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Linking value creation and value capture to open innovation

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SUMMARY

The two most commonly identified dimensions of an innovation business model are creating and capturing value from innovation. Both aspects are increasingly mediated by the firm's relationships with other firms in a value network – firms that supply inputs, buy outputs and provide complementary goods and services. On one hand, the shorter product lifecycles and increasingly higher development cost for new products with much higher time pressure for market launch and, on the other hand, the need for growth and value creation through new products and businesses are important drivers for the implementation of open innovation within the business models of both large and small firms.

The literature review reveals that open innovation is still a very young and fluid research field. Chapter 2 defines, analyzes and synthesizes the following categories: the notion of open innovation; towards more open business models; organizational design and boundaries of the firm; leadership and culture; tools and technologies; IP, patenting and appropriation; industrial dynamics and manufacturing. As a point of departure, this notion of open innovation is first proposed by Henry Chesbrough in 2003 who argues that the position of the internal R&D as an invaluable strategic asset is already seriously eroded due to changes in society and industry (like increased mobility and supply of both knowledge workers and venture capital) which have caused the organizational boundaries of the innovation process to start breaking up. Open innovation has emerged as a model where firms commercialize both external and internal ideas and technologies and use both external and internal resources. However, the adoption of open innovation does not happen without changing the current business models. And not only they but also systems, processes, values and culture need to be transformed. Furthermore, open innovation should be managed according to a firm's position in the value chain, the business/technology lifecycle and the value proposition pursued by the companies.

The first section of chapter 3 answers the questions which resources are valuable, what is value, how it is created and captured. The second section throws light upon value creation and value capturing through innovation in general and, afterwards,

within the open innovation model. There I argue that firms first always have to create customer value before capturing it and the most sustainable way to do that is through continuous innovation of products, services and processes. Still, the best defense against losing the value of innovation is to keep innovating on the business model. Open innovation has revitalized the interest of companies to tap into external sources of knowledge and to make use of their knowledge and/or technology that do not fit their current business models. I emphasize the need to balance the ability to profit from external knowledge sources and the ability to develop and exploit internal knowledge.

Value creation and capturing processes are at the centre of both strategy analysis and open innovation (via the business model). However, in open innovation a firm *collaborates* with partners, suppliers and/or customers to improve its internal innovation capabilities or to expand the markets for the external use of internal innovation since innovation is the most sustainable way to create value for a targeted customer group. Open innovation stipulates that whereas value creation is an inherently cooperative process, value capturing is inherently competitive.

The following section propose corporate venturing not only as a financial (value creation), but also a strategic asset. While venture firms have access to the parents' core competences and resources, corporate venturing offers to the parent company an opportunity to experiment with new areas of business, to reconfigure resources and even to boost its organic growth. Different ways of how to extract value from corporate venturing are presented.

The last section of chapter 3 explains why IP and intangible assets should be managed as a strategic asset. Besides the numerous benefits of licensing, the proactive management of IP could reduce costs, motivate R&D employees and promote a public image of a company as innovative.

Chapter 4 starts with different ways how to balance value creation and value capturing. Several reasons are defended why valuable resources, which are the basis of a sustainable competitive advantage, should *not* be kept closed within a firm. Furthermore, I develop different options for open innovators to create and capture

value within weak appropriability regimes. The following section analyzes the strengths and weaknesses of changing the focus of a firm's business model when assessing complementary assets, which could eventually impact the firm's propensity to innovate. The subsequent section explores the seemingly paradoxical question why not weak, but strong appropriability facilitates open business models. The latter, in turn, depends on a firm's assets and value proposition, as well as on the corresponding business models of its suppliers, customers, competitors and complementors throughout the value network. Still, any open innovation business model must regard the relationship of value creation and value capture for all the participants as a *dynamic process* since new technologies/knowledge tend to require new business models, new value propositions to customers and often new value capture mechanisms for the open innovation firm. The commercialization of an innovation is based on a business model of the innovating firm, but its scope and impact goes beyond its boundaries and requires changes in the established value creation and distribution mechanisms.

In the final chapter I conclude that both open innovation, on one hand, and value creation and value capturing, on the other hand, focus on an improved utilization of a firm's key assets, resources and positions. Open innovation can balance the need to create value with that to capture value in order to profit from innovation. However, it requires serious organizational changes in order to be implemented; the most difficult one is the opening of the firm's business model and its alignment with the business models of the different parties in the value chain. Only under these conditions open innovation could be linked tightly with value creation and value capturing in a sustainable way.

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CHAPTER 1:

Introduction and problem definition

The aim of Chapter 1 is to present generally the subject, its relevance, and the structure of the thesis. In this chapter I will point out the research objectives, the central research question, as well as the research sub-questions. Research methods which have been applied will also be described in this chapter. Finally, I will give a short introduction to other chapters of this thesis.

1.1. Introduction to the subject and defining a problem statement

Firms involved in close innovation face inherent limits on their ability to appropriate returns from technological innovation. In this Master Thesis, I examine the business models used by incumbents given the limited appropriability available in a closed innovation setting. I will try to show how firms can capture value through different assets, while creating value and positive network effect through open innovation - an inherent openness that attracts collaborators, complementors, users and rivals to their corresponding value network.

Prior research has identified three fundamental aspects of a business model: creating value, capturing value, and embedding the business model into a value network. Much of the managerial and academic interest in business models has focused on how to appropriate the value created from new businesses.

More and more firms develop currently business models that make use of open innovation. A key issue for such models is how firms capture value without formal appropriability of an innovation. The interest in open innovation business models has existed nearly as long as the term "open innovation" itself, centering on the apparent paradox of firms making money using open innovation. After reviewing prior research related to the transition from close to open innovation business models, this Master Thesis will present the findings of open business models that enable firms to create a lot of value and to capture a lot of the value created. I will analyze how open

innovation can contribute positively for sustaining high levels of both value creation and value capture in business models.

In prior research, the two most commonly identified dimensions of business models that were developed based on new technological innovations are creating and capturing value from those innovations. Both aspects are often mediated by the firm's relationships with other firms in a value network — firms that supply inputs, buy outputs and provide complementary goods and services. Not surprisingly, value creation is a universal dimension of recent conceptions of a business model. Given heterogeneous preferences across both individual and organizational buyers, value creation requires identifying relevant customer segments, the value proposition for each, and how the business model will provide that. More importantly, incumbent companies have on average not a good track record in developing new business models. Small firms and start ups have been better in developing new ideas. In an open innovation context, large firms have several reasons to tap in the creativity pools of the many start ups that continuously emerge as the result of entrepreneurial actions. The need to create value through new products and businesses and the need to avoid commoditization in a firm's existing businesses are important drivers for open innovation between large incumbent companies and small start-up firms.

A business model must also explain how a firm can capture part of the value it jointly created with its value network partners. One key step is to define a revenue model, including what will be priced and how much will be charged. Another prerequisite is making sure that the cost structure is consistent with the customer's perceived value and the portion of the value creation that can be captured. Finally, firms must sustain that value capture against competition, often through unique and valuable internal characteristics such as resources, capabilities, core competencies, or culture. Firms can also establish durable external relationships with the buyers, sellers and complementors within a value network.

Because the value created and captured by a firm is determined by its position in the value chain, a firm's business model must define its role in the value chain. Many firms also depend on the supply of third-party complements, and thus the firm's

strategy depends on the entire value network of suppliers, buyers, complementors and other allies. These three dimensions of a business model are implemented through a firm's strategies and its execution of those strategies. For the purpose of our study, I will adopt the following definition of a business model: the business model defines the value proposition, selects the appropriate technologies and features, identifies targeted market segments, defines the structure of the value chain, and estimates the cost structure and profit potential.

1.2. Purpose and Research approach

This thesis gives an overview of the emerging research field of open innovation (OI) in a phase that is still very fluid. The purpose of this thesis is to depict the major trends in the publications and contemporary business practices through identifying the main themes in the literature (including case studies) and investigating the research frontier. It also aims at discussing the potentially important link between value creation and value capture to open innovation that is rather unexplored research topic.

The general research objective of my thesis is to investigate possibilities for an organization offered by OI, as a relatively new model which is very different from the traditional so-called closed innovation model. A more specific objective of my work is to look into possible ways how in practice open innovation can be successfully integrated in firms' strategies and business models and, thus, extend theoretical and practical knowledge about OI and its value-driven applications.

The thesis builds on two main pillars. In the second chapter, a literature overview of the publications on open innovation published until March 31, 2008 was conducted. However, since the expression was coined as late as 2003, much ongoing research is still not found in the publications. In the third chapter potential synergy of open innovation with the value creation and value capturing strategy of the firm is investigated.

Despite of growing interest about open innovation it is still an unfamiliar value creation and value capturing approach to most of the managers and organizations.

For me it is both a great challenge and an opportunity to study this model because only recently discovered it. However, open innovation has a unique ability to provoke immediately a great interest and excite curiosity in both small and large firms. Another challenge for me is to introduce OI in a way that a reader of this thesis would become interested in OI, believe in its potential and eventually embed it (or, at least, some elements of it) in his/her organization whatever its type.

1.3. Limitations

In my thesis I have mainly chosen to focus on research which explicitly uses the term open innovation. There are of course many researchers that investigate issues closely related to open innovation without using the term, but this lies outside the scope of this thesis. I have also limited my search to the social sciences: I have restricted my attention to academic publications, i.e. industry reports are out of scope.

1.4. Research questions

Central research question

In order to meet the research objective, formulation of research questions are needed. The following question is central in my thesis:

“How can we connect value creation and value capturing with open innovation?”

I chose this question for my research because it is important to find out what the possible impediments in front of this linkage are and how they could be overcome. Trying to arouse interest in people about this model with theoretical information is one thing. In practice, however, the difficulties for implementation could be a great challenge since OI requires serious changes in the organizational thinking.

Research sub-questions

In order to help find the answer to the central research question, some sub-questions have been formulated:

- 1) What determines a valuable resource?
- 2) What is value, how is it created, and who captures it?
- 3) What is the role of the business model for value creation and value capturing?
- 4) How should we apply the creation and capturing value mechanisms in the open innovation context?

1.5. Research methods

To get a better understanding of research done on open innovation a systematic search of literature publications up until March 31, 2008 was performed through University of Hasselt's library, interlibrary exchanges, Internet and two major databases of management journals:

- ISI Web of Knowledge-database

Social Sciences Citation Index (SSCI)

- search terms "open innovation", "open business models" in title, keywords or abstract;

- EBSCO Host

Business Source Premier

Academic Search Elite

- search terms "open innovation" and "open business models" in title, keywords or abstract.

The benefit of the current method is that it enables a comprehensive analysis of the books and articles published in the specified time period. As the aim was to gain an overview of research conducted within the open innovation field, the book reviews and columns discussing or mentioning open innovation in general terms were excluded from further analysis of the publications in the field. The most published and cited author is Henry Chesbrough who coined the term in 2003. What this search tells us is that the topic has been mainly dealt with as a pure innovation issue and that other

aspects and consequences of organizing for open innovation have not been drawn in the open innovation literature. Most of the journal articles appear in practitioner oriented journals (here: Academy of Management Perspectives, California Management Review, Harvard Business Review, McKinsey Quarterly, Sloan Management Review, Research-Technology Management). It is also worthwhile mentioning that about half of them are based upon case studies.

The papers and books were read, analyzed and grouped according to their thematic content. Several of the publications naturally have bearing on several of the generated themes. After several round of iterations, the following categories were defined:

- The notion of open innovation;
- Business models;
- Organizational design and boundaries of the firm;
- Leadership and culture;
- Tools, technologies;
- IP, patenting and appropriation;
- Industrial dynamics and manufacturing.

1.6. Structure of the thesis

This thesis is structured as follows:

Chapter 1

In this chapter I gave short introduction of my research, its objectives and relevance, applied methods and limitations.

Chapter 2

Chapter two provides a literature overview and a thematic analysis of both books and publications on the subject of open innovation. It also reviews the directions of research that have been considered important.

Chapter 3

In the third chapter, I explore the opportunities to link a firm's value creation and capture strategy with open innovation.

