

Maaretta Törrö

Global intellectual capital brokering

| Facilitating the emergence of innovations
| through network mediation

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Abstract

The market for intellectual capital has become global. Ideas, knowledge, and technology are now flowing more freely than ever as companies are opening up their processes in the spirit of open innovation. Simultaneously, firms are being increasingly forced to utilize new external channels to gain input for their innovation process. This development has led to the emergence of intermediate actors who facilitate transactions on intellectual capital.

This study concentrates on one type of these intermediaries, *global intellectual capital (IC) brokers*. These brokers act as mediators between previously unconnected parties, providing their customers access to a global pool of providers and buyers of intellectual capital, partly enabled by the internet. This study aims at building a holistic picture of the phenomenon of global intellectual capital brokering. The ways in which global IC brokers create value for their customers and facilitate the emergence of innovations are explored.

The open innovation paradigm provides the principal theoretical basis for this study. Furthermore, the phenomenon is observed from the perspective of industrial network theory, in order to understand how interorganizational networks affect the role of global IC brokering. Empirical insight into the topic is gained through a case study, where the views of all actors in the brokering process – the providers, mediators, and buyers of intellectual capital – are analyzed. The observed cases represent a variety of industries, cultural backgrounds, and company sizes, ranging from individual scientists to multinational corporations.

The main findings of the study imply that global intellectual capital brokers do facilitate the emergence of innovations by building unobvious contacts between previously unconnected parties. The transactional contacts established by the

broker do not diminish the importance of long-term strategic relationships, but complete them. Brokering services are especially beneficial in emerging industries where knowledge cells are fragmented globally, and in terms of cross-industrial contacts. The short-term approach brings along a high degree of uncertainty, but the opportunity to gain access to new networks outweighs the risks.

The study also reveals in which ways global IC brokering creates value for different types of customers, including both proactive and reactive sellers and buyers of intellectual capital. Furthermore, positive and negative implications of the brokering service for the customers on both sides are listed, helping corporate decision-makers to better understand the phenomenon.

Though this study provides substantial new contributions to the knowledge of open innovation practices and the intermediate markets for innovation, there are still plenty of fruitful research topics available in the area. Some suggestions for a future research agenda are thus provided at the end of this publication.

Preface

This publication, inspired by the growing amount of attention devoted to the concept of open innovation, explores a novel approach to innovation management. Introducing a new viewpoint can render research terminologically challenging, but all the more rewarding. The term *global intellectual capital brokering* developed during the course of this study, and aims at capturing the wide and complex phenomenon discussed in the following.

The topic opens up various interesting research tracks, and a number of related studies can be expected to be published in the near future. This publication serves as a starting point for prospective studies, structuring the theoretical basis behind global intellectual capital brokering, and helping both academicians and practitioners better understand this emergent phenomenon.

I am very grateful for the stimulation and support that I received for this study from Petteri Alahuhta, Professor Pekka Abrahamsson, and Professor Harri Haapasalo. I would also like to express my special compliments to all of the persons interviewed for this study, and some individuals who have contributed to my work in diverse ways: Professor Göran Roos, Petri Kalliokoski, Dr. Ammon Salter, Professor Juhani Warsta, Aki Pöyry, Janne Suhonen, and Johan Plomp.

I am looking forward to more discussions on the global market of intellectual capital and its implications for the development of new business models.

Oulu, January 2007

Maaretta Törrö

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Appendix 1: List of the half-structured theme interviews conducted for this study

1. Introduction

1.1 Background and motivation for the study

While striving to maintain their organic growth, companies are increasingly forced to rely on external sources to obtain input for their innovation process. Collaboration with suppliers has long been an essential part of the research agenda of large corporations. Similarly, traditional outsourcing of innovation, where the strategic decision is made to transfer the full responsibility for a certain part of the innovation process to a third party, has become increasingly popular. The trend, however, is moving towards the use of more extensive networks in order to access external competences. The challenge now becomes to identify and contact the individuals and organizations all over the world that might provide a promising idea or solution to complement the company's own innovation process. (Bowonder et al. 2005; Moitra & Krishnamoorthy 2004; Perrons & Platts 2004; Fowles & Clark 2005; Quinn 2000; Chesbrough 2003b.)

Active large-scale screening for potential sources of innovation is also prevalent in the *open innovation* paradigm introduced by Henry Chesbrough in 2003. In this two-way model, firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market. In the open innovation model, the boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two. There are purposive outbound as well as inbound flows of knowledge and technology. Here we can see a fundamental shift from the old model of *closed innovation*, where companies adhered to the belief that successful innovation requires control. Since externally acquired knowledge still demands further development within the company, the function of internal R&D has by no means become redundant. Nevertheless, it no longer represents the irreplaceable strategic asset that it once was.

Though open innovation has lately become a widely discussed phenomenon, there is little empirical evidence available on how it is practised in companies. As expressed by Gassmann (2006), there are many white spots in research on open innovation left. Many other academicians have also encouraged further research, providing more focused topics. Suggested by Katila (2002) and Laursen and Salter (2006), much greater knowledge is needed about the ways in

which firms organize their search for external ideas for innovation. Similarly, little is known about outbound-oriented open innovation, where companies profit from selling their own intellectual capital to the outside (Chesbrough & Crowther 2006).

More attention has also been called for the rise of *intermediate markets* for innovation (Arora et al. 2002; Chesbrough 2006). There is a growing importance of intermediaries – companies who facilitate transactions on intellectual capital, and give their customers a new approach for implementing both outbound and inbound open innovation. This study sheds more light on one rather novel type of innovation intermediaries, here defined as *global intellectual capital brokers*. These companies act as network mediators, offering their customers access to a global pool of providers and buyers of intellectual capital – ideas, knowledge, competences, and technologies. The match-making process of global intellectual capital brokers is largely aided by the internet which enables worldwide searching, but is also partly reliant on more personal networks. The research gap on this particular interface of innovation has been especially emphasized by Dodgson et al. (2005; 2006).

To include both outbound and inbound practices of open innovation, this study takes a holistic approach to global IC brokering, taking all actors in the brokering process into consideration. In addition to the theory base on open innovation, industrial network theory (e.g. Håkansson & Snehota 1989) is incorporated in the theoretical body of this study. This follows the suggestion of Vanhaverbeke and Cloudt (2006), who argue that a network perspective is necessary as a complementary approach of open innovation. The multifaceted theoretical background and the rich empirical case study material together provide a sound approach for better understanding the emergent phenomenon of global intellectual capital brokering.

1.2 Objectives and research questions

The objective of the study is to build a holistic model of global intellectual capital brokering, understanding how global IC brokers facilitate the emergence of innovations.

This main objective is systematically approached through the following research questions. The first question is answered through deduction from prior theory, whereas the rest of the questions necessitate empirical insight gained from the case analysis.

- *Which elements form the theoretical framework of global IC brokering?*
- *How do companies perceive open innovation?*
- *How do interorganizational networks affect the role of global IC brokers?*
- *How is the value creation in global IC brokering process perceived from different actors' points of view?*

In the scope of this study, the term global intellectual capital broker refers to intermediate actors who establish contacts between providers and buyers of intellectual capital in order to facilitate global IC transfer. These brokers particularly utilize the internet as a means to enable efficient cross-national and cross-industrial match-making.

1.3 Research approach

In order to interpret and evaluate a study, one must first understand the scientific paradigm under which the study has been conducted. Burrell and Morgan (1979) have constructed a scheme for analyzing assumptions about the nature of social science, presented in Figure 1. Their scheme builds a juxtaposition of two sets of assumptions, forming the subjectivist and objectivist perspectives of reality. These assumptions that they use to conceptualize social science are related to ontology, epistemology, human nature, and methodology.¹

¹ Ontological nature concerns the very essence of the phenomena under investigation; epistemological nature refers to the ground of knowledge – how one might begin to understand the world and communicate this as knowledge to fellow human beings; human nature includes assumptions on the relationship between human beings and their environment; and methodological nature refers to the way in which one attempts to investigate and obtain knowledge about the social world (Burrell & Morgan 1979).

In the model by Burrell and Morgan (1979), the subjectivist approach emphasizes the importance of subjective individual experiences in the creation of the social world. The objectivist approach, at the other extreme of the continuum, treats the social world as hard, external, and objective reality, with the objective to arrive at universal laws that explain and govern the reality being observed.

The subjective – objective dimension

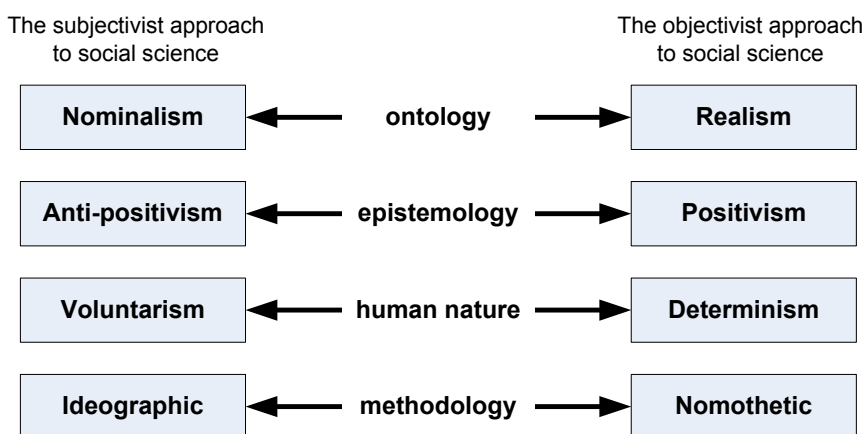


Figure 1. A scheme for analyzing assumptions about the nature of social science (Burrell & Morgan 1979).

The aim of this study is to holistically understand and interpret the phenomenon under observation within its real-life context. The study is conducted employing qualitative research methods, where the researcher's personal experiences and insights are an important part of the inquiry. Consequently, this study finds itself towards the subjectivist end of the continuum. (Burrell & Morgan 1979; Patton 1990.)

In this study, as is typical of case studies, prior theory provides a focus to the data collection phase, charting the body of knowledge and identifying gaps (Perry 1998). However, these gaps are not expressed as precise, testable, closed yes/no propositions or hypotheses, but as general broad, open research issues (Yin 1994), leaving room for induction. This study thus includes some deduction

based on prior theory, although inductive theory building is more prominent. The research strategy follows Perry's (1998) suggestion for case study methodology. More profound discussion concerning case studies as a research strategy is provided in the beginning of the empirical part of this study.

1.4 Research material

One important characteristic of the case study method is its reliance on multiple sources of evidence (Yin 1994). Similarly, the present study benefits from prior theory development to guide data collection and analysis, but there is an emphasis on the empirical inquiry, where several data collection methods are combined.

The theoretical part of the study is largely based on academic journal articles, complemented by some recent literature on open innovation and markets for technology. Due to the holistic perspective of the study, the theoretical data presented discusses the phenomenon of global IC brokering from several angles. The theoretical review proceeds from broader topics of open innovation and methods of sourcing external competences towards more detailed discussion on IC brokering. Industrial network theory is also introduced to open a new angle of observation. To complement the theoretical discussion, some examples of global IC brokers that have been mentioned in the literature are presented.

The empirical part of the study relies predominantly on qualitative data from personal half-structured theme interviews. These interviews have been organized with relevant individuals representing the companies selected for the case study. Additionally, some secondary sources such as the internet, as well as printed and televised media, have been utilized to collect background information on the case study organizations. The empirical research material and its collection methods are further discussed in the empirical part of this study.

1.5 Outline of the study

The theoretical part of the study is divided in five sections. To begin with, the open innovation paradigm is introduced, forming the logic behind the study.

Secondly, different methods of accessing external sources of innovation are shortly reviewed to shed light on the context of intellectual capital brokering. After this, a new theoretical perspective concerning the discussion on open innovation is provided, taking the view of industrial network theory on the topic. In the fourth section, the discussion becomes more focused on the phenomenon of global IC brokering, piecing together previous theory development on the subject. Finally, a theoretical framework of global IC brokering is formed. The purpose of this framework is to guide data collection and analysis in the empirical part of the study.

The empirical part starts with discussing the objectives of the empirical research, the selection of the case studies, and the data collection methods employed. After this, the empirical data collected from the case studies is analyzed. This section ends with an evaluation of the design and implementation of the empirical research.

The last chapter aggregates the theoretical and empirical parts of the study through discussion and conclusions. Furthermore, limitations of the study are identified, and the study as a whole is evaluated. In conclusion, some challenges and suggestions for further research are provided. The outline of the study has been illustrated in Figure 2.

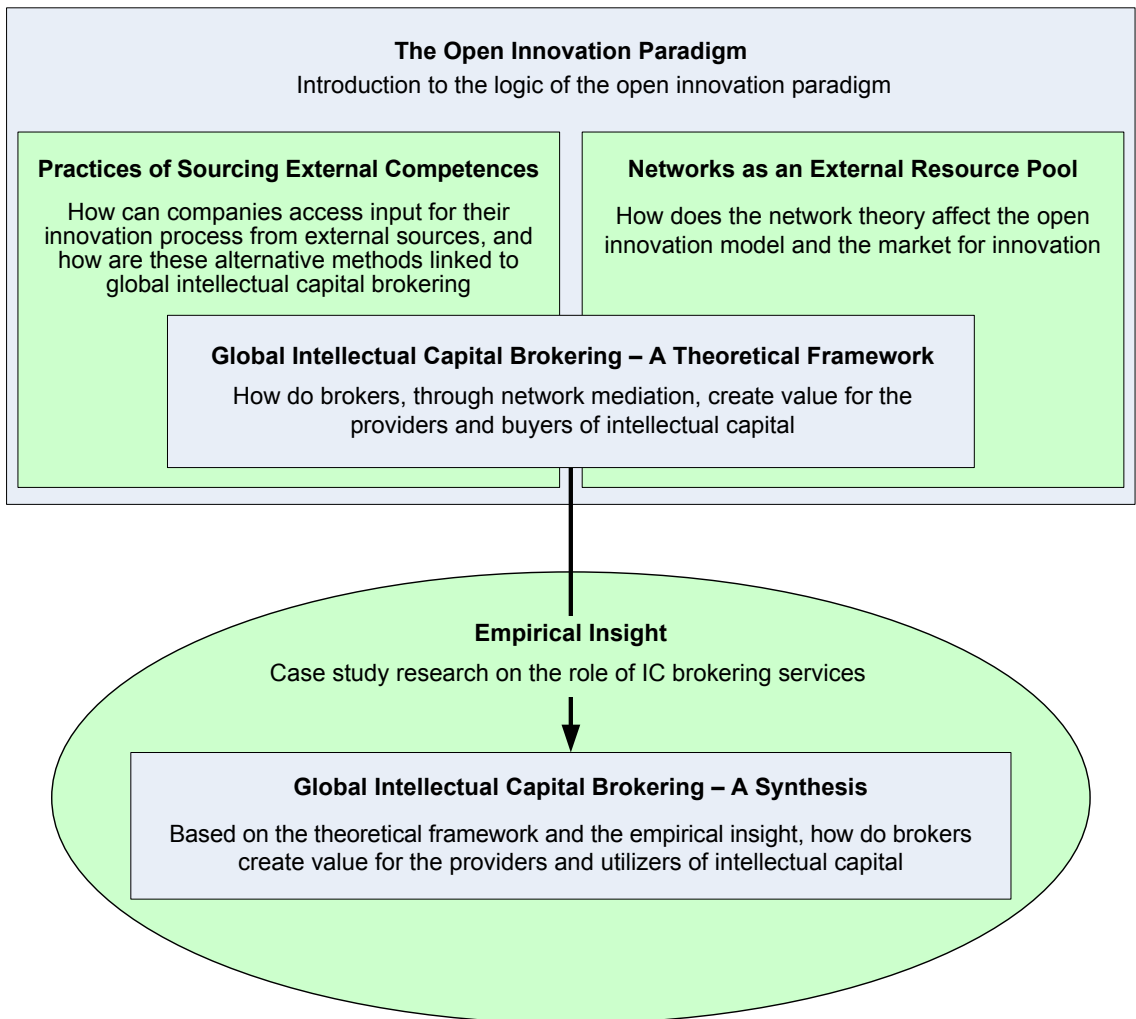


Figure 2. Outline of the study.

2. Theoretical background of global intellectual capital brokering

Due to increasingly intensifying global competition, companies constantly need to renew themselves in order to stay ahead of their rivals. Innovation rate is one of the critical success factors in today's dynamic market environment; it may even be the only way to create value through profitable growth, as Prahalad and Ramaswamy (2003) argue. The industry has also recognized the importance of innovation as a determinant of future competitiveness, and companies are open-mindedly looking for new ways to boost their capability to innovate. External sources of innovation have emerged as an effective solution to the need to perpetually generate new business. This study discusses the use of mediated knowledge networks as an external source of corporate innovation.

In the following sections, a very comprehensive approach to global intellectual capital brokering is taken in order to better understand the phenomenon in its broader context. First the ideology of open innovation is introduced, together with the reasons leading to the erosion of traditional protective innovation models. Then a portfolio of innovation sourcing channels is presented, ranging from classical outsourcing to the recently introduced concept of "crowdsourcing" – utilizing common people to facilitate corporate R&D. These sourcing channels are further linked to IC brokering in order to understand how it differs from alternative ways to access external sources of knowledge. After that, a network perspective on IC brokering is taken to illustrate the importance of network dynamics behind the phenomenon. Finally, a theoretical model is built to describe how, based on the insight gained from previous studies, global IC brokering services can be used to facilitate the emergence of innovations.

2.1 The open innovation paradigm

2.1.1 Principles of the open innovation model

In the past, internal R&D was a valuable strategic asset for the company; it was even considered to be a formidable barrier to entry by competitors in many markets. Only large corporations capable of doing the greatest amount of R&D

could compete in their respective industries. In this model of *closed innovation*, firms adhered to the philosophy that successful innovation requires control. In light of this logic, companies would have to generate their own ideas which they would then develop, manufacture, market, distribute, and service themselves. (Chesbrough 2003a.)

These days, however, the leading players are encountering remarkably strong competition from many upstarts. These newcomers conduct little or no basic research on their own, but have rethought the fundamental ways in which they generate ideas and bring them to market. In this new model of *open innovation*, firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market. The boundary between a firm and its surrounding environment is porous, enabling innovation to move easily between the two. (Chesbrough 2003a.) The models of closed and open innovation are illustrated in Figures 3 and 4.

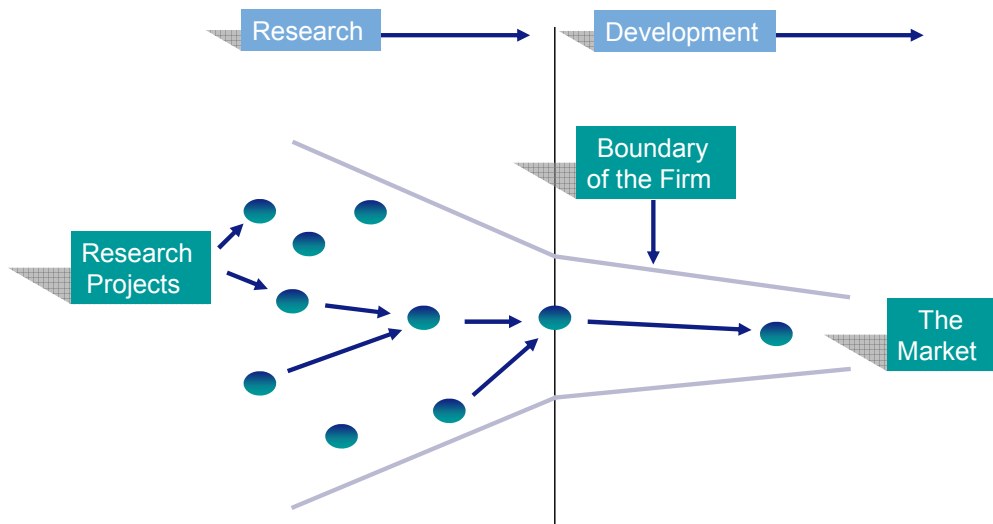


Figure 3. The model of closed innovation (Chesbrough 2003a).

