DATING FOR INNOVATION

Recognizing and creating opportunities in fluid environments through collaborative interorganizational relationships.

Cassandra Marshall

AKADEMISK AVHANDLING

Som för avläggande av ekonomie doktorsexamen vid Handelshögskolan i Stockholm framläggs för offentlig granskning fredagen den 17 december 2004, klockan 13.00 i sal Torsten, Handelshögskolan Sveavägen 65.

DATING FOR INNOVATION

Recognizing and creating opportunities in fluid environments through collaborative interorganizational relationships

Cassandra Marshall
The FENIX Research Program
Stockholm School of Economics

Abstract

Metaphors embody our sense of what we see and interpret as happening. *Dating* is a metaphor, and words like mingle, movement, change, and dynamism apply to it. In this thesis, the dating metaphor serves the purpose of describing interorganizational innovation initiatives in fluid conditions. It invites us to consider how an established organization is, over time, challenged to design and redesign the subject of collaboration, the way they collaborate, and with whom they collaborate.

Both practice and theory present good reason to believe that collaborative interorganizational relationships have become particularly important for innovation and new product development in industries characterized by rapid technological change and dynamic competition. Even though collaboration across organizational boundaries represents an important change in the way companies innovate and develop new products (services and processes), it appears as if the process and practical steps of such arrangements are scantly explored.

This thesis addresses this gap by empirically studying a focal company's attempts to bring new opportunities into the world through collaborative interorganizational relationships under conditions marked by fluid change. A diverse set of research methods ranging from an insider action research approach to more conventional case study methods were applied to shed light on contingencies that may play a role in influencing the process and practical steps.

The result suggests an explorative logic and process, where the partners make use of interorganizational relationships as a means to explore the knowledge necessary for creating, recognizing, and, eventually, developing future opportunities. Not only interest and continued motivation, but also calculated costs and perceived risks, were thus outcomes of the collaboration rather than prescribed beforehand. Furthermore, the empirical findings suggest that corporate entrepreneurs at lower levels in the organization have a more significant influence than previously assumed. From a general point of view, these results imply that parts of the process can be facilitated, but not all initiatives or activities can be directed. Managers are thus challenged to reflect on how to productively deal with interorganizational innovation activities without adapting a classical linear and/or hierarchical monitoring of interorganizational innovation initiatives.

Keywords: Innovation, New product development, Collaborative interorganizational relationship, Corporate entrepreneurship, Insider action research, Telecommunications industry

DATING FOR INNOVATION

Recognizing and creating opportunities in fluid environments through collaborative interorganizational relationships.

STOCKHOLM SCHOOL
OF ECONOMICS
HANDELSHÖGSKOLAN I STOCKHOLM

EFI, The Economic Research Institute

EFI Mission
EFI, the Economic Research Institute at the Stockholm School of Economics, is a scientific institution which works independently of economic, political and sectional interests. It conducts theoretical and empirical research in the management and economic sciences, including selected related disciplines. The Institute encourages and assists in the publication and distribution of its research findings and is also involved in the doctoral education at the Stockholm School of Economics. At EFI, the researchers select their projects based on the need for theoretical or practical development of a research domain, on methodological interests, and on the generality of a problem.

Research Organization
The research activities at the Institute are organized in 21 Research Centers within eight Research Areas. Center Directors are professors at the Stockholm School of Economics.

