both internally and externally for antiwrinkle technology options for next-generation Olay products. At a technical conference in Europe, P&G first learned of a new peptide technology developed by a small cosmetics company in France. After they shared some of their work at a conference attended by P&G’s skin-care researchers, they accepted an invitation for their technologists to visit P&G and present their data on the antiwrinkle effects of the new peptide. The peptide became a key component used in the blockbuster product, Olay Regenerist. This company now continues to
collaborate with P&G on new technology identification and further upstream research projects. Again, the technology is sourced from an outside developer and the deal connects the technology strengths of the French firm with the global brand power of P&G in skin products. The technology provider—although it continues to be a strategic technology partner—is not involved in the commercialization of this product.

3.4.4 Search for Assets Owned by Others to Develop a New Business Model

Companies can develop new technologies mainly in-house. Still, the business model requires an open approach to create and capture value. Chesbrough (2006a) describes different cases of this strategy. We illustrate it with the development of the iPhone.\footnote{Although it continues to be a strategic technology partner—although it continues to be a strategic technology partner—is not involved in the commercialization of this product.}

The iPhone can be considered as an internal innovation and design project of Apple. Apple was already working on the iPhone in 2002. After several years of keeping the details of the phone under wraps, Apple announced the launch of the iPhone in June 2007. This new, internally developed innovation had 200 patents attached to it. The iPhone stood out from its competitors because of its touch screen, advanced features, and elegant hardware design.

With hindsight, however, the real value for the iPhone resides in the apps, rather than in the device itself. With each new application that is developed customers can use their mobile phone in new and unprecedented ways. Remarkably enough, unlike smartphones enabled by Symbian, Palm, and Microsoft, the original iPhone did not provide native support for third-party applications. It was only after there was evidence of tremendous demand for third-party applications (further propelled by successful efforts by third parties to install software without Apple’s cooperation) that Steve Jobs reversed his initial position. He announced that a software development kit (SDK) would be made available to third-party developers in 2008, and the iPhone SDK was released on March 6, 2008.

Even here, though, Apple retained control of the ecosystem. Loading a third-party application onto the iPhone is only possible after the developer pays an Apple Developer Connection membership fee and the app is approved by Apple for distribution through the App Store (run by Apple). Developers are free to set any price for their applications to be distributed through the App Store, of which they will receive a 70% share. Developers can also opt to release the application for free and will not pay any costs to release or distribute the application beyond the membership fee. The App Store was launched with the release of iOS 2.0, on July 11, 2008.

While the ecosystem remains under Apple supervision, the uptake of third-party apps has been impressive. As of March 2012, Apple has passed 25
billion app downloads. Opening the iPhone to third-party developers turned the device into a platform where Apple and the external developers jointly create value for customers by leveraging the ideas of a fast growing set of apps. Apple captures value by using the iPhone and the (access to the) App Store as key assets to appropriate value in a systematic way.

### 3.4.5 Internal Knowledge Accessible to Others to Develop a New Business Model

Companies can outsource internally developed knowledge not to monetize on it (see cell 2 in Table 3.1), but to create a platform similar to the one we have been discussing in section 3.4. In this case, companies with considerable knowledge in specific technological fields farm out technologies and know-how in order to reinforce a platform from which they may profit indirectly. Strong platforms are necessary to induce third parties to develop proprietary applications, which, in turn, generate more profits for the platform owner. In other cases, opening the platform technology allows application developers to customize products and extend the range of applications far beyond the original set of applications offered by the firm that developed the platform—similar to the iPhone case. We illustrate this in cell 5 of Table 3.1 by IBM’s support for Linux.

IBM has supported Linux for more than a decade. The company has donated hundreds of patents and it invested $100 million a year to support the Linux OS. Furthermore, IBM is working closely together with Linux to generate and accelerate new applications based on the Linux OS. IBM’s support increased the chances that Linux succeeds in its competition with Microsoft in OS markets (Henkel, 2006).