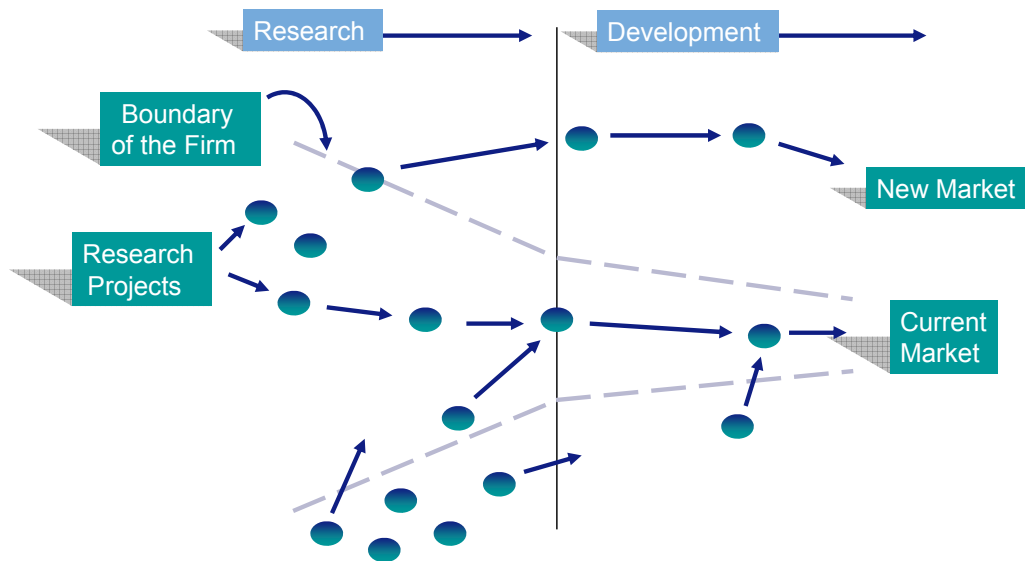


Figure 4. The model of open innovation (Chesbrough 2003a).

The entire logic of open innovation is based on a landscape of abundant and mobile knowledge. Table 1 helps to clarify the reasoning behind the open innovation paradigm, contrasting the principles of closed and open innovation models.

Table 1. Contrasting principles of closed and open innovation (Chesbrough 2003b).

Closed innovation principles	Open innovation principles
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

2.1.2 Push and pull factors behind the rise of open innovation

As Moitra and Krishnamoorthy (2004) put it, enterprises are being forced to experiment with new and more effective approaches for R&D management and innovation generation. It is becoming increasingly difficult for any one company to single-handedly support an aggressive R&D agenda (Perrons & Platts 2004). There are both push and pull factors changing the conventional R&D landscape and contributing to the rise of the open innovation paradigm.

To sum it up, the most important *push factor* behind the paradigm shift is the continuously growing pressure to innovate. Crystallized by Chesbrough (2003b): Companies that do not innovate, die. Moitra and Krishnamoorthy (2004) name more precise reasons that are forcing the growth of open innovation, such as the growing corporate focus on return on investment, shrinking R&D budgets, competitive forces, and scarce talent. The rapid creation of new technologies and steadily shortening product and process life cycles are also contributing to the phenomenon (Huston & Sakkab 2006; Fine 1998). Combined with changing customer needs, these factors are pushing companies to reengineer their innovation processes and business models in order to capture value from technologies being developed – both in-house and elsewhere.

Finding *pull factors* that encourage companies to find alternatives to the traditional control-driven model of closed innovation is also not a difficult task. The increasing availability and mobility of a skilled workforce is one important factor. Globally mobile workers help to diffuse the knowledge from strong R&D organizations to suppliers, customers, partners, universities, start-ups, consultants, and other third parties. With information more widespread, new companies can access useful knowledge that was previously unavailable to them. The fluid labor market permits even start-up firms to pioneer the commercialization of promising new technologies, and it is becoming increasingly difficult for companies to control their proprietary ideas and expertise. Secondly, the growing availability of private venture capital has helped to finance new firms and their efforts to commercialize ideas that have spilled outside the silos of corporate research labs. The abundance of venture capital presents real hazards for the companies making significant commitments to internal R&D. Thirdly, there is a wide external market for new research results. If a company is not ready to utilize its internal research results, they will

no longer sit on the shelf. Instead, there are plenty of alternative pathways for a new idea or technology to become commercialized in new markets outside the boundaries of the company. Finally, the increasing capability of external suppliers can also be identified as one factor boosting the rise of open innovation. On one hand, R&D co-operation with suppliers helps companies develop new products and technologies faster and more efficiently. But on the other hand, these suppliers are also free to find other partners, taking the new technologies to the market without the participation of the company that funded the original R&D. Together these four pull factors have motivated companies to rearrange the distribution of knowledge. (Chesbrough 2003b.)

2.1.3 The development of innovation process theories

Our understanding of the innovation process has changed a lot during the past decades. Rothwell (1994) has described the evolution of the dominant model of best practice in the innovation process throughout the latter half of the 20th century. He proceeds from the straightforward technology-push and market-pull models of the 1950s and 1960s to the more parallel and integrated models of the 1980s and 1990s. In his article Rothwell reminds that his five-generation model is only a simplification of reality, and in fact all types of innovation process continue to exist in various forms even today.

Companies are increasingly looking beyond their organizational boundaries for new sources of innovation, but the open innovation philosophy is by no means a new phenomenon. Rosenberg (1976) claimed already three decades ago that the value of “first-mover” advantages in capturing the economic returns from innovation is overrated. Rosenberg and Steinmueller (1988) continued by suggesting that firms that fail to exploit external R&D may be at a severe competitive disadvantage. The innovation process theories, however, have seemed to be lacking behind this development. For example Ulhøi (2004) has taken up the subject, remarking that traditional innovation theories need to be extended to include open source innovations.

Yakhlef (2005) has answered to this challenge and extended Rothwell’s (1994) continuum by adding what he calls the sixth-generation innovation process. According to Yakhlef, the newly emerging distributed innovation model seems

to proclaim the 6th generation process, which ushers companies' R&D departments into a fundamental shift in the way they organize and bring their ideas to market.

Rothwell's (1994) process theories were still to a large extent based on the philosophy of self-reliance and hierarchical control of innovation that has prevailed in many companies for most of the 20th century (Yakhlef 2005). The open innovation paradigm challenges this conventional thinking rooted in the statement by Lawrence and Lorsch (1967), who suggest that innovation context is most effective when regarded as private property and is hierarchically controlled. Rothwell (1994) already touched upon the theme of external innovation sourcing by mentioning networking as a growing trend of innovation management. Now the free flow of knowledge across organizational boundaries has increased to the point where we can already talk about a new generation of modeling the innovation process. The development of innovation process theories is portrayed in Table 2.

Table 2. The development of innovation process theories from the 1950s until today.

Generation	Main characteristics of the innovation process
1.	Technology-push, innovation follows scientific discoveries.
2.	Market-pull, demand from the market directs and stimulates industrial innovation.
3.	Coupling model, a multi-factor interactive sequential process. Emphasis on key individuals.
4.	Integration, parallel processes, early and effective supplier linkages.
5.	Overall organizational and systems integration, flexibility, networking, real time information processing, electrification across the whole innovation system. (Rothwell 1994)
6.	Open innovation, utilizing both internal and external channels in different stages of the innovation process. (Yakhlef 2005)

2.1.4 The approach to open innovation in this study

Chesbrough (2003b) roughly differentiates two streams of open innovation, namely inbound and outbound activities. Here inbound activities refer to the acquisition of technology from the outside, and outbound activities mean the commercialization of internally developed ideas or technologies through external channels. Gassmann (2006) takes the categorization one step further, noting that the open innovation phenomenon has received contributions from many different research streams. He suggests that opening up the innovation process can be observed from the following perspectives: (1) globalization of innovation, (2) outsourcing of R&D, (3) early supplier integration, (4) user innovation, and (5) external commercialization and application of technology.

Today it has been recognized that competitive advantage often comes from inbound open innovation: leveraging the discoveries of others (Chesbrough & Crowther 2006). This perspective of open innovation, however, should not be confused with the outsourcing of the entire R&D function of a company. As e.g. Holmes and Glass (2004) argue, the closed-to-open shift does not diminish the role of internal R&D. Internal R&D competencies are not only required to generate innovation but also to assess outside technologies as well as provide an ability to develop architectures to integrate the disparate technologies acquired from sources outside of the firm. According to Chesbrough and Crowther (2006), there is preliminary evidence that internal R&D spending is maintained or even increased in organizations that switch to the open innovation model. They suggest that leveraging external research may function more as a complement than as a substitute for internal R&D.

Even though the discussion on open innovation has concentrated mainly on the inbound process of open innovation, it is also necessary to build an understanding concerning the other end of the open innovation funnel. Ideas and technologies are not just waiting to be picked – there must be a company or an individual willing and motivated to act as the external source of innovation. Therefore this study aims at building a holistic model of intellectual capital brokering, covering both the outbound and inbound perspectives on knowledge transfer.

In the following section, different kinds of methods for leveraging external sources of innovation are discussed, varying from traditional outsourcing to open source models and user innovation. The purpose of the chapter is to describe the sourcing of external competences for the corporate innovation process as a wider phenomenon. After this, a more focused view on global IC brokering is taken.

2.2 Practices of sourcing external input for innovation

Intellectual capital (IC) has been identified as a key driver of innovation and competitive advantage in today's knowledge-based economy (Teece 2000). In other words, the quest for innovativeness has brought along with it the quest for intellectual capital. Phrased by Chatterji and Manuel (1993), almost all companies with significant internal R&D activities are making deliberate efforts to locate, acquire and exploit technology from external sources. They are not alone with their view. A number of researchers readily testify that companies are increasingly looking beyond their boundaries for various external sources of innovation: suppliers, customers, business partners, competitors, universities, research institutes, or independent individual experts (see e.g. Rigby & Zook 2002; Fowles & Clark 2005; Bowonder et al. 2005; Kodama 2005). Depending on their capabilities and needs, companies use external sources for all phases of innovation, from discovery and development to commercialization and even product maintenance (Quinn 2000; Linder et al. 2003).

But despite the growing interest in using external input in the innovation process, not much research has been conducted on the different sourcing channels of external innovation. Linder et al. (2003) are calling for explicit corporate innovation sourcing strategies: Instead of an ad-hoc approach to innovation sourcing, companies should systematically evaluate available channels of external competences, matching specific sets of sources with their innovation needs. In order to be able to choose the most suitable sourcing channels, companies need more information regarding the nature and applicability of these channels. This study aims to shed more light on the usage of global intellectual capital brokers as a channel for innovation sourcing. But to start with, basic information is given on different types of innovation sourcing practices. It will thus be possible to compare and link IC brokering with alternative channels for accessing external input for the innovation process.

2.2.1 Outsourcing the innovation function

The term innovation outsourcing is widely used to describe the process of acquiring external technologies or knowledge. However, there is a decisive difference between the outsourcing of the entire innovation function and other inbound open innovation activities.

To understand the fundamental meaning of the term outsourcing, Del Vecchio (2005) provides the following definition: Outsourcing is a strategic decision made by a company concerning a business process, in which a third party receives the responsibility for achieving the goal of the business process in a given time-frame with clearly defined benchmarks for success. The third party takes control over the people, tasks, and operations necessary to achieve the goal of the business process.

It is obvious that only a small fraction of external innovation sourcing falls into this strictly defined category of outsourcing, where the responsibility for a predetermined task is given over to a certain third party. Yet many companies are outsourcing significant parts of their innovation processes. Outsourcing is no longer restricted to peripheral business functions and is mainly motivated by a cost saving logic, but has now developed into a routine strategic management move that affects the heart of the competitive core of organizations (Hoecht & Trott 2006). Even strategic management itself can be outsourced, as can be seen in the popularity of management consultant services.

When planned carefully, knowledge-based outsourcing can provide significant benefits for a company. According to Quinn (1999), outsourcing can yield greater intellectual depth and access, opportunity scanning, reliability, quality, value-added solutions or worldwide outreach. Moreover, outsourcing can lower the costs and risks of innovation essentially. Quinn (2000) suggests that refraining from outsourcing can even pose a threat for companies to become technologically obsolete, because suppliers might possess knowledge and contacts that the client cannot duplicate.

But outsourcing core business processes of a firm, such as innovation, also poses severe risks. Companies can often be attracted to outsourcing as a means to relieve intensifying competitive pressure, but resorting to hasty and near-sighted

outsourcing decisions might prove harmful in the long term (Leavy 2004). One significant risk of innovation outsourcing is missing critical learning opportunities (Leavy 2004; Perrons & Platts 2004). As Hamel and Prahalad (1994) have remarked, competing for the future is closely tied to competing for today's learning opportunities on which future capability and competitiveness will be based. The challenge is to recognize potential future core competencies when making outsourcing decisions. As Leavy (2004) points out, a company might realize too late that the skills and knowledge they would have developed by not outsourcing a certain part of their innovation activities could have later been utilized to support their key technologies.

In summary, outsourcing larger parts of the innovation process might yield remarkable gains especially in the short term. However, replacing internal R&D with outsourced innovation might prove detrimental for future competitiveness. As Chesbrough and Crowther (2006) put it, leveraging external research should rather function as a complement than as a substitute in the performance of internal R&D activities.

2.2.2 Investing in external sources of innovation

Acquisitions are an extreme mode of investing in outside innovators. Acquisitions allow firms to undertake substantial expansions of resources that might be difficult to develop internally (Karim & Mitchell 2000). Thus they can be seen as a way to leverage external R&D, although not exactly in the spirit of open innovation. Acquisitions provide a high degree of control, but correspondingly, a high level of commitment is required from the acquiring firm (Roberts & Berry 1985). An acquisitive approach to new technologies also implies a high risk. According to previous studies, acquisitions can serve as a substitute for innovation (Hitt et al. 1990), and acquisitive growth strategies seem to have negative effects both on R&D investments and outputs (Hitt et al. 1991). Claude-Gaudillat and Quélin (2004) conclude that acquisitions as a means of finding new competencies are especially popular among companies whose competences are rather diversified, or when the technologies acquired differ from the competencies already possessed.

According to Linder et al. (2003), many companies have shied away from acquisitions, preferring instead to set up venture funds to invest in companies that complement their own product and business development. In seeking to benefit from breakthrough innovations, companies may take equity positions in organizations focused on small or emerging markets. These kinds of investments in external innovators might imply high costs and difficulties with integration, and there is little control over the technologies developed by outside ventures. However, an equity partnership might give a company a good chance to participate in and nurture an emerging market. (Linder et al. 2003.)

Investing in external sources of innovation either in the form of acquisitions or venture capital are alternatives open for larger firms with adequate funds. In addition to high costs, difficulties with integrating the acquired technologies with the internal knowledge body of the company are essential disadvantages of sourcing innovation through investments (Linder et al. 2003).

2.2.3 Partnering for innovation

Alliances are another way of accessing lacking capabilities or combining resources in order to create new capabilities (Hamel 1991), and can take place both within or across innovation sectors (Linder et al. 2003). The success of an alliance is linked to the absorptive capacity developed over time, which is the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends (Cohen & Levinthal 1990). In other words, alliances are only successful as a source of new competencies if a company is able to internalize the information acquired through the partnership.

However, learning is not the only goal of R&D alliances. Based on previous literature, Claude-Gaudillat and Quélin (2006) sum up additional advantages as a chance to share the risk and the costs, to diminish uncertainty, and to benefit from reversibility when accessing new competencies.

Strategic alliances or partnerships based on the exchange and collaborative development of intellectual properties have been identified to facilitate innovation (Doz & Hamel 1998). Nevertheless, in spite of their proven advantages, IP-based strategic alliances and partnerships are subject to a number

of control, security, and anti-trust issues arising from interorganizational sharing, development, ownership, and exploitation of intellectual properties (Fitzpatrick & DiLullo 2005).

2.2.4 Open source – innovation through peer production

Today's digitally networked environment allows for radically different ways of creating and managing innovation. Large amounts of information, knowledge, and cultural goods are developed through social production systems that do not rely on markets or clear hierarchies, but are instead based on social signals and motivations to organize significant productive enterprises. This phenomenon is often referred to as name peer production. (Benkler 2005.)

Open source software is the most widely known example of peer production. It is a form of software that is developed by internet-based communities and is freely available to all (von Hippel & von Krogh 2003). Open source software developers self-organize in teams whose members are dispersed throughout the world. Team members volunteer their time and expertise, working long hours, apparently to earn only the praise and recognition of their colleagues. (Federman 2006.) There is no single organizing party cashing in on the open source movement. The main beneficiaries are the developers themselves. As von Krogh (2003) phrases it, open-source software developers freely reveal and share because they garner personal benefits from doing so, such as learning to develop complex software, perfecting expertise with a computer language, enhancing their reputation, and for pure fun and enjoyment.

The shared values and motivation for open source software developers are further illustrated in Figure 5. Personal values, including propensity to intrinsic motivation, are the principal drivers which stimulate individuals to contribute work. Within the open source community an individual's contribution to development may lead to reputation enhancement which in turn may be rewarded by personal benefits such as job offers or promotions. It is also the case that personal benefits may accrue as a side-effect of the shared values and culture that characterize the community – this may, for example, take the form of job offers in which a subjective assessment of individual “fit” plays an important part. The processes and systems of open source software, in particular

the communication processes and protocols for virtual team work, support and encourage the culture, shared values, and sense of participation in a common effort. (Millar et al. 2005.)

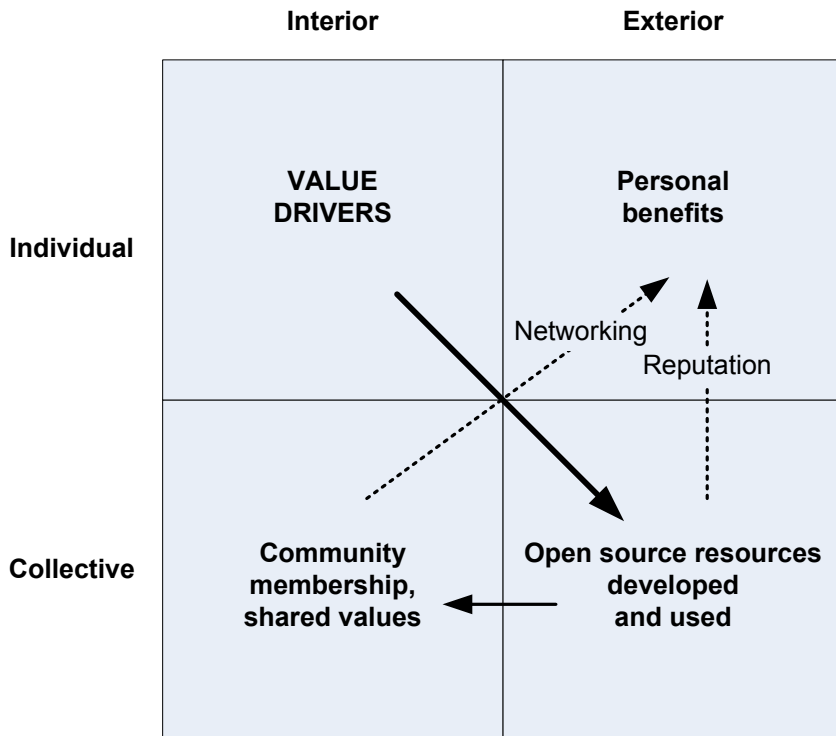


Figure 5. Values and motivation for open source software developers (Millar et al. 2005).