Chapter 4

In the fourth chapter, results from the preceding two chapters are compared to provide an analysis of the present research field of open innovation and its linkage with value creation and capture.

Chapter 5

In this final chapter, conclusions are drawn, some recommendations are given and potentially important future directions for research are proposed.

CHAPTER 2

OPEN INNOVATION – Literature review

2.1. Introduction to Open Innovation

Much evidence identifies innovation as the main driver for companies to prosper, grow and sustain a high profitability (e.g. Drucker, 1988; Christensen, 1997). This means that the questions that are asked in research no longer revolve around why innovation is important. The focus instead lies on how to innovate and how innovation processes can be managed in a profitable way. A recently proposed and popularized model for the management of innovation is based on the need for companies to open up their innovation processes and combine internally and externally developed technologies to create business value. This notion of *open innovation* was first proposed by Henry Chesbrough (2003a; 2003c) and has quickly gained the interest of both researchers and practitioners, illustrated by a number of special issue publications, dedicated conferences and a rapidly growing body of literature.

As a point of departure, Chesbrough argues that internal R&D no longer is the invaluable strategic asset that it used to be due to a fundamental shift in how companies generate new ideas and brings them to the market (Chesbrough, 2003a; 2003c). In the old model of *closed innovation*, firms relied on the assumption that innovation processes need to be controlled by the company – it was based on self-reliance. Changes in society and industry has led to an increased mobility of knowledge workers and the development of new financial structures such as venture capital – forces that have caused the boundaries of innovation processes to start breaking up (Chesbrough 2003c). Chesbrough defines open innovation as:

“...the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open Innovation is 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 the firms look to advance their technology” (Chesbrough, 2006b, p.1).

The focus lies on the transformation of the previously solid boundaries of the company to a semi-permeable membrane to enable innovation to move more easily between the external environment and the internal R&D processes. A central part of innovation process is also to organize search for new ideas that have commercial potential (Laursen and Salter, 2006).

The ideas of open innovation originated also from experiences from open source software (OSS) development where new principles for development projects were identified (West and Gallagher 2006), and initially a lot of literature was based on technology transfer and spin out/spin in, but the scope has rapidly broadened. Today, open innovation is becoming a paradigm that connects research from various parts of management sciences. The term is still being debated and many authors agree that open innovation has a much broader application than first proposed by Chesbrough (e.g. Piller & Walcher, 2006). The research field is expanding in many directions and the ongoing debates cover a multitude of areas connected through the overall aim of understanding how firms can become more innovative.

2.2. A Thematic Analysis of Open Innovation Publications

The following section briefly presents the publications in each theme. It should be remembered that this thematic analysis is based on the publications that use the term open innovation as mentioned earlier.

2.2.1. Exploring the Notion of Open Innovation

The notion of open innovation comes from Henry Chesbrough, a Berkeley professor at University of California that has gained international fame through his book “Open Innovation – The new imperative for Creating and Profiting from Technology” that appeared in 2003. He describes how companies in the 20th century have invested heavily in internal R&D and hired the best people – enabling them to develop the most innovative ideas and protect them with IP strategies. The generated profit was used to reinvest in R&D – in a virtuous circle of innovation (Chesbrough, 2003a).

However, in the end of the 20th century, a number of factors have changed, mainly: 1)

Rise and increased mobility of knowledge workers, 2) growing availability of venture capital. This has caused the closed innovation process in firms to start breaking up (Chesbrough, 2003b). Chesbrough identifies a number of factors indicating a shift in how innovation was managed (2003c):

- Useful knowledge has become widely diffused;
- Companies do not take full advantage of the wealth of information;
- Ideas that are not readily used can be lost;
- The value of an idea or a technology depends on its business model;
- The presence of venture capital changes the innovation process for everyone;
- Companies need to be active sellers and buyers of intellectual property (IP).

These insights led to the development of an open innovation model where firms commercialize external (as well as internal) ideas by deploying outside (as well as inside) pathways to the market – i.e. *“the boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two”* (Chesbrough, 2003a, p. 37). In an open innovation process, projects can be launched from internal or external sources and new technology can enter at various stages. Projects can also go to market in many ways, such as out-licensing or a spin-off venture in addition to traditional sales channels (Chesbrough, 2003d). Open innovation is based on the following principles (Chesbrough, 2003a; 2003c):

- Not all smart people work in-house – need to tap into external knowledge;
- External R&D can generate significant value to us;
- Research does not need to originate from our internal work to be profitable for us;
- A strong business model is more important than being first to market;
- Internal as well as external ideas are essential to win;
- We can capitalize on our own IP and we should buy others’ IP when needed.

Open innovation is described as “both a set of practices for profiting from innovation and also a cognitive model for creating, interpreting and researching those practices”

(West, Vanhaverbeke, & Chesbrough, 2006b, p. 286). In “Open business models (2006a), Chesbrough claims that open innovation responds to two anomalies in previous research on innovation. First, he treats the *spill-overs* as an explicit consequence of the business model (instead of something to avoid) and the *intellectual property rights* as a new class of *strategic assets* (instead of only as a tool for protection). He claims that both can deliver additional revenue to the current business model. Chesbrough also identifies five key themes in research so far (Chesbrough, 2006b):

- The business model - two important functions, create value within the value chain and capture a part of it for the focal firm;
- External technologies – can leverage a firm’s business model through filling the gaps and by creating complementary products that stimulate faster acceptance of the technology;
- Difficulty of identifying, assessing and incorporating knowledge – increased emphasis on managing knowledge and linking knowledge;
- Start-ups – carriers of new technologies and explorers of new markets, and represent experiments with business models;
- IP rights – facilitates exchange of ideas and technologies.

Early models of open innovation have been seen and studied in the industry of open source software development (OSS) and have later been transferred to more general open innovation practices. West and Gallagher (2006) identify three main challenges of open innovation (motivation, integration and exploitation of innovation) that they investigate through a qualitative and quantitative study of OSS development. They identify four generic open innovation strategies:

- Pooled R&D – shared R&D which require shift in culture;
- Spinouts – a way of escaping large firm bureaucracies;
- Selling complements – accepting commoditization or develop differentiated products based on commodities;

- Donated complements – general purpose technologies are sold so users can develop differentiated products (e.g. user toolkits).

Open innovation as a management model is currently gaining grounds in many industries. For instance, open innovation modes have been identified as one of the main trends in pharmaceutical innovation today. Since it is too costly to have all competences in-house, pharmaceutical companies have started to concentrate on core competencies evolving around technology platforms and therapy areas, in the same time as collaborations with the right partners is increasingly important. Balancing the right size and structure of R&D is one of main objectives in R&D management today. Gaule (2006) builds heavily on Chesbrough (2003b) to analyze the impact of open innovation on several parts of the organization, based on his own consulting model for open innovation. He further provides a series of short case studies, for example on Procter & Gamble.

Chesbrough (2004) also introduced the metaphor of chess and poker to describe the management of innovation. When increasing the sources of ideas in a company the evaluation of early stage technologies is increasingly important. When targeting a known market with a new technology it is like *playing chess* – you know the pieces and what they can do – all information is known. When in a situation of unknown technology and unknown markets – the path is not only unknown but *unknowable*. Measurement errors, i.e. *false positives* and *false negatives*, are likely to occur. The metaphor of *playing poker* can be used for managing false negatives. To play poker, it is argued that companies “need to measure their capital and stage their investments in projects upon the receipt of new information” (Chesbrough, 2004, p. 25). Poker strategies include:

- Observation of what happens internally after the decision to terminate funding;
- Exposure of the failure to outsiders – get new perspectives;
- Out-licensing of the rejected project;
- Formation of a spin-off venture.

In *chess* you are looking for a fit with the roadmap of future project and the current

business model, need a net present value > 0 and minimize the false positives. In *poker* you want to create options for future business models, leverage or extend the business value, have an options' value > 0 and manage false negatives (Chesbrough, 2004).

2.2.2. Towards more open business models

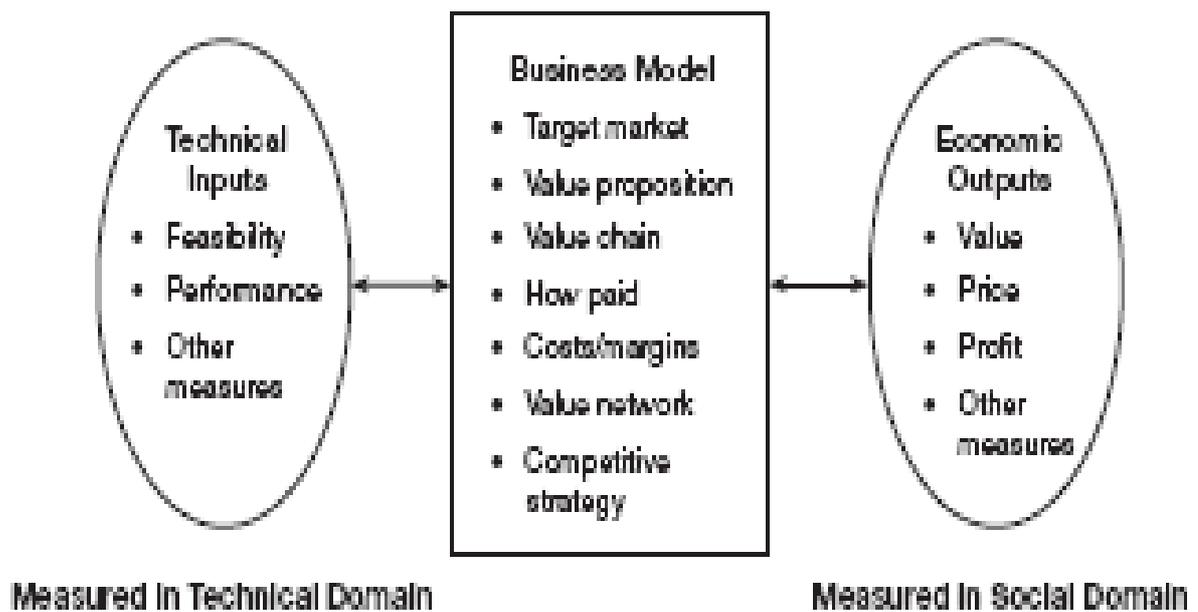


Figure 2.2. The business model as a cognitive map across technical and economic domains (Chesbrough, 2003a)

Chesbrough and Rosenbloom (2002) argue that every company has a business model through which it creates value and it captures a portion of that value. The business model consists of six functions:

- articulation of *value proposition*;
- identifying *market segment*;
- defining of the structure of the firm's *value chain*,
- specifying the revenue generation mechanisms and estimation of *cost structure* and *target margin*;

- the description of the position within the *value network*;
- formulation of *competitive strategy*.

Chesbrough also argues that companies need to adapt their business models to open innovation, because open business models enable companies to be more efficient in creating and capturing value from companies' IP (Chesbrough, 2003c).

The adoption of the open innovation does not happen without changing the current business model. Chesbrough (2006a, 110-134) divides business models into six types depending, how advanced they are in combining innovation processes and IP management with their business models. The types of business models are summarized in figure 2.3.

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Description	Undifferentiated	differentiated	Segmented	Externally aware	Integrated	Changeable, Shapes markets
Innovation process	none	Ad Hoc	Planned	Externally supportive	Connected to business model	Identifies new business models
IP management	NA	Reactive	Defensive	Enabling asset	Financial asset	Strategic asset
Examples	Kebab & pizza restaurants	Start-up technology companies	Technology push companies	Mature industrial R&D firms	Leading financial firms	Dell, Wal-Mart

Figure 2.3 Types of business models (adapted from Chesbrough, 2006a, p.111)

Type 1 companies compete basically with price and availability. They have no development activities or significant intellectual property. In the second level, companies have little IP and some innovation activities and differentiation, but those activities are not managed explicitly. The companies with type 3 business models have more chances to sustainable development. These business models include an explicit innovation process and IP management. The firm segments its markets and invests in R&D. These firms utilize the closed innovation model. Types 4, 5 and 6 are considered as open ones. Type 4 business models start to open up to the environment. Customers and suppliers have a role in innovation process, innovation from outside are scanned and IP is managed as a corporate asset with occasional out-licensing cases. When companies utilize the type 5 business models, they could

be called as real open innovation companies. Internal and external R&D activities are then integrated and widely understood and companies also focus on new markets and business with current markets and businesses. The innovation process is connected to the business model and IP is managed as a financial asset. The last type of business model (6) is even more open than types 4 and 5. The essential feature in this type is that with it, companies are able to change themselves through innovation of their own business models. IP is now managed as a strategic asset and customers' and suppliers' business models are integrated with the company's own (Chesbrough, 2006a, p. 111-134).