ORGANIZATION AND MANAGEMENT	
Management and Organisation (A)	Prof Sven-Erik Sjöstrand
Center for Ethics and Economics (CEE)	Adj Prof Hans de Geer
Center for Entrepreneurship and Business Creation (E)	Prof Carin Holmquist
Public Management (F)	Prof Nils Brunsson
Information Management (I)	Prof Mats Lundeberg
Center for People and Organization (PMO)	Prof Jan Löwstedt
Center for Innovation and Operations Management (T)	Prof Christer Karlsson
ECONOMIC PSYCHOLOGY	
Center for Risk Research (CFR)	Prof Lennart Sjöberg
Economic Psychology (P)	Prof Guje Sevón
MARKETING	
Center for Consumer Marketing (CCM)	Acting Prof Magnus Söderlund
Center for Information and Communication Research (CIC)	Adj Prof Bertil Thorngren
Marketing, Distribution and Industrial Dynamics (D)	Prof Björn Axelsson
ACCOUNTING, CONTROL AND CORPORATE FINANCE	
Accounting and Managerial Finance (B)	Prof Johnny Lind
Center for Financial Analysis and Managerial Economics in Accounting (BFAC)	Prof Kenth Skogsvik
FINANCE	
Finance (FI)	Prof Clas Bergström
ECONOMICS	
Center for Health Economics (CHE)	Prof Bengt Jönsson
International Economics and Geography (IEG)	Prof Mats Lundahl
Economics (S)	Prof Lars Bergman
ECONOMIC STATISTICS	
Economic Statistics (ES)	Prof Anders Westlund
LAW	
Law (RV)	Prof Erik Nerep
Center for Tax Law	Prof Bertil Wiman

Chair of the Board: Professor Carin Holmquist *Director:* Associate Professor Filip Wijkström

Address
EFI, Box 6501, SE-113 83 Stockholm, Sweden • Homepage: www.hhs.se/efi/
Telephone: +46(0)8-736 90 00 • Fax: +46(0)8-31 62 70 • E-mail efi@hhs.se

DATING FOR INNOVATION

Recognizing and creating opportunities in fluid environments through collaborative interorganizational relationships.

Cassandra Marshall

STOCKHOLM SCHOOL
OF ECONOMICS
HANDELSHÖGSKOLAN I STOCKHOLM

EFI, The Economic Research Institute

Dissertation for the Degree of Doctor of Philosophy, Ph.D.
Stockholm School of Economics 2004

ISBN nr 91-7258-663-X

Keywords:

Innovation

New product development

Collaborative interorganizational relationship

Corporate entrepreneurship

Insider action research

Telecommunications industry

Printed by:

Elanders Gotab, Stockholm 2004

Distributed by:

EFI, The Economic Research Institute

Stockholm School of Economics

P.O. Box 6501, SE 113 83 Stockholm, Sweden

www.hhs.se/efi

To Mikael

PREFACE

The research presented in this report is submitted as a doctoral thesis at the Stockholm School of Economics. The work has been carried out within the framework and approach to collaborative research of the FENIX Research Program attached to the Institute for Management of Innovation and Technology (IMIT). This research program was founded in 1997 by Chalmers University of Technology, the Stockholm School of Economics, the Institute for Management of Innovation and Technology, AstraZeneca, Ericsson, Telia, Volvo, and the Foundation for Knowledge and Competence Development.

Our warm thanks go to the sponsors of FENIX. The companies associated with FENIX, the Foundation for Knowledge and Competence Development, and Vinnova have provided generous funding to support the research over the years. Last but not least, we must recognize the managers and employees of TelCo. This research could not have been undertaken without the empirical material and experience they so willingly shared.

As usual, the author has been entirely free to conduct and present her research as she saw fit; as an expression of her own ideas.

Stockholm, November 2004

Niclas Adler
Director of the Fenix Research Program

Bengt Stymne
Professor, Stockholm School of Economics

ACKNOWLEDGEMENTS

This thesis lists only one author. However, there are many people that have taken part in the work who deserve great thanks!

First, the studies presented in this thesis could not have been undertaken without my fellow colleagues at TelCo and representatives at the partner companies. With them I learned what was at stake in the somewhat confusing context of collaborative interorganizational relationships. I would gladly thank them individually were it not for my commitment to maintain the confidentiality of all our discussions and interviews.

I owe an intellectual debt to Bengt Stymne, Horst Hart and Mats Lundqvist who formed the thesis committee. Thanks to Bengt and his keen eye as regards theory and methodology, but also for his great curiosity in what happens in organizations. Thanks to Horst, my patient tutor, who has been a companion to my thoughts in years of reflection and searching conversation so that, eventually, the idea and research questions were given a definition. Moreover, I will be forever grateful for Horst's support at my first conference. Thanks to Mats who entered the thesis committee quite recently. He admirably entered into the ongoing discussion with knowledge and understanding of the subject that, without a doubt, have improved this thesis.