In addition to the personal benefits gained by individuals participating in open source projects, also companies may benefit from making their intellectual property publicly available. This argument clashes with the private investment model introduced by Demsetz (1967), which assumes that innovation will be supported by private investment and that private returns can be appropriated from such investments. To encourage private investment in innovation, society grants innovators some limited rights to the innovations they generate via intellectual property law mechanisms such as patents, copyrights, and trade secrets. The results of open source development are not protected this way, but freely revealed as a public good in the spirit of collective innovation. But in the

case of open source projects, giving up the proprietary rights does not necessarily represent a loss of private profit for the innovator. Instead, free revealing may actually result in a net gain in private profit for the innovator. For example, it can increase innovation diffusion and so increase an innovator's innovation-related profits through network effects. Empirical research has shown that free revealing can even be the best practical route for innovators to increase the profit from their innovations, concerning both information-based and physical goods. (von Hippel & von Krogh 2003; 2006.)

Free-riding is another side of free revealing, implying the benefits gained by outsiders who do not participate in the development process but have access to the results. But as von Hippel and von Krogh (2003) explain, free-riding is not a problem in open source models: the open source contributors gain private benefits that are tied to the development of the good, outweighing any benefits available to free riders.

Ulhøi (2004) presents that innovations emerge in a continuum of private-collective models of agency, ranging from purely private interests at one end (closed source) to purely collective interests at the other (open source). Between these two extreme cases there is an area of hybrid models (Ulhøi 2004) or private-collective innovation models (von Hippel & von Krogh 2003). Characteristics of innovation models on the closed-open source and private-collective continuums are illustrated in Figure 6.

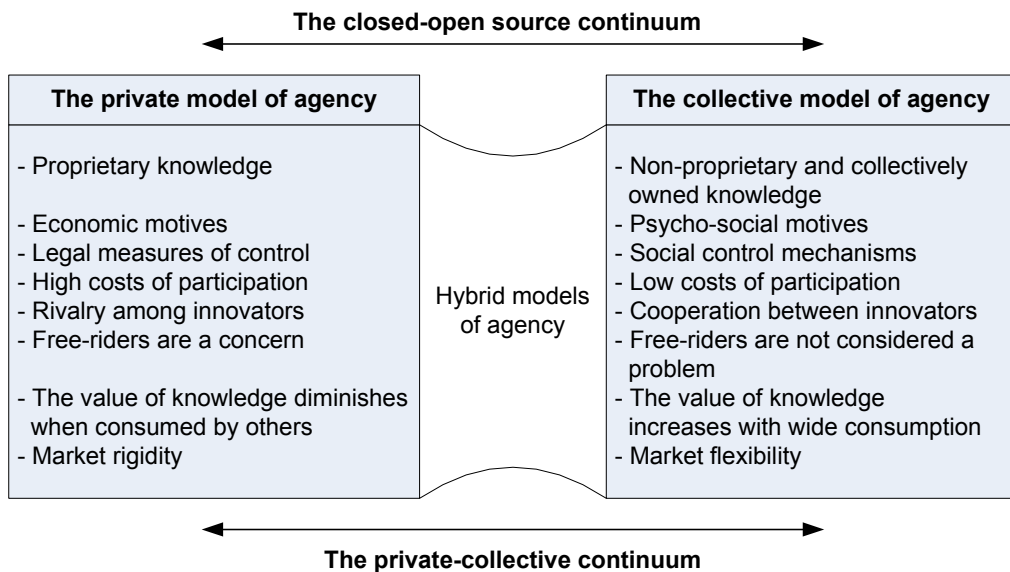


Figure 6. The closed-open source and private-collective continuums of innovation models (Ulhøi 2004).

There is a clear analogy between the private and collective innovation models of Figure 6 and Chesbrough's (2003b) division of closed and open innovation principles described in Table 1. However, whereas Chesbrough emphasizes the managerial perspective of rivalry and profit-making, Ulhøi (2004) concentrates on a more theoretical analysis of the two models.

There seem to be diverse opinions about where the principles of open innovation take place on the private-collective continuum of innovation models. While Chesbrough (2003b) evidently underlines private interests, Kuhlen (2006) emphasizes the collective dimension of the open innovation model, suggesting that open innovation criticizes the "homo oeconomicus" -spirited argument that monetary incentives are the primary and only motivation for creativity and thereby for innovation.

Similarly, there have been varying opinions about the relation between open source development and open innovation in general. Piller (2003) uses the term open innovation to mark the transmission of the ideas of open source software development to other product ranges. Chesbrough (2006) refines this view,

arguing that even though these two share some concepts, open innovation explicitly incorporates the business model as the source of both value creation and value capture. In this study, Chesbrough's view has been adopted; suggesting that open innovation and open source development are related concepts, but find themselves in different positions on the private-collective continuum of innovation models. As Gassmann (2006) states, the analysis of open source software development shows an extreme version of open innovation, and management research and practice in the spirit of open innovation can profit by cherry-picking some ideas and concepts from open source development.

The rapid growth of open source software development has led to a vast amount of literature, using a range of frameworks and models, to analyze this phenomenon (Millar et al. 2005). The open source or peer production principles, however, are not limited to software development. Borrowing Ulhøi's definition (2004), the term open source can be used to describe any innovative and/or research and development related project in which the innovator has, a priori, waived rights to the critical knowledge component of the innovation, for example a programming code, design principle, or a chemical formula. Open source systems present a novel and successful alternative to conventional innovation models, and provide important lessons regarding the most effective ways to structure and implement innovation (von Hippel & von Krogh 2003; von Krogh 2003).

As Benkler (2002) concludes, peer production has a systematic advantage over markets and firms due to improved identification and allocation of human creativity. Awazy and Desouza (2004) proceed to suggest that the entire future of knowledge work might be manifested in how open source communities work. Peer production and open source principles have indeed changed the rules of dealing with innovation, and are widely influencing the way that companies are managing their innovation activities today. These topics are further discussed in the next sections, concentrating on the perspectives of user innovation and "crowdsourcing", another form of utilizing networks of individuals to facilitate corporate innovation.

2.2.5 User innovation

User communities are a source of innovation that existed long before the advent of open source software and extend far beyond it (von Hippel 2001). Empirical research in a number of fields has shown that users are frequently the first to develop and use prototype versions of what later become commercially significant new products and processes (Morrison et al. 2000). Consequently, innovation by users is now understood to be an important part of innovative activity in the economy (Henkel & von Hippel 2005).

Reichwald and Piller describe the process of co-operative and voluntary collaboration between a customer (user) and a producer using the term interactive value creation (original term in German *interaktive Wertschöpfung*). This collaboration might refer to operational activities as well as product or process development. The interactive value creation process can be initiated both by the customer and by the company. (Reichwald & Piller 2006.)

Studies on the subject consistently find that innovation is concentrated among the *lead users* in a user population (Henkel & von Hippel 2005). Defined by von Hippel (1986), lead users are members of a user population with two distinguishing characteristics. First, they are at the leading edge of important trends, and so are currently experiencing needs that will later be experienced by many users in that marketplace. Second, they anticipate obtaining relatively high benefits from obtaining a solution to their needs, and so may innovate.

According to von Hippel (2001), three conditions need to be met in order to support innovation by user communities: (1) at least some users have sufficient incentive to innovate, (2) at least some users have an incentive to voluntarily reveal their innovations and the means to do so, and (3) user-led diffusion of innovations can compete with commercial production and distribution. Although a monetary reward might be of advantage, users often reveal their knowledge out of non-financial motives (Reichwald & Piller 2006). Even a low level of benefit can be an adequate reward for users to take part in the corporate innovation process – what matters is that their benefits exceed their costs (von Hippel 2001).

In response to customers' increased role in innovation, the customer interface of companies becomes a crucial area to manage. The knowledge gap between the market and the company may be bridged by ensuring the transfer of both codified and tacit knowledge through frequent and intense communications, and by providing customer support during trial-and-error iterations, which are necessary for product development. (Yaklef 2005.) The internet provides companies with new opportunities for this kind of cost-effective and informative knowledge transfer with customers (Reichwald & Piller 2006).

Understandably, knowledge transfer does not only imply receiving information from customers. Companies need to replace the secrecy around their R&D activities with a new type of transparency. As Ogawa and Piller (2006) phrase it, all collective customer commitment practices must share one characteristic: full disclosure of the entire product development process, from initial consumer comments to final product commercialization. This reflects a shift from a perspective of "exploiting customer knowledge" by the firm to a perspective of "knowledge co-creation" with customers by allowing customers to interact among themselves and involving them as partners in innovation (Sawhney & Prandelli 2000).

Sawhney et al. (2003) highlight the use of mediated channels of collaboration with customers as an efficient way to boost corporate innovation. According to them, to fully exploit the internet as an enabler of innovations, companies need to complement their direct channels of customer interaction with indirect, or mediated, interactions. Those points of contact can be carried out by third parties that function as knowledge brokers, helping companies overcome the gaps in knowledge about customers that impede innovation. (Sawhney et al. 2003.)

Sawhney et al. (2003) observe the mediation of innovation by third parties particularly in the customer interface. This study, on the other hand, discusses the same phenomenon as a form of intellectual capital brokering where companies use mediators to access external knowledge, competencies and technologies. Thus in the scope of this study, the sources providing their expertise might include but are not limited to users and customers.

Before moving on to linking the above discussed innovation sourcing strategies to IC brokering, one more alternative method of getting external input for the

innovation process is introduced. The term “crowdsourcing” might not be widely known, at least in the academic world. However, the phenomenon that the term describes seems to be an emerging source of corporate R&D, providing an interesting opportunity to reengineer the innovation process.

2.2.6 Crowdsourcing – capitalizing on the common people

The word *crowdsourcing* first appeared in the June 2006 issue of the *Wired* magazine in an article by Jeff Howe. In his article *The Rise of Crowdsourcing*, Howe describes a variety of companies who have learned a new way to take advantage of the networked world. Instead of looking for cheap labor in China or India, they are now utilizing the virtually unrestricted pool of everyday people. Amateurs and professionals alike can be activated to use their spare cycles to create content, solve problems or even do corporate R&D. Howe does not hesitate to give a name to this emerging phenomenon: “It’s not outsourcing: it’s crowdsourcing.” (Howe 2006.)

Though the term crowdsourcing might be one man’s invention, the phenomenon behind it is unquestionably not. Examples of companies conducting a form of crowdsourcing are abundant, and the semi-scientific discussion around the phenomenon has escalated rapidly.

The internet-based encyclopedia Wikipedia describes crowdsourcing as an attempt to replace selectively hired, trained and managed workforces with mass volunteer participation and self-organization. Open source software projects are a form of crowdsourcing that has existed for years, but the idea is diffusing to a wide variety of industries. Wikipedia itself, a free-content encyclopedia collaboratively written by volunteers, is one of the best-known crowdsourcing projects. (Wikipedia 2006a; 2006b.)

The question of how to best utilize the massive resource pool of everyday people in corporate processes such as R&D remains to be answered. Nevertheless, a number of companies have already discovered the chance to capitalize on the networks of individuals by crowdsourcing some corporate tasks to this voluntary workforce. It is highly likely that the vivid public conversation around the topic

will soon catalyze raising attention in the form of theoretical contributions on this promising value creation model.

2.2.7 Summing it up – an interlinked framework of innovation sourcing practices

In the foregoing, six different practices for obtaining external ideas, competences, or technologies to be used in the corporate innovation process have been introduced. These vary greatly in the degree of required investments, expected benefits, and the impact on the internal R&D function of the company. However, it does not matter if these practices are different by nature, there are still strong linkages between them. There are several ways in which different methods to access external competencies can be categorized (e.g. Claude-Gaudillat & Quélin 2004; Linder et al. 2003; Chiesa et al. 2000), but none of these can be unanimously chosen as the best or the right one. In fact it is very hard to draw a line between the different practices, and it is easy to agree with Howells (1999) who concludes that different forms of innovation outsourcing are becoming less distinguishable and increasingly blurred over time.

The list of innovation sourcing methods presented above is rather more exemplary than comprehensive. Yet it is comprehensive enough to provide a clear picture of the variety of practices available for a company that wants to utilize external resources to accelerate its internal R&D efforts.

All of the discussed sourcing practices share some characteristics with intellectual capital brokering. Nevertheless, simultaneously some distinctive differences between these practices exist. Gassmann (2006), cited in the foregoing, recommended some “cherry-picking” to combine ideas and concepts in order to build an ideal model for practicing open innovation activities. Figure 7 illustrates how this cherry-picking has been carried out in the case of IC brokering. It is shown how IC brokering is closely linked to these alternative sourcing practices, incorporating some of their key advantages, but leaving out their main weaknesses.

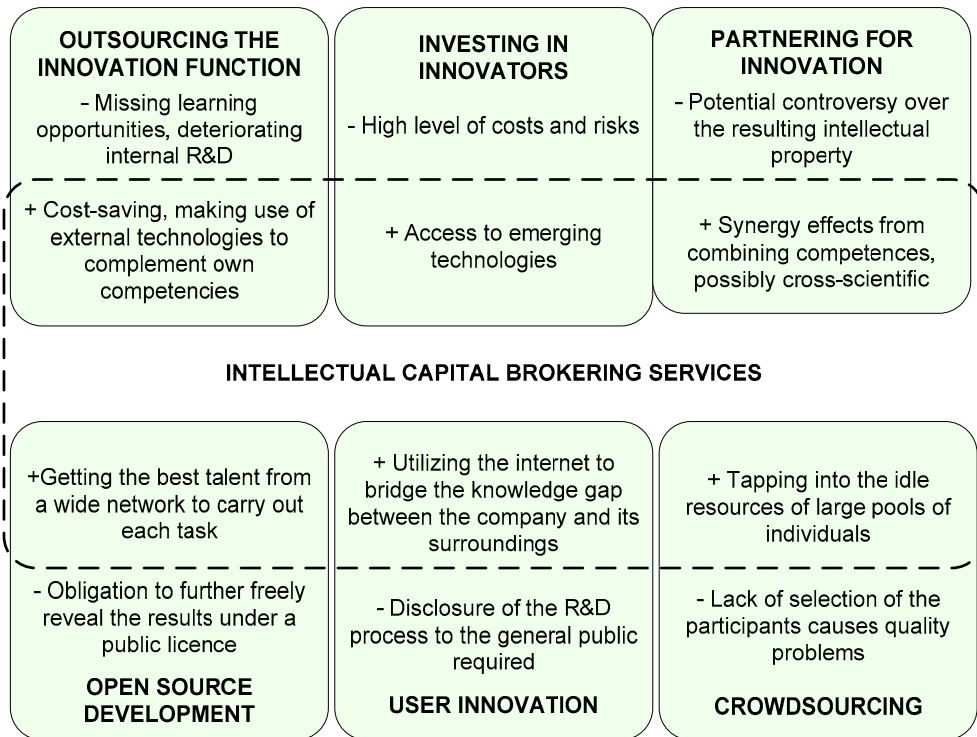


Figure 7. Intellectual capital brokering – combining advantages of related innovation sourcing practices.

In the following section, the essence of IC brokering is further explored, reviewing previous studies on the subject and linking IC brokering to the wide theory base of interorganizational network models. As a conclusion, a theoretical framework for understanding global intellectual capital brokering is built.

2.3 Networks as an external resource pool

Open innovation presumes that knowledge flows between firms, and the channels for these repeated flows are interorganizational networks, constituted from a diverse range of possible ties (Simard & West 2006). Therefore, in order to understand open innovation, we need to understand the network context in

which firms operate. As Vanhaverbeke and Cloudt (2006) suggest, a network perspective is necessary as a complementary approach of open innovation.

In this section, a short introduction to the industrial network model is given. The aim is to utilize network theory in order to understand how innovation intermediaries can create value for companies in search of external sources of technology.

2.3.1 The industrial network perspective

In the open innovation model, a company benefits from opening up its boundaries to allow both inbound and outbound knowledge flows. The notion of a company being in intense interaction with its environment is as such not a new idea, but builds on a strong body of industrial network theory.

Astley noted already in the 1980s that the boundary between organizations and their environments begins to dissolve. Organizations are to be viewed as being part of their environments in the sense that their formulation of collective actions with other organizations is what establishes the very dimensions of their environments. Each organization should be seen as contributing to a joint enterprise with other organizations and thus helping to construct the parameters of the collective existence it shares with others. (Astley 1984.)

Similarly, Håkansson and Snehota (1989) argued that the (inter)dependence of an organization on other entities makes it difficult to disconnect the organization from its network, since a business organization without its interactive environment loses its identity. They introduced the concept of the *context* of an organization instead of its *environment* when referring to the entities that are related to the organization. The context is enacted, it is created by the organization itself, and in a sense it even constitutes the organization itself. Håkansson and Snehota (1989) summarize the propositions of the industrial network model as follows:

1. Business organizations often operate in a context in which their behavior is conditioned by a limited number of counterparts, each of which is unique and engaged in pursuing its own goals.

2. In relation to these entities, an organization engages in continuous interactions that constitute a framework for exchange processes. Relationships make it possible to access and exploit the resources of other parties and to link the parties' activities together.
3. The distinctive capabilities of an organization are developed through its interactions in the relationships that it maintains with other parties. The identity of the organization is thus created through relations with others.
4. Since the other parties involved in the interaction also operate under similar conditions, an organization's performance is conditioned by the totality of the network as a context, i.e. even by interdependencies among third parties.

Interorganizational relationships hold a variety of characteristics. Cheung and Turnbull (1998) attempt to capture the essence of interorganizational relationships, summarizing them as multi-dimensional, directional, structured, varied and evolutionary. They are established in many dimensions and are relatively varied in terms of importance, intensity, closeness, strength, commitment, and growth-orientation. Furthermore, interorganizational relationships are developed to a varied extent and are dynamic to a varied degree.

Håkansson and Ford (2002) remind us that a company's relationships are the outcomes of its strategy and its actions, and paradoxically, the company is itself the outcome of those relationships and of what has happened in them. Therefore, according to them, a network is both a way to influence and to be influenced. Both situations exist simultaneously and both premises are equally valid.

Mattsson (1985) uses the term *position* to define the role which a company has for other organizations that it is directly or indirectly related to. Thus, network positions are the result of investments in exchange relationships. These positions form the base for the companies' strategic actions in the future. (Mattsson 1985; Johanson & Mattsson 1985.) *Positioning*, on the other hand, refers to the process of developing one's position in the network by investing in relationships with other actors (Axelsson & Johanson 1992). Taking a more practical view, Gadde et al. (2003) draw conclusions on the implications of network interdependencies

on an individual firm: The productivity and efficiency of the firm are directly related to how it handles its interdependencies with a number of counterparts.

2.3.2 The resource dimension of an interorganizational network

Network relationships never come for free, but require investments. Investments can be described as processes in which resources are committed to create, build or acquire tangible or intangible assets which can be used in the future (Johanson & Mattsson 1988). Explained more practically by Möller and Halinen (1999), all relationships are the results of investments of management time and financial resources, and the development of relationships takes time. Johanson and Mattsson (1988) argue that since the development of relationships requires investments, the definition of investments stated above implies that a firm's relationships and positions in a network can be looked at as partially controlled, intangible market assets.

Relationships combine the physical and organizational resources of a company with those of its counterparts. Thus a significant part of a company's total resource base is located beyond its ownership boundary and is controlled bilaterally with other firms. (Gadde et al. 2003.)

As Ford (2002) points out, network literature not only considers relationships as resources, but also emphasizes how each company's resources are developed and exploited through these relationships. Through network relationships a company can learn and develop its capabilities, and improve its innovation potential (Håkansson & Snehota 1995). The returns of relationship-specific investments are difficult to measure but are also likely to be more valuable than other, measurable returns of resource investments (Easton & Araujo 1994).

Gadde et al. (2003) conclude that the main concern for a company is to make the best use of the resource constellation in the network. They also remind that in these efforts, it is important that resources are not perceived as givens. Resources always have 'hidden' and unexploited dimensions that can be explored and developed in interaction with business partners. Due to this nontransparent nature of networks, knowledge generation concerning networks is not unproblematic. However, companies need valid views of their network

context in order to perceive the opportunities embedded in the network (Möller & Halinen 1999). Dubois (1998) sees two alternative ways to generate the necessary in-depth information and knowledge: either by participating in the activities of the network, or through having relationships with actors knowledgeable about the network.