Linux was the first operating system that could challenge the dominance of the Microsoft’s Windows OS. In 1999, when IBM adopted Linux, it already had a large installed base of customers and a large community of developers committed to contributing to its development. Through the investments in Linux, IBM could be independent from Microsoft’s licensing terms and it could reveal interface specifications for its platforms. IBM profited from an open source platform such as Linux because open source software is less expensive than proprietary software. This allowed IBM to charge its customers less for applications and services. One of the advantages of developing an open source OS is that the risks and costs of designing and developing software can be distributed among many contributors. Although IBM was spending a lot of money on the development of Linux, other firms such as Nokia, Intel, and Hitachi made substantial investments as well. Commercial investments in Linux are estimated to exceed $1 billion a year. Sharing costs and efforts developing a core infrastructure reduced the costs of having a widely accepted OS that could compete with Microsoft's Windows.
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The Linux platform also provided a common platform on top of which IBM could build special applications and services. IBM was increasingly focusing on selling high-end hardware, proprietary software running on top of Linux, and integration and other customized services to enterprise customers. By helping to establish Linux, IBM was strengthening its own business model in selling proprietary software solutions for its clients running on top of Linux. The openness of Linux also gave IBM more freedom to co-develop products together with its customers.

3.4.6 Use Others’ Knowledge to Create Your Own Business Model

The upper right cell in Table 3.1 combines a linked business model with outside-in open innovation. Here, a company sources knowledge from other organizations to set up a business model that is linked to business models of other (partner) organizations. As we will see, this combination enables companies to come up with new strategies that go beyond the classical open innovation examples. We illustrate this with a few examples.

3.4.6.1 Better Place

Better Place was a venture-backed start-up company, established in 2007 and based in Palo Alto. The start-up’s mission was to make electric vehicles (EVs) appealing to the mainstream buyers. It developed and sold battery-charging and battery-switching services for electric vehicles. Better Place could thus be considered as an electric-car infrastructure firm: its approach was not to innovate the electric car but rather to innovate the ecosystem around the car. Alongside its smart-grid network of charging stations, battery packs, and cars, Better Place was best known for its concept of battery swap stations, where cars fitted with appropriate battery packs can exchange a discharged pack for a fully-charged one in less than 5 minutes. The company got into financial difficulties by the high investment required to develop the charging and swapping infrastructure and the market penetration which was significantly lower than originally, which, in turn, was caused by the resistance of car manufacturers and other players to switch to a battery swap system.

Better Place intended to make EVs a mainstream product in the car industry by a unique business model. The model started identifying the current problems with the use of EVs: Adner (2012) identified a number of hurdles to overcome: First, EVs were more expensive to purchase than comparable gas-powered cars, mainly because batteries are very expensive. Second, electric cars have a limited driving range which is primarily determined by its battery. Third, the battery charging infrastructure is scant compared to the
network of gasoline service stations. Moreover, charging takes a long time. Fourth, since batteries are expensive and the technology is evolving fast, the resale value of the battery is extremely low. Finally, the limited driving range precludes drivers from reaping the full benefits of an EV thanks to the lower power costs per kilometer compared to gas-powered cars.

Better Place’s business model tried to resolve the problems mentioned above. First, consumers should not own batteries in order to reduce the price of EVs. Second, EVs should offer the same driving range and convenience as the gas-powered cars. Better Place invited customers to enter into subscriptions to purchase driving distances similar to the mobile telephone industry where customers contract for minutes of airtime. The initial cost of an electric vehicle may also be subsidized by the ongoing per-distance revenue contract just as mobile handset purchases are subsidized by per-minute mobile service contracts. In this way, electric cars could be sold cheaper than the average gasoline car. The Better Place approach enabled manufacturing and sales of different electric cars separately from the batteries. The monthly payment covered electric “fuel” costs including battery, daily charging, and battery swaps. Better Place allowed customers to pay incrementally for battery costs including electric power, battery life, degradation, warranty issues, maintenance, capital cost, quality, technology advancement, and anything else related to the battery. An extra advantage for the customer was that when the car owner sells the car, he doesn’t have to sell an outdated or degraded battery. The resale value was in this way tied to the car and not the battery. The Better Place electric car charging infrastructure network tackled the problem of the limited driving range. The company invested in national or region-wide battery switching stations. Better Place has already rolled out a nation-wide network of battery switching stations in Israel and was working with partners to build standards-based networks in Denmark, Australia, California, and Hawaii.