Further, Chesbrough (2007b) argues that the rising costs of technology development and the shortening product life cycles make it harder for companies to justify innovation investments. Using open business models, a company can attack the cost side through leveraging on external R&D resources to save time and money and attack the revenue side by licensing out internal technologies. He also argues that companies need to develop their capabilities to experiment with their business models, for instance through alternative brands or spin-offs (to reduce risks); fundamental changes that require top commitment and support (Chesbrough, 2007b).

According to Chesbrough and Schwartz (2007), co-development partnerships are increasingly important in open innovation models. This is in line with Chiaromonte (2006), who argues that the difference of open innovation to traditional outsourcing of innovative capacity is that the outside partners are not seen as suppliers but as peers. Chesbrough and Schwartz (2007) point out that the use of partners can create business models that reduce R&D expenses, expand innovation output and open up new markets. To be able to do this, the authors underline the need to:

- define the business objectives for partnering;
- classify the R&D capabilities of the firm
 - ✓ core (key source of advantage)
 - ✓ critical (vital to success but not key)
 - ✓ contextual (needed to complete the offering, but not differentiator)

- align the business models of the two firms.

This is confirmed by a study in the Netherlands that showed that very few companies actually had an articulated business model – which made it difficult for them to be flexible, for instance through succeeding with implementations outside the original business domain (Van der Meer, 2007).

2.2.3. Organizational design and boundaries of the firm

According to Chesbrough (2003 c) not all companies apply openness completely, it can rather be described as a continuum between high and low degree of openness. He also identifies a number of different roles that companies can have in models of open innovation (Chesbrough, 2003c):

Organizations that fund innovation:

- Innovation investors (incubators, VC, private equity etc) and innovation benefactors (early financing)

Organizations that generate innovation:

- Innovation explorers (discovery research functions, used to belong to R&D)
- Innovation merchants (codifying and commercializing IP, royalties, etc)
- Innovation architects (create value through creating a system for bringing pieces together, e.g. Nokia)
- Innovation missionaries (create and advance technologies to serve a cause, OSS)

Organizations that bring innovation to the market

- Innovation marketers (profitably market new ideas)
- Innovation one-stop centers (sell other's ideas, e.g. Yahoo)

There are still some organizations – *fully integrated innovators* – which try to keep control of all parts (Chesbrough, 2003b).

Jacobides and Billinger (2006) discuss vertical architecture as a way of defining the scope of a firm and the extent to which it is open to final and intermediate markets. Permeable vertical architectures are described as partly open to the markets along the value chain. Increased permeability enables more efficient use of resources, better matching between market needs and capabilities, promoting more open innovation platforms. A case study of a fashion firm showed that it was possible to successfully change the vertical structure through increasing its permeability – arguing that firms can manage their boundaries to change and improve their own operations, strategic and productive capabilities, innovation potential and resource allocation processes (Jacobides & Billinger, 2006). In line with this, Tao and Magnotta (2006) describe the sourcing process at Air Chemicals, where the company has attempted to create a broader interface towards different pools of knowledge in the world, and to search providers that are able to further provide a broader interface towards for example scientists.

Fetterhoff and Voelkel (2006) focus on the problems involved in the search process for innovations. In their definition of innovation, customer demands need to be met by technology, and it is this merging process that they focus on. They argue that as firms mostly are not used to evaluate external innovations, there are a number of issues involved in the management of external innovation:

- Seeking opportunities;
- Evaluating the market potential and inventiveness of a given opportunity;
- Recruiting potential partners by building a convincing argument;
- Capturing value through commercialization;
- Extending the innovation offering together with outside partner (Fetterhoff & Voelkel, 2006).

Dittrich and Duysters' (2007) analysis of Nokia's outside contacts are along the same line. For earlier generations of mobile telephony, Nokia kept product development as an internal issue, while for third generation telephony, the company opened up its processes. In this case, the company engaged in exploration together with outside

firms. Whereas Nokia had earlier had long term partnerships based on the exploitation of innovations, the company now made use of explorative collaboration agreements to organizations with which the company had less strong relations. This set of “weak ties” implied that a more organic way of working than the previous - “strong tie” exploitation agreements that built on stable structures. Simard and West (2006) also distinguish between different types of ties between companies. They discuss *deep ties* that enable a firm to capitalize on existing knowledge and resources and *wide ties* that enable a company to find new technologies and markets. Open innovation networks can consist of both deep and wide ties and can be both formal (contractual) and informal. The authors further argue that *deep networks* tend to mostly lead to incremental innovations (Simard & West, 2006).

Another research study by Dahlander and Wallin (2006) deals with the central theme of how firms can utilize communities as complementary assets without having any ownership or hierarchical control over them. Communities have developed practices to protect their work and in order to gain access to it as well as influence the direction of the community; firms need to assign individuals to work in these communities. The authors showed that firm sponsored individuals are approaching more individuals than are approaching them and that they also seek to interact more with central individuals in the community.

Brown and Hagel (2006) discuss the emerging phenomenon of creation nets where a multitude of participants collaborate to create new knowledge, learn from and build on one another’s contributions – under the guidance of a network organizer. They present examples such as the development of Linux but also motorcycle development in China and networks of amateur astronomers. Creation nets are started by a network organizer (gatekeeper) that decides who participates in the networks, defines participation protocols. Activities are usually organized in modular processes, enabling freedom with well defined interfaces. Creation nets also define action points, which participants must deliver. This requires long term incentives to align and motivate participants. It also requires new management approaches:

- Choose the appropriate way of coordination of the network;

- Balance local innovation with global integration;
- Design effective action points;
- Establish useful performance feedback loops.

The authors further argue that creation networks are best suited for situations where there is an uncertain demand for goods and services, where there is a need for participation of many different specialists to enable innovation and performance requirements are rapidly changing.

With the trend towards more open innovation systems, companies will increasingly commercialize knowledge assets externally in order to keep up with competitors. Lichtenthaler (2007a) identifies three major principles that will help firms achieve strategic fit in the keep-or-sell decision: coordination, centralization, and collaboration. First, firms need to consider external knowledge exploitation as a strategic activity. Then, this strategy needs to be aligned with other strategies (coordination) and a clear direction is needed (centralization). Finally, emphasis should be put on cross-functional collaboration to reduce interface problems.

One way to externally exploit knowledge assets is by means of technology licensing. According to Lichtenthaler (2007b) technology licensing is seldom driven by one particular factor, but it results from a combination of various drivers/motivation factors). The author's questionnaire-based survey focusing on medium-sized and large industrial firms indicate that *ensuring freedom to operate* is of outstanding importance and *gaining access to another company's technology portfolio* is considered the second driver. The monetary dimension did not appear to be that important as was expected.

2.2.4. Leadership and Culture

Articles on open innovation tend to end up by stating that leadership needs to support people striving to be innovative. Yet very few articles actually analyze leadership in open innovation. Fleming and Waguespack (2007) discuss leadership in open innovation communities. They state that consistent with the norms of an engineering

culture the future leader of open innovation must first make strong technical contributions from a structural position that can bind the community together. This is enabled by two correlated but distinct social positions: social brokerage and boundary spanning between technological areas. An inherent lack of trust associated with brokerage positions can be overcome through physical interaction.

Boundary spanners do not suffer this handicap and are much more likely than brokers to advance to leadership. Longitudinal analyses of careers within the Internet Engineering Task Force community (the world's first open innovation community) from 1986-2002 support the arguments.

Witzeman et al. (2006) point out that not only the technological systems need to change. The more external innovation is sourced by the firm, the more systems, processes, values and culture also need to be transformed. The companies in Witzeman's et al. (2006) sample expressed resistance toward open innovation. Powerful forces inside the organization worked to harness current technology rather than search for new technologies from the outside. This is not strange, the authors argue. Company people are trained to think internally, and this tendency is strengthened by concepts such as core competences and Six Sigma. The leaders within this area are therefore those that manage to include the external sourcing in its procedures, for example as a standing point in its project management processes. This is indeed a challenge.

“Building external thinking into the firm requires change. The firm must review the new product development processes, the supply chain, the strategic planning process, the reward system, the technology roadmap, and many other systems for their ability to incorporate external innovation /.../ Harnessing external technology for innovation requires a fundamental change in employee thinking. The “not invented here” syndrome is replaced with the “Invented Anywhere” approach” (Witzeman et al., 2006, p. 27).

This is also in line with Dodgson et al (2006) who recognize that:

- 1) Cultural changes as well as new skills are necessary;

- 2) the technology does not replace existing practices;
- 3) it does not overcome the uncertainty of innovation.

2.2.5. Tools and technologies

Several papers discuss the technological interface that enables the firm to collaborate with a large set of customers. As argued by Dodgson et al (2006) the change of the interface demands a change in the organizational ability to absorb, or assess the impressions from the outside. The organization needs to be prepared, the authors argue. In the case of Procter & Gamble, the case in question, the company had over decades developed a way to connect internally to improve the attitude for initiatives that came from outside the own department (both from outside and inside of P&G). The technique is called “Connect & Develop” (Huston and Sakkab, 2006; 2007).

The technologies, tools, and processes that are in use for open innovation can largely be described as:

Coordinating/aggregating

This point refers to for example the Procter & Gamble Connect and Develop (C&D) model that is used to leverage sources internally and externally to leverage the distributed innovative capacity (Huston and Sakkab, 2006, 2007). The C&D model makes use of the large interface of a multinational organization towards outside parties all over the world to find ideas for new products, understand customer needs, and find solutions to technical problems or issues. Similarly, Tao and Magnotta (2006) provide an example of a process called “Identify and Accelerate” (I&A) that is used to create an understanding of the specific needs of the organization and extend the company’s interface towards the market by collaborating with external search providers to find solutions to those needs. Under Coordinating/aggregating can also be included standard open source methods as well as the toolkits used for innovation and mass customization (Piller and Walcher, 2006)

Liberating

Piller and Walcher (2006) argue that customer have “sticky knowledge” that is not easily revealed in standard market research. Their idea is to use idea competitions to release customer creativity and through that make use of the hidden knowledge and the hidden preferences. They use a case from Adidas’ development of soccer shoes as an example.

Allowing/including

As several papers argue, there are problems involved in setting up the structures to use open innovation. One such problem is that the existing models direct attention towards internal sources of ideas and competence, rather than towards external sources. To change behavior and culture, the formal models that govern the work process therefore need to be the start of the change. Gassmann et al. (2006) write about the use of the software development model extreme programming (XP) to open up the innovation process. The authors point out that the iterative character of the process allows for intense customer interaction, and analyze the applicability of XP to new product development.

The P&G practitioners Huston and Sakkab (2006; 2007) argue that the implementation of a new working system needs to be aligned with the leadership of the organization and with the roles, responsibilities and relationships of the people and processes in place. They stress that the involvement of a senior executive is crucial for the success of open innovation.

There are not only advantages, but also negative sides of integrating customers in the innovation process. Enkel et al (2005) discuss risks and strategies that companies can use to avoid these risks based on a questionnaire study (141 companies) and in-depth case studies of nine companies that were invited to participate in a workshop series:

- Loss of know-how – Involve trustworthy customers, chose the moment and develop IP agreements;
- Dependence on customers’ views – choose the ‘right’ customers and work with a mix of customers;

- Dependence on customers' demands or personality – avoid exclusivity agreements, work with HR to understand customers and their culture and apply open communication;
- Limitations to mere incremental innovation – work with lead users and indirect users, use the right method to include customers and chose an intelligent timing;
- Serving a niche market only – Use different customers in different stages of the innovation process and pay attention to the search field process;
- Misunderstandings between customers and employers – Develop solid relationships with customers, use the right tools and develop suitable incentive systems.