2.3.3 Implications of network theory to the open innovation model

To sum up the previous sections, in order to make the most of external resources, a company needs to invest in network relationships and build its position in the interorganizational network on a long-term perspective. Without these relationship-specific investments the company would firstly most likely not perceive and secondly hardly get access to the resources embedded in the network. How then can companies “tap into the external resource pools of competencies” as assumed by the open innovation paradigm, without the cost of the investments exceeding the benefits?

Before answering, the nature of interorganizational networks must be reconsidered. Helander (2004) challenges the more limited approach of the industrial network theory, arguing that value-creating networks do not merely consist of close long-term relationships. According to her, the nature of the relationships in a value-creating network can vary considerably, and the value is created in the network also through more short-term and transactional exchange relationships.

As the perspective of value-creation in networks is widened to include transactional relationships, mediated relationships provide an interesting point for discussion. Utilizing *intermediaries* as a gateway to the networked resource pool might be one answer to the question posed above. Intermediaries can be generalized as organizations that function in the midst of the users and producers of knowledge (Smedlund 2006). As Dubois (1998) was quoted above, in-depth knowledge about the network can also be generated through having relationships with actors knowledgeable about the network. Intermediaries, who are in fact using their relationship network as the basis of their value offering, can be seen as forming an “easy access” to the networks of users and producers of knowledge. By exploiting the intermediary’s connections and knowledge about

the resources and opportunities in the network, the corporate customer can avoid investment intensive position building. In the following section, this view is further elaborated on by taking a closer look at the role of intellectual capital brokers and the intermediate markets in the innovation business.

2.4 Intellectual capital brokers as value creators

Knowledge is imperfectly shared over time and across people, organizations, and industries. Ideas from one group might solve the problems of another, but only if connections between existing solutions and problems can be made across the boundaries between them. When such connections are made, existing ideas often appear new and creative as they change form, combining with other ideas to meet the needs of different users. These new combinations are objectively new concepts or objects because they are built from existing but previously unconnected ideas. (Hargadon & Sutton 1997.)

Looking at the definition given by Christensen et al. (2004), an innovation is anything that creates new resources, processes, or values or improves a company's existing resources, processes, or values. Comparing this view to that of Hargadon and Sutton above, we can conclude that allowing knowledge to be shared through connections between previously unconnected groups, it is possible to generate innovations. In this section, the role of intellectual capital brokers as network connectors facilitating innovation is discussed.

2.4.1 Intellectual capital brokers defined

As Hargadon and Sutton (1997) sum up, *brokers* derive value by enabling the flow of resources between otherwise unconnected subgroups within a larger network. Marsden (1982) defines brokers as intermediate actors that facilitate transactions between other actors lacking access to or trust in one another.

Based on these definitions it can be concluded that brokers create value based on a *value network* model. A value network is one of the three generic value configuration models identified by Stabell and Fjeldstad (1998). According to them, firms that can be modeled as value networks rely on a mediating

technology to link customers who are, or wish to be, interdependent. The mediating technology facilitates exchange relationships among customers distributed in space and time. The firm itself is not the network; it merely provides a networking service.

Considerable network analytic research has shown the amount power that brokers accrue. An intellectual capital broker depends on both its network position and on an organizational memory that allows it to acquire, retain, and retrieve new combinations of information obtained through its position. When facilitating transactions of technological solutions, brokers benefit by being well connected to a range of disparate industries and enabling the flow of existing solutions between those that have such knowledge and those that do not. Subgroups in this expanded network, then, reflect relatively isolated sets of actors, technologies, and concepts. The boundaries between these subgroups can exist at many different levels, between individuals, organizations, or industries. (Hargadon & Sutton 1997.)

Remembering the above described comparison of knowledge-flow facilitation and innovation generation, basically any third party bridging previously disconnected pools of ideas can facilitate the emergence of innovations. In this study, the term “intellectual capital broker” is employed instead of “knowledge broker” or “technology broker”, for instance. This terminological choice has been made to emphasize the role of these intermediate actors in the corporate customers’ innovation process as a whole, not merely restricted to R&D.

Figure 8 further illustrates the scope of intellectual capital brokering in contrast to the market of intellectual property (IP). As Chesbrough (2003b) sums up, intellectual property refers to the subset of ideas that (1) are novel, (2) are useful, (3) have been reduced to practice in a tangible form, and (4) have been managed according to the law. IP therefore encompasses patents, copyrights, trade secrets, trademarks, etc. IP might serve as a trigger for a new innovation, but it is not a prerequisite for an innovation to be born. Groundbreaking innovations might as well spring up from combining knowledge streams or implementing wild ideas. The scope of intellectual capital brokering is thus not limited to marketing actual IP, but mediating all kinds of ideas, knowledge and competences. This comprises all the fields presented in Figure 8.

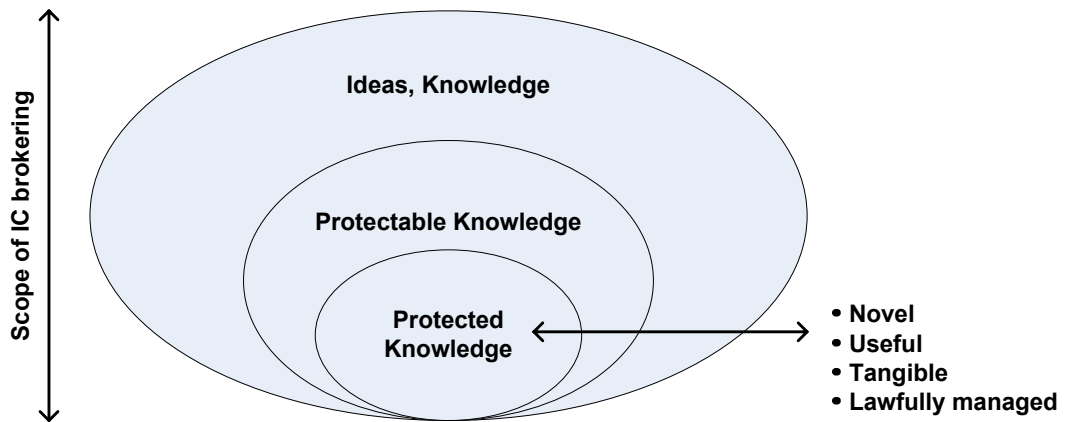


Figure 8. Scope of intellectual capital brokering, adapted from Chesbrough (2003b).

Alternative terminological approaches to intellectual capital brokering

Sawhney et al. (2003) composed the term “innomediaries” to describe the knowledge brokers that connect, recombine and disseminate otherwise disconnected pools of ideas, or in other words, fill the gap between companies and their customers. They suggest that these innomediaries can span structural holes by creating virtual bridges between companies and their customers across space and time. Furthermore, they differentiate “innovation marketplace operators” as one type of an innomediary, referring to an actor whose purpose is to connect sellers of innovation with potential buyers. “In this case, the innovations are typically intellectual property – a discovery, patent or kind of know-how. Thus the type of knowledge available for sale is the specialized expertise of professionals.” (Sawhney et al. 2003.)

In this study, the setting is a bit different. As stated, Sawhney et al. (2003) consider networks of “professionals having specialized expertise” as a separate case from customer networks. Here, however, customers are justifiably counted as “professionals having specialized expertise” in their own right, similarly to other type of individuals connected by an intellectual capital broker. The know-

how of a customer, though representing a different type of knowledge, can be as valuable as that of a researcher, only of a different kind. Therefore the term IC broker is used in this study to refer to a focal actor coordinating and mediating any kind of intellectual capital from within a loose network of individuals, whether these individuals are customers or other professionals. The explanation of including customers and not purely concentrating on “innovation marketplace operators”, as phrased by Sawhney et al. (2003), is simple: It is difficult, if not impossible, to make a difference between a customer and another type of person possessing relevant know-how. For instance, if a software engineer, who sells his solution to a software producer via a competence broker, frequently uses the products of this company, does he count as a customer or some other person “having specialized expertise”? To avoid linguistic gimmickry, customer knowledge is therefore not treated as a separate case in this study.

Networks vs. communities

Intellectual capital brokers are said to create value through their network position. This concept of a network position, however, should not be mixed with that of a personal position or reputation in an open source community. Whereas an individual’s position in an open source community depends on their personal contribution to the joint development project, an IC broker’s network position depends on the scale and scope of the connections possessed.

To avoid misconceptions, a clarification of the terms *community* and *network* must be made. Brown and Duguid (2002) discuss innovation in organizations with the help of the concepts *network of practice* and *community of practice*. According to them, networks consist of people who have practice and knowledge in common, but most of the members are unknown to each other. The links between the network members are usually indirect and often coordinated by a third party. Although interaction in these sort of networks is rather low, they are an efficient system for fast and extensive information sharing. Communities of practice, on the other hand, are relatively tightly-knit groups of people who know each other and work together directly. Communities allow for highly creative and productive collaboration, but their reach is inevitably limited when compared to looser networks. (Brown & Duguid 2002.)

Many of the benefits experienced by open source developers depend on membership in a well-functioning developer community. Wellman (2005) describes these communities as networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity. As there is no equivalent social support for members of a looser network, other kinds of sources for motivation are required. Consequently, global intellectual capital brokering is a business model built on monetary incentives.

2.4.2 Networks as a source of innovation

Network structures have been identified as a value-adding source of innovation in several contexts (e.g. Benkler 2002; Awazy & Desouza 2004; Howe 2006). The firm itself is no longer the locus of competence. Instead, competencies that the firm has access to are spread across an extended network, consisting of diverse actors such as suppliers, partners or consumer communities. (Prahalad & Ramaswamy 2003.) In the following, the advantages of networks as a source of innovation are discussed.

According to Simard and West (2006), accessing a network allows a firm to rapidly fill a specific knowledge need without having to spend enormous amounts of time and money to develop that knowledge internally or acquire it through vertical integration. Furthermore, they point out that in prior studies, networks have been found to have beneficial returns on innovation such as increased knowledge gain and patenting rates, improvements on existing products and new product creation, faster time to market, and reduction of duplicated effort. By providing access to complementary skills, scale benefits, and a broader knowledge base, network ties positively influence firm innovation. (Simard & West 2006.)

According to Maula et al. (2006), utilizing external resource pools that are not under direct control of the focal corporation might be critical to the success of an innovation, especially in the case of systemic innovations. Maula et al. suggest that these external actors might be developing different components of the systemic innovation simultaneously. However, the same model basically applies to any kind of innovation, when we see the innovation as a modularized entity consisting of converging flows of knowledge and skills. Thus, a company can

exploit the external resource pools to acquire some critical know-how that triggers a new innovation, disregarding the type of the innovation concerned.

Innovations are not merely dependent on new technologies, but on new ways of creating value. As Normann and Ramírez (1993) point out, successful companies do not just *add* value, they *reinvent* it. Kim and Mauborgne (2005) call these kinds of strategic moves *value innovations*. According to them, the leading companies of tomorrow do not succeed by battling competitors, but by creating new uncontested market space ripe for growth. The way to find this uncontested market space is not necessarily to develop new technologies, but think of new ways to utilize current ones. This kind of revolutionary thinking does not easily emerge from inside the company, but is often catalyzed by external ideas. Networks consisting of a diversity of individuals are a natural platform for combining ideas and therefore creating new value innovations. This ability to build on converging knowledge flows will be a critical success factor in the future.

As Chesbrough (2006) suggests, the presence of intermediate markets for innovation may interact with more networked structures to change the way in which innovation is organized. The next step is to see how intermediaries change the process of innovation sourcing, and how they help to create additional value for the actors at both ends of the innovation funnel.

2.4.3 Intellectual capital brokering – access point to knowledge networks

Making the most of the resources embedded in a network requires significant and continuous investments in interorganizational relationships (e.g. Johanson & Mattsson 1988; Axelsson & Johanson 1992; Möller & Halinen 1999; Håkansson & Ford 2002). Maintaining and nurturing these relationships can sometimes prove too consuming for a company, no matter if the benefits of such network-building would be recognized. As Chesbrough (2006) states, while external relations are critical for successful management of innovation, there is a limit to how many of these relations a company can handle effectively.

In these times when an increasing amount of corporate functions are being outsourced, intellectual capital brokers now offer companies the possibility to outsource their network management activities. Intermediate markets on innovation have arisen, based on the ability of competence brokers to match problems and solutions across their wide networks of connections. As Chesbrough (2006) puts it, specialist firms now provide information, access, and even financing to enable transactions on intellectual property to occur. Here IC brokers take the role of the third party that transmits knowledge from the network to the outside, as described by Dubois (1998).

Intellectual capital brokers are in fact using their network connections as an asset that they are selling to corporate customers outside the network. Naturally, IC brokers cannot provide the aspects of trust and commitment that would develop in a long-term relationship (Ford et al. 1998) between a solution provider and a corporate customer. However, due to their extensive networks, global IC brokers can give their customers access to the best talent and know-how available, after which the knowledge transfer happens on a transactional basis. This kind of access sets the initial conditions for continuous innovation (Hargadon 1998). Moreover, the possibility for further interaction between the two connected parties emerges as soon as the link has been established.

The business of innovation is becoming truly global in its character, and diverse countries bring new pools of human capital and talent into play (West et al. 2006). Simultaneously, as Vanhaverbeke (2006) argues, companies are increasingly *forced* to establish ties in broader networks to develop or absorb new technologies, commercialize new products or simply to stay in touch with the latest technological developments. Future success of firms depends upon the capacity to learn about management of technological innovation from wherever it is practiced most efficiently and effectively around the world (Dodgson 2000). The aspect of globalization of knowledge further stresses the position of intermediates. Not every company can single-handedly maintain a global contact network to enable a rich knowledge flow from the outside. A specialized broker whose mission is to build and develop competence networks can put much more effort into establishing ties with foreign research institutes or consumer communities than an individual company ever could.

Ease of finding relevant competence is one important reason for transaction-based competence sourcing. Intermediaries not only provide easy access to a wide resource pool, but they can also help identifying and filtering the most suitable knowledge or technology. Chatterji (1996) emphasizes that success in the sourcing of external technology will require a planned approach. He describes this increasingly important business process with a conceptual model consisting of eight discrete steps, illustrated in Figure 9. Chatterji's model is based on the assumption that companies internally manage the entire sourcing process, which is a lengthy and resource-consuming activity. However, by utilizing the services of an IC broker, a company can hand over the responsibility for search and evaluation tasks (2.–6.) marked with arrows in Figure 9. Naturally, some coordination will be required from the company's side, but with good instructions the intermediary can seek out exactly the kind of competence preferred. The company can then devote most of its attention to the crucial steps in the beginning and in the end of the sourcing process: Defining business needs and benefits (step 1), and ensuring organizational learning and improvement (step 8).

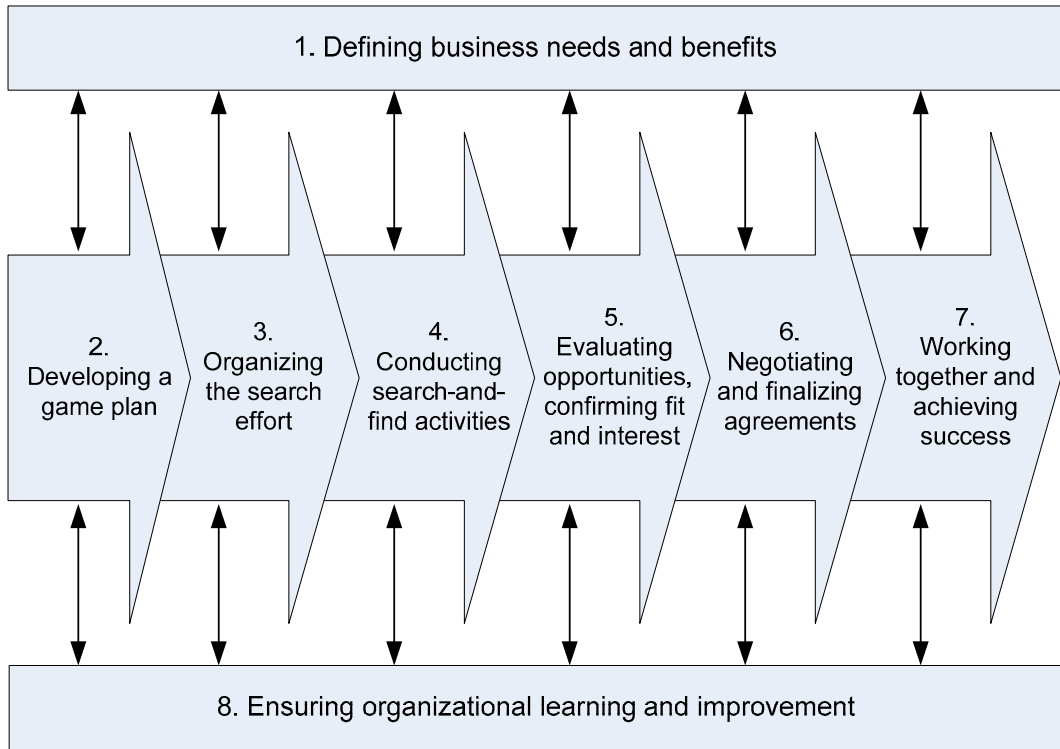


Figure 9. Conceptual model of the technology sourcing process (Chatterji 1996).

Also Claude-Gaudillat and Quélin (2004) argue that accessing external capabilities through a market transaction is quicker and more flexible than through other modes. However, the applicability of acquiring competence through a market transaction with the help of IC brokers has to be considered separately for each case. Even if the use of intermediates might be easy, quick, and flexible, there might be other factors suggesting alternative procedures. For example, market transactions do not necessarily allow the appropriation of new capabilities, since the source of the knowledge remains outside the boundaries of the firm (Claude-Gaudillat & Quélin 2004). Bryan (2004) sums up the preconditions for transaction-based competence sourcing accordingly: From a buyer's perspective, the knowledge to be acquired from the market must be more insightful and relevant – as well as easier to find, gain access to, and assimilate – than alternative sources. In the following, factors that might render brokering

services less beneficial than alternative channels of competence sourcing are discussed.

2.4.4 Risks and downsides of global intellectual capital brokering services

A significant risk related to IC brokering is that of internalizing the externally sourced competence, and maintaining a substantial competence base within the company. As Chatterji and Manuel (1993) argue, the primary locus of problems is not in finding and acquiring the technology but in successfully nurturing and exploiting it after it has been acquired.

According to Chatterji and Manuel (1993), external sourcing activities must complement the strengths and weaknesses of internal R&D efforts. They argue that a corporation must maintain a strong internal R&D function to derive maximum benefit from its external sourcing activities. Rosenberg (1994) goes even further in his argumentation, suggesting that the main motive for firms to conduct basic research is to enhance their ability to use external knowledge.

Companies need to be careful to maintain the balance between the internal and external locus of competence. As Prahalad and Hamel (1990) warn, the embedded skills that give rise to the next generation of competitive products cannot be “rented in” by outsourcing. However, the danger of forgoing learning opportunities can be reduced by ensuring that external sourcing plays a complementary and not a compensatory role in relation to internal competences. Transaction-based innovation sourcing does not directly lead to the deterioration of the internal competence base, but companies have to be aware of this risk and manage it accordingly.

As in the case of internal R&D programs, the success of external sourcing activities depends on early buy-ins from all key individuals within and outside the R&D function (Chatterji & Manuel 1993). Resistance towards new ideas – whether they bound from inside or outside the company – is a well-known phenomenon in all types of organizations, and has become known as the “Not Invented Here” (NIH) syndrome. According to Katz and Allen (1997), the NIH syndrome means that project members are more likely to see only the virtue and

superiority of their own ideas and technical activities, while dismissing the potential contributions and benefits of new technologies and competitive ideas and accomplishments as inferior and weak. Potentially emerging NIH effects may thus endanger even the most promising development projects unless the initiative is accepted by all relevant actors. The risk of NIH thinking is naturally even bigger when trying to introduce external ideas and technologies that are totally new to the company. As Katz and Allen (1997) suggest, it is very important to observe and tackle NIH related attitudes, and encourage behaviors that are more receptive and responsive to new ideas and emerging technological opportunities.

