

# Chapter 2

## Enriching Open Innovation Theory and Practice by Strengthening the Relationship with Strategic Thinking

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**Abstract** In this chapter, we first argue that open innovation can be applied to situations where companies do not themselves develop new products or services. As a consequence, open innovation becomes relevant for a much larger group of organisations than hitherto. Second, we argue that open innovation scholars have failed to sufficiently differentiate open innovation initiatives in terms of their impact on companies' growth: Some open innovation initiatives lead to incremental innovations in existing businesses while others are used to establish completely new businesses. Both arguments illustrate the need to integrate open innovation initiatives into the strategy of the firm.

### 2.1 Introduction

We believe there is a pressing need to rethink open innovation. The development of open innovation has been tightly linked to the concept of the (open) innovation funnel. In this chapter, we argue that open innovation should be sundered from the 'innovation funnel' concept for it to perform even greater service in the future.

We make two arguments why the connection to the 'innovation funnel' should be loosened to enable new research paths to be found in the open innovation field. First, we argue that organisations in different kinds of industries can benefit from open innovation even when they do not develop new products or services themselves. This change in perspective makes open innovation relevant to a much broader range of organisations than before. Second, open innovation, with its main focus on the innovation funnel, has implicitly concentrated on R&D projects that, if successful, would boost growth in existing businesses. To date, innovation

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scholars have made few attempts to make comparisons between open innovation initiatives as: (1) ways to speed the growth of existing businesses; (2) ways to set up new businesses. Both arguments illustrate the need to integrate open innovation initiatives into the strategy of the firm. Scholars need to: (1) analyse how managers follow a stepwise process for linking firms' strategy with open innovation practices; (2) take the integration of open innovation into strategy seriously.

We explore these two themes in more detail in the following two sections. In the conclusions, we focus on the consequences of this attempt to broaden the scope of open innovation for both practitioners and scholars.

## 2.2 Open Innovation beyond New Product Development

Open innovation scholars have always (implicitly) focused on open innovation practices in the context of new product development. This is illustrated by the central place occupied by the open innovation funnel in Chesbrough's seminal book (2003). Open innovation has been defined in terms of inside-out or outside-in innovation. These two terms implicitly refer to the open innovation funnel where external knowledge is acquired to strengthen internal competencies and to speed up the innovation process within the company, and in which unused, internal knowledge is monetised through external paths to market. External knowledge is in-sourced to develop new products or businesses, or internal knowledge is sold to other firms, which deploy it for their own new product development.

However, Vanhaverbeke and Chesbrough (2013) show that open innovation can be applied to many more situations than just new product development. They claim that new product development is only one of many business activities where open innovation is applicable and valuable. New product development is not an option in many industries such as services where firms typically focus on creating solutions for customers rather than producing and selling products based on new technologies. Moreover, in many manufacturing industries, companies produce and sell commodities. In such cases, new product development is simply not an option. Vanhaverbeke and Chesbrough (2013) argue that in such industries, a company (the focal firm) should first determine which strategic drivers should be leveraged to gain competitive advantage. Next, technological innovations in other companies may be useful for leveraging the strategic drivers identified. Therefore, the focal firm has to set up a network (or an innovation ecosystem) including these companies: Technological innovations in the latter will lead to a competitive advantage for the former. In short, we should not automatically link open innovation to new product development but rather look for specific strategic drivers in certain situations.

A good example can be found in the crude oil business within a large oil company. The product sold by the business unit is clearly a commodity and hence new product development is automatically excluded (at least at the business-unit level). However, as in any business, competitive advantage in the crude oil

industry is determined by a number of strategic drivers. Two of these are: (1) early detection of large oil wells; (2) effective drilling of these wells. Competitiveness in the crude oil business depends on various technologies that boost the productivity of exploration and extraction. Oil companies have to find the richest oil wells before their competitors do and drill them more effectively through new technologies that allow them to extract oil more productively at greater depths. Although the oil industry is dominated by large companies with strong R&D capabilities, they rely mainly on specialised 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 service firms typically receive more patents each year than most of the large integrated oil companies. The oil company gains a competitive advantage if it partners with Schlumberger (usually in combination with other specialised services companies), which has leading-edge exploration and drilling technology. An oil company can set up a research programme with these partners and (co-) finance the R&D of new exploration and drilling technology. They become strategic partners in advancing this technology. The oil company will typically require exclusive use of the technology for several years before Schlumberger can sell the technology to other oil firms.