Thanks to Mats, Robert, Peter and Tommy in the Genesis project, a journey and exploration of much that was inwardly felt but still unnamed. Eventually, we managed to write the words for our thoughts. I also had the good fortune to write a paper together with Blanche Segrestin. She clearly brought a fresh and creative view into the analysis, which I believe improved the conclusions presented in this thesis.

In preparing this thesis I am indebted to many other scholars and colleagues too numerous to name for their valuable ideas and feedback on tentative results along the research journey. However, without the FENIX Research Program, this research journey would never have started. I was lucky to meet and work with a great team of people. Thank you Niclas Adler, Flemming Norrgren, Sven Kylén (I believe I still owe you a dinner) and Michael Eriksson. Thank you Armand Hatchuel and Rami Shani. Thank you my fellow PhD students, Golaleh, Jan, Jon,

Jonas, Lotta, Peter, Robert, Sanne, Tommy and Ulf. Thank you my colleagues in Stockholm, Andreas, Fredrik, Gunnar, Hans, Håkan, Lin, Ragnar and Robin.

A special *thank you* goes to Prof. Christer Olofsson for his review and comments when opposing the draft version of this thesis. During the last two years, Peter Corrigans's professional (language) editing of conference papers, articles and eventually this entire thesis manuscript improved the clarity of presentation tremendously.

Lastly, I owe most to my family and loved ones. They have shared most of this undertaking and, with unhesitating faith, encouraged me to carry on and complete this thesis. I owe a big hug to my mother Britt, my sister Ilona, my niece Nicole and my brother Ned for all the love and support they provide me. I hope my father Lionel can feel that he was a part of the journey. I am also thankful to Mikael's family Caisa, Lasse, Johan and Robert with families.

Mikael, I do not have the words. Being loved by you gives life its meaning and depth. I know you are as happy as I am!

Stockholm, November 2004

Cassandra Marshall

LIST OF CONTENTS

List of figures

List of tables

Appended Papers

Paper I. Marshall, C. (2004). New product development when the plan has reached its limit. In Engwall, M. (2004), "Produktutveckling bortom kunskapens gränser. Mot en osäkerhetens grammatik", pp.85-118.

Paper II. Marshall C. (2004). The dynamic nature of innovation partnering: a longitudinal study of collaborative interorganizational relationships. European Journal of Innovation Management (2004), Vol. 7, Iss. 2., pp.128-140.

Paper III. Marshall C. and Segrestin B. (2003). Managing exploratory partnerships: a case of new business creation in the tele-communications industry. Presented at The 9th International Product Development Management Conference, Sophia Antipolis, 2002. Submitted to International Journal of Innovation Management (November 2003)

Paper IV. Marshall C. (2004). Bonds beyond Bounds: a study of corporate entrepreneurs' use of external relationships. To be submitted to an academic journal.

Paper V. Marshall C. (2004). Collaborative innovation in industries facing discontinuous change: can experiences acquired in biopharmaceuticals be useful for incumbent telecommunications companies? To be submitted to Economics of Innovation & New Technology.

1.

BACKGROUND

This thesis poses questions concerning how an established company can conduct collaborative interorganizational relationships as a means of innovation and new product development under conditions marked by fluid change. Before I go on to specify further the subject and research questions, this section will briefly present the research setting so that the thesis and its contents can be placed in their proper contextual element.

From a stable to a fluid state: the case of the telecommunications industry

The telecommunications industry was in a significant state of change, with new regulatory policies, technological discontinuity, transformed market structures, and changing customer demands during the 1990s (Fransman 2001; 2002). The first transforming factor in the industry, i.e. new regulatory conditions, allowed companies to offer services to end-customers without building and operating their own telecommunications networks. While traditional, state-owned telecommunications operators have acted independently, within a closed and more or less integrated value chain, the future presents a new situation where the value chain is breaking up into a wholesale market for network capacity and a retail market for bundling and integrating value-added products and services for end-customers.