2.4.5 The role of the internet in global intellectual capital brokering

Anderson and Anderson (2002) describe how the internet was thought to cut out intermediaries by allowing businesses to connect directly with their customers. According to them, however, quite the opposite is occurring: The role of intermediaries is becoming even more important, the internet has only changed the ways in which they are able to create value.

Furthermore, the internet has not only affected the middlemen, but revolutionized the global flow of information and accessibility of external knowledge in general. As Arora et al. (2002) argue, information and communications technologies, including the internet, have greatly enhanced the ability of firms to expand their repertoire of knowledge by engaging external actors in the innovation process.

Based on an extensive literature review², Verona et al. (2006) have discussed how virtual environments substantially strengthen the competences of a knowledge broker. They have divided the advantages brought by the virtual environment into two phases in the brokering cycle, firstly network access, and secondly knowledge absorption, integration, and implementation. The beneficial impact factors found by Verona et al. have been listed in Table 3.

² For references see Verona et al. 2006.

Table 3. The impact of virtual environments on a knowledge broker's distinctive competences (adapted from Verona et al. 2006).

Brokering cycle	Specific dimensions	Impact of virtual environments
<u>Network access</u>	Direct ties	<ul style="list-style-type: none"> • Low-cost and easy-to-use platform • Elimination of geographic barriers • Blurring up of the trade-off between richness and reach • Network externalities
	Indirect ties	<ul style="list-style-type: none"> • Open standard allowing entry to partners' partner competences
	Structural autonomy	<ul style="list-style-type: none"> • Syndication • Convergence among unrelated skills • Opportunities for sharing innovative labor
	Tie modality	<ul style="list-style-type: none"> • Real-time, two-way, low-cost communication • Low costs of conversion of the platform of interaction
<u>Knowledge absorption, integration, and implementation</u>	Knowledge absorption	<ul style="list-style-type: none"> • Tools enhancing knowledge acquisition from individuals – online tracking; surveys and pools; user-friendly toolkits for product configuration • Communities of creation
	Knowledge integration	<ul style="list-style-type: none"> • Formal mechanisms increasing information distribution • Informal social integration through extended connectivity • Communities of practice facilitating assimilation through distributed learning
	Knowledge implementation	<ul style="list-style-type: none"> • Information digitalization increasing the inputs for knowledge transformation • Electronic archives facilitating knowledge retrieval and recombination • Availability of the same knowledge to more potential users

Table 3 clearly illustrates that a brokering position becomes even more beneficial in a virtual environment. However, a critical note must be given before declaring that the internet multiplies the value creation potential of an IC broker. In the scope of this study, an IC broker is an actor that merely mediates knowledge, but does not use this knowledge to build up its own competence pool. Thus, a global IC broker capitalizes on the virtual environment by utilizing only a part of the factors described by Verona et al. (2006).

The virtual environment also imposes some additional risks to the use of IC brokering services. As Kalakota and Konsynski (2000) argue, customers will

demand the same levels of trust and integrity in the networked world as they expect of the customary off-line system. Confidentiality issues thus form a sizeable challenge for global IC brokers. The positive and negative implications of the virtual environment on intellectual capital brokering will be further explored in the empirical part of this study.

2.4.6 The three levels of actors in global intellectual capital brokering

The process of intellectual capital brokering involves three different levels of actors: the IC provider, the broker, and the IC buyer (Figure 10). Here the IC provider – in other words the source of the idea or technology that may develop into an innovation – is the network consisting of individuals and companies who possess certain competences.

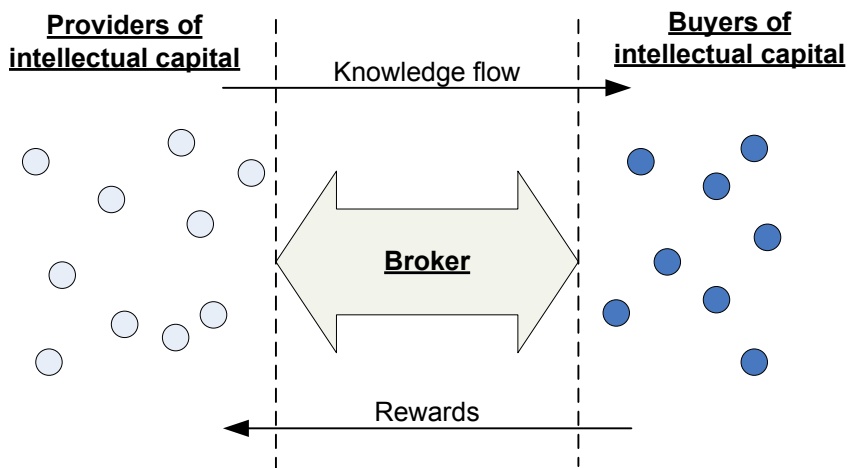


Figure 10. Three levels of actors in the process of intellectual capital brokering.

There has not been much research on the roles and motives of the different actors in the innovation sourcing process, which is why these three levels of actors are carefully examined in the empirical part of this study. In this section, short descriptions of previously introduced cases of buyers, mediators and sellers in intellectual capital brokering processes are reviewed.

Buyers of intellectual capital

Procter & Gamble, one of the world's largest consumer goods producers, is a company frequently mentioned when talking about open innovation. They have been instrumental in creating and supporting a number of internet-based innovation intermediaries, such as InnoCentive, Yet2.com, and NineSigma (Dodgson et al. 2005). By 2000 P&G executives had realized the potential of external sources of innovation. Whereas P&G employed 7500 R&D staff, there were approximately 1.5 million researchers around the world working in the same areas of science and technology at levels equal to or better than P&G's internal expertise. P&G made it their goal to acquire 50% of their innovations outside the company: half of their products would come *from* their labs, and the other half *through* them. (Huston & Sakkab 2006.)

In the heart of P&G's new innovation strategy is a model called Connect and Develop. The logic behind Connect and Develop is finding good ideas anywhere in the world and bringing them in to enhance and capitalize on internal capabilities (Huston & Sakkab 2006). As one P&G executive put it: "Innovation is all about making new connections. Most breakthrough innovation is about combining known knowledge in new ways or bringing an idea from one domain to another". (Dodgson et al. 2005.) Therefore P&G is actually looking for "illogical", "unpredictable" or "unobvious" connections – combinations of technologies in applications that go well beyond their original intended use (Sakkab 2002). Intermediate markets of innovation have played an important role in the implementation of the Connect and Develop model. As Sakkab (2002) describes, internet-based technology transfer marketplaces hold a huge potential for P&G, both as a way to market their technology and, perhaps more importantly, as a way to find technologies that can solve important problems.

P&G is an excellent exemplar case of open innovation and involvement with intellectual capital brokers in practice, and it is clear that these activities have had a great positive impact on their innovation success rate (Dodgson et al. 2006). However, more evidence on different kinds of companies is required in order to form a more complete picture of the corporate customers of global intellectual capital brokers. This gap will be addressed in the empirical part of this study.

Global intellectual capital brokers

Although no thorough research has been done on the role of intellectual capital brokers, some of them have been frequently mentioned in the literature, effectively in connection with P&G (see e.g. Dodgson et al. 2006; 2005; Huston & Sakkab 2006; Sakkab 2002). In the following, four companies who have made intellectual capital brokering their business model are introduced.

InnoCentive is a web-based community that aims at connecting corporate clients with a network of thousands of scientists around the world. This US-based organization was established in 2001 from the initiative of the pharmaceutical giant Eli Lilly, but has expanded rapidly to a wide variety of industries. The incentive-based business model is rather simple: Corporate customers, called *seekers*, can post their R&D challenges in the InnoCentive online forum, and get advice from *solvers*, a network of scientists from more than 170 countries. Each challenge provides a detailed description of the problem, requirements, deadline, and the amount of reward. The name of the seeker company remains known only to InnoCentive. Scientists around the world can register as solvers, and the most active solvers can currently be found in China, Russia and India. (Dodgson et al. 2005; InnoCentive 2006.)

NineSigma, founded in 2000 with P&G's assistance, is based on a similar model to InnoCentive's – connecting companies with external sources for innovative ideas, technologies and services. Their solution providers include companies of all sizes, universities, government labs, private research organizations, and consultants. As a distinction from InnoCentive, in NineSigma's case the problems posted on the network of solvers are somewhat broader, which requires more interaction between the solver and the customer. Therefore, a connection is established between the two after the most attractive proposal has first been selected by the customer. (Huston & Sakkab 2006; Dodgson et al. 2005; NineSigma 2006.)

Yet2.com is another online marketplace for technology, founded in 1999. In contrast to the previously introduced intermediates, Yet2.com brokers existing technology and intellectual property. Yet2.com works with clients to write briefs describing the technology that they are seeking or making available for license or purchase, and distributes these briefs throughout a global network. Network

members interested in posted briefs contact Yet2.com and request an introduction to the relevant client. Once introduced, the parties negotiate directly with each other. Unlike InnoCentive and NineSigma, Yet2.com offers companies the possibility to create revenue out of unused or under used technology by offering their intellectual property on sale in the online database. (Huston & Sakkab 2006; Dodgson et al. 2005; Yet2.com 2006.)

YourEncore, founded by P&G and Eli Lilly in 2003, is a competence broker capitalizing on the experience of retired knowledge workers. They maintain a network of high-performing retired scientists and engineers. Through YourEncore, companies can contract with a retiree who has relevant competence for a specific, short-term assignment. They can thus access deep experience and new ways of thinking at low cost and with little risk. Compared to the other case examples of competence brokers, YourEncore's service offering is more locally oriented since the process results in an employment of a person. However, the basic idea of connecting a cross-disciplinary competence network with a corporate customer is the same. (Huston & Sakkab 2006; Dodgson et al. 2005; YourEncore 2006.)

It is obvious that even though all these companies have based their business model on intellectual capital brokering, their value creation processes are clearly divergent. Table 4 illustrates the ambiguity of service models offered by global IC brokers. Here the above mentioned brokers are categorized by three characteristics of their service processes: (1) the origin of the initiative for the transaction, (2) anonymity of the parties of the transaction, and (3) the content that is being brokered.

Table 4. An abridged categorization of the service models of some intellectual capital brokers.

	Yet2.com	YourEncore	InnoCentive	NineSigma
Origin of the initiative for the transaction				
Knowledge provider push	x			
Knowledge user pull	x	x	x	x
Anonymity of the transaction parties				
Full anonymity			x	
Connection established between parties	x	x		x
Content being brokered				
Technology	x		x	x
Other type of competence		x		

The aim of Table 4 is not to provide a full categorization of IC brokers' service models, but to demonstrate their diverseness. The result is that each intermediate has a unique value offering for the customer. No identical patterns are formed, even when measured only on these three dimensions. Bringing in more characteristics would further differentiate the brokers analyzed here. Since each service provider has their unique basis of value creation, it can be assumed that the most suitable applications of these services similarly vary to a large degree. So far there has been no research analyzing what kinds of service models would be appreciated by the potential customers of global IC brokers. This question will be tackled in the empirical part of this study.

Intellectual capital providers

As noted by Chesbrough and Crowther (2006), the outbound-oriented concepts of open innovation have not been adopted into widespread use yet. Therefore, little is known about the individuals and companies who make the decision to let their unexploited competence be commercialized by an IC broker.

Gans et al. (2002) have analyzed how the industry affects companies' tendency to sell their intellectual capital through an intermediate. They argue that the use of brokers is more prevalent for start-up innovators in industries where patents

are relatively effective in protecting IPR, such as the biotechnology industry. Here small companies act as upstream suppliers of ideas or technology rather than as a horizontal innovation-oriented competitor. In contrast, when investment costs for the entrant are relatively low and the technological innovation is not protected by patents, as in the disk drive industry, the disclosure threat tends to foreclose the idea market. Start-up innovators in this environment are more likely to commercialize their innovation through product market competition. (Gans et al. 2002.)

In P&G's case, technology transfer marketplaces were said to hold huge potential as a way to market their technology (Sakkab 2002). This assumption is firmly in accordance with the basic ideology of the open innovation paradigm described by Chesbrough (2003b). However, not much insight into the expectations, motives and risks of companies or individuals releasing their knowledge to be sold forward in the spirit of open innovation, or more specifically, through an intellectual capital broker, has been gained in previous studies.

In the following section, the understanding gained from previous studies is shaped into a theoretical model on global IC brokering. Due to the novelty of the topic the model still embodies some substantial gaps. In point of fact, its main purpose is to provide a framework that will serve as a starting point for the empirical part of this study.

2.5 Theoretical framework for a holistic model on intellectual capital brokering

Based on the theoretical review taken above, researchers are setting high expectations on more open innovation processes. A global market for intellectual capital is emerging, supported by modern communication technology and the urge to continuously develop new, innovative products and processes.

Converging knowledge flows have been identified to generate new ways of creating value. Consequently, companies are turning to external sources of innovation in order to be able to capitalize on the global pool of competences. Simultaneously, the market value of previously unused or underused knowledge, such as research results or technologies, has been recognized.

Networks are seen as an important locus of resources, and a platform for innovative initiatives. However, acting in a network requires plenty of investments into interorganizational and interpersonal relationships, and might not always be affordable. Third parties that form a link between the actors providing and utilizing knowledge might facilitate the market for global innovation exchange. By bridging previously unconnected networks these third parties – in the scope of this study global intellectual capital brokers – could provide companies a shortcut to entirely new ways of creating value. As Arora et al. (2002) suggest, markets for technology possess a significant potential for expanding, provided that an effective organization of such markets is created. The emergence of global IC brokers might be one such structure that supports the rise of markets for knowledge and technology.

In light of previously published scientific articles, it seems that IC brokering services are a promising new business model, but little is known about the fears and expectations of companies regarding the use of these services. Figure 11 pulls together the current understanding of global IC brokering, discussed in the previous sections of this study.

This theoretical model provides a good representation of the phenomenon, but leaves many questions unanswered. We do not know whether companies truly see online brokers as a promising opportunity to access external knowledge and better exploit internal knowledge, or whether they disregard IC brokering despite its presumable advantages. Therefore empirical observations among all three levels of actors in the process of intellectual capital brokering are required to build a more complete model of the phenomenon. Next, the challenge of enriching the model in Figure 11 with information from real-life business cases is taken in the empirical part of this study.

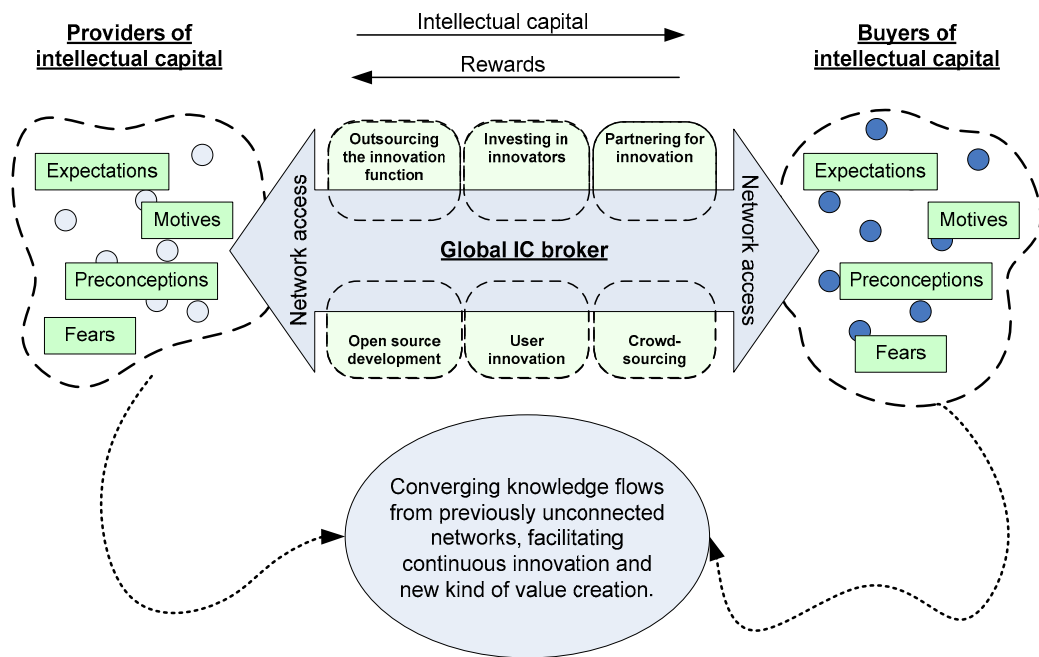


Figure 11. A theoretical framework for a holistic model on global intellectual capital brokering.

3. Case study: Empirical observation on global intellectual capital brokering

3.1 Empirical research design

In this section, an overview is given of the objectives of the empirical part of the study, the selection of cases, and data collection methods. The section is followed by an analysis of the data collected from the cases. After the case analysis the design and implementation of the empirical research are evaluated. The implementation process of the empirical study has been illustrated in Figure 12. The figure simultaneously clarifies the structure of this chapter.

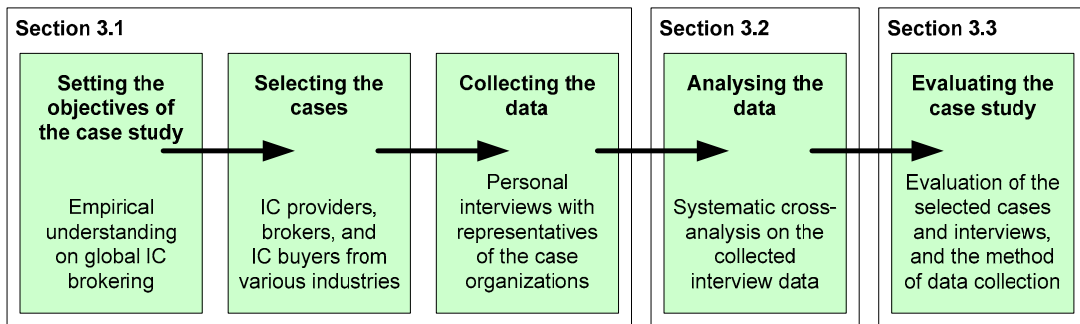


Figure 12. The implementation process of the empirical study.

3.1.1 Objectives of the empirical study

The aim of the empirical part of this study is to gain an understanding of how global intellectual capital brokering is perceived to create value in its own context. This understanding is reached by personally interviewing individuals who are – either through their own interests or as a representative of a larger organization – in the position to be potential users of these brokering services. Considering the research objectives, the case study method was selected to be the most appropriate research strategy. As Yin (1994) defines, a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. This description is thoroughly valid in the setting of this study.

One further characteristic of the case study inquiry is that it benefits from the prior development of theoretical propositions to guide data collection and analysis (Yin 1994). Similarly, a strong theoretical basis has been founded for this case study in the previous sections of the publication. This theoretical basis has been utilized to direct the design of the empirical research and the content of the interviews. However, no hypotheses or other propositions were formed after the theoretical review, since the aim of the study is to interpret, and not to test or confirm pre-set propositions. The result is neither purely objective nor purely subjective, but as Patton (1990) phrases it, emphatically neutral: The researcher includes personal experience and empathic insight as part of the relevant data, while taking a neutral nonjudgmental stance toward whatever content may emerge.

3.1.2 Selection of cases

Selection of cases is an important aspect of building theory from case studies. Unlike in hypothesis-testing research, it is not recommended to pick the cases randomly or statistically. The preferred process of data collection for case studies is called theoretical sampling. (Eisenhardt 1989.) In theoretical sampling, the analyst jointly collects, codes and analyzes the data, and decides what data to collect next and where to find it, in order to develop theory as it emerges (Glaser & Strauss 1967). The selection of most relevant cases, which may for example replicate or extend the emerging theory, is well-founded due to the limited number of cases which can be studied (Eisenhardt 1989).