2.2.6. IP, patenting and appropriation

All firms using open innovation need to deal with the need to protect their intellectual capital (Henkel, 2006). How companies manage intellectual property (IP) depends on whether they operate in a *closed innovation* paradigm or an *open innovation* paradigm according to Chesbrough (2003a). One assumption of open innovation brought forward by the author, is that there exists a multitude of ideas outside the firm and that the firm should be an active buyer and seller of IP. Technology assets have no inherent value independent of the business model used to employ them. The author further discusses how Millennium Pharmaceuticals, IBM and Intel use different strategies to connect IP to business models and to leverage internal and external IP through those models (Chesbrough, 2003a).

According to von Hippel and von Krogh (2006), *free revealing* can often be the best practical route for innovators to increase profit from their innovations. The authors review evidence showing that *free revealing* is practiced far beyond software. The practical reasons why innovators want to freely reveal information instead of holding it secret or licensing it could be (1) when others know something close to your secret, (2) when profits for patenting are low and (3) when incentives for free revealing are positive. The authors argue that the phenomenon of *free revealing* suggests that there is a *private-collective model* of innovation incentives. This model offers society the

best of both worlds – public goods created by private funding (Von Hippel and von Krogh, 2006).

In a qualitative and quantitative study of firm-developed innovations with embedded Linux, Henkel (2006) shows that companies are aware of this dilemma and use different means to protect their code. They reveal about half of the code they develop, depending on how important the need for obtaining external support in the development work is. The more support is needed, the more code is revealed. Smaller firms with less internal resources thus reveal more. The author further argues that firms practice *selective revealing* to minimize competitive loss. This is consistent with profit-maximization behavior (Henkel, 2006).

Hurmelinna et al. (2005) claim that the question whether to be protective or to exploit new knowledge externally is two-folded. They use the term *appropriability regime* to discuss exploitation of knowledge assets and sustainable competitive advantage. The strength or weakness of the regime in the protective sense may turn out to be both useful and harmful, depending on the situation the company is facing. The results show that in most appropriability issues, an intermediate position emphasizing the means of legal protection might turn out to be the most effective strategy, and may provide the company with more control and various alternatives to react proactively to emerging opportunities.

2.2.7. Industrial dynamics and manufacturing

So far, the notion of open innovation has mainly focused on the company level and less on the network or industry level where the benefits for the focal firm is discussed jointly with those for the collaborating organizations. According to Vanhaverbeke (2006b) there is a need to address a broader scope of analysis. Christensen et al (2005) place the concept of open innovation in the context of industrial dynamics and applied evolutionary economics.

Berkhout et al. (2006) also point out, on a general level, the necessity of a cyclical model of innovation and argue that our society now has four production factors,

capital, labor, knowledge and creativity, enabling the “innovation economy”. Christensen and his colleagues (2005) further argue that firms manage open innovation regarding an innovative technology in different ways depending on:

- 1) their position in the innovation system;
- 2) the stage of maturity of the technological regime;
- 3) the value proposition pursued by the companies.

They claim also that there are many challenges to investigate further in the interplay between technology entrepreneurs and incumbents where open innovation is often conducted under conditions of high transaction cost.

Cooke (2005) takes a regional innovation system perspective and argues that in order to overcome intra-firm knowledge asymmetries, firms tap into the regional knowledge capabilities. This perspective explains how research, innovation and production actually functions. These capabilities are rooted in open science or open innovation. Further, he argues that capable knowledge actors congregate in a few places called “mega-centers” (e.g. in biotechnology). Network nodes are key relay points in global-regional innovation systems.

From an alternative perspective, Bromley (2004) gives an overview of the fundamental changes that manufacturing has gone through in the United States: craft production, mass production, lean production, and high-quality production. The author argues that the latest rapidly growing change in American manufacturing relates to the open innovation era. This new approach to corporate research and development uses modern software and the Internet as brokers between firms that require research in specific area and those worldwide that are capable and willing to provide it at appropriate cost. Accordingly, Bromley (2004) points to the urge for US to undertake a major study of world trade and technology policy to understand how its position in science and technology and international economic competitiveness has been affected by open innovation.

2.3. Synthesis and Analysis

As with any emerging field, several authors have been keen to describe the phenomenon in question. It is clear that there has been up until now a certain focus on the money issue – how patents are protected and on how business models must change. As pointed out earlier in this thesis, several of the papers are in practice oriented publications. The theoretical depth in the analysis of open innovation is yet to be developed. Looking at the research topics, it is also clear that some of them have been more popular than others. These themes are also very broad. Leadership is one topic brought up in three of the papers, but none of them analyze leadership as it is performed. Rather, two of the publications only point out the importance of leadership and the third (Fleming and Waguespack, 2007) study how leaders emerge in networks. The leadership issue as such is thus left untouched so far.

The review of the existing literature in the open innovation field reveals that OI is a very young field in which the most energy has been put into a fascination for the subject as such. Researchers have mainly investigated the three most obvious questions resulting from an opening up of the innovation process:

- what happens to the way money is made or how is the business model changed?
- what happens to the organizational structure?
- what happens to the intellectual property management?

So far, researchers have mainly explored these issues in general terms and have concluded that a change from closed to open innovation will inevitably happen. How this is going to happen is less clear. One reason for that may be that there are still a limited number of cases that are often referred to (such as IBM, P&G, Air Chemicals and Innocentive). Furthermore, there is actually still very little knowledge available on this topic. As a result, it seems that the empirical basis for the suggestions being made in the papers is limited. This is the reason why there is so small amount of research on leadership and culture. More knowledge is available on tools and technologies. This is reasonable as technology enables the collaboration between many actors, for example when a firm collaborates with a large number of experts. The publications in journals on industrial dynamics and manufacturing are somewhat

different than the others, approaching the term from another perspective. This indicates a growing interest from other fields than the strictly firm-oriented.

A substantial amount of the publications present case studies (often, however, referring to the same cases). This is not surprising in a field of research which is in its early phase. However this argues for the need of conceptualizing publications in order to further develop the open innovation body of knowledge and the underlying theoretical models.

There are also some clear limitations in the papers. For example, there are very few authors who are critical to the concept of open innovation. In the first years after the publication of Chesbrough's "Open Innovation" (2003), most of the subsequent publications have been characterized by a fascination for the topic and a need to explain it in many different contexts. The explanations have stayed predominantly at a fairly shallow level. There is a need also for a critical discussion on the concept, its strengths and weaknesses and - what I will try to explore in the next chapters - how it could be linked to value creation and value capture.

CHAPTER 3

Value Creation and Value Capture vs. Open Innovation

3.1. Valuable resources and dimensions of value

The major contribution of resource-based theory has been the exploration of heterogeneous resource endowments and how these can be the source of advantage if competing firms are unable to imitate these. In most contributions to the perspective, resources are assumed to be valuable and attention has been focused on isolating mechanisms that prevent rival firms from replicating the desired resource bundles. I would argue that resources are valuable in relation to a specific market environment, i.e. if they exploit opportunities and/or neutralize threats in a firm's environment. A resource could also be defined as valuable if it either enables customer needs to be better satisfied or if it enables a firm to satisfy needs at lower costs than competitors. Thus, resources are valuable when they enable a firm to conceive of or implement business models and strategies that improve its efficiency and effectiveness (Bowman and Ambrosini, 2000).

When we explore why some firms outperform others, we will discover that these differences derive from resources that are capable of performing variably within the firm. This rules out any inert resource inputs, which are incapable of displaying heterogeneous performance on their own. The only resource that is capable of performing heterogeneously across competing firms is people and especially their managerial and entrepreneurial capabilities. A core economic function of managers in the economy is to create value by figuring out and organizing asset combinations that yield economies of scale and scope as well as appropriability benefits. Therefore, it is the idiosyncratic ways of doing things in the firm and notably its business model that allows the firm to create more value than its competitors, and that may permit it to capture most of the revenues from this value.

Since markets are dynamic and as valuable knowledge becomes more widely available, competitors can expand their domains at the expense of the firm, through imitation, or by exploiting new innovations (including business models). This implies that the firm's business model has to be dynamic in order to help the firm adapt to

changing conditions. And a better way to protect the works of innovators and stimulate even greater innovation is to encourage the development of new business models. If the business model is not updated over time, the firm is at risk of either unwittingly destroying instead of creating value or to be caught in the commodity trap. Still, although the business model's focus is on value creation. While it also addresses how that value will be captured by the firm, it is strategy that goes further by focusing on building a sustainable competitive advantage.

3.2. Value Creation and Value Capture within the open innovation paradigm

The last hundred years have seen an unprecedented improvement in the quality of human life, due in large measure, to the ability of companies to continuously improve their own productivity and their talent for creating new and better products and services and by finding better ways to make and offer existing ones (business model innovation). Competitive markets, on the other hand, relentlessly force the same companies, over time, to surrender most of this value to others. Instead of merely appropriating value, companies serve as a main engine of discovery and progress by continuously creating new value out of the existing endowment of resources.

Companies that achieve true and lasting sustainability build their strategies basically on two key dimensions: creating value for customers and capturing value for shareholders. I support the claim that these are two distinct, although interrelated, aspects of any successful strategy, and still, they have to be considered jointly within the strategy. Value creation stands for the perceived value of a company's products or services, or its value propositions, to its customer relative to the price charged. Value capturing refers to the difference between that price and the cost of creating this value. In a broader context, capturing value can refer to all stakeholders involved in a firm's activities i.e. employees, managers, suppliers etc.

My argumentation comes down to the following two main points:

- first, in order to be successful firms need to score simultaneously or *almost* simultaneously on both value creation and value capture;

- second, depending on the particular circumstances and contexts, companies may temporarily need to put the focus or put more emphasis on one than the other dimension (without losing sight of the other dimension altogether). In other words, this is all about managing a necessary, useful and healthy tension, not about trading off one against the other.

Finally, firms always have to create value before they can capture it, because *there is no tangible and/or intangible value to be captured in a sustained way if it is not preceded by value creation in the market for customers* (Subramanian and Verdin, 2004).

First and foremost, in order to add more customer value, companies need to ignite innovation within their firms and the second is to capture the returns from innovation. Innovations can be introduced not only in the products/services and the organizational processes, but also in the business model.

The rewards of value innovation will be far from immediate, which is why it is so important to strategize in this situation – whether to pursue radical or incremental innovation. Companies must pay urgent attention before the need demonstrates itself and make investment ahead of taking return.

It is necessary that customers do find the company's propositions addressing their requirements. Successful strategy however requires more than that: it is also about turning such customer-specific advantages into sustainable competitive advantages and profits in the face of competition.

It is in the customer's interests for a company to reinvest its financial rewards to further improve, innovate and perhaps re-invent the business model. A good example is Philips which is not only known for its innovative products, but also for the financial problems it went through. It was unable to capture a sufficient part of the value it created for its customers, having to share it with the competition who copied their innovations. Philips' incessant technological innovations and piles of patents did not necessarily translate even in perceived customer value, a prerequisite for even being able to capture any of that supposed value. Now through open innovation the

company is presented with a great new variety of opportunities to create and capture more value.

A more sustainable route for companies may be to either simultaneously increase both value creation and capturing, or to do so in a closely packed sequence of moves. Such an approach has proved to be rewarding for companies that understand that both value creation and value capturing are essential.

Anyway, doing nothing is not an option because in today's competitive markets — competition is quick to imitate a successful value innovation. Even in the 1980s, American budget airline People Express, while showing strong initial profits, went out of business as competition imitated and improved on its low cost model. Although the Belgian movie group Kinepolis was successful in the 1990s with its value innovations, it fell on hard times as competitors replicated key aspects of its business model. Even though the initial value innovation is distinct, it is slowly eroded as competition catches up. The best defense against losing the value of innovation is to keep innovating on the business model. The only way to do that efficiently in the current economics is to keep innovating, creating and capturing value at a continuous pace. That is the challenge and also the reason why so few companies can sustain their stay at the top. As demand changes and competition catches up to the new standard, the leader is constantly forced to innovate, sometimes incrementally and sometimes in a radical fashion. Innovations may occur from the firm's ability to sense changes in demand before the competitors do or its creation of new activity models that serve existing demand in more competitive ways. In general, industry leaders tend to steer innovations which change the structure of the industry toward their advantage. By influencing the very basis of competition, leaders can dictate how value flows in the industry and how it will evolve. For most industry leaders, the challenge lies not in anticipating the incremental changes, but in anticipating and preparing for the structural breaks that completely change the basis of competition in the industry (Subramanian and Verdin, 2004).