Secondly, technological development has brought about new technical platforms and services. One of the most prominent features of technological change in the industry could be the growth of the Internet, with the accompanying development of globally-accepted technical regulations, i.e. the Internet protocol (IP). The new technology made it possible to connect local telecommunications networks (between companies as well as countries), allowing different computer platforms to communicate with one another. Networks based on the IP were capable of carrying all types of telecommunication services, e.g. voice, audio, text, data, images, and video. Together with advances in web technologies, the IP also dictated the pace of technological convergence. This has resulted in an extended

industry, increasingly referred to as the ICT industry[1], with the prospects of sharing technical platforms that have historically been performed in disparate fields (i.e. an industry made up of information, computer-oriented, and telecommunications sectors). This in turn increases the importance of close interaction between different vendors to ensure that all products fit together, thus meeting customer demands for cohesive products and services (Moore, 1995). What was previously a single business is increasingly being divided into several businesses, new business models, and new industrial structures. Accordingly, we are witnessing how different service providers e.g. intermediaries such as software companies, aggregators that integrate services provided by others, as well as several resellers, are making inroads into the 'opening' between the infrastructure provider and the end-customer (see Figure 1).

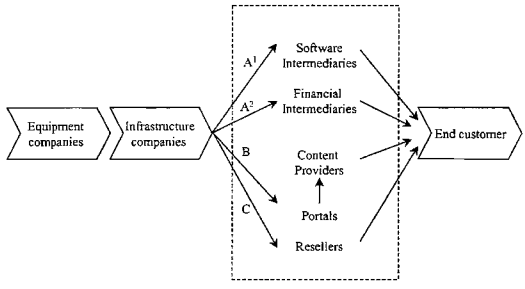

Figure 1. The deconstruction of the telecommunications value chain (Li and Whalley 2002, p. 462). A^1, A^2, B and C represent different new business models.

Thirdly, telecommunications and information technology (IT) form a set of technologies relevant to a wide range of industries and applications, rather than constituting an industry *per se* (i.e. they can be considered an enabling technology facilitating the development of new and/or more effective solutions regarding already-established business or technological functions). This has led incumbents to ramify themselves into new lines of business, while new entrants from other industries have decided to intrude into the same domain seeking an opportunity for profitable diversification (e.g. online-banking which, at minimum, entails a trinity consisting of banks, finance software companies, and telecommunications companies). Yet another group of new entrants is made up

[1] ICT is an abbreviation of Information and Communication Technology. ICT denotes a collection of technologies and applications enabling the electronic processing, storage, and transfer of information for a wide variety of users or clients (Cohen et al., 2002).

of new entrepreneurs, occasionally inexperienced in telecommunications and financed by venture capital institutions. This adds to the further development of a rather fragmented sector, with increasingly permeable boundaries that are easy to cross from neighboring industries.

Fourthly, the evolution of the Internet constitutes a new paradigm which has caused an interpretive ambiguity, or equivocality (Weick, 1979; Weick 1995), as regards the value of new technology, customer demands, and the position of incumbent companies in relation to entrants from neighboring industries and new start-ups. Under the conditions described, it seems important to lay stress on the different meanings of *ambiguity.* According to Weick (1995), we can understand ambiguity from two different angles. He writes:

> Ambiguity understood as confusion created by multiple meanings calls for social construction and invention. Ambiguity understood as ignorance created by insufficient information calls for more careful scanning and discovery.

Weick's, (1995, p. 94-95) recommendation is to use the label *equivocality* for the former meaning as it "explicitly points to the presence of two or more interpretations". Set in relation to the emerging ICT industry, we perceive that companies, in addition to their own experiences (as users, developers, and/or producers), are exposed to the scientists' and the popular media's different perceptions of the actual impacts of ICT on the society of the future. Consequently, the dynamic and rapid technological and market advances in ICT have given rise to a wide range of expected and desired future scenarios[2]. The described conditions have affected competition, not only as conventionally defined between companies, but also between different explanations and perceptions of the future development of technologies, appropriate products and services, customer demands, and so forth. There are many possible acceptable solutions and change seems to be characterized by both path dependence (i.e. based on interpretations and outcomes of past actions and changes) and unpredictability (Lindmark et al., 2004). In the light of these facts, we might conclude that the ICT industry is still in a formative phase. Innovation and new product development, under these conditions, are clearly about a process, and less about discovery than about invention.