Better Place is an illustration of cell 6 in Table 3.1. Its business model could only be successful if different partners in the ecosystem aligned their innovations to the business model of Better Place. The success relied on the innovations of others. Moreover, Better Place’s success hinged on the willingness of the partners to subscribe to the business model. Car manufacturers were very important in that respect: They had to change the car design so that battery packs could be switched according to Better Place standards. Renault-Nissan adapted its Laguna, eRogue and Luence car models, but there was not enough backing from other car manufacturers to turn Better Place into a success. Also battery manufacturers had to adapt their technology to switchable packs. Moreover, they would no longer sell their batteries to car manufacturers but to Better Place itself. Similarly, relations with electricity producers/distributors could be important for Better Place. Finally, governments played a crucial role in the adoption process of the business model. They could set or adopt standards, set prices of oil and electricity, and they had the power to decide about
the development of the network and could help in setting the price of new EVs through tax regulations and subsidies.

Although Better Place filed for bankruptcy, the case illustrates that making EVs attractive to the mainstream car driver requires an organization whose business model tackles the different hurdles in the existing ecosystem. Better Place could only succeed if other players in the ecosystem innovate (outside-in open innovation) and adopt or co-align their business model to that of Better Place. Lack of support by car manufacturers was one of the reasons why the company never turned into the success it promised to be in its first years. It is nevertheless an interesting example of so-called linked business models.

3.4.6.2 SkyNRG

A major concern for the airline industry is greenhouse gas emissions from aviation and their impact on climate change. One interesting initiative of the aviation industry in that respect is SkyNRG, which was launched in November 2009. Founding partners are Air France KLM Group, North Sea Group (a group of companies delivering products and services to the oil market) and Spring Associates (a strategy consulting firm helping companies in becoming more competitive through sustainable products and solutions). The mission of SkyNRG was to help create and accelerate the development of a market for sustainable jet fuel, yet safe and affordable.

SkyNRG is not established to develop new biofuel technologies. Many of the technical hurdles facing aviation in its move towards sustainable aviation biofuels have now been overcome and much of this work has been achieved within the industry. However, to reduce greenhouse gas emissions biofuel has to become mainstream in the aviation industry. Therefore, commercialization and scaling up of the supply of aviation biofuels are crucial. SkyNRG’s mission is to set up an ecosystem of strategic partners to introduce biofuels as an alternative source of energy. SkyNRG has spent two years on research and development to create a one-stop shop for airlines, airports, military, and other kerosene end-users integrating the complete supply chain for sustainable jet fuels. From feedstock-to-flight, the supply chain covers elements such as strict selection of sustainable feedstock, refining contracts, distribution to any airport in the world, quality assurance, plane fuel service, insurance, marketing and project (co) funding with airports and end customers. In this way, SkyNRG can be considered as a global market maker in sustainable jet fuel.

SkyNRG is an example of how an organization can unfold an innovation ecosystem including organizations from different industries that need to work together for a new value proposition to succeed. The instigator, KLM, is one of the (potentially many) airline companies that can profit from a new source of kerosene also helping them to achieve the target to reduce the carbon footprint of the industry. KLM has no knowledge or internal capabilities to develop and
produce biofuel, but it has a vested interest as a customer of aviation biofuel to guarantee a stable and competitively priced supply of bio-kerosene. With the establishment of SkyNRG, KLM was setting up a large ecosystem including the different types of partners that are necessary to convince airline companies around the globe to switch gradually from petro-based fuel to biofuel.17