As the characteristics of the industry's value propositions change or the nature of the configurations of activity and the associated capabilities change, long-term winners

could end up being the industry's laggards, as happened with Kodak in the photo-equipment business or even with an industry leader such as Wal-Mart, which has seen its scale and scope being a disadvantage after all. The point is that in the more competitive industries or markets where value capturing is less easy, more attention should be posed to the value creation side. Hence, there is a seemingly paradoxical condition: the more competitive a business gets, the less one should focus on the competition. What I mean is that essentially the only way out of competitive decline is to focus on adding value for the customer. Whatever innovation strategy is chosen, it needs to be aligned with the ability of the firms' business model to create and capture value.

As the findings have already shown, *Open innovation* is already a popular concept in contemporary innovation management literature. To my knowledge, it has not been interrelated to the existing literature about value creation and value appropriation in a systematic way although it is straightforward that open innovation, as it has been defined by Chesbrough (2003), provides the firms with new ways to create and capture value from insourcing externally developed and/or outsourcing internally developed technology or ideas. In this paper, I blend these concepts to each other and, thus, demonstrate how the recent insights about open innovation can advance our understanding of value creation and value capturing.

The burgeoning management literature on open innovation has revitalized the interest of companies to tap into external sources of knowledge and to make use of their knowledge and technology that do not fit their current business models. Furthermore, minimum three distinctive capacities are crucial in explaining why some companies are much better than others in creating and capturing value from insourcing externally developed and outsourcing internally developed technology and technological collaboration with innovation partners. On one side is the multiplicative capacity (capability to transfer knowledge from the external environment). On the other is absorptive capacity which Vanhaverbeke et al (2007) define as the capability to recognize the value of new external information/technology and apply it internally). However, on both sides (although in different networks) companies need a relational

capacity (capability to build and retain relationships, networks). Hence, absorptive capacity is linked with the outside-in dimension, and multiplicative – with the inside-out dimension of open innovation. The relational capacity enhances the absorptive and the multiplicative capacity and stands in the foundation of open innovation.

In the open innovation model, internal knowledge or technological capabilities remain crucial in determining firms' innovative capabilities and financial performance even when firms divert their attention more and more towards external knowledge. The reason is that even if not applied in the firm's present business they could generate value in the form of patents, license royalties, spin-offs, divestments, new market knowledge. Chesbrough (2003, 2006) and Gassmann and Enkel (2006) stressed the need to balance the ability to profit from external knowledge sources and the ability to develop and exploit internal knowledge. Innovating firms are performing better when they combine internal innovation activities with external technology sourcing.

Chesbrough's (2003) open innovation model can be decomposed into four constituent dimensions: value creation and capturing via the business model, transactions /networks with innovation partners, capabilities or competencies, and coping with technological and market uncertainty which are embedded in the funnel concept.

Innovation based value creation for a targeted customer group is at the centre of open innovation. Chesbrough (2003a, 2006b) have demonstrated in detail that value creation and capturing processes are determined by the business model, which is a central idea in open innovation. Similarly, value creation and capturing are also at the centre of strategy analysis (Bowman and Ambrosini, 2000) suggesting that there is a strong, although yet fairly unexplored link between open innovation and strategy making processes.

Both business models and strategy making processes are relevant for value creation and value capturing. Innovating firms have to determine at *the corporate level* which technologies are important enough to acquire from external partners (Vanhaverbeke and Peters, 2005). At *the business level*, they have to figure out how externally sourced technology can be leveraged to generate value for a customer group and

how the company can capture part of the value which it has generated together with its partners. Business models also determine which type of innovations it will develop as products and which it will out-license or divest as a spin-off. In this way, they determine also which external technologies an innovating firm has to in-source in order to minimize the number of "false positives" and which internal technologies to out-source in order to maximize revenues from "false negatives".

We can explore 'value creating systems' as an example to compare open innovation with the classical strategy analysis framework. Porter (1985) has argued in length that value is created by a "value creating system" – a vertical chain extending from suppliers in upstream industries to buyers of products or services: "Gaining and sustaining competitive advantage depends on understanding not only a firm's value chain but how the firm fits in the overall value system" (Porter, 1985, p. 34). However, there is a major difference between value creation within the open innovation context and within a classical "value system". In the classical value system every company occupies a particular position within the value system and adds value to the inputs before passing them to the next actor in the chain. Relationships between firms (suppliers, distribution channels, substitutes, etc...) are described bilaterally as simple exchange relations and are mainly dealt with by means of arm-length transactions. Managing and organizing requirements are restricted to activities within the firms. There is a clear distinction between firms and markets; outside the firm boundaries only markets exist. On the contrary, in open innovation a firm collaborates with technology providers, suppliers and/or customers to improve its internal innovation capabilities or to expand the markets for the external use of internal innovations (Chesbrough, 2003). In an open innovation context, firms *jointly* create value through a number of non-arm-length transactions, eventually organized in inter-organizational layers (Vanhaverbeke, 2006b).

Accordingly, open innovation should be linked to the concept of co-opetition (Brandenburger and Nalebuff, 1996). In co-opetition collaborating actors create value because they combine different skills, competencies. But the value that is jointly created has also to be divided. This is the fundamental duality in co-opetition and in

open innovation: *"whereas value creation is an inherently cooperative process, value capturing is inherently competitive"* (Brandenburger and Stuart 1996, p. vii). The joint value creation in open innovation depends on the strength of the ties among the partners. Thus, the quality of the relations between an innovation firm and its partners determines the size of the pie. The share each participant gets is determined by two factors: the first factor is the bargaining position of each company (Porter, 1985). In traditional competitive strategies value creation can be considered separately from the value capturing process since it is framed as a zero-sum game (which is typical for price-negotiations in commodity markets). Second, in value networks capturing value has to be considered jointly with value creating strategies because the quality of the cooperation among players determines the total value created and, thus, also the size of the pie that can be claimed. Therefore, firms have always to consider a trade-off: being too greedy in claiming their part of the pie might reduce the size of the pie because it might endanger the trust among the firms and the quality of their cooperative agreements (Vanhaverbeke et al., 2007).

3.3. Beyond value creation by corporate venturing

Chesbrough (2002, 5) separates the terms "corporate venture capital" and "corporate venturing" by defining corporate venture capital as investments that a company does to fund directly external start-ups or start-ups that it has spun off. Corporate venturing, on the other hand, is a general term to all venture activities in the company and includes also spinning off internal ventures. There are four types of corporate venture capital investments, depending on the objectives of the investing corporation and the linkage between the parent and the venture (Figure 4.1).

		Corporate investment objective	
		Strategic	Financial
Link to operational capability	Tight	Driving <i>Advances strategy of current business</i>	Emergent <i>Allows exploration of potential new business</i>
	Loose	Enabling <i>Complements strategy of current business</i>	Passive <i>Provides financial returns only</i>

Figure 3.1. Types of corporate venture capital (Chesbrough, 2002, p.7)

Some of the VC investments of corporations are strategic. A company tries to increase the revenue and profits of its current businesses by seeking synergies with the new venture and the company's own businesses. If the linkage between them is tight, it is driving type of investment, and the VC investment is done for boosting the current businesses of the parent company. Driving investments are used for instance promoting a standard. Enabling investments are also strategic, but operational linkages between the parent and the venture are not required to be so tight. In these cases, start-ups are usually developing complementary products or services that increase the demand of the products and services of the parent company. On the other hand, the objective of VC investment can also be financial, when a company is mainly looking for only returns from the investment. With emergent investments a company creates tight link to a venture that does not advance the current businesses of the parent, but may become valuable in the future. These kinds of investments are done for example to start ups that have been spun off earlier from the parent company. VC investment to ventures that are not linked to the parent's strategy or operations, are done basically just for returns. (Chesbrough, 2002, 6-10)

Corporate venturing mutually advances the both parties, the parent company and the venture. While venture firms have access to the parent's core competences and resources, corporate venturing offers to the parent company an opportunity to

experiment new areas of business and reconfigure resources (Dougherty, 1995). Corporate venturing could be seen as a source of organic growth and the vital element of renewal, but also high-risky and too bold initiative that distracts the core business. The concerns are justified, since usually corporate venturing does not create the result the company is hoping for. McGrant et al. (2006) have studied Nokia's venturing activities (Nokia Ventures Organization), and list eight advices, how to extract value from corporate venturing and control the risk related to it:

- *Protect the ventures from short-term pressure:* New ventures could be very benefit to the parent company in a long run. Ventures have to be structured the way that they are not expected to deliver immediate financial results.
- *Recruit the employees to the new venture carefully:* When the parent is choosing personnel to the new venture. Only enthusiasm towards the venture is not enough and volunteers are not necessarily the best alternatives. Instead the parent should look for people with good networking skills that have been participated in innovative projects earlier and who are good at building entire businesses not just technologies. Own training programs for the new leaders of the venture could be also organized.
- *Measure ventures differently than your core businesses:* New corporate ventures cannot deliver the same results than core businesses and it requires different management system.
- *Manage the whole portfolio of ventures, not just an individual venture:* Maximizing benefits from venturing the investing company has to observe the portfolio of ventures and the roles of ventures in that content, not just evaluate the success of the individual project.
- *Prepare to learn from new markets:* The new market of the venture is different from the parent's core ones. Learning could require time and several changes in directions. Rushing into market and ignoring its principles cause just extra costs.
- *Manage new ventures in stages:* In the management of ventures, their unpredictability should be taken account. The stage system reduces the ambiguous of the management and gives opportunities to redirect ventures in certain points.

- *Stop ventures early and cheaply*: Traditional dilemma in corporate venturing is called escalation commitment, where the venture becomes too personal to employees and it is not stopped even if there would be good reasons for that. Early discontinuation decisions allow companies to limit potential downsides of the venture and personal capital the managers could invest.
- *Build in learning-transfer mechanism*: When a venture division is designed, corporate-wide learning should be considered. Mechanism for transfer knowledge could be, for example, transferring the whole venture into the parent company, creating collaborative culture: organizing training, networking events and work rotation, documentations, bringing explicitly the examples of the ventures into training-and-development programs (McGrant et al., 2006).

3.4. Beyond value capture by proactive management of IP and intangible assets

Knowledge economy, that emphasizes knowledge as the most essential element of gaining profits, requires firms to change their management of IP and other intellectual capital. IP should be managed as a strategic asset of a company and the management should take the technology lifecycle into account (Chesbrough, 2006b). *Many technologies and patents developed within a company are never commercialized.* Chesbrough (2006b, 26) lists many reasons why to offer unused IP outside the company: unused technologies/IP are a waste of resources, unused technologies decrease the motivation of employees that created them, unused ideas increase the disorder of innovation process and databases, new knowledge could be generated and captured by releasing unused technologies and unused technologies may end up in the markets anyway via some other company and innovation.

The increased patent numbers and the importance of intellectual assets have encouraged the birth of the secondary markets of IP, technologies and know-how. Markets for technologies are spaces where intellectual assets are traded. Chesbrough (2006b, 139) enumerates the companies, that act as intermediary in

secondary markets, as innovation intermediaries. Companies like InnoCentive, NineSigma, InnovationXchange and Yet2.com help companies to find markets to companies' technologies and find potential external ideas to be used in companies' own businesses.

Licensing is increasing, especially in high-tech industries (e.g. Grindley & Teece, 1997) and it has changed from a tactical issue to a one of the central strategic concerns. There are several (strategic and economic) reasons, why companies license their technologies and patents. Licensing could be a low-cost method to profit from technologies, which the company does not utilize in its core businesses. Gallini (1985) has stated that the incumbent companies could try to prevent the development of new and better technologies by licensing their old technologies to rivals.