[2] Cf. recent discussion on the subject in relation to the ICT policy-making process of Cohen and colleagues, 2002.

On top of all of these changes, the market recession at the turn of the millennium and the related productivity and profitability crisis in the telecommunications industry pose further challenges for practicing managers, especially those aiming to invest in risky and long-term projects relating to innovation and new product development. The predominant reason for operating a network revolves around the question of how many times one can resell the infrastructure, i.e. selling transmission capacity to several customers on the same piece of cable. From this point of view, one important challenge confronting incumbents is the continual reduction of prices, which have fallen to about one-third of the level at which they stood three years ago. A steadily-growing market, but falling profit margins, create pressure to find new sources of revenue. We can also expect that the changed role of incumbent telecommunications operators is creating pressure with regard to structural rationalization.

In conclusion, the former telecommunications industry is undergoing profound technological and market change equivalent to a 'new game environment' (McGee, 1995) and 'emerging opportunity arena' (Hamel and Prahalad, 1994) where industry boundaries, adequate product designs, and processes are waiting to be shaped. Moreover, an 'emerging actor system' where, as a result of liberalization, the number of actors and the number of actor categories are increasing (Lindmark et al., 2004).

Interorganizational relationships in the telecommunications industry

It is argued that companies acting in the telecommunications sector are creating new organizational models that are significantly different from those that have dominated company structures during preceding decades and that this provides a new context for future management practice. Interorganizational relationships and network constellations are among the arrangements most frequently mentioned. It is proposed that the emergent stage of ICT will result in an increase in the collaborative interorganizational arrangements and alliance formations (Dussauge and Garrette, 1999). For instance, Li and Whalley (2002) have suggested that the former linear value chain develops into value networks, i.e. a series of intertwined value chains wherein certain companies are simultaneously involved in more than one value chain. Furthermore, the development of different technologies makes it difficult for any company to join all research and

development directions. It is thus expected that, for instance, the suppliers of telecommunications equipment and independent software companies will carry out much of the future R&D and product development work that was previously realized by incumbent telecommunications operators (Oliver, 2001). An illustration of this transformation might be the numerous initiatives and corporate programs for downsizing and reducing the total number of employees which were started up during the 1990s.

Since neither incumbents nor new entrants can operate (or invest in) a part of all the knowledge and the components of future products and services by themselves, we can expect a situation and a need relating to both specialization and integration. Consequently, independent companies are turning out to be more dependent on the contributions of other companies and interorganizational collaboration is becoming an integral part as regards future innovation and product development (cf. Li and Whalley, 2002; Moore, 1995). This agrees with Mölleryd's (1997) conclusions regarding the development of mobile telephony in Sweden. Among other things, he found that clusters of companies or networks played the role of the entrepreneur via collaborative interorganizational relationships for the development of innovations.

Most incumbent telecommunications companies have experience of external collaborative efforts, particularly in the process of industry globalization, as is the case regarding AT&T's alliances with Olivetti, Phillips, NTT, Toshiba and Ricoh, the Atlas joint venture established in 1987 by Deutsche Telekom and France Télécom, or the contemporary European joint venture, known as Unisource, between the Swedish, Swiss, Spanish and Dutch telecommunications operators (see, for example, Dussauge and Garrette, 1999). Although the greater part of these efforts was aimed at achieving economies of scale, their history also includes quite a few instances of joint innovation and R&D activities, as well as part-owned research institutes. These examples have in common the fact that they involved major, established companies, primarily within the same sector. Furthermore, they were all governed via a joint economic entity, i.e. represented equity forms of collaboration.

Recent changes, however, present new challenges. The increasingly multi-disciplinary and multi-institutional ICT industry will, presumably, affect industry boundaries and the optimum scale and scope of activities between companies (Li and Whalley, 2002; Trillas, 2002). We can expect a growing need to organize

complementary but dissimilar activities, i.e. in the sense that network operation, equipment design, software development, and service integration require different sets of capabilities, probably forcing a variety of collaborative arrangements. It has also been suggested that the ambiguity and speed of change imply complementary forms of collaborative interorganizational arrangements. Companies can no longer rely exclusively on the traditional type of alliances that generally take long-term involvement and clearly-defined tasks for granted. They should also make room for short-lived interorganizational collaborations and trials that focus on exploring narrowly-defined business opportunities (Duysters and de Man, 2003).