The example of the crude oil business within oil companies is just one example of how companies that were not typically considered as open innovators can still drive competitive dynamics through innovation ecosystems and open innovation. In this setting, it is essential that the partnering companies have networked and mutually-independent business models. In the case of the iPhone: Apple creates value by setting up a platform for apps and the number of apps determines an iPhone's value for the customer. Obviously, app makers are dependent on the platform to create value for customers. Networked or linked business models are a recent development that has received attention from Osterwalder and Pigneur, authors of the best-selling book *Business Model Generation* (2009). Vanhaverbeke and Chesbrough (2013) provide other examples, such as SkyNRG (<http://www.skynrg.com>) and Curana ([www.curana.be](http://www.curana.be)). Quilts of Denmark ([www.qod.dk](http://www.qod.dk)) represents another example where the technological efforts of external partners are used to leverage a strategic driver of QoD, which translates the technology into a profitable value proposition for its customers (Vanhaverbeke 2011). Curana and QoD are SMEs: They benefit through their open innovation network from the technological advances of their technology partners, which require scientific and technological knowledge that is hard to develop internally and involves large up-front investments that lie far beyond an SME's scarce resources.

To sum up, open innovation—once sundered from the open innovation funnel and new product development—offers business opportunities for a broad range of companies that were not previously considered as beneficiaries of open innovation strategies. Within this extended open innovation framework, new product development should be considered as a strategic driver that applies to some situations but not to others. To extend the applicability of open innovation, we always have to start from the strategy of a firm, identify the key strategic drivers for creating

value/enhancing the firm's competitive position, spot and select potential innovation partners, and set up a joint project to develop technologies or strengthen the firm's strategic drivers. Thus, even in the absence of any internal new product or service development, companies can still nurture their network of innovation and value-chain partners to boost their competitiveness. In the next section we will look in more detail at the key role played by strategy in the theory and practice of open innovation.

### **2.3 Open Innovation and the Need for a more Explicit Role of Strategy**

Open Strategic concepts implicitly took a central place in seminal open innovation publications (Chesbrough 2003, 2006). The business model, for instance, is a central part of the open innovation funnel because it determines what external knowledge a firm needs to source from external partners and what internal knowledge can be licensed out or sold to other companies. As such, strategy has always been core to open innovation. However, very few publications have tried to get to grips with the complex relationship between open innovation and strategy. To our knowledge, apart from some practice-oriented publications (which implicitly integrate strategy into management decision making on open innovation) (Slowinski and Sahal 2010; Chesbrough and Appleyard 2007) is the only publication that analyses the relationship between open innovation and strategy in depth. Yet, they focus only on open invention and open co-ordination in which ecosystem partners play a role. Although quite interesting, in our view this approach limits the role of strategy in open innovation. In our opinion, open innovation projects should be differentiated according to their impact on the company's current or future growth. Depending on their impact, projects play distinctive roles in a firm's strategy. The strategic value of different open innovation approaches can only be assessed if open innovation is first integrated into firms' corporate and business strategies. Several practice-oriented authors have detailed how managers can follow a stepwise process to successfully link firms' strategy to open innovation practices (Slowinsky and Sahal 2010; Kirschbaum 2005). Yet, the link between open innovation on the one hand and strategy on the other hand has received scant attention in the academic literature. In contrast with the rapid growth of the open innovation literature, few articles have focused on open innovation and strategy (Chesbrough and Appleyard 2007; Dittrich and Duysters 2007).

In what follows, we show how the linkage between open innovation and strategy is crucial for big firms applying open innovation to new product/business development. We illustrate our argument by examining three well-known cases: Procter & Gamble's (P&G) Printed Pringles, the Swiffer Duster of the same company (Chesbrough 2003, 2006), and DSM's Emerging Business Areas (EBAs)

(Kirschbaum 2005). These examples of open innovation are considered successes by both professional journals and the academic literature. However, these three examples each have a different impact on the growth of the companies involved: The Printed Pringles and the Swiffer Duster examples represent cases where the company is strengthening its existing businesses while the EBAs at DSM portray the firm's bold bet on creating completely new divisions that should become operational within 3 to 10 years.

*P&G's Printed Pringles.* P&G wrote a public brief describing the technical problem of how to print edible dye images on their potato crisps and sent it out worldwide for potential solutions. A university professor in Bologna, running a bakery that was also producing baking equipment, rose to the challenge. He had already created an edible food dye that could be printed on cakes and biscuits. P&G licensed the IP from him and launched Printed Pringles within 8 months. Within one year, the new product boosted P&G's revenues by 14 %. Huston and Sakkab (2006) reported on how P&G was able to lower product development costs and time-to-market for the new product variant through the sourcing of external technology. The Italian bakery technology could not have been discovered by P&G if it had not developed a global network of potential sources of ideas and know-how that it set up as part of its open innovation programme. Printed Pringles was a commercial success and is a shining example of how a company can make use of existing external technologies for short-term improvements or for differentiating existing products.