Licensing is also an alternative to expand the use of the company's own technology into unfamiliar industries. In addition, one traditional explanation to licensing is that companies license to make their technologies as a standard of the industry. (Arora et al., 2001) A big patent portfolio also enables cross-licensing that gives companies freedom to manufacture and design new products and capture value from their innovations (Grindley & Teece, 1997) As a summary, Tidd et al. (2005, 261) have listed the benefits of licensing intellectual property rights:

- Reduced or eliminated production and distribution costs and risks;
- Reaching a large market;
- Exploitation in other applications;
- Establishing standards;
- Gain access to complementary technologies;
- Block competing developments;
- Convert competitor into defender.

If IP is not used internally, there are also other ways to extract value from unused intellectual assets than licensing or cross-licensing. Promising IP could be applied

into a new start-up, spin-off or collaborative company such as joint venture. If licensing is not possible, a patent or a technology could be sold or even donated for free (open source development). In addition, proactive management of IP could reduce cost, motivate innovators/R&D employees and promote the public image of the company as an innovative company. (Tao et al., 2005)

The development of a large patent portfolio with large proportion of high-quality patents from large area of business is important part of the new IP strategy. However, despite of growing importance of licensing, IP strategy is still primary for supporting a company's core businesses. To be just a "licensing company" and far from the product market is very risky strategy (Grindley & Teece, 1997).

CHAPTER 4

RESULTS

4.1. Balancing value creation and value capture

The resource-based view and the knowledge-based view argue that firms can create and capture value according to the unique bundle of resources they possess and the differences between these resources are held responsible for the differences in performance between firms (Bierly and Chakrabarti, 1996). In other words, proponents of the resource-based view or the knowledge-based view emphasize the fact that a sustainable competitive advantage is based on those resources (knowledge) and capabilities that are owned and controlled within the boundaries of a single firm.

An important question that we have to ask in that respect is: "What is the value of this introspective viewpoint centered on the firm itself, in relation to open innovation?". Although the resource-based view emphasizes that a firm's competitive advantage results from difficult-to-imitate bundles of resources within the boundaries of the firm, I argue that from the perspective of open innovation these resources should not be closed off within one single firm. Rather scarce, valuable and reasonably durable resources of different (previously independent) companies should be brought together in order to offer value for the targeted customers. Consequently, a firm's critical resources should extend beyond its boundaries and enable resource flows (knowledge flows) with external firms (Vanhaverbeke et al. 2007).

From a resource point of view, there are three important reasons why firms set up inter-firm linkages. First, companies team up with other companies to monitor and stay in touch with the latest technological developments (Vanhaverbeke, 2006b). Second, collaboration enables the transfer of external knowledge and in that respect acts as an important complement to the internal innovative activities of organizations. Finally, companies are no longer able to exploit and commercialize innovative products on their own (Chesbrough, 2003). So, inter-firm linkages help firms to obtain

access to complementary resources that are needed to commercialize new products (Teece, 1986).

There are also alternative ways of *creating* value. First, I point out that, other than capturing the value from innovative efforts through fending off imitators and achieving superior profitability, firms can also benefit from *investing in assets that will increase their own value*. Indeed, I argue that under some conditions (which I identify later on), innovators may be better off if they encourage imitation in order to benefit from asset appreciation instead of beating the others to the punch in providing the good or service (Jacobides, 2006). This leads to a fresh set of predictions, which provide an analytical foundation for some of the recent arguments put forth in the context of open innovation. I also point out that changing the scope of the organization not only affects the extent to which it can capture the fruits of its innovative labor; but it also affects the extent to which it can be innovative in the future. Combining these two observations paper provides a firm a different option to manage its boundaries in a way that strikes an advantageous balance between the twin concerns of creating and appropriating value.

Furthermore, the resource-based theory makes use of complementary assets and appropriability regimes as two key concepts to understand how firms benefit from innovation. I propose that an innovator often has a substantial opportunity to *shape* the architecture of complementors around them, and think strategically about how to organize the set of other participants (their roles and the ways in which they are connected). Even entrepreneurial ventures can achieve a comfortable position in the industry architecture by influencing *the structure of their sector in ways that would eventually fit their own capabilities* (Jacobides, 2006).

This suggests to me that managing or influencing an architecture can allow a firm to capture a disproportionate amount of the benefits created by an innovation, especially because innovations often require (or justify or legitimize) the creation of a new architecture. But given scarce resources, does it make sense to keep the biggest part of a potentially shrinking pie, or a modest part of a growing pie? Focusing excessively on value appropriation can impede value creation. Yet exactly

how can an industrial architecture be changed to benefit a particular industry participant, and especially an innovator? Complementarity influences the size of the value to be bargained over (some combinations yield higher value, others lower value, depending on their “fit”). In contrast, mobility influences the bargaining power of the asset holders, and thus the division of the value since some assets cannot be replaced while other assets can be replaced by numerous equivalents at negligible cost.

Given the recent rise of opportunities to engage in creative restructuring of business models with the support of outsourced production, the question of how a firm can get architectural advantage becomes an important issue in the context of open innovation. Inasmuch as a firm has an architectural advantage, it can afford not to care about protecting or investing in complementary assets. Instead it should focus on maintaining its advantage by holding on to one part of the production process (or assets) while increasing mobility in the other part; openness does not mean not being strategic in terms of what is left to others.

Let us explore the possible gains from *value creating* moves that encourage, rather than protect, the imitation of an innovation. The key insight is that *while imitation by competitors may reduce profitability, it also increases the value of the underlying assets*; and the innovator can benefit from the latter. Open innovators should try to protect the relative mobility of the asset which is controlled and the complements which are not controlled. Relative mobility drives the division of surplus: the more competitive and mobile the complementary asset, the higher the returns for any given level of IP protection of the innovation.

If there is sufficient competition in the complement, an innovator confronted by weak intellectual property protection would not need to access the specialized complementary assets and/or capabilities. Abstracting from IP protection, a firm can benefit inasmuch as it can enhance mobility in vertically adjacent stages, without needing to reduce the level of complementarity (Jacobides, 2006).

4.2. Shifting the focus of the business model

Innovators should consider if they would benefit from maintaining a narrow focus of their business model even in the face of loss from unprotected intellectual property or if they should rather broaden its focus and invest in supporting their platform.

Maintaining a *narrow* focus is favored when the costs of developing complementary assets are excessive, given the existing set of resources, capabilities and deftness from a focal firm's perspective favors some sharing of the fruits of innovation. In this case, "giving something away" in the negotiation process is sometimes advantageous on balance. The costs of developing complementary assets are an important determinant of the focus of the firm's business model, i.e. its boundaries. A *broadening* of the firm's focus would be favored when the architecture within which it is located is rapidly expanding. The firm should consider whether it would be better off from getting a reasonable share of a growing pie, rather than myopically focusing on protecting a large share of a shrinking pie. Thus, it may be better for a firm if it diverts resources to support its platform even though such investment might also benefit its competitors. The issue here is whether the firm single-handedly or in collaboration with others is able to invest in sustaining its own vertical eco-system, and thus protect it against competing (and often incompatible) alternatives (Jacobides, 2006).

Adjusting the scope of the firm both influences its current share of value and its future ability and propensity to innovate. Rather than only caring about how to protect the value of a single golden egg, we might want to think more carefully about the health of the goose that could lay numerous eggs. Accessing complementary assets inevitably changes the scope of a firm and thereby impacts its dynamic capabilities and propensity to innovate. In some cases, such capability adjustment may entail a costly loss of ability to come up with future innovations. Overall, the advantage of integrating should be balanced with the costs of interfering with the firm's ability to innovate in the future – more control at the expense of speed, time to market, greater asset intensiveness, etc. (Teece et al., 1997)

In essence, I suggest that the possibility of creating value from open innovation is best viewed as a first imperative, whereas problems relating to value sharing can be seen as a second order qualifying condition. We should shift the question from “how do you protect innovation in order to reap the maximum amount of surplus” to, “how can you find a way to generate value and capture the greatest possible amount of surplus, regardless of whether others emulate the ideas or not?”.

4.3. Appropriability Regimes and Open Business Models

Innovation presents a dilemma for managers. On the one hand, innovation is proffered as an elixir for growth, profitability, and competitive advantage. Examples as P&G, Intel, or Genentech illustrate how innovation can drive performance. On the other hand, there are no guarantees that innovators will be rewarded for their efforts. Business history is littered with examples of innovators who failed to parlay their innovations into economic advantage.

Becoming “more innovative” has become a mantra of management gurus, but it is clear that this advice is not enough as a recipe of success. The challenge is not just creating value from innovation, but *capturing* that value as well. Inability to capture will not only hurt the enterprise, but society as well. In a private enterprise economy it is necessary for innovators (as a class) to earn sufficient profits over time to warrant further investment in research and development and related innovative activity.

Figuring out how to capture value from innovation at the enterprise level is not a new problem. Managers have long been aware of the challenge, and scholars have recognized that the substantial appropriability of returns from innovation by the innovator is uncommon. Returns from innovation can be siphoned off by imitators, customers, suppliers, and other providers of complementary products and services. In practice and in scholarly research, much of the emphasis has been on how to build protective barriers around innovations in order to afford the innovator a bigger “slice” of the pie. These barriers can take the form of legal protection (such as patents, copyrights, or trade-secrets) as well as other strategies such as investing in

complementary assets (such as manufacturing, distribution, brand, services, and technologies).

Open innovation presents a strategy whereby companies make much greater use of external ideas and technologies in their own business, while letting their own unused ideas be used by others, typically but not only through licensing-out. As Chesbrough notes in “Open Business Models”: “*open innovation offers that prospect of lower costs for innovation, faster time to market, and the chance to share risks with others.*”

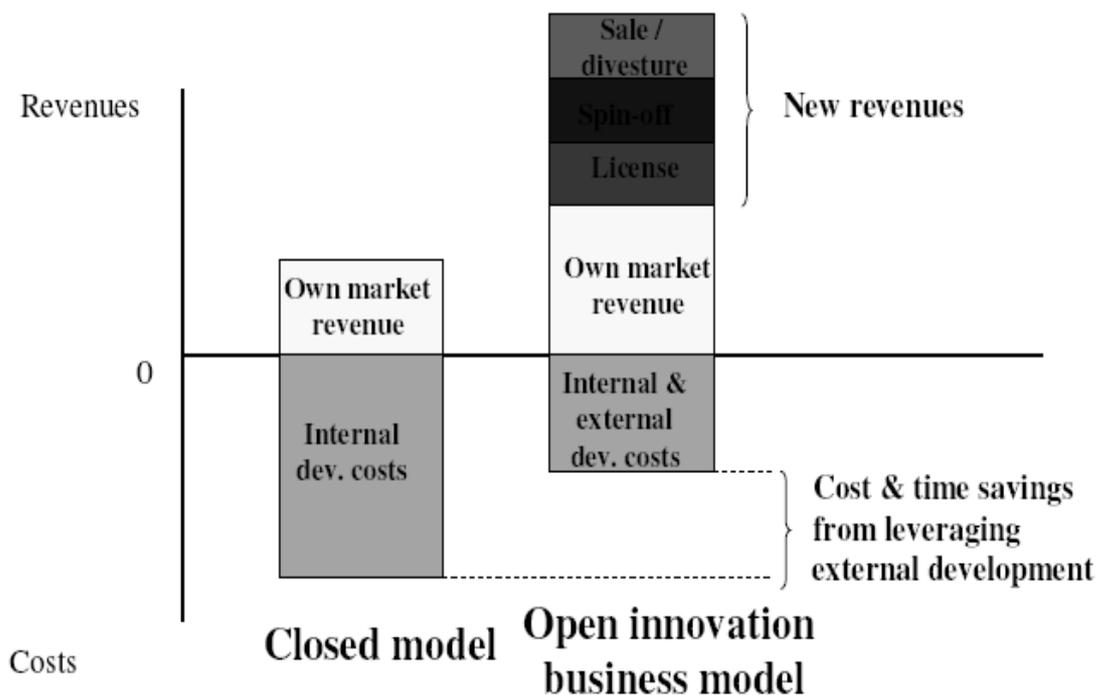


Figure 4.1. The New Business model of Open innovation (Chesbrough, 2006a)

Although it might seem that open innovation models and weak appropriability regimes are close cousins, but they generally are not. In many ways, strong appropriability facilitates open business models. Consider a regime of weak appropriability. Without patents, trade secrets, or other forms of IP protection, and without some degree of natural protection from imitation, the innovator has nothing to license. Potential partners can readily imitate. In this circumstance, the firm’s

business model is in a sense “open”; but there is unlikely to be benefit associated with the firm facilitating what is likely to happen anyway. Of course, the reverse is also true. In weak appropriability regimes, imitation strategies will be viable, at least until the generator of new technology is destroyed by free riding from the imitators (Pisano and Teece, 2007).