The TelCo case

The company

The focal company in the present thesis is an incumbent telecommunications operator (up until 1993, state-owned in a [de facto] monopoly position), whose main interests lie in the Nordic and Baltic markets. Today, it provides a portfolio of services including traditional fixed and mobile telephony, data communications, and the Internet, in keen competition with its rivals on the market. Its customer base consists of both business organizations and residential consumers.

The main part of this research was conducted at one of the company's business divisions, henceforth called *TelCo,* which was responsible for the development, administration, and sale of products and services designed for customers in the business segment, i.e. companies. At the time of the present research, the division had approximately 4,600 employees (of a total of 30,600 in 1999), of whom about 700 were focusing on innovation and new product development activities (including product management).

Work on the thesis ranged across a time period characterized by a strong focus on innovation and growth during the period 1999-2000, likewise during a period of strong consolidation of the business as a result of the market recession, 2000-2003. By way of example, the company has reduced its personnel by more than 40 per cent over the last 5 years (from 30,600 to 17,300). The organization has undergone several reorganizations during the latter period, plus a merger with

another telecommunications operator in 2003. This in turn increased the number of employees by more than 50% (26,000). The number of employees at TelCo has varied over the same period (from 4,600 to 1,200), however, the amount of people engaged in innovation and new product development seems constant.

The product(s)

Most products or services described in the empirical case studies (see the method section below) have in common the fact that they involve new technology such as the Internet and technologies related to mobile data communications (e.g. the Wireless Application Protocol (WAP) and wireless LAN technologies).

During the period, the company has carried out extensive development work to expand the bandwidth of the access network to meet the growing volume of information and services based on the Internet and demands for mobility. At the outset of this thesis, TelCo decided to take a further step, i.e. to invest resources and time in developing value-added services based on the Internet and with the prospect of greater mobility. Mobile data and Mobile E-services were among the services featured in the development plan, and remain so.

The development of mobile data requires complementary innovations in order to provide any value to users. Not least, the prospects and opportunities regarding data communication and Internet functionalities have increased concurrently with the development of more data-capable terminals, e.g. mobile phones equipped with color screens, cameras and the like. Over and above new technologies, new categories of actors are expected to influence important parts of future product and service offerings. Among these actors, we can name service providers such as application and content providers.

Hence, managers and corporate members of TelCo will have to deal with patterns of interactions and innovation processes that are somewhat different from those they are accustomed to. Along with uncertainty as regards demand, it seems as if future innovation and new product development will involve experimentations in new concepts and forms of coordination, with a variety of actors upwards and downwards in the value chain. Noteworthy in this context, however, is Lindmark and colleagues' (2004, p.408) observation that, in the case of data communications services and mobile data services: "there has been a fear [among incumbents] of launching too simple products too early. Instead of launching an unfinished service on the market and refining it according to the learning that

takes place, there has been a tendency to wait until the services, products and/or technologies are fully developed". A good many of the TelCo members contributing to the thesis shared this view of the matter.

The need for interorganizational collaboration

In 1999, when work commenced on this thesis, there was a strong focus on innovation and new product development. Such activities were considered an obvious requirement in order to ensure that future products and product portfolios surpassed the standard of upcoming, competing alternatives. The company's long-standing tradition as a state-owned telecommunications operator, together with its strong position in technical development, had enabled it to maintain a leading position in growing markets such as mobile communication, the Internet, and IP-based network services. Yet, during later years, especially following the breakthrough of the Internet, it had been shown that the increased level of competition had challenged the company's traditional business and business model, resulting in falling margins. Furthermore, the emerging field of ICT revealed that previously-attained knowledge was not enough to keep pace with changes in technology, customer demands, or upcoming business models. New strategies and focus areas were supposed to pave the way for future prosperity, and this would preferably be in balance with the development and production of its current core business.