If we look at SkyNRG from the perspective of KLM, the initiative illustrates how a company can tackle a major strategic challenge (dependence on petro-based fuel) by setting up a hub company that unfolds an ecosystem to guarantee a growing supply of aviation biofuel. KLM and its network of airline partners in Skyteam are (potential) customers of the aviation biofuel. The required technical innovations (such as the development of second generation feedstock for fuel production) are developed by the biofuel industry and specialized technology centers. However, technology is only one determinant of the mainstream adoption of biofuel in the airline industry. A breakthrough can only be achieved by combining essential expertise and experience in the fields of regulations (standard setting), effective sustainability criteria, product knowledge, and air transport. There are considerable adoption risks, as several players may choose not to switch to aviation biofuel. KLM is interested as a customer in a steady supply of competitively priced biofuel which is a major driver of profitability. Outside-in open innovation plays a role but in a different way than in cell 3 of Table 3.1: in that cell the knowledge sourced from external partners empowers the focal firm to develop a new product or service. Here (in cell 6), KLM is not developing a new product or service using external knowledge, but it established SkyNRG to accelerate the technological progress in the biofuel value chain, guaranteeing in this way the supply of aviation biofuel. KLM adopts an open business model: value is created through the concerted action of several partners in the ecosystem and is shared according to predetermined agreements. The ecosystem is orchestrated by a dedicated company (SkyNRG) who crafts inter-organizational ties to create an ecosystem between organizations that have never been in contact with each other before. While in the previous case, Better Place took on the role of a hub firm, KLM tries to realize its strategic objective through the establishment of an ecosystem orchestrated by another organization.18

3.5 EXTENDING OPEN INNOVATION

The classification scheme presented in Table 3.1 is a simple framework to examine different combination of innovation strategies and business modeling. The outcomes of the left and right columns in Table 3.1 are quite different from each other. The stand-alone business models are focusing on the new product or service development. Most open innovation examples that have
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been described in the literature can be classified in the left-hand column. In contrast, linked or networked business models have received less attention. With linked business models a company can use inside-out or outside-in open innovation beyond new product development. In the left-hand column of Table 3.1, external knowledge is sourced to develop a new product or business, or internal knowledge is marketed to another firm that will use it for its own product development. In the right-hand column, a combination of linked business models and open innovation can be used to leverage any strategic driver as in the case of SkyNRG. We discuss this point in greater detail below using a hypothetical example of the crude oil business in BP.

Assume you are a manager in the crude oil business at BP. The product you are selling is inevitably a commodity and product innovation is by definition excluded. Competitiveness in the crude oil business depends on various technologies that increase the productivity of exploration and extraction. Oil companies have to detect the richest oil wells earlier than competitors and drill them more effectively through new technologies that allow them to extract oil at larger depths. Although the oil industry is dominated by large companies with strong R&D capabilities, they rely on specialized oil-services companies such as Schlumberger and others to develop new technologies for oil exploration and extraction: the oil-services sector is a beacon of innovation within the energy industry. Oil-services firms typically receive more patents each year than most of the large integrated oil companies. BP can gain a competitive advantage if it partners with Schlumberger (usually in combination with other specialized services companies) with leading-edge exploration and drilling technology. BP can set up a research program with these firms and (co-) finance the research and development of new exploration and drilling technology. They become strategic partners in advancing this technology. BP will typically require exclusive use of the technology for several years before Schlumberger can sell the technology to other oil companies.

This example illustrates how a combination of open innovation can be applied in commodity businesses where product innovation is not a competitive driver. Open innovation applied to new product or business development should be considered as a specific competitive driver relevant in particular situations but not in others. Open innovation can be applied in a wider range of situations if we start with the strategy of a business, identify the key value drivers that should be acted upon, spot and select the potential innovation partners and set up a joint project to develop technologies or solutions that will strengthen the firm’s competitive position. Thus, even in the absence of any product or service innovation in the business, firms can still “nurture” their network of innovation and value chain partners to become more competitive. Nambisan and Sawhney (2010) have shown how such a network has to be managed.
This shift away from product innovation also shows that the competitive position of firms may rely on a broad set of value drivers, going from process innovations, an increase in the productivity, or enhancing the quality of products. Increasing throughput time, reducing operational complexity and costs, or integrating processes are other examples. Which one to focus on depends on the business context, but in each case the focal firm can set up a joint research initiative and encourage (technology) partners to join forces to accelerate the required technological innovation to augment the competitive advantage of the former.

Finally, extending open innovation in this way makes it more relevant for companies and organizations who are recipients of technologies/innovations—service industries, low-tech manufacturing industries, governments, etc. Recipient organizations can initiate and orchestrate the collaborative initiative while technology providers are implementers within this framework.