In this study, theoretical sampling has been employed to select representative cases from all three levels of the brokering process: the provider level, the mediator level, and the buyer level. The involvement of all three levels in the empirical research was considered highly significant in order to form a holistic picture of the brokering process. The chosen cases represent a range of different industries and company sizes. The sample includes multinational corporations, small enterprises and individual researchers. The goal was to illustrate the brokering model from various different points of view. Since the focus of previous studies on open innovation has been on the US market, this study purposefully concentrates on European-based companies. The list of the case companies chosen for this study is presented in Appendix 1.

Given the variety of case characteristics, a lot of emphasis has been put on unique case orientation, assuming that each case is special and unique. Patton (1990) divides this approach into two phases. The first level of inquiry is being true to, respecting, and capturing the details of the individual cases being studied. After this, cross-case analysis follows from and depends on the quality of individual case studies. In this study, each case has first been analyzed separately, followed by a cross-case analysis, the results of which are documented in Section 3.2.

3.1.3 Data collection methods

It is characteristic of qualitative research to collect materials which make many kinds of questions and problematics possible. The researcher has to be able to change the viewpoint, lens and focal distance as freely as possible. (Alasuutari 1995.) The ambiguity of the research data has been ensured in this study by taking several perspectives on the research problem. The individuals interviewed for the empirical part had very different relations to the phenomenon under study, which enables observing it from many sides.

The empirical data of this study consists primarily of documented interview situations. As Alasuutari (1995) explains, although qualitative data is expected to be rich, multi-dimensional, and complex, like life itself, it may be collected in situations that are organized only for the study. What counts is that the material consists of reports that document the situations as carefully and accurately as possible.

In addition to the documented interview situations, also other types of data sources like the internet, company-specific documents such as annual reports, and the mass media, have been utilized to gain background information on the case companies and their relation to the phenomenon under study. This improves data triangulation, in other words the use of a variety of data sources in the study, which is considered an important way to strengthen a study design (Patton 1990).

Half-structured theme interviews were the primary data collection method for this study. In this type of interview it is possible to flexibly adapt the pre-determined questions to the situation, and the interviewees are not tied to any

alternative answers, but are free to express themselves with their own words (Hirsjärvi & Hurme 2001; Eskola & Suoranta 1998). Half-structured interviews enable taking into account that it is essential how people interpret things, and what kind of meanings they give to things (Hirsjärvi & Hurme 2001). All interviews for this study were conducted personally at the premises of each case organization concerned, so that the observation and interaction could be as complete and natural as possible. The interviewees were allowed to speak freely, avoiding any unnecessary interruptions.

No question forms were sent to the interviewees in advance, and the topic of the discussion was introduced as 'open innovation', providing only limited information about the study. The topics of the discussion proceeded from more general ones to questions that are specific to global competence brokering. These measures aimed at decreasing the reactivity of the measurement utilizing the mechanistic method, as described by Alasuutari (1995). The assumption behind the mechanistic method is that the information received will be least affected when the informant is given as little information as possible. To avoid any misconceptions, documentation of the interview situations was first sent to be checked by the interviewees before utilizing it in the empirical analysis.

3.2 Analysis of the empirical data

In this section, the results of the case analysis are presented. These results were reached through an inductive cross-analysis performed on the data that was collected for the empirical part of this study. The results of the analysis are arranged in an order that echoes the structure of the theory chapter. First the interviewees' reflections on open innovation and use of external capabilities are described. After this, the role of network relationships as facilitators of innovation is discussed. In conclusion, the views on the role of global intellectual capital brokers are presented from three different perspectives, including all levels of actors in the brokering process. A framework of the empirical analysis has been presented in Figure 13.

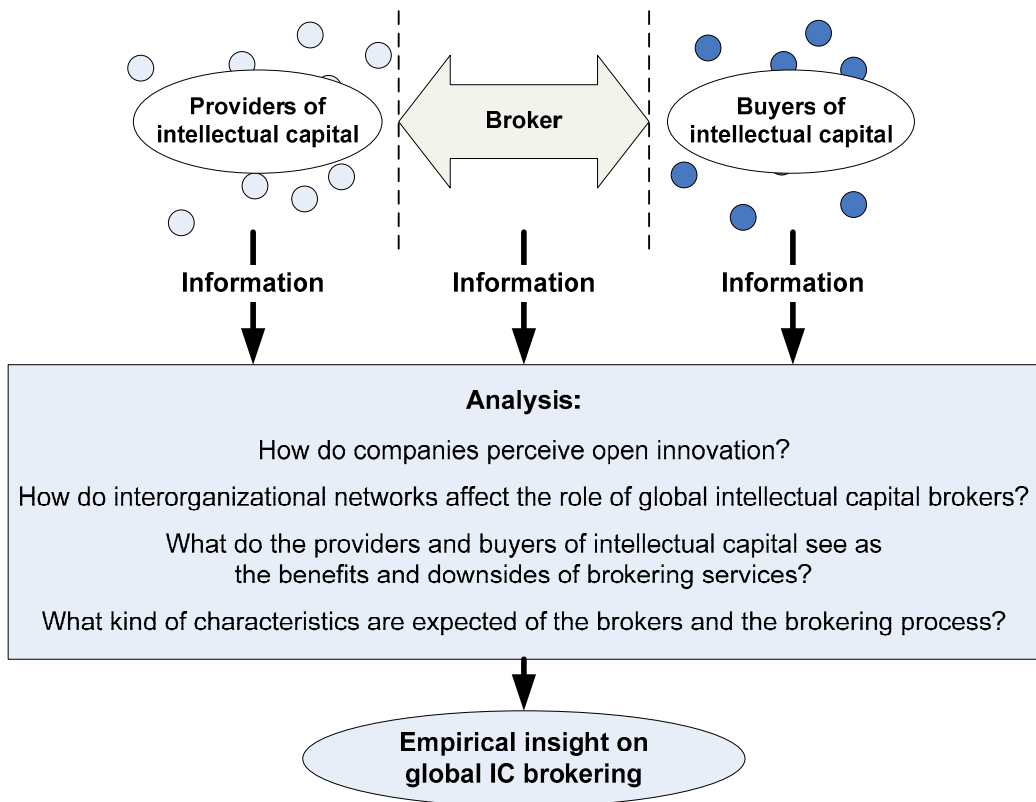


Figure 13. A framework of the empirical analysis.

3.2.1 Perceptions on open innovation

The interviewees unanimously agreed that external co-operation is crucial for the long-term survival of a company. Yet the term open innovation invoked a variety of reactions. Some respondents disregarded open innovation as hype; a branded phenomenon that will level out in a few years' time. However, the prevalent attitude towards open innovation was welcoming. It was considered important that this phenomenon, which has always existed, now has a name and has been brought into people's awareness.

But no matter if open innovation has become a buzzword, merely talking about it is not enough. It was argued that practices of open innovation in companies must be made explicit and measurable. There must be a management review

process behind the open innovation activities, otherwise they might be perceived as unimportant.

Collaboration was thought to be the key to successful innovation. Both external and internal input can be attracted through a collaborative approach, aiming at a win-win situation. Yet it was underlined that there is a difference between open innovation and public innovation. The competitive setting has not been changed by the rise of open innovation, and profitable growth was still seen as the primary objective of companies. It was clear that the interviewees had adopted Chesbrough's (2003b) view on open innovation as a tool for serving private interests. The collective perspective on open innovation, emphasized by Kuhlen (2006) and Piller (2003), was not shared by any of the respondents.

"It's all about profit-making."

Employing the practices of open innovation was believed to speed up the emergence of innovations and market entry. The respondents hoped that following the principles of open innovation would lead to new combinations of knowledge and the creation of new value propositions. Knowledge sharing in general was thought to be on the increase, and this was expected to make the markets more dynamic. However, companies need to be active to make the most of open innovation, and must be open to renew their business models.

"There is a danger that firms will continue doing the same things as they always have, even if they use open innovation practices. The real value comes from reinventing yourself."

Open innovation was perceived to be especially important in emerging fields, but was also expected to start spreading to more traditional industries, such as the automobile or the pharmaceutical sector. There was basically no doubt that the principles of open innovation already have had their breakthrough in the business world. Yet it was believed that a closed model of innovation could be suitable in some cases of sovereign market leaders who are ahead of the competitors in their core competence area.

"There truly is an open market for technology."

“Nobody can go alone in such emerging fields, I don’t see any other way than being totally open there. You just need to combine so many different types of knowledge to come up with new solutions.”

“If we’re the leading edge then we would more likely use the closed innovation model, we already have the best knowledge in the area. When you’re small and behind the pack you need an open model.”

Nevertheless, some of the interviewees pointed out that open innovation is not only about trading patents or technology. There are more opportunities for value creation than just selling and buying technology, for example in terms of user innovation or co-branding.

“You can do something special on the branding level, sometimes very diverse companies get together. It looks like it’s just brands working together, but you’re actually creating a new space where to innovate.”

Culture was seen as an important element for the success of open innovation, both on the global level and on a corporate level. Thinking globally, different cultures make it more difficult to collaborate. Cultural variety presents a challenge for open innovation especially when working across continents or within Europe, where a wide range of cultures are present. Collaboration was thought to be easier in areas that are culturally more uniform, such as the United States or Japan. From the point of view of individual firms, introducing the principles of open innovation is likely to require some changes in corporate culture, and the process of cultural change is never easy. Therefore, due attention must be paid to the introduction of open innovation methods, first internally and then externally. If the new culture is not fully accepted, there is a risk of NIH syndrome (see Katz & Allen 1997) – employees will start to resist any external input, because they fear that this will lead to downsizing their own internal R&D budget.

In regard to the relation between open innovation and internal innovation, it was emphasized that not all competences can be bought from the outside, and strong in-house knowledge is also required. Many respondents also warned that companies should not treat open innovation as a cost-saving technique. External collaboration can be very expensive, sometimes even more expensive than

developing the same knowledge internally. Risk management further increases the costs of open innovation. Companies are afraid that collaboration will bring along IPR risks and the possibility of information leakages. Preventing these takes a lot of time and effort, and makes the innovation process increasingly complex.

“You get into very lengthy negotiations which can hamper the speed of innovation. You also need a lot more people, for example lawyers must be involved all the time even though they don’t contribute to the innovation process in any way.”

On the whole the interviewees were more familiar with the inbound process of open innovation than the outbound process. Commercialization of the technologies and research results that were not utilized in-house was in general not very active or systematic. Some respondents mentioned that their companies were also active in this area, but most felt that they have not wanted to put too much effort into it because it is not their core business. However, most of the respondent expected to become more active in the field of outbound open innovation in the near future.

In general, the interviewees’ opinion on more open innovation processes was very positive, and these kinds of activities were expected to be on the increase in the future. Figure 14 summarizes the main findings on open innovation from the empirical data.

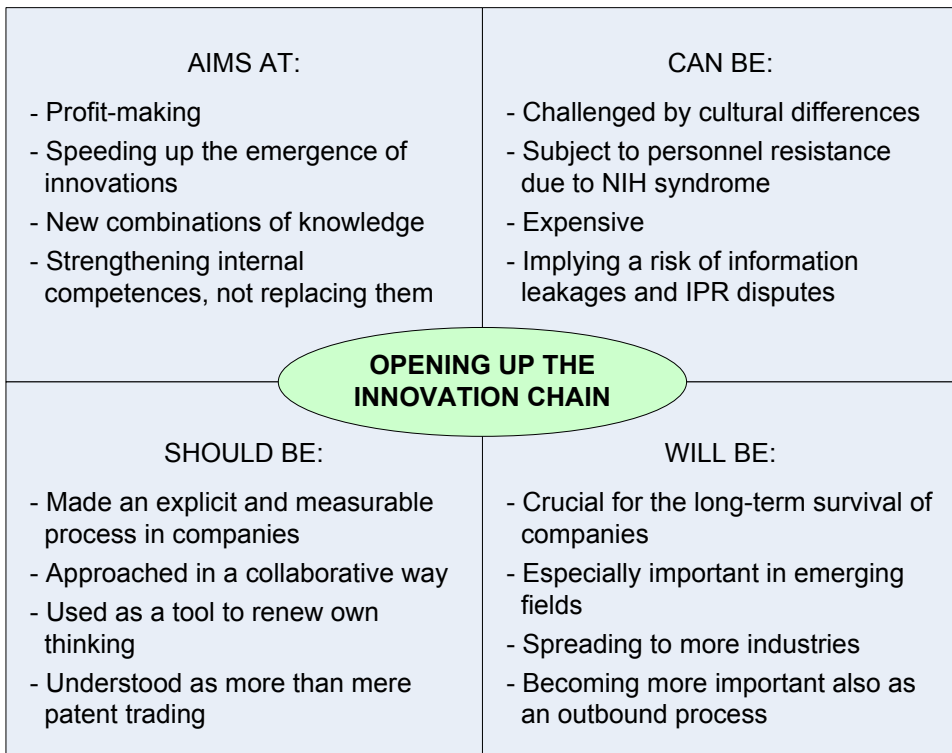


Figure 14. The interviewees' opinions on opening up the innovation process.

3.2.2 Networks as a source of innovation

The importance of network relationships and personal contacts could not have been emphasized more by most of the respondents. When talking about external input in the innovation process, it was considered important to have reliable partners with whom the focus is on long-term commitment and strategic co-operation. The activities that lead to new products and services were thought to be crucial for the future success of the company, and therefore any external collaboration in this area requires a high degree of trust towards the external party. There are always some risks involved in the creation of new innovations, so risk-sharing with the partner becomes important. However, this kind of risk-sharing behavior does not exist in transactional relationships, which is why most of the respondents stressed their preference for long-term collaboration.

“We concentrate on existing relationships. We only work with people that we are not threatened by, and we can absorb risk for these people.”

“There needs to be the right relationship in order to share information. If you buy in external capabilities there is always a risk that you don’t understand what you are buying. And it’s your brand that gets damaged if there are problems, it’s like commercial suicide.”

There were some contradictory opinions about the usefulness of belonging to different kinds of networks. Some interviewees were convinced that being involved in a network already brings value as such; you never know what kind of opportunities might emerge there. One respondent was more pessimistic towards network benefits, arguing that belonging to a network does not directly bring any results. However, here the focus was on formal networks, such as memberships of some associations. In regard to other types of networks, such as personal contact networks, none of the interviewees denied their significance.

To highlight some of the benefits of network relationships, the interviewees did not only mention them as an essential external resource, but also as a learning opportunity. It was considered important to utilize the chance to develop the company’s own competences through different kinds of partnerships. In an optimal situation a partnership would lead to a win-win situation, where the parties can combine their competences in a unique way. Most of these benefits would require an existing long-term relationship. However, building new – also informal – networks was also considered highly important, because it is through these kinds of cross-sector contacts that you might come up with completely novel ideas and establish co-operation in totally new areas.

It was recognized that networks do not just emerge automatically, but one needs to be active in establishing and managing network relationships. Some respondents felt that they would like to pay more attention to external relations, but are too pressed with internal problems, and therefore cannot afford allocating more time for network building. For big companies it might be somewhat easier to form networks than for small ones. Some interviewees thought that when their company has a good name in the global market, others will contact them directly in order to propose co-operation. Smaller companies seldom have this advantage; they need to build their own network right from scratch.

When making the comparison between using your personal network or buying a networking service from a broker, personal contacts were clearly preferred.

“Why do it with a broker when you yourself know whom to ask.”

However, there are also situations where your personal network is not adequate. In these cases the use of a broker was considered worth trying, even though the first choice would always be to use personal contacts. Some interviewees mentioned that brokers might also come in handy in formalizing a network of previously unknown parties. This way the broker, as a central node, could bring some rules for interaction in dispersed arms-length networks. Having these kinds of formalized rules might encourage participation in such transactional network relationships.

Figure 15 illustrates the characteristics of existing network relationships and external mediated networks as sourcing channels for intellectual capital. Although existing relationships were emphasized as the primary alternative by the interviewees, it must be noted that these two channels are totally different by nature, which renders any universal order of superiority irrelevant.

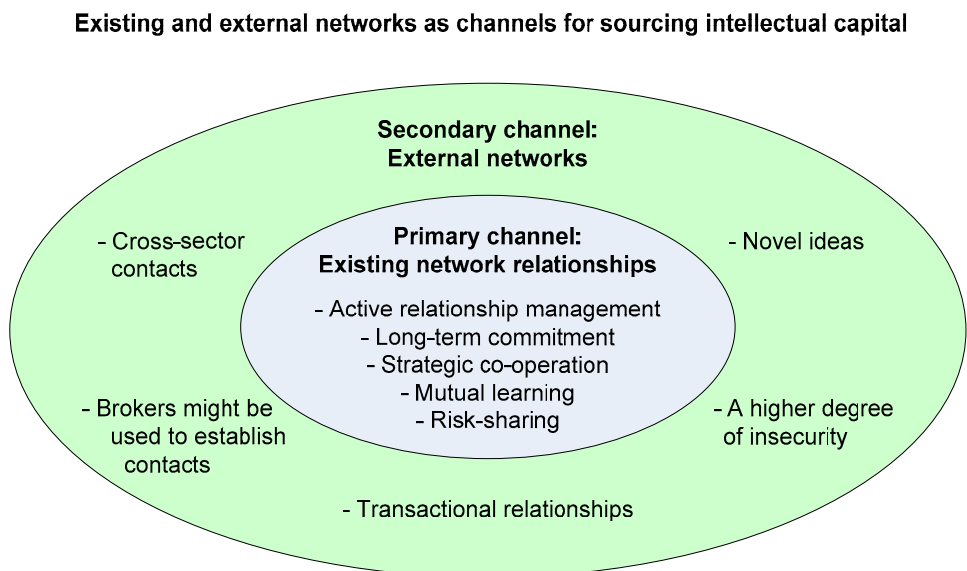


Figure 15. Existing and external networks as channels for sourcing intellectual capital.

3.2.3 The role of global intellectual capital brokers

In the following, the interviewees' opinions on global intellectual capital brokers are divided into three different perspectives. First, the view of the IC providers is discussed, describing the perceived benefits and downsides of using a broker from their angle. After this, the opposite perspective is taken, sketching the pros and cons from the point of view of the buyers. To conclude with, the focus is put on the broker. It is described how, according to the respondents, a global IC broker should be, and what kind of a process should be used to make such a service attractive to customers on both sides of the chain.

Intellectual capital providers' perspective

Using a broker gives the IC provider the possibility to access a much wider buyer network around the world, and reduces the time to market. It was generally believed that smaller companies are the ones who could benefit the most from using a brokering service when wanting to market their intellectual capital, because their own contact networks are very restricted. Nevertheless, some respondents noted that larger companies receive equivalent value when cross-industrial matching is concerned. A big company might have a very strong customer network in its own sector, but their possibilities to reach beyond the borders of the industry are often very limited. This is where a broker might help to find completely new interest groups and create new unobvious connections.

“You might have good technology that just doesn't fit your market. [...] Sometimes it might be used in some other area which you would never have thought of, even an old technology that has been sitting on the shelf for years could work, you never know.”

Brokers not only serve companies who wish to commercialize their technologies, but were also believed to provide a nice tool for universities, individual scientists, or hobbyists who wish to capitalize on their competences. The IC providers can thus be divided into two groups: proactive and reactive ones. Proactive IC providers are more often companies who put their competences on offer in the global marketplace. Reactive IC providers, on the other hand, react to demand from the buyer side. The reactive group largely consists of scientists and researchers.

When placing a technology to be sold through a broker, the providing party must be well aware of the value proposition of their technology. It is not possible to just throw technologies on the web and expect potential buyers to fight for them. It takes time and effort to formulate the description of the technology concerned, and understand what it could offer a potential buyer. It was testified, both by some companies and by brokers, that if you do not put enough effort into the process of selling the technology, the likelihood of finding a match through a broker is very low. Yet the investment of time and money needed to find a potential buyer is much lower when a broker is involved when compared to doing it on your own.

“You could spend one or two years just finding the right people to contact. And even if you would know the right company you might never find the right person.”

“Sometimes a company just won’t get in the door, whereas we as a broker could arrange a meeting with just one phone call.”