Innovation and new product development activities have traditionally been internally directed and governed by a highly standardized development process (for a more detailed account of the development process, see Paper I). It has, however, been brought to general attention that many innovation and product development initiatives entail a more open-ended process. Moreover, although hardly reflected in business plans and procedures, the need for interorganizational collaboration has become a matter for discussion every so often.

The motives for seeking partners outside the company's boundaries can be illustrated by the goals set forth in a letter of intent (LoI) between TelCo and two of its partners. According to the agreement, the partners aimed to:

> [...] identify, develop and exploit joint business opportunities, from a supplier and mobile operator/ISP [Internet Service Provider] perspective, for a wireless e-service system solution (Alliance Alpha, LoI of May 11, 2000).

It is worthy of note that the choice and order of the words in this particular LoI, i.e. "identify, develop and exploit joint business opportunities", correspond to the most common definitions of entrepreneurship (cf. Shane and Venkataraman, 2000).

2.

THE RESEARCH QUESTIONS

Being an industry at the crossroads of new regulatory policies, converging technologies, and transformed market structures, the telecommunications field represents an attractive setting for researching the process of interorganizational innovation initiatives. This section aims to describe the purpose and specify the research question(s) guiding work on this thesis.

Innovation in environments characterized by fluid change

Several researchers have described environmental conditions that undermine the capacity of incumbent companies and take them outside their familiar domains. The reader may recall Eisenhardt's (1989) description of 'high velocity' environments in the semiconductor field in Silicon Valley, or the influence of global technological factors in D'Aveni's (1994) 'hypercompetition'.

The usual description of technological change paints a picture of periods of incremental adjustments that are disrupted by periods containing major scientific or technological breakthroughs (or discontinuities)[3]. Such discontinuities have the potential to quickly transform the competitive landscape and the overall definition of the relevant problems in a specific industry (Tushman and Anderson, 1986:1996; Dosi, 1988). They may stimulate new visions of possible opportunities for innovation and new product development, as well as being 'competence-destroying' for incumbents (Abernathy and Clark, 1985; Henderson and Clark, 1990; Leonard-Barton, 1992; Prahalad, 1998; Tushman and Anderson, 1986/1996). The capability to learn anew thus becomes important. Furthermore, major technological discontinuities promote a sense of uncertainty and

[3] In accordance with Lambe and Spekman (1997), we can define 'technology' as the generic term for product technology (i.e. the set of ideas embedded in the product itself), process technology (i.e. the set of ideas involved in the manufacturing of the product), and management technology (i.e. the knowledge required to market the product).

equivocality. Dosi (1988, p.1134) describes the 'pre-paradigmatic phases' in technological change in the following terms:

> During these highly exploratory periods one faces a double uncertainty regarding both the practical outcomes of the innovative search and also the scientific and technological principles and the problem solving procedures on which technological advances could be based.

Most of the literature on disruptive or discontinuous change has focused on the technology's scientific and technical development. We should remember, however, that the telecommunications industry is also experiencing profound change in new market applications, market structures and regulatory policies that add to the overall sense of a disruptive or *fluid condition*.

A recent article by Adner and Levinthal (2002) provides a complementary framework that differentiates between the technology's technical development and its market application. These researchers depict technology evolution in terms of significant shifts in the domain of the application of an existing technology, what they call 'technological speciation events'. This view holds that 'discontinuities' can spring not only from advances in the underlying technology, but also from discoveries of new domains of application. The technological advances required for such shifts may, in an immediate sense, be modest. However, experience shows that new application domains entail a re-evaluation of the critical functions and needs, in turn bringing about a process of technological change and adaptation that may be rapid and radical. The characteristic distinguishing between technology development and a technology's market application lies in the different pattern of innovation activities and learning. In Adner and Levinthal's (2002) view, innovating companies in the telecommunications industry, besides the traditional focus on selecting technologies for a fixed market context, should also be directed towards discovering new potential application domains and market contexts for existing technologies. In this respect, we might distinguish efforts aimed at creating and recognizing new opportunities related to the Internet and opportunities that concern Internet-based applications such as 'Mobile E-services'.