Strong appropriability regimes allow firms the choice of a closed or open business model. In particular, the possession of a strong patent portfolio gives the innovating firm the option to simply use the technology internally, license, or both. Chesbrough offers Qualcomm, UTEK, and Intellectual Ventures as examples of IP enabled business models. Such enterprises specialize in technological innovation and the creation of patentable inventions. If the market for know-how and IP works well, then this is a viable business model, and one that is very valuable to society, eliminating the need for the innovator to enter into other segments of the value chain where it doesn't have any competitive advantage.

Strong appropriability based on strong IP thus supports open innovation. This is really nothing more than a manifestation of the principal that property rights need to be well-defined for markets to work. If property rights are nonexistent or are fuzzy, exchange will not take place, or it will be rare and inefficient because neither the buyer nor seller know the precise contours of what is being bought and sold. Such fuzzy boundaries around property rights are likely to lead to disagreements about value; so that transactions that might otherwise occur simply don't happen. Hence, clarity around intellectual property boundaries will both enable and encourage innovators to consider out-licensing.

Also, we should consider the role that complementary assets play in the enthusiasm with which firms should embrace open innovation and open business models. Even if the firm operates in a weak appropriability regime, the ownership of complementary assets that are likely to remain important in the future (e.g., distribution channels, brand) gives the enterprise the confidence to outsource innovation. In this case the firm knows that it will still have a means to extract value from the innovation (to the extent to which the innovation is competency enhancing and will create demand for

the complementary asset). Where it is the case that the firm was both bereft of complementary assets and operating in a regime where appropriability was weak, one would expect that rapid imitation would destroy value capture opportunities, thereby undermining both open and closed innovation models (Pisano and Teece, 2007).

Teece et al (1997) argues that in the absence of formal appropriability barriers, firms are best able to create advantage through superior “dynamic capabilities” such as rapid learning, but such advantages would appear to be rarer and less sustainable than those provided by formal appropriability.

4.4. Interdependence of Business Models in the Value Network

As the logic of industrial architecture implies, a firm’s business model depends not only its IP and value proposition — as explicitly identified by Chesbrough (2003a, Chapter 1) but also implicitly on the corresponding business models of the suppliers, customers, competitors and complementors throughout its value network.

Because IP provides barriers to imitation, strong appropriability can make it easier for firms to identify the value capture (but not value creation) part of their business model. New technologies will tend to require new business models, when the technology changes the value proposition to customers, the value capture by the innovator firm, or the relationship of firms within the value network. A firm’s competitive advantage thus is determined in part by its structural position relative to external organizations that play a role in its innovation (Teece et al, 1997).

In fact, few innovators can determine their business model in isolation. The business model depends not only on the value perceived by customers, but also suppliers, competitors, customers and complementors. A firm’s ability to command its desired price (and thus extract value) depends on intrasegment rivalry and its negotiating power relative to buyers and sellers (Porter, 1980), as when Microsoft and Intel used their quasi-monopolies to capture the profits in the PC value chain.

Firms that have influence over their business models thus will be concerned about

entering into an open innovation value network where their exchange partner has strong enough IP to assure appropriation of rents. But such power will be rare: few partners — whether component suppliers or systems integrators — have the alternative of walking away from an unfavorable deal without enabling a potential competitor.

Another key issue is the use of cross-subsidies in business models. Such business models are increasingly common in complex systems (e.g., West and Gallagher, 2006) and such models can both create vulnerabilities for business models of other firms in the value network and, in turn are vulnerable to competition from such firms. For example, a firm's business model may be vulnerable to shifts in the business model of complementors. Netscape used a revenue model of licensing its market-leading web browser application to large corporate users that was consistent with other PC software. However, this revenue model was decimated by Microsoft's decision to give away a directly competing product (Internet Explorer) as a free complement bundled with its Windows operating system.

The appropriation decisions of the focal innovator can affect other firms in the ecosystem in two ways. First, the friction from the innovator appropriating the value of its innovation can hinder the process of open innovation if it discourages information search or cumulative innovation. Secondly, if suppliers, component producers or complementors lack their own ability to capture value, then the value network may not create enough value to win customer adoption (Vanhaverbeke, 2006a).

Thus, any open innovation business model must consider the relationship of value creation and value capture for all the participants in the value network (Chesbrough, 2003a). This imperative is particularly important for technologies subject to network effects, where firms must trade off value appropriation against the demand-side economies of scale provided by widespread adoption (West, 2003).

Value creation and value appropriation are central to the commercialization of new technologies. The value network is created in order to create value for a particular customer group. Balancing the value appropriation among the different actors in the value network requires the active management of a central firm. Besides the task to

organize the network to create value from the innovation, this central firm also has to manage the potential tensions between partners about value capturing. This is a difficult task because competition is no longer based on rivalry between single firms but between groups. Different product offerings – and not firms – are competing in the market. It is a group-based competition where the total value created depends on the quality of the relations between the partners in the value network. The profitability of the companies or the distribution of the total value created depends not only on the traditional bargaining power of each partner. Contrary to the firm based competition, value appropriation has to be considered jointly with value creating strategies in group based competition because the total value created depends on the quality of the inter-organizational relations. In other words, too much fighting about the share of the pie reduces the total volume of the pie. (Vanhaverbeke, 2006a) This subtle interaction between value creation and value appropriation implies that there exists a continuous tension between maximizing joint value creation and firm level profitability. The innovating company has to manage this tension carefully.

Two central ideas illustrate how value is created and distributed in the commercialization process of open innovation. First, the commercialization of an innovation is based on a business model of the innovating firm but its scope and impact is much wider than the firm itself: its path to the market entails the establishment and management of an inter-organizational network of partners with different assets and positions in the value system. Thus, although a business model is always centered on a particular firm, it has as a unit of analysis a much wider scope than the firm since it encompasses the capabilities of multiple firms in multiple industries. Business models are in this way no longer tied to the boundaries of the firm but can be analyzed in terms of open innovation. Second, the previous analysis also suggests that the analysis of competitive advantage can be centered on the value-creating system and not necessarily on the firm or the industry (Normann and Ramirez, 1993). The source of value creation lies in networks of firms and the configuration of their roles in these networks.

The commercialization of new technologies also challenges the established

theoretical frameworks about value creation and distribution. Vanhaverbeke and Cloudt (2006) argue that in order to understand the commercialization of new technologies one has to integrate various theoretical perspectives. First, the commercialization of new technologies is situated at the crossroad of strategic management and entrepreneurship: it combines how value is created for buyers who want to pay premium prices with the exploitation of new business opportunities based on the emergence of a new technology. Next, the resource based view of the firm is also applicable since the value network brings together different players with complementary resources and capabilities that are necessary to market the new products. The establishment of a value network is also related to dynamic capabilities (Teece et al. 1997) because it activates, coordinates and reconfigures these resources in new ways to create value. Value networks are almost by definition related to strategic networks and the relational view of the firm. The recipe of "open innovation" can only be understood when different ingredients such as transactions, capabilities, value creation and appropriation, and inter-organizational networks are linked to each other and integrated in a coherent strategy. Companies with complementary capabilities or positions in the value system have to be fully committed to cooperate. Creating value cannot be done unilaterally based on the efforts of a single, focal firm, nor can it be done without keeping the different and divergent interests of all collaborating partners in mind.

The focal companies – or industry shapers – establish boundary spanning activities for two purposes. On the one hand, they design the whole process starting from the idea or business model how the innovation or new product offering has to deliver value: the complexity of the technology requires that a central firm monitors the multiple simultaneous innovations in the case of systemic innovations and the changes required in different parts of the value network in order to deliver value. On the other hand, they have to make sure that they have an impact on the resource allocation decisions of the other actors in the network. These two processes – industry foresight and industry shaping - are dynamic concepts since a company has to manage its dependencies on other actors by shaping the industry over different time horizons (Vanhaverbeke, 2006b).

CHAPTER 5

Conclusions and recommendations

In this paper I intended to analyze how open innovation can be linked to value creation and value capturing. I suggest that insights from best practices in open innovation allow us to shed a new light on the concepts of value creation and value capture and to improve our understanding how management decisions can strengthen a firm's ability to exploit the business opportunities in its external environment.

Open innovation balances the need to create value with that to capture value in order to profit from innovation in a sustainable way. Traditional concepts of business strategy are no longer able to provide sustainable mechanisms for creating and capturing value. As the practicability of open innovation spreads from software to science and other industries, we will need to update the concepts of value creation and value capturing. Open innovation is an excellent attempt to supply this update.

Open innovation argues why companies should tap into external sources of knowledge and to make use of their knowledge and technology that do not fit their current business models. It also provides key insights in explaining why some companies are much better than others in creating and capturing value from in-sourcing externally developed and outsourcing internally developed technology and technological collaboration with innovation partners. Knowledge economy, that emphasizes knowledge as the most essential element of gaining profits, requires firms to change their management of IP and other intellectual capital. IP should be managed as a strategic asset of a company.

Value creation and capturing processes are determined by the business model, which is a central idea in open innovation. Both business models and strategy making processes are relevant for value creation and value capturing. In an open innovation context, firms *jointly* create value through a number of non-arm-length transactions and depending on the strength of the ties among the partners. Thus, it is

the quality of the relations between an innovation firm and its partners determines the size of the pie each one of them gets.

Likewise, the commercialization of an innovation is based on a business model of the innovating firm but its scope and impact is much wider than the firm itself: its path to the market entails the establishment and management of an inter-organizational network of partners with different assets and positions in the value system. Business models are not tied only to the boundaries of the firm and can be analyzed in terms of open innovation. The source of value creation and value capture lies in networks of firms and the configuration of their roles in these networks.

The contribution of this paper is an integration of several extant bodies of theory into a coherent explanation of value creation and value capture within the present era of open innovation. What are the main conclusions from this paper? First, both open innovation, on one hand, and value creation and capture, on the other hand, focus on utilizing a firm's key assets, resources and positions. These concepts have to be linked to one another since they are focusing on the same managerial practices. So far, they have not been connected in a systematic way: they all stem from recent business practice and must play a decisive role in the decision making of managers. In this paper, I attempt to combine these concepts, showing on the one hand that the ultimate purpose of open innovation is increasing the value creating and value capturing capabilities of innovating companies, and that our understanding of value creation and value capture can be enriched by linking them to open innovation.

Second, in order to understand value creation and value capture we have to combine the resource based view (capability building) and the relational view of the firm since the absorptive and the multiplicative capacities of a firm are determined by its ability to establish and manage its inter-organizational ties. A theoretical underpinning of open innovation should start from the same theoretical angles adding in a strategic perspective the two dimensions of value creation and value capture via the business model.

Third, open innovation is much more explicit about the different organizational practices to improve insourcing and outsourcing. The organization and management of different ways to diffuse innovations (e.g. scouting, corporate venturing, alliance management, incubators, use of intermediaries, etc...) plays a crucial role in explaining successful cases of open innovation. Relating value creation and value capture to open innovation opens up new avenues to incorporate open innovation into a concept that is also valuable for managerial practice.

Open innovation is not only an example of what most companies can achieve, but a model that virtually every company can adopt. However, when or if adopting a business model based on open innovation, there can be real tensions between the aspects of the business model that create value and those that help to capture a portion of that value. A highly proprietary technology, for example, easily earns a profit for the firm, if alternatives offer less value. But in many circumstances customers are reluctant to buy such products (because of price, limited availability, or delivery or service issues) which means that a firm needs to cooperate within its value network. Yet, making the technology more open (which makes it more appealing to customers), makes it harder to capture value from the offering. So these offsetting factors must be balanced.