One clear benefit from a smaller IC provider’s point of view was the security given by a neutral third party. It was considered difficult to balance a deal between a small start-up company and a large multinational corporation, but using a broker as a mediator was thought to help with setting the expectations on both sides. However, even with a broker involved it was believed that a win-win situation was almost impossible to reach – the buyers were thought to win more in the process than the providers.

To list some of the risks felt by intellectual capital providers, many respondents complained about the feeling of insecurity when dealing with a broker. They cannot have any control over the broker, and they can never be entirely sure that there are no information leakages to competitors, or that the knowledge they provided is not passed further without them finding out about it. IC providers did not appreciate the principle of anonymity too much. They would like to know whom they are dealing with, who buys their technology, and for what purpose. The providers also emphasized the importance of getting feedback from the buyer. They clearly appreciated a more transparent brokering process, where anonymity would be broken at least at the stage when the deal is made.

There were also some doubts about a possible communication barrier, especially in the case of individual scientists and smaller companies. How could the brokering process be global if the parties from all over the world cannot communicate using a common language? The brokers' answer to these suspicions was the use of local intermediates as an extra link in the process. In the case where the IC provider and buyer do not understand each other, the broker would utilize its own network to find a local broker who would act as a mediator in the process, making sure that the flow of communication is not hindered by language barriers. Therefore, the principle of being a truly global marketplace is possible.

Intellectual capital buyers' perspective

Looking at the brokering service from the buyers' point of view, the interviewees easily identified a list of benefits: It's easy, fast, provides access to new networks, does not require too much of resources, and enables the use of specialized external search capacity. In other words, the buyers expected quick solutions with minor effort. The brokers, however, had a slightly more realistic view of the value created for the buyers. According to the brokers, the brokering service could offer all of the above and much more, but it does require significant involvement from the buyers' side. The buyers should not expect any results if they are not ready to put some effort into the search process themselves. A broker can facilitate the process, but not take over the responsibilities of the buyer in defining their needs.

Utilizing brokering services was thought to bring more flexibility to the business, because it makes it easier to find external resources. There is no need to specialize into everything internally if competences are easily available on the market. This reduces personnel costs and enables a more dynamic competence base. Brokers were considered most helpful in cases where the company had a well-defined problem or a specific need. In regard to the type of competence needs, the respondents felt that the brokering service could be most viable in product development types of problems where knowledge is likely to already exist. Using a broker was not seen as a solution to questions in the field of basic research, where it was thought better to develop the competence internally.

“The product developers have better uses for these services. If we in the basic research would need such a service, we would not have focused our research so well.”

As was already mentioned in the case of IC providers, the buyers also found brokers useful only if they were not able to use their own network. The opportunity to make cross-industry deals and unobvious connections through a broker was considered important. This could also be the case in emerging sectors where knowledge is fragmented into many small cells. If there are no established networks within the industry, a broker can be used to create them.

“If someone has a network that I don’t have I would like to use it. But it would not be my first choice. I think it is much more valuable to build your own network.”

The global approach enabled by the broker was considered significant, not only in terms of an increased number of potential IC providers, but also regarding the variety of solutions. People with a different cultural background might see a problem in a totally different light, and provide a solution that the buyer would never have expected. The global network thus brings additional value to the buyer due to the richness of cultural variety embedded in the network of IC providers.

Similar to the provider side, the IC buyers can also be divided into proactive and reactive categories. For the proactive ones, who define their intellectual capital needs and hire the broker to find them solutions, brokers can create value by getting into knowledge networks for them. There is a huge global resource in different kinds of researcher communities, and some of them could even be motivated to solve companies’ research problems for free. Many companies were actively forming relationships with universities and research institutes around the world to tap into this huge resource pool, but naturally the reach is much wider when using a broker whose core competence is to build these contact networks. Seeking solutions on a global scale was considered worthwhile even when there are no results – this would mean that the only way to acquire the needed competence is to develop it in-house.

“At least you know there’s nothing there. So you know you’re not building capabilities for nothing.”

Frequent use of brokering services was thought to increase the value gained from these services. Regular use was believed to lead to learning effects that would cut down the time and effort required for participating in the service process. For first-time users the yield of the process was not considered to be very high compared to the invested time and money. The low hit rate was considered a big minus – only a very small percentage of the competence seekers find a matching solution provider. The brokers have tried to restrict this uncertainty by selecting a success fee principle as their pricing strategy. Thus, the customers only pay when the brokering process has been successful and a match has been found.

Yet the brokering process always incurs some costs for the competence seeker. A lot of in-house knowledge is required in order to be able to define the specific need, and to test and understand the solutions offered. The broker does not give any guarantees in the process, so the provider of the intellectual capital is responsible for any potential defects. However, the respondents found that it is mostly the buyer that suffers if the acquired technology or knowledge was faulty. This emphasizes the importance of internal capabilities in order to be able to judge whether the quality of the provider is sufficient.

“There is always a risk that you don’t understand what you are buying. And it’s your brand that gets damaged. It’s like a commercial suicide.”

Some of the larger companies did appreciate the possibility to remain anonymous especially in the beginning of the process. They felt that the broker provided a barrier between them and the outside world, reducing noise generation. However, anonymity was not thought to remove the risk of information leakages, because there is no control over the broker. Therefore it was considered crucial to be able to trust the broker completely.

“The biggest risk is the middleman, you have no control of who will be looking at your data. They might pass it on to a competitor immediately, who knows.”

“There is less and less trust in this world.”

The internet was also thought to be a problematic element in the brokering process due to its public nature. Companies were afraid of contamination: They might receive some answers that they were not looking for, even some solutions that they were already working on themselves. This was believed to cause problems afterwards if they would publish such a technology, and the solution provider would start fighting for his rights. The brokers were less worried about these situations, because no confidential information is given in the brokering process before signing a non-disclosure agreement. Therefore the process was characterized as safe, and IPR disputes were not considered likely to emerge. As regards the danger of an overflow of information, which was mentioned by a couple of interviewees, the brokers were considered responsible for filtering the information and managing the quality of the leads provided.

Many respondents felt that it would require a significant cultural change in the company to start using brokering services. This would mean totally new processes in the innovation chain of the company, and was believed to encounter strong resistance especially in the beginning. However, all of the respondents either had tried an IC brokering service before or showed interest in using them. Exploration is a good term for summarizing the general attitude towards IC brokering – the expectations were not necessarily very high, but it was not considered smart to let the chance go by without trying.

“Some infrastructures are not open for open innovation. It’s not part of the culture. Changing a corporate culture is very very risky.”

“When people taste the benefit they will start using the brokers more. But first you need to make them try it.”

Characteristics of global intellectual capital brokers

When talking about the characteristics of global IC brokers, there was one word that clearly outweighed any other perspectives: Trust. It was considered to be of overriding importance that the broker is reliable and truly objective. Furthermore, brokers were expected to be professional in search activities and network building, and preferably skilled in the areas of technology that they were dealing with. It was not considered possible for a broker to add value as a facilitator without understanding the content that was being mediated. They were

presumed to focus on the quality and not on the quantity, so the filtering and evaluation process would demand an essential amount of competence.

Moreover, a global presence was considered important for a broker. It is not enough to have an online marketplace to become global. A broker needs to interact with people from different cultural backgrounds, which makes cultural awareness highly important.

Altogether the role of brokers raised a variety of opinions. On one hand brokers were characterized as a sign of inefficiency; in the ideal world there would be no role for middlemen. Nevertheless, they were thought to provide a valuable service and help facilitate interaction between previously unconnected parties. Intellectual capital brokers in particular were thought to be a new phenomenon, and therefore an interesting one.

“There is supposed to be an open market yet there is an absolute role for brokers because the system is not working optimally.”

“They are opportunistic, born of the modern era. They are doing what you would like to do but you cannot afford it.”

The brokers emphasized that they do not want to be seen as competitors to companies' own contact networks. The role of the broker was described to be complementary, not competitive. Even a professional broker, who is specialized in network building, could never achieve a fully comprehensive network. Therefore collaboration is important, and it is necessary for a broker to utilize other brokers' networks as well. Regional or industry-specific partners were considered to be essential to the brokering process, providing access to completely new networks.

“I'd use other brokers' networks as well, whatever network it takes. One shouldn't look at it as competition. There are enough deals to close for everyone.”

The process of global intellectual capital brokering

To describe an optimal brokering process, the respondents expected it to be simple, fast, efficient, incurring low costs and requiring low involvement. The

brokers confirmed to strive for efficiency, but wanted to emphasize that the customers should realize that a certain level of involvement will always be needed from their side as well. According to the brokers, a low-involvement process would only lead to low-quality results.

The role of the internet in the brokering process was considered to be critical. It speeds up the process, enables global access, and allows for efficient filtering. However, the internet is just the first step. Personal contact was regarded as absolutely necessary in the latter phases of the process; the respondents did not want to get involved in a totally faceless process without any interaction with the other party.

“The internet saves you a lot of time compared to flying around the world looking for the right people, this might take a couple of years. [...] But it’s not a replacement to negotiating a deal, the process cannot be carried out entirely online.”

In addition to the interaction of the connected parties, the involvement of the broker in the final phase of the negotiations was also found to be necessary. The brokers have observed that facilitating the interaction between the negotiating parties all the way until the deal is made has helped to increase the success rate. The broker was seen to balance the expectations on both sides, and help the parties work out some disagreements. Without the broker’s facilitative role the hit rate was believed to be much lower.

Even though an online marketplace was considered to be an important element of global IC brokering, there were some companies who were quite doubtful about publishing their data on the internet. According to the brokers there had been some cases where the customers did not want to utilize the online marketplace, but wanted to use the network connections of the broker in a less public way. This kind of an offline service was also considered valuable, albeit it would leave out the possibility for the most unobvious connections which might be established on the internet.

Some interviewees felt that the most difficult part in the process would be to bridge the gap between information and usability. Others were more concerned about potential violations of intellectual property rights or information leakages. These traps can only be avoided if the brokering process is thoroughly

characterized by professionalism and confidentiality. It is a matter of trust if the customer is ready to take these risks and explore the possibilities of global IC brokering.

“If the trust breaks down the entire open innovation breaks down.”

An integrated view on the role of global competence brokering

In Section 2.5 a theoretical model of global intellectual capital brokering was formed. In this section, the same phenomenon has been discussed from an empirical point of view, analysing how global IC brokering is perceived by actors on different levels of the process. A summary of these empirical findings is illustrated in Figure 16.

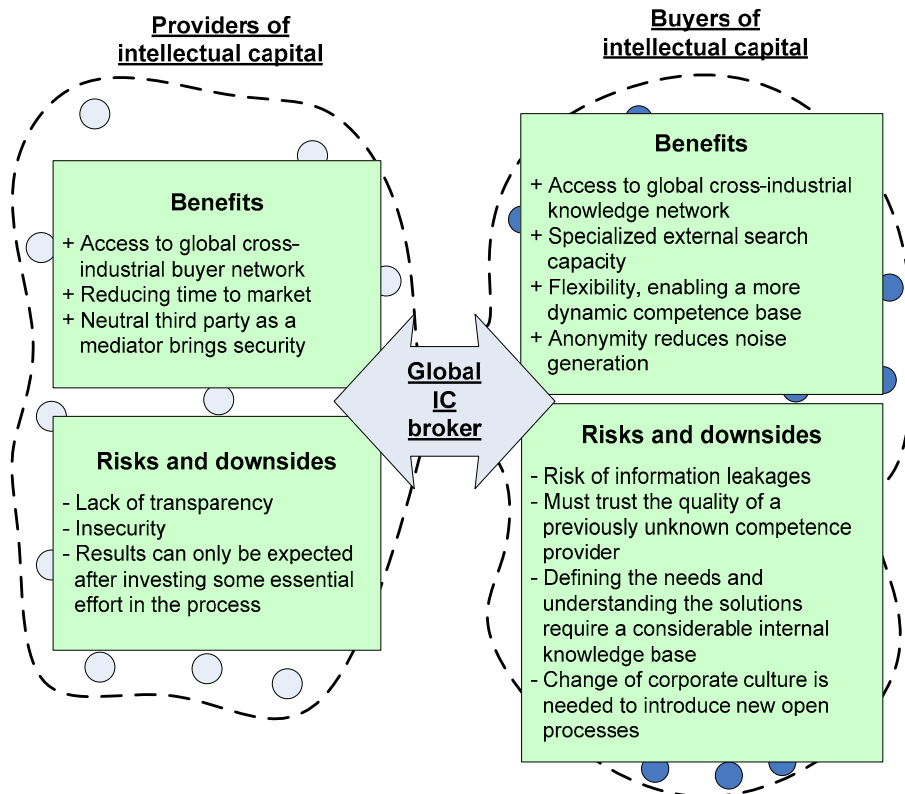


Figure 16. The pros and cons of global intellectual capital brokering as perceived from the providers' and buyers' point of view.

Naturally the benefits perceived by the customers depend on the quality of the service provided by the broker. Figure 17 below lists some of the most important characteristics that the respondents expected of well-qualified intellectual capital brokers.



Figure 17. Characteristics expected of a global intellectual capital broker.

The analysis of the empirical data provided plenty of new information on the phenomenon under study. The next step is to integrate the insight gained from the empirical analysis with the theoretical background discussed in Chapter 2. However, before providing any conclusions, an evaluation of the empirical part of the study is made in order to be able to judge the importance of the results of the study.

3.3 Evaluation of the empirical research material and its collection methods

There have been plenty of opinions on the optimal number of cases to be included in a case study, and therefore for example Patton (1990) argues that there are no rules for the sample size in qualitative research. Perry (1998) has compiled the views of several theorists, summarizing that the widest accepted range seems to fall between 2–4 as the minimum and 10–15 as the maximum number of cases. The selected number of cases in this study can thus be well justified. Moreover, as Patton (1990) comments: The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the

information-richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size.

In this study, the richness of information has been ensured by selecting case companies from all actor levels related to the phenomenon under scrutiny. The companies represent a variety of industries and nationalities – some of them can even be characterized as global. The interviewees selected also represent various functions within the companies. This can partly be seen as adding to the number of viewpoints in the empirical observation, because they all have a different relation to the phenomenon under study. Nevertheless, the range of functional viewpoints can also be argued to have limited the analytical generalizability, and consequently the validity of the research. The same goes for the fact that there was only one individual interviewed at most of the case organizations. However, as Alasuutari (1995) argues, in qualitative research the most important aspect of all is *local explanation*. This means that the model of explanation must fit in as neatly as possible with the empirical material of the study. To demonstrate the broader meaning and relevance of the result is a separate task. (Alasuutari 1995.)

Personal interviews were the primary method for data collection in this study. As Tuomi and Sarajärvi (2002) point out, the main benefit of interviews as a data collection method is their flexibility: The interviewer has the possibility to repeat a question, correct misunderstandings, clarify complex phrasings and expressions, and discuss with the informant. Patton (1990) describes the half-structured theme interview strategy used in this study as the *interview guide approach*. Here the topics and issues to be covered are specified in advance, but the interviewer decides the sequence and working of questions during the course of the interview. According to Patton, this approach has a number of strengths. The prepared outline increases the comprehensiveness of the data and makes data collection somewhat systematic for each respondent. Logical gaps in data can be anticipated and closed, and the interviews remain fairly conversational and situational. However, this interactive flexibility can also be seen as a downside, since it reduces the comparability of responses. (Patton 1990.)

Alasuutari (1995) provides more discussion on the consequences of this kind of interactivity. As he points out, an interview is always an interactive situation, where the interviewer and the situation influence the interviewee and by the same token the nature and reliability of the data collected. From the *factist*

perspective the interaction situation is defined as a potential source of error. In order to study aspects of interaction as sources of information rather than merely as potential sources of error, it is necessary to evaluate how the parties involved in the interaction have interpreted the situation. Adopting the *interaction perspective*, when drawing conclusions from the data, the researcher should consider it as a totality resulting from a particular kind of interaction situation, not as statements extracted from their context. (Alasuutari 1995.) This view has been taken into consideration when interpreting the empirical data in this study.

4. Contributions of the study

4.1 Theoretical implications

4.1.1 Perceptions on open innovation

The empirical investigation strongly supported the view of Moitra and Krishnamoorthy (2004), who suggested that enterprises are being forced to experiment with new and more effective approaches for innovation generation. This view was especially prevalent in terms of emergent industries and technologies. More distributed and open innovation models were believed to have permanently replaced the philosophy of controlling innovation. This backs up Yaklef's (2005) definition of the sixth-generation innovation process, extending Rothwell's (1994) continuum of dominant innovation process theories with a new paradigm, open innovation.

However, despite of the strong belief in more open processes, companies seem to want to have their feet on the ground, and do not resort to overstating their praise about open innovation. The introduction of more open processes was seen to require changes in corporate cultures, necessitating a very careful approach. It was also emphasized that external inputs do not diminish the importance of internal R&D, nor do they necessarily imply cost saving. Moreover, open processes can be very complex and bring along many kinds of risks, especially in terms of information leakages.

Although the term open innovation has been widely adapted in companies, the perspective is still primarily on the *inbound* flow of knowledge and technologies. The empirical understanding from this study confirms the view of Chesbrough and Crowther (2006), who estimate that the outbound-oriented concepts of open innovation have not been widely adopted yet.

In regard to the difference between open innovation and public innovation discussed in the theoretical part of this study, it is clear that Chesbrough's (2003a; 2003b) view of value creation and private interests is dominant in the business world. The empirical insight gained from this study gave no support to Piller's (2003) and Kuhlen's (2006) arguments about the collective dimension of

open innovation. The new paradigm was believed to facilitate value creation, not change the competitive setting into a collective one.

4.1.2 Practices of sourcing external input for innovation

Concerning the alternative methods of sourcing external input for innovation introduced in Section 2.2, the prevalent preference emerging from the case studies is that of long-term strategic partnering. The respondents shared the views of Cohen and Levinthal (1990) and Claude-Gaudillat and Quélin (2006), who argued that partnering provides a chance for mutual learning, cost- and risk-sharing, and diminishing uncertainty.

Many of the case companies had also explored the novel approaches of open source methods, user innovation and crowdsourcing. These were expected to hold potential for the future, but were still treated rather as a peculiarity than a major source of competitive advantage. Therefore the suggestion by Awazy and Desouza (2004), that the entire future of knowledge work might be manifested in how open source communities work, still seems very remote.

4.1.3 Networks as a source of innovation

The principles of the industrial network perspective (e.g. Håkansson & Snehota 1989; Cheung & Turnbull 1998; Håkansson & Ford 2002; Gadde et al. 2003) had been strongly internalized by the representatives of the case organizations in this study. In addition to many other benefits, network relationships were intensely emphasized as the most important channel of both inbound and outbound open innovation. Yet it was understood that network development requires plenty of investments (Johanson & Mattsson 1988; Möller & Halinen 1999), and one firm's opportunities to build relationships are always limited.

As a result of the resource limitations on network building, companies were inclined to share Helander's (2004) view that value can also be created in networks through more short-term and transactional exchange relationships. This enables a global approach, where a much wider network of potential contacts becomes available. Especially cross-industry contacts outside a company's own

relationship network were considered highly beneficial. The interest towards wider and looser networks pushes companies to work through mediators, or as Dubois (1998) phrases it, through actors who are knowledgeable about the network.

Global intellectual capital brokers are one type of these mediators, capitalizing on the *value network* model introduced by Stabell and Fjeldstad (1998). Brokers are believed to be able to act as a central node in dispersed arms-length networks, formalizing the interaction between previously unknown parties. They are considered especially beneficial in situations where the company's own relationship network is not sufficient, encouraging and facilitating more transactional relationships. The role of brokers is believed to be emphasized in emergent, dynamic industries, where knowledge has been fragmented into small distant cells. Table 5 illustrates the circumstances in which companies might choose to utilize a broker instead of clinging to their existing relationship network.

Table 5. Preferred channel of finding contacts for open innovation processes under different circumstances.