*P&G's Swiffer Duster.* The Swiffer Duster is a second example of open innovation success in P&G. It illustrates how open innovation can be instrumental for the development of a new product category. P&G wanted to produce a duster as a follow-up to its successful Swiffer mop, but its internally developed prototype was unappealing. The Japanese company UniCharm had developed an attractive duster but the company did not have the manufacturing, distribution or marketing strength to introduce the innovative product in other markets beyond Japan. P&G's research team recognised 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 for both P&G and its Japanese partner. The resulting partnership enabled P&G to launch the Japanese innovation in the US in just 18 month under P&G's established Swiffer brand. Swiffer is now a market leader and is sold in 15 global markets. This case illustrates how large companies can insource external knowledge and innovative products to drive sales growth. It leads to a win-win situation for both partners because of their complementary positions. UniCharm had the right innovation but not the strength to market it globally. P&G is a global operator but lacked a product with UniCharm's merits and appeal. The licensing deal extending the sales of the new Swiffer outside Japan profits both companies and their consumers. Obviously, the Swiffer duster is a bolder strategic move than the Printed Pringles case but it is still a fairly simple case when it comes to the managerial challenges required to source the technology and successfully launch the product.

One way to broaden the focus of the open innovation literature is to link it explicitly to corporate strategy. Popular open innovation cases (such as the P&G examples) illustrate how a firm can benefit by using external knowledge sources to develop new products in existing businesses. This emphasis on the use of open innovation in existing businesses eclipses other potential strategic uses of open innovation. More specifically, firms also engage in open innovation to develop completely new businesses. Several companies have taken steps in this direction. IBM's Emerging Business Opportunities (EBOs) for example have received a lot of attention in the literature. IBM established its EBO programme in 2000 to identify and nurture new lines of business. An EBO focuses on 'white space' opportunities that promise to become profitable, 'billion-dollar' businesses within 5 to 7 years. EBOs are typically assigned an experienced IBM executive champion to manage the venture during its start-up phase. Pilot projects, almost always involving clients, validate and refine initial ideas for the EBO's products or services. Once an EBO has grown to sufficient size, it usually becomes part of an existing IBM business unit. Several EBOs achieved over \$ 1,000 million in revenue and most ventures are in various stages of maturation and growth (IBM 2008). EBOs have been analysed in terms of organisational inertia and ambidexterity (O'Reilly et al. 1996). However, they also require a different approach to external partners and, consequently, open innovation has to be implemented in a way that differs from ventures in existing businesses. We describe DSM's EBAs—another example with similarities (but also differences) with IBM's EBOs—to examine how open innovation is fundamental in emerging businesses and how it takes a different form from that found when it supports existing businesses.

*DSM's EBAs.* DSM is a Dutch globally operating, science-based company active in health, nutrition, and materials. Innovation permeates DSM and its existing businesses, which are clustered into Nutrition, Pharma, Performance Materials, and Polymer Intermediates. The corporate Innovation Centre is responsible for developing future growth opportunities through Emerging Business Areas—EBAs involve exploration of new fields requiring combinations of the company's existing technical strengths in performance materials and life sciences with the purpose of creating future business opportunities (Vanhaverbeke and Peters 2005; Wijen et al. 2011). There are currently three EBAs: Bio-Based Products and Services, Biomedical Materials, and Advanced Surfaces. The EBAs are expected to generate € 1,000 million in revenue by 2020.

Developing new businesses (such as in the case of IBM or DSM' EBAs) sets different requirements for implementing open innovation than strengthening existing businesses (P&G examples). First, the new ventures have to be strictly aligned with corporate strategy: Some ideas may be very promising but if they do not tie in with the company's strategic direction then they are candidates for out-licensing or spin-offs. The alignment with corporate strategy is virtually absent in ventures that are created within existing businesses, as most of them are extensions of existing offerings. In this case, strategy is well known and the ventures are automatically conceived within the existing strategic context. Second, since these are completely new businesses, DSM has to broaden its skills or even develop new