3.6 CONCLUSIONS

Open innovation from its inception has examined the connection between the firm’s R&D processes and the firm’s innovation model. As the concept has been explicated and expanded, that connection has itself evolved. In the initial 2003 book, the business model was treated as static (Chesbrough, 2003a). The canonical experience of Xerox PARC with its many technologies that did not fit the copier/printer business model of the parent company showed the importance of linking innovation and the business model. In Chesbrough (2006a) the evolution of the business model was considered, and a six-stage maturity model was propounded to represent different levels of development. The platform business model was the highest, most valuable type of business model. In the 2011 volume that directly considered open innovation in services, the shift of many companies toward services required their business models to change as well.

With this chapter, we think that we have extended the evolution of these concepts further. We invite readers to engage in this research themselves, and help us further understand the novel ways in which more open innovation processes can combine with more open, connected business models to create and then capture value.

NOTES

1. Grönlund, Sjödin, and Frishammar (2010) is an interesting article about the stage-gate process in an open innovation context.

3. A good example is the Flavr Savr genetically modified tomato of Calgene (Vanhaverbeke & Cloodt, 2006) or the examples provided by Adner (2012) such as e-books, digital cameras, inhalable insulin, electronic health records, etc.

4. In a recent webinar on November 28, 2012, the Manager of Open Innovation at Procter & Gamble, Nick Nicholides, stated that P&G had done more than 1,300 collaboration contracts in its Connect and Develop program since 1999, and that 40% of P&G’s partners had done multiple deals with P&G. So, some of the open innovation transactions in this instance had turned into ongoing relationships.

5. We also could add the “coupled process” type of open innovation as argued by Gassmann and Enkel (2004). To keep the number of combinations tractable within a short chapter, we chose to limit our attention to the outside-in and inside-out type of open innovation.

6. The development of Tide at P&G is another great example. Tide was the first heavy duty synthetic laundry detergent which was developed at P&G by a small team long after the company had officially given up the project to develop a synthetic detergent. It is a perfect example of skunkworks. For more information, we refer to Dyer, D., Dalzell, F. & Olegario, R. (2004) Rising Tide: Lessons from 165 Years of Brand Building at Procter & Gamble, Boston: Harvard Business School Press. An overview of the Tide development can be found at http://laundry.about.com/od/laundrydetergents/ss/Tide-Laundry-Detergent-Through-The-Decades.htm.


8. P&G also developed Nodax, a technology that can be used to manufacture new biopolymers using renewable resources. However, P&G is not a producer of plastics and it sold the invention to Meredian, Inc., a privately-held corporation. Meredian uses the acquired technology to manufacture polymers that will biodegrade. Similar to the ConAgra Foods case, P&G’s technology helps Meredian to develop and produce a new product category, but the recipient launches the product and grows the market without the help of the Cincinnati based multinational. For more information see http://www.pgconnectdevelop.com/home.


12. This account is synthesized from two key sources. One is http://apple-history.com/ipod; the other is an article from Wired Magazine in 2004, http://www.wired.com/gadgets/mac/news/2004/07/64286?currentPage=all.

13. See Chesbrough, 2006, chapter 8, for more discussion of IBM and Linux.

14. DC fast charging is presently considerably slower than Better Place’s 59.1 seconds battery-switchover. The same DC fast chargers can recharge the battery of the Nissan Leaf to 50% in 30 minutes because the car’s software controls the rate of charge and not the fast charger (LaMonica, 2010).
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17. The industry has been forging ahead with pilot projects in a number of countries worldwide. But airline companies and the biofuel producing value-chain cannot do it alone. Political support and financial investment will have to come from a number of stakeholders. Global sourcing and marketing of sustainable jet fuel require promoting R&D throughout the entire supply chain, advancing the technical certification and economic viability of next-generation aviation fuels, pushing for mechanisms that help to create a level playing field for sustainable jet fuel, and finding ways to finance the premium to be paid for sustainable jet fuel until the bio-fuel industry is big enough to guarantee competitive prices.
18. This, in turn, raises interesting questions how large stakeholders such as KLM keep control of the decision making in hub firms such as SkyNRG.
19. Linked business models are, however, not new: Chesbrough (2006) provided interesting examples of open business models and showed how companies can create and capture value through the development of a platform.