Circumstance parameters	Preferred channel	Existing relationship network	Global IC brokers
Industry		Mature	Emergent
Environment		Stable	Dynamic
Knowledge cells		Networked	Fragmented
Prevalent thinking		Long-term	Short-term
Relationships		Strategic	Transactional
Scope		Within-industry	Cross-industry
Approach to risks		Risk-sharing	Uncertainty

It must be noted that not all parameters have to hold true simultaneously, but they must be considered separately. For example a well-networked company in a mature industry might find it advantageous to utilize the services of a broker when they wish to look for cross-industry contacts.

4.1.4 Global intellectual capital brokers as value creators

As Prahalad and Ramaswamy (2003) suggest, firms themselves are no longer the locus of competence, but they have access to competences that are spread across an extended network. Vanhaverbeke (2006) takes this view further, stating that companies are increasingly *forced* to establish ties in broader networks to develop or absorb new technologies, commercialize new products or simply to stay in touch with the latest technological developments. Based on the results of this study, companies do share these views. Moreover, they consider brokers to be helpful when trying to establish these unobvious ties.

Brokers, as defined by Marsden (1982), facilitate transactions between actors who lack access to or trust in one another. In the case of global intellectual capital brokers this definition fully applies. Companies underlined that the services of a broker are needed only when access to the other party is missing, otherwise they would establish the contact themselves. In regard to the lack of trust, a broker was not believed to remove the uncertainty between the parties, but to formalize the process of interaction and thus bring additional stability.

The empirical insight from this study raised no doubt about the fact that global IC brokering can facilitate the emergence of innovations. Brokering services are an efficient way of utilizing external networks as a resource pool, which has been proven to be critical for successful innovation (Maula et al. 2006; Simard & West 2006). The intermediate markets of innovation (Arora et al. 2002; Sakkab 2002; Chesbrough 2006) were considered to be growing in importance and permeating through different industries. Representatives of the case organizations concurred with the opinion that innovation is largely about combining knowledge in new ways (Dodgson et al. 2005), which can be achieved with the help of a broker.

Figure 18 crystallizes the basic value creation model of global IC brokering: facilitating the emergence of innovations through by building unobvious contacts between previously unconnected parties. The flow of monetary rewards in exchange for the provided intellectual capital shows that global IC brokering is not based on collective incentives (see Kuhlen 2006) like open source models. Global IC brokering can be identified as a hybrid model of innovation (Ulhøi 2004), promoting open processes while emphasizing private interests.

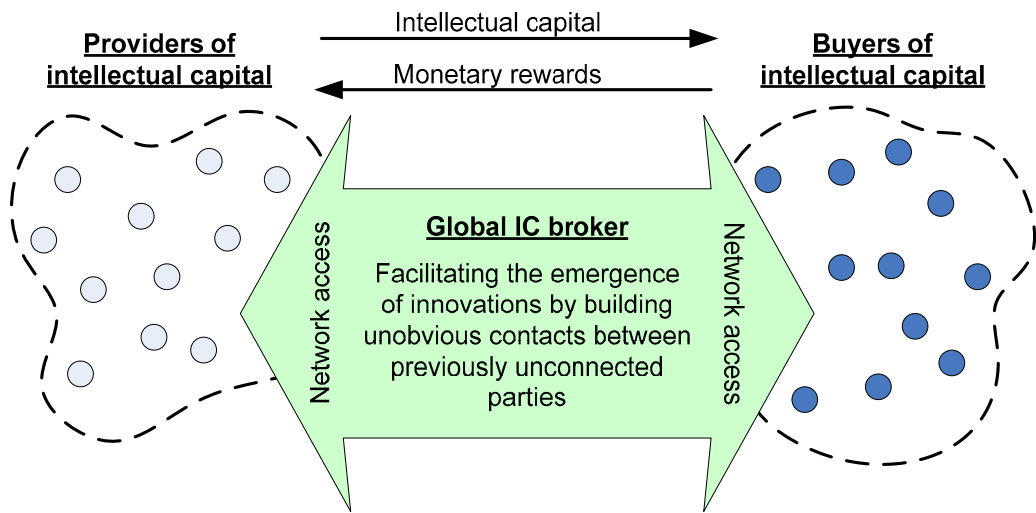


Figure 18. The basic value creation model of global intellectual capital brokering.

However, the value creation potential of a broker does not apply to the same degree in all circumstances, as can be seen from Table 5 above. Furthermore, the type of value creation also depends on the role of the customer. Four different customer roles clearly emerge from this study, depending on whether they take initiative, and whether they wish to sell or buy intellectual capital. Figure 19 presents how brokers can create value for these four types of customers.

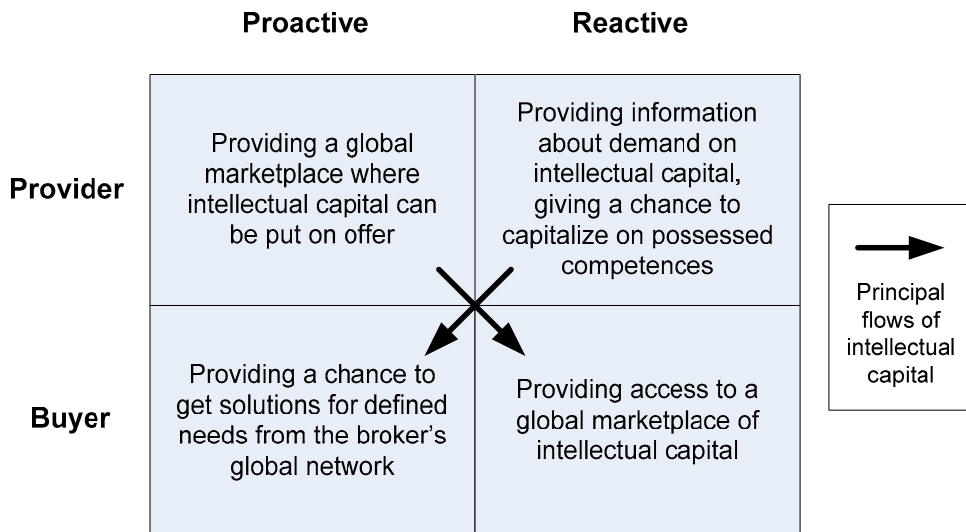


Figure 19. How global IC brokers create value to different types of customers.

As can be seen from Figure 19, most matches are made between proactive providers and reactive sellers, and similarly between proactive sellers and reactive providers. The basis for value creation is clearly different in all four cases, which implies that the service processes experienced by different types of customers are not uniform.

4.2 Managerial implications

The results of this study suggest that the full potential of open innovation has not been exploited in either the inbound or the outbound direction. Companies see much more opportunities in the future, for example in terms of more dynamic processes, reinventing value chains, co-branding and user innovation. Open-mindedness and creativity are called for in order to realize the full potential of new distributed innovation processes, leading to revolutionary development that has been encouraged by Normann and Ramírez (1993) and Kim and Mauborgne (2005). The requirement for these new approaches poses a big challenge to decision-makers in companies.

Nevertheless, the shift towards more open processes has to be managed with care in order to avoid cultural clashes and the Not Invented Here (NIH) syndrome (see Katz & Allen 1997). The case study results highlighted the opinion that practices of open innovation must be made explicit and measurable in companies. Otherwise they would face the risk of being perceived unimportant by the personnel.

Global intellectual capital brokering, as one form of open innovation, does offer companies plenty of opportunities for new ways of value creation. It does not replace personal networks or diminish their importance, but can complement them significantly – especially under certain circumstances, as presented in Table 5. The internet is a decisive enabling factor behind the business model of global IC brokers, having several positive impacts as listed by Verona et al. (2006). However, what Verona et al. do not emphasize, the internet is just the first step in the brokering process, and personal contact is required afterwards. Therefore, companies should not imagine brokering to be a rapid low-involvement process, even if it does not demand as much effort as searching for the other party without the broker. Table 6 lists additional positive and negative implications of global IC brokering services as perceived by the customers at both ends of the process. These implications should be taken into consideration when making decisions about using services of a global intellectual capital broker.

Table 6. Benefits and risks of global IC brokering for the providers and buyers of intellectual capital.

	Findings	Related research results
IC providers	Benefits	
	- Access to global cross-industrial buyer network, facilitated by the internet	- Chesbrough (2003a; 2003b), Dodgson et al. (2005), Sakkab (2002), Sawhney et al. (2003)
	- Reducing time to market	- Chesbrough (2003a; 2003b), Fine (1998)
	- Neutral third party as a mediator brings security	- Marsden (1982)
	Risks and downsides	
- Lack of transparency	- Ogawa & Piller (2006), Sawhney & Prandelli (2000)	
- Insecurity	- Ford et al. (1998), Kalakota & Konsynski (2000)	
- Results can only be expected after investing essential effort in the process		

Table 6. (cont.)

	Findings	Related results
IC buyers	<p>Benefits</p> <ul style="list-style-type: none"> - Access to global cross-industrial knowledge network, facilitated by the internet - Specialized external search capacity - Flexibility, enabling a more dynamic competence base - Anonymity reduces noise generation <p>Risks and downsides</p> <ul style="list-style-type: none"> - Risk of information leakages and IPR disputes - Must trust the quality of a previously unknown competence provider, no risk-sharing - Defining the needs and understanding the solutions require a considerable internal knowledge base and essential effort - Change of corporate culture is needed to introduce new open processes, risk of NIH syndrome 	<ul style="list-style-type: none"> - Arora et al. (2002), Awazy & Desouza (2004), Benkler (2002), Bowonder et al. (2005), Chesbrough (2003a; 2003b), Claude-Gaudillat & Quélin (2004), Dodgson (2000), Dodgson et al. (2005), Fowles & Clark (2005), Hargadon & Sutton (1997), Howe (2006), Huston & Sakkab (2006), Kodama (2005), Maula et al. (2006), Prahalad & Ramaswamy (2003), Quinn (1999; 2000), Reichwald & Piller (2006), Rigby & Zook (2002), Sakkab (2002), Sawhney et al. (2003), Simard & West (2006), Verona et al. (2006), West et al. (2006) - Hargadon & Sutton (1997) - Huston & Sakkab (2006), Moitra & Krishnamoorthy (2004) - Fitzpatrick & DiLullo (2005) - Claude-Gaudillat & Quélin (2006) - Chatterji (1996), Chatterji & Manuel (1993), Chesbrough & Crowther (2006), Hitt et al. (1990; 1991), Holmes & Glass (2004), Leavy (2004), Prahalad & Hamel (1990), Rosenberg (1994) - Chatterji & Manuel (1993), Katz & Allen (1997)

4.3 Limitations of the study

Qualitative studies which use documented interview situations as the research data are always problematic in terms of reliability, which means the repeatability of the measurement results (Hirsjärvi et al. 2001). An interview is always a unique situation, influenced by the interaction between the interviewer and the interviewee. Nevertheless, several methods have been employed to strengthen

the reliability of this study. The congruence of the study has been improved by utilizing both primary and secondary sources of information. The aim has been to ensure the accuracy of the instrument by discussing the same questions from different angles during the interviews, and to improve the objectivity of the instrument by reviewing previous research results on related topics. Moreover, the research practices have been enlightened by carefully describing the data collection process and providing details about the conducted interviews (Appendix 1).

There are also some limitations in terms of the validity of the study, signifying the ability of the research method to measure what was supposed to be measured (Hirsjärvi et al. 2001). The construct validity of this study has been improved by carefully planning the implementation of the study. Consulting several professionals and academicians about the subject before the implementation of the empirical part of the study has helped to design the approach towards the phenomenon under study. The documented interviews were sent to be checked by the interviewees themselves in order to avoid any potential misconceptions. The conclusions drawn from the empirical data have been supported by presenting some direct quotes from the interviews. Several viewpoints have been included in both the theoretical and the empirical part of this study to improve triangulation. However, it was not possible to improve the investigator or analyst triangulation (Denzin 1978), because all the interviews were conducted and the findings reviewed only by one individual.

As was already mentioned in the evaluation of the empirical part of the study in Section 3.3, the restricted number of conducted interviews might have influenced the results of the study. Individuals representing different functions in the organization might have a different view on the phenomenon under study, so the validity of the empirical data could have been improved by interviewing several individuals from each case organization. This, however, was not possible in all of the cases due to practical reasons. Furthermore, the aim was to select a wide range of case organizations from different industries, representing different roles in the process of global capability brokering. Large companies from various sectors were well represented, as well as individual scientists and inventors, but there could have been more focus on small and medium-sized enterprises. Moreover, the case organizations were largely European-based,

which could partly have affected the findings. A broader perspective could have been provided by including some cases for example from Asia or Latin America.

Choosing an emergent phenomenon as a topic of a study certainly makes both the research process and the implications of the study more interesting. Yet the novelty value also introduces some challenges during the process of the study. There are plenty of new and potentially ambiguous concepts involved, and it might prove difficult to find a common understanding concerning these concepts among the informants. Personal interviews as a data collection method have partly helped to overcome any misunderstandings in this respect. Nevertheless, due to the lack of previous research on the phenomenon, a large part of the terminology utilized in this study has been subjectively selected by the researcher, which might be seen as a limitation. However, all terminological choices have been carefully justified in the theoretical part of this study, clarifying the approach to certain concepts, and explaining the reasons behind some terminological decisions.

4.4 Suggestions for further research

During the implementation of this study it became clear that there is not much knowledge available about *outbound* open innovation practices, as already noted by Chesbrough and Crowther (2006). This view thus opens up plenty of future research opportunities. More specifically, it would be interesting to explore how the size of the company, geographic and cultural environment, or the characteristics of the industry affect companies' open innovation practices, both outbound and inbound.

Anonymity was an issue that raised strong feelings among the interviewees of this study. It was mainly considered positive from the point of view of larger corporations, providing a barrier between them and the rest of the world, whereas individual scientists and small enterprises called for more transparency. However, large companies also identified several risks regarding anonymity. Little research has been done on the topic so far, and the role of anonymity in business processes – especially those carried out through an intermediate or on the internet – provides a fruitful opportunity for future studies.

This study concentrated on observing global intellectual capital brokering as a holistic phenomenon, and understanding how value is created in the brokering process. Yet it must be noted that the utilization of external input in the innovation process is not restricted to acquiring new intellectual capital. As Chatterji and Manuel (1993) argue, the primary locus of problems is not in finding and acquiring technology, but in successfully nurturing and exploiting it after it has been acquired. Cohen and Levinthal (1990) talk about the *absorptive capacity* of a firm, referring to its ability to recognize the value of new, external information, assimilate it, and apply it to commercial ends. This absorptive capacity forms an interesting point of view to the benefits of global IC brokering. Are companies fully able to utilize the intellectual capital that they acquire through the broker, and what kind of cultural and operational changes are required to make the most of brokering services?

In general, more open innovation processes are an emerging phenomenon offering a variety of nearly untouched research topics. This study only scratched the surface of such phenomena as *crowdsourcing* and mediated user innovation communities. These topics, among other forms of open innovation, will hopefully find their place on the research agenda in the near future.

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Appendix 1: List of the half-structured theme interviews conducted for this study

Foundation for Finnish Inventions

Industry: Consultancy
Interviewee: Sami Mäkinen, Sales Manager
Location: Espoo, Finland

GlaxoSmithKline

Industry: Pharmaceutical
Interviewee: Phil Litherland, Technical Director
Location: London, UK

Philips Research

Industry: Research (Electronics)
Interviewee: Ferrie Aalders, Senior Director Business Excellence
Location: Eindhoven, The Netherlands

Shell

Industry: Energy and petrochemical
Interviewee: Dave McCormick, Group Strategy; Leo Roodhart, Vice President GameChanger Group
Location: The Hague, The Netherlands

TeliaSonera

Industry: Telecommunications
Interviewee: Juha Jernberg, Senior Development Manager, Product & Service Development
Location: Oulu, Finland

TNO

Industry: Research and consultancy
Interviewee: John Hoogerwerf, Patents and Licensing Director
Location: Delft, The Netherlands

Unilever

Industry: Foods, health and personal care
Interviewee: Graham Cross, Collaborative Innovation Director
Location: Rotterdam, The Netherlands

University of Turku, Institute of Biomedicine

Industry: Research (Biotechnology)
Interviewee: Adolfo Rivero-Müller, Postdoctoral Fellow
Location: Turku, Finland

VTT Technical Research Centre of Finland

Industry: Research
Interviewee: Jukka Jämsä, Business Development Manager,
Ventures
Location: Espoo, Finland

Yet2.com

Industry: Technology Transfer
Interviewee: Emma Hughes, European Director
Location: London, UK

List of other individuals interviewed or consulted for this study

Prof. Pekka Abrahamsson, VTT Technical Research Centre of Finland
Petteri Alahuhta, Technology Manager, VTT Technical Research Centre of Finland
Prof. Harri Haapasalo, University of Oulu
Prof. Lars Bo Jeppesen, Copenhagen Business School
Petri Kalliokoski, Vice President of Innovation, VTT Technical Research Centre of Finland
Mika Naumanen, Business Development Manager, Ventures, VTT Technical Research Centre of Finland
Prof. Göran Roos, ICS Intellectual Capital Services
Dr. Ammon Salter, Tanaka Business School, Imperial College London
Prof. Juhani Warsta, University of Oulu



Author(s) Törrö, Maaretta		
Title Global intellectual capital brokering Facilitating the emergence of innovations through network mediation		
Abstract <p>The market for intellectual capital has become global. Ideas, knowledge, and technology are now flowing more freely than ever as companies are opening up their processes in the spirit of open innovation. Simultaneously, firms are being increasingly forced to utilize new external channels to gain input for their innovation process. This development has led to the emergence of intermediate actors who facilitate transactions on intellectual capital.</p> <p>This study concentrates on one type of these intermediaries, <i>global intellectual capital (IC) brokers</i>. These brokers act as mediators between previously unconnected parties, providing their customers access to a global pool of providers and buyers of intellectual capital, partly enabled by the internet. This study aims at building a holistic picture of the phenomenon of global intellectual capital brokering. The ways in which global IC brokers create value for their customers and facilitate the emergence of innovations are explored.</p> <p>The open innovation paradigm provides the principal theoretical basis for this study. Furthermore, the phenomenon is observed from the perspective of industrial network theory, in order to understand how interorganizational networks affect the role of global IC brokering. Empirical insight into the topic is gained through a case study, where the views of all actors in the brokering process – the providers, mediators, and buyers of intellectual capital – are analyzed. The observed cases represent a variety of industries, cultural backgrounds, and company sizes, ranging from individual scientists to multinational corporations.</p> <p>The main findings of the study imply that global intellectual capital brokers do facilitate the emergence of innovations by building unobvious contacts between previously unconnected parties. The transactional contacts established by the broker do not diminish the importance of long-term strategic relationships, but complete them. Brokering services are especially beneficial in emerging industries where knowledge cells are fragmented globally, and in terms of cross-industrial contacts. The short-term approach brings along a high degree of uncertainty, but the opportunity to gain access to new networks outweighs the risks.</p> <p>The study also reveals in which ways global IC brokering creates value for different types of customers, including both proactive and reactive sellers and buyers of intellectual capital. Furthermore, positive and negative implications of the brokering service for the customers on both sides are listed, helping corporate decision-makers to better understand the phenomenon.</p> <p>Though this study provides substantial new contributions to the knowledge of open innovation practices and the intermediate markets for innovation, there are still plenty of fruitful research topics available in the area. Some suggestions for a future research agenda are thus provided at the end of this publication.</p>		
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This publication draws attention to the intermediate markets for innovation - a mechanism that facilitates transactions on intellectual capital. Global intellectual capital brokers are one type of these intermediaries, acting as network mediators between previously unconnected parties, and fostering the cross-industrial transfer of ideas, knowledge, and technologies. This study builds a holistic picture on global intellectual capital brokering, exploring how the brokers create value to their customers and facilitate the emergence of innovations.

The study enriches the theoretical base of open innovation by observing it through a network perspective. Components from several related research streams are integrated to form a model of global intellectual capital brokering, taking all actors in the brokering process into consideration. The multifaceted theoretical background and the empirical case study material together provide a sound approach for better understanding this emergent phenomenon.

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