ones. These ventures stretch the technological competences of the company almost by definition. DSM has to reach out to technology partners to access, assimilate, and integrate these skills. New skills are not necessarily technology-related: In order to have a viable business model for the EBA ventures, DSM sometimes has to create new routes to market. This can lead to acquisitions of firms with access to (potential) customers. Similarly, for realising the benefits of its technologies, DSM requires access to other parts of the value chain, which leads to partnerships with firms owning key complementary assets: The joint venture between the US-based POET and DSM in the second generation bio fuel refineries using bio-based feedstock is a good example. The production of cellulose-based ethanol requires close co-operation between feedstock producers, enzyme companies, fermentation companies, ethanol producers, and oil majors (distribution to pump stations). DSM is delivering the enzyme and fermentation technology. POET is a bio-refinery that has access to the feedstock and has the right outlets for selling the bio fuel to oil majors. The two partners will start the first bio-refinery in 2014 in Iowa and will license out the technology to other bio refineries in the US. The need to develop new skills and routes to market is usually absent in ventures cultivated by existing businesses. Third, the EBAs are developed in collaboration with a broad range of external (technology) partners. This kind of collaboration is quite different from that with partners creating new products within existing businesses. The vast majority of partners within the EBAs are science-based ones. This is because most of these ventures are several years ahead of market applications and face great technological challenges using new and unproven technology. Moreover, partners within the EBAs are often new contacts, unlike partners in existing business ventures that are mostly part of existing networks. Fourth, EBAs typically make use of different governance modes to source external technology than ventures to spur existing businesses given that most technology for the EBAs is still at an early development stage. There will be more contract research and long-term development agreements with universities and research labs. Corporate venturing also plays a crucial role in EBAs. By contrast, value chain partners take a back seat until the technology and the business model have been tested.

The technological developments required to launch ventures in the three EBAs are explorative in nature and very expensive. DSM is too small a company to independently finance the research required for the development and commercialisation of the technologies in the EBAs. Therefore, the company has been setting up several public–private partnerships in the South-East of the Netherlands. The BioMedical Materials Programme, for example, is a partnership of the Dutch government, academia, and industry, focusing on research and development in the field of biomedical materials. Since 2007, this programme has become a world leader in the field of biomedical materials and their use and applications in a clinical environment. Besides DSM and the University of Maastricht, leading players in the consortium include Philips Research, Organon, Medtronic, FUJIFILM Life Science, Pharming, TNO (Dutch Organisation for Applied Scientific Research), and most of the leading universities and university medical centres in The Netherlands. DSM took the initiative in setting up this programme to support

its ambitions to become a leading player in the biomedical market. The programme is fully in line with DSM's focus on developing the medical innovations of the future. The co-operation is a way of joining forces, speeding up development and attaining results that would be much harder for partners to achieve on their own. It also allows DSM to be a technology leader at only a fraction of the costs.

A similar initiative is the Dutch Polymer Institute. This Institute is a public-private partnership performing pre-competitive research into polymers and their applications. It links the main polymer producing and processing companies with top Dutch polymer research institutes. Founded in 1997, at the initiative of DSM and others, the institute is currently a European centre of excellence in the polymer science and engineering field. This spawns more scientific publications for the universities and intellectual property for the companies. The Institute fosters awareness of new technology and helps competing companies to work together to trigger innovation. It also makes university know-how available to companies, creating conditions that facilitate breakthrough inventions and trigger industrial innovation. Some 200 researchers are currently involved in the Institute's projects at knowledge institutions around the world. DSM is one of the major industrial companies involved in collaboration with the Dutch Polymer Institute: It allows the company to create opportunities based on early stage technologies that are at the core of the EBAs. At the same time it enables DSM to access state-of-the-art research at a relatively low price.

All in all, open innovation projects with an impact on either existing businesses or with implications for a company's growth potential in new areas play distinctive roles in firms' strategies. We therefore need to gain a better understanding of how different forms of organisation and management help companies team up with different kinds of external partners to either stimulate existing businesses or to create completely new growth areas. Different strategic growth targets (short-term in the business versus long term in the EBAs) lead to different ways of organising open innovation. Open innovation projects targeted at creating new growth areas should bring together all parts of the firm to ensure that relevant knowledge is centralized in one place. In ventures for creating opportunities within existing businesses only the focal business unit or a small group of business units are involved. In a similar manner, open innovation projects aiming to set up new businesses should involve a different set of partners than projects stimulating existing businesses. Notwithstanding the strong academic focus on open innovation projects for the purpose of creating growth opportunities within existing businesses, it should be noted that developing new products is just one possible key aim of open innovation projects. The development and incubation of early-stage ventures in business areas targeted as growth areas (beyond the existing divisions in the company) is another important option. Revealing the link between open innovation and the strategic drivers and purposes of companies opens up important new areas for future open innovation research.