Hence, value creation and value capturing can be linked to open innovation only if a firm's business model based on open innovation is aligned with the business models of the other participants in the value chain – suppliers, customers, supplementors, partners, etc.

Combining open innovation with value creation and value capturing can also be realized in different ways. The approach in this thesis is only one way to enrich our understanding of the value mechanisms of open innovation. In my opinion, another fruitful approach is to focus on particular management challenges in open innovation. Detailed case studies could illustrate how companies cope with the considerable management challenges in implementing open innovation. Companies get involved in open innovation for different reasons and there is a wide range of management practices to implement open innovation successfully (e.g. scouting, corporate

venturing, alliance management, incubators, use of intermediaries, etc.). Analyzing best practices in companies could result in a richer idea of what open innovation entails. It could also transform it from a fairly narrow model for profiting from technologies to a concept that makes sense for managers in all business areas. Another example is the analysis of how firms can benefit from specific types of technology intermediaries (Chesbrough 2006). These examples should open new perspectives to change open innovation into a concept that is embedded in managerial practices for value creation and value capturing.

REFERENCES

1. Arora, A., A. Fosfuri and A. Gambardella (2001); *Markets for technology: the economics of innovation and corporate strategy*, The MIT Press, Cambridge
2. Berkhout, A. J., Hartmann, D., van der Duin, P., and Ortt, R. (2006) *Innovating the innovation process* International Journal of Technology Management, 34(3-4): 390-404.
3. Bierly, P. and A. Chakrabarti, 1996, *Generic knowledge strategies in the U.S pharmaceutical industry* Strategic Management Journal, 17 winter special issue, pp. 123-135.
4. Bowman, Cliff, and Ambrosini Veronique (2000) *Value Creation Versus Value Capture: Towards a Coherent Definition of Value in Strategy* British Journal of Management, Vol. 11, p.1-15
5. Brandenburger, A., and Nalebuff, B. (1996) *Co-opetition* Harvard Business School Press, Boston
6. Brandenburger, A. and Stuart, H. 1996, *Value-based business strategy*, Journal of Economics and Management Strategy, 5, pp. 5-24.
7. Bromley, D. A. (2004). *Technology policy* Technology in Society, 26(2-3):455-468.
8. Brown, John, and Hagel III, John (2006) *Creation Nets: Getting the most from Open Innovation* McKinsey Quarterly No2
9. Chesbrough, Henry W., and Teece, David J. (1996), *When is Virtual Virtuous: Organizing for Innovation*, Harvard Business Review, Jan-Feb, pp. 66-73.
10. Chesbrough, Henry, and Rosenbloom, Richard (2002) *The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spinoff Companies*, Industrial and Corporate Change, vol. 11 (3): pp. 529-555, 2002
11. Chesbrough, Henry (2003a) *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

12. Chesbrough, Henry (2003b) *Open Platform Innovation: Creating Value from Internal and External Innovation*,” Intel Technology Journal, 7, 3 (August): 5-9
13. Chesbrough, Henry W. (2003c) *The Era of Open Innovation* Sloan Management Review, 44, 3 (Spring): p. 35-41
14. Chesbrough, Henry (2003d). *The logic of open innovation: Managing intellectual property*. California Management Review, 45(3): 33-58
15. Chesbrough, Henry (2004), *Managing Open Innovation: Chess and Poker*, Research-Technology Management, 47, 1 (January): 23-26.
16. Chesbrough, Henry (2006a) *Open Business Models: How to Thrive in the New Innovation Landscape*, Boston: Harvard Business School Press, 2006
17. Chesbrough, Henry, Wim Vanhaverbeke, and Joel West, eds. (2006b) *Open Innovation: Researching a New Paradigm*. Oxford: Oxford University Press
18. Chesbrough, Henry and Adrienne Kardon Crowther (2006c) *Beyond high tech: early adopters of open innovation in other industries*, R&D Management, 36, 3 (June): 229-236
19. Chesbrough, Henry W. (2007a) *The market for innovation: implications for corporate strategy*, California Management Review, 49, 3 (Spring): 45–66.
20. Chesbrough, H. W. (2007b) *Why companies should have open business models* MIT Sloan Management Review, 48(2): 22-28
21. Chesbrough, H. and Schwartz, K. (2007) *Innovating business models with co-development partnerships* Research-Technology Management, 50(1): 55-59.
22. Chesbrough, Henry, and Appleyard, Melissa M. (2007) *Open Innovation and Strategy* California Management Review vol. 50, No. 1, (FALL) p. 57-76
23. Chiaromonte, F. (2006) *Open innovation through alliances and partnership: theory and practice* International Journal of Technology Management, 33(2-3): 111-114
24. Christensen Clayton M. (1997). *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press: Boston.

25. Christensen, Jens Frøslev, Michael Holm Olesen and Jonas Sorth Kjær (2005). *The Industrial Dynamics of Open Innovation — Evidence from the transformation of consumer electronics*, Research Policy, 34, 10 (December):1533-1549
26. Cooke, P. 2005. *Regionally asymmetric knowledge capabilities and open innovation exploring 'Globalization 2' - A new model of industry organization* Research Policy, 34(8): 1128-1149.
27. Dahlander, L. and Wallin, M. W. (2006) *A man on the inside: Unlocking communities as complementary assets* Research Policy, 35(8): 1243-1259.
28. Dittrich, K. and Duysters, G. (2007) *Networking as a Means to Strategy Change: The Case of Open Innovation in Mobile Telephony* Journal of Product Innovation Management, 24(5): 510-521.
29. Dodgson, M., Gann D. and Salter, A. (2006) *The role of technology in the shift towards open innovation: the case of Procter & Gamble* R&D Management, 36(3), 333-346.
30. Drucker, P.F. (1988) *The Coming of the New Organization* Harvard Business Review, 66(1): 45-53.
31. Enkel, E., Kausch, C., and Gassmann, O. (2005) *Managing the risk of customer integration* European Management Journal, 23(2): 203-213
32. Enkel E. and Gassmann O. (2007) *Driving Open Innovation in the Front End: the IBM Case* the EURAM Conference, May 16-19, Paris.
33. Fetterhoff, T. J. and Voelkel, D. (2006) *Managing open innovation in biotechnology* Research-Technology Management, 49(3): 14-18.
34. Fleming, L. and Waguespack, D.M. (2007) *Brokerage, Boundary Spanning, and Leadership in Open Innovation Communities* Organization Science, 18(2)165-184
35. Gassmann, O., Sandmeier, P., & Wecht, C. H. (2006) *Extreme customer innovation in the front-end: learning from a new software paradigm* International Journal of Technology Management, 33(1): 46-66.

36. Gaule, A. (2006) *Open Innovation in Action: How to be strategic in the search for new sources of value*. London: Blackwell.
37. Grindley, P.C. and Teece, D.J. (1997) *Managing Intellectual Capital: Licensing and Cross-Licensing in Semiconductors and Electronics* California Management Review, vol. 39, iss.2, pp. 8-41
38. Henkel, J. (2006) *Selective revealing in open innovation processes: The case of embedded Linux*. Research Policy, 35(7): 953-969.
39. Hurmelinna, P., Kyläheiko, K., & Jauhiainen, T. (2007) *The Janus face of the appropriability regime in the protection of innovations: Theoretical reappraisal and empirical analysis* Technovation, 27(3): 133-144
40. Huston, Larry, and Sakkab, Nabil (2006); *Connect and Develop: Inside P&G's new model for innovation*, Harvard Business Review, March, 58-67.
41. Huston, L. and Sakkab, N. (2007) *Implementing open innovation* Research-Technology Management, 50(2): 21-25.
42. Jacobides, Michael G. et. al. (2006) *Benefiting from innovation: Value creation, value appropriation and the role of industry architectures* Research Policy, 35, 1200–1221
43. Jacobides, M. G. and Billinger, S. (2006) *Designing the boundaries of the firm: From "make, buy, or ally" to the dynamic benefits of vertical architecture* Organization Science, 17(2): 249-261
44. Laursen K. and Salter, S. (2006) *Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms* Strategic Management Journal, 27, 131-150.
45. Lichtenthaler, U. (2007a) *The drivers of technology licensing: An industry comparison* California Management Review, 49(4)
46. Lichtenthaler, U. (2007b) *Hierarchical strategies and strategic fit in the keep-or-sell decision* Management Decision, 45(3): 340-359.

47. McGrant, R., Keil, T. & Tukiainen, T. 2006. *Extracting Value from Corporate Venturing* MIT Sloan Management Review, vol. 48, iss. 1, pp. 50-56
48. Normann, Richard and Rafael Ramírez (1993) *From value chain to value network: designing interactive strategy*, Harvard Business Review , July-August, 71 (4), pp. 65-77.
49. Piller, F. T. and Walcher, D. (2006) *Toolkits for idea competitions: a novel method to integrate users in new product development* R & D Management, 36(3): 307-318.
50. Pisano, Gary P., and Teece, David J. (2007) *How to Capture Value from innovation: shaping intellectual property and industry architecture* California Management Review Vol. 50, No. 1 (Fall), p. 278-296
51. Simard, C. and West, J. (2006) *Knowledge Networks and the Geographic Locus of Innovation*, in H. W. Chesbrough & W. Vanhaverbeke & J. West (Eds.), *Open innovation: Researching a new paradigm*: 220-240.
52. Subramanian, Venkat, and Verdin, Paul (2004) *What Value Leaders Do?* Working paper n°04/031, Centre Emile Bernheim, Brussels, November, (<http://www.solvay.edu/EN/Research/Bernheim/documents/wp04031.pdf>)
53. Tao, J. and Magnotta, V. (2006) *How air products and chemicals “identifies and accelerates”* Research Technology Management, 49(5): 12-18.
54. Teece, David.J. (1986) *Profiting from technological innovation: implications for integration, collaboration, licensing and public policy*, Research Policy, 15, pp. 285-305.
55. Tidd, J., Bessant, j. and Pavitt, K. (2005) *Managing Innovation: Integrating Technological Market and Organizational change*. 3th edition. John Wiley
56. Van der Meer, H. (2007) *Open Innovation – The Dutch Treat: Challenges in Thinking in Business Models* Creativity and Innovation Management, 16(2): 192-202.

57. Von Hippel, Eric (2005). *Democratizing Innovation* Cambridge, Massachusetts: MIT Press
58. Vanhaverbeke, Wim and N. Peters (2005) *Embracing Innovation as Strategy: Corporate Venturing, Competence Building and Corporate Strategy Making* *Creativity and Innovation Management*, 14(3), 246-257.
59. Vanhaverbeke, Wim (2006a) *Open innovation in value networks*, in Chesbrough, Vanhaverbeke and West (Eds.) *Open innovation: Researching a new paradigm*, Oxford University Press, Oxford, 205-219.
60. Vanhaverbeke, Wim (2006b) *The inter-organizational context of open innovation*, in Chesbrough, Vanhaverbeke and West (Eds.) *Open innovation: Researching a new paradigm*, Oxford University Press, Oxford, 205-219.
61. Vanhaverbeke, Wim, Myriam Cloudt and Vareska van de Vrande (2007) *Connecting absorptive capacity and open innovation* Conference paper
<http://www.cas.uio.no/research/0708innovation/CASworkshop/VanhaverbekeEtAl.pdf>
62. West, J. and Gallagher, S. (2006) *Challenges of open innovation: the paradox of firm investment in open-source software* *R & D Management*, 36(3): 319-331.
63. West, Joel (2006) *Does Appropriability Enable or Retard Open innovation?* In Chesbrough, Henry & Wim Vanhaverbeke & Joel West (Eds.), *Open innovation: Researching a new paradigm*: 285-307. Oxford: Oxford University Press.
64. Witzeman, S., Slowinski, G., Dirkx, R., Gollob, L., Tao, J., Ward, S., and Miraglia, S. (2006) *Harnessing external technology for innovation* *Research-Technology Management*, 49(3): 19-27.
65. Von Hippel, Eric (2005) *Democratizing Innovation* Cambridge, Massachusetts: MIT Press
66. von Hippel, E. and von Krogh, G. (2006) *Free revealing and the private-collective model for innovation incentives*. *R & D Management*, 36(3): 295-306.