## 2.4 Conclusions

When open innovation was launched by Chesbrough as a new concept in 2003, it was tightly linked to other concepts such as new product development, the innovation funnel, and business-model change in large companies. Gradually the scope of open innovation has been broadened, introducing new concepts such as open business models and open services innovation (Chesbrough 2006, 2011). In our view, it is time to explicitly incorporate open innovation into firms' strategy. This has been a major gap in the open innovation literature over the last 10 years and has hampered its adoption as a mainstream concept.

We focused on two topics in this chapter. First, open innovation can be useful for companies that are not involved in new product development. We gave examples of such firms, showing how they can become more competitive by accessing the open innovation activities of other companies. Second, the full potential of open innovation cannot be realised unless it is explicitly linked to corporate strategy. Some companies use open innovation in very different ways from those found in standard case studies. These firms tightly link open innovation to corporate growth targets. This leads to new open innovation applications (for instance when collaboration with partners focuses on building new internal (technological) competences).

Both topics show how important it is to embed open innovation initiatives in the firm's strategy. Several practice-oriented authors have described how managers follow a stepwise process to link firms' strategy to open innovation practices. It is time the academic literature took the integration of open innovation into strategy seriously. We discern the following potential implications of this broader concept of open innovation for research and practice:

- *Strategy as a starting point:* Introducing open innovation is pointless unless it is part and parcel of a firms' strategy. There is an urgent need to integrate open innovation into strategy and differentiate open innovation projects according to their strategic role. A shift away from new product development shows that a firm's competitiveness may rely on a broad set of strategic drivers. Examples include process innovation, boosting productivity, raising product quality and usability, cutting throughput time, reducing operational complexity and costs, and process integration. The business context will determine which aspects to focus on but in any case the focal firm can set up a joint research venture and encourage (technology) partners to speed up innovation in a given field. Therefore, managers should begin by identifying the key strategic drivers that can be leveraged by new (technological) developments with partners rather than start out with the need to open up during a new product development process.
- *The need to change the theoretical open innovation framework:* The extension of the open innovation framework also implies that the open innovation funnel is no longer the central analytical framework. It should be replaced by a new framework that incorporates items that are central in the innovation ecosystem literature (Adner 2012).

- *Understanding the diversity of open innovation projects:* Integrating open innovation activities into corporate strategy helps explain the large differences among firms when it comes to successfully implementing open innovation. Careful analysis of the role of open innovation in firms' strategies sheds light on the host of organisational and managerial practices that are now labelled as 'open innovation'. This diversity of open innovation activities mostly stems from firms' different strategic objectives.
- *Linking open innovation to the corporate growth and renewal literature:* In the literature, the scope of open innovation activities is usually determined by the business model of mainstream businesses in a company. The potential benefits of open innovation from a corporate growth and renewal angle are hardly broached in the literature: Several companies (such as IBM and DSM) have successfully used open innovation to build completely new businesses based on a fundamentally different approach.
- *Exploration/exploitation:* Once open innovation is tightly linked to corporate (growth) strategy, scholars can draw on a broad stream of literature on exploration/exploitation (March 1991) and the need to have an 'ambidextrous' company (Tushman and O'Reilly 1996; Janssen et al. 2012). "An ambidextrous organisation is one that is capable of simultaneously exploiting existing competencies (e.g., satisfying existing customers) and exploring new opportunities (e.g., developing new products)".
- *Capability building and dynamic capabilities:* When open innovation is part and parcel of corporate growth strategy, we might expect new competence-building to become a central topic. In this case, open innovation is not only instrumental for developing a product from research through to market launch. New competences also have to be built for corporate quests for new technologies and business areas. This is a chance to put the role of open innovation in developing new competencies and dynamic capabilities in the limelight (Teece et al. 1997; Teece 2007; Helfat et al. 2007).
- *Wider applicability of open innovation:* Extending open innovation in this way makes it more relevant to firms that are technology/innovation recipients (such as service industries, low-tech manufacturing industries, and governments). Recipients can begin and orchestrate collaboration while technology providers deal with implementation. This means open innovation can also help in fields such as: Creating and improving services; processes; technologies; management practices; ideas/concepts; strategies; and business models; competence building, regardless of the industry.
- *Managing innovation ecosystems as the new imperative:* Nambisan and Sawhney (2010) have shown how innovation ecosystems have to be managed. However, they limit their attention to firms that are technological innovators and require an ecosystem to get the technology developed and adopted. Our approach is different, leading to a different type of ecosystem and different guidelines for appropriate management of the ecosystem.

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