Innovation and the demands for learning and knowledge creation

There is today a large body of research describing how the changing nature of economic life, by reason of increasing interdisciplinary and complexity of knowledge, is impacting on innovation activity[4]. There are several ways that interorganizational relationships can provide benefits and positively affect the outcome of innovation activities. Among those, the reader may recall three key benefits frequently mentioned in the literature: knowledge sharing, exploitation of complementarities, and scale (Ahuja, 2000a; Harrigan, 1986).

Arguing from a knowledge view, the immediate motive may be found in an increasingly knowledge-based economy where the generation and use of knowledge are seen as one important dimension determining the performance of companies (Kogut, 2000; Kogut and Zander, 1992). In this view, technological change is but one example of change in the business environment, besides globalization and altered legislation, which force established organizations to develop their resource and knowledge bases. Second, the processes of specialization and integration (Fransman, 2001; Fransman, 2002), by which business activities are restructured into "systems of flexible specialization" (Larson, 1988), through the division of functions and disciplines, and where individual companies become specialized for a particular stage in the value chain, or a specific knowledge domain, have made the exploitation of complementarities an important motive (Ahuja, 2000a).

Systemic interdependencies between companies entail the maintaining of capabilities wider than the range of activities actually performed in-house. According to Larson (1988), the typical solution to the problems of interdependence is to structure and coordinate the organization's behavior more closely with that of other organizations. Furthermore, conditions such as ever-shortening product lifecycles and growing customer demands have made speed-to-market a critical factor, sometimes even precluding internal development of the relevant competencies (Lei & Slocum, 1990; Lambe and Spekman, 1997). The third benefit, economies of scale, enables companies to take on and invest in (with a shared risk) larger innovation and development projects. It has also been argued that under conditions of dynamic competition, it becomes even more

[4] See, for example, Cohen and Levinthal, 1989; Brown and Duguid, 1991; Van de Ven and Polley, 1992; Cheng and Van de Ven, 1996; Powell, 1998; Mytelka and Smith, 2002.

important to take part in standard-setting bodies and collaborate with leading partners (cf. McGrath, 1997).

The increasing interest in interorganizational innovation initiatives

Popular advice regarding how established companies can improve their innovativeness and bring new products and services onto the market under conditions marked by fluid change rarely fails to mention the importance of interorganizational relationships and networks (Oliver and Ebers, 1998). The emphasis on interorganizational collaboration represents a principal change in the way that most large mature companies use to develop new products and services, though.

Innovations introduced up until the 1970s were largely a result of internal systematic R&D investments. Not until the 1980s were companies in industries such as computing, semiconductors, automotive, and biotechnology indicating a transformed path. Instead of adapting to market and/or technological change single-handedly, a number of companies initiated collaborative relationships such as joint ventures, strategic alliances, and partnerships (Hagedoorn, 1995; Hagedoorn, 2002; Hagedoorn and Kranenburg, 2003)[5]. The most common explanation for this transformation is that no single company possesses all the resources, competencies, or legitimacy required to be able to innovate in regimes of rapid technological and market change (e.g. Pfeffer and Salancik, 1978; Dosi, 1988; Baden-Fuller and Volberda, 1997; Lambe and Spekman, 1997; Teece, 1992).

Recent research reinforces the significance of interorganizational collaboration for innovation and product development by showing their positive impact on the innovation outcome. A good deal of this literature has described the involvement of suppliers in new product development. For instance, Bonaccorsi and Lipparini (1994) found that interorganizational collaboration between a leading Italian

[5] For empirical evidence of the use of interorganizational collaboration in the mentioned industries, see, for example, Arora and Gambardella (1990), Dussauge and Garrette (1999), Miles and Snow (1992), Oliver (2001), and Powell et al. (1996). A general (thus not specific to a certain industry) account and historical writing on the practice of collaborative arrangement can be found in Alter and Hage (1993) and Dussauge and Garrette (1999). For an early analysis of joint ventures, see also Harrigan (1986).

company and its suppliers was critical for new product success as it led to shorter product cycles, better products, and increased competitiveness. Rigby and Zook (2002), for their part, found that companies that collaborate with external partners in R&D earn a higher percentage of their total sales from new products than companies which do not collaborate. Studying the biotechnology field, Shan, Walker and Kogut (1994) found that the greater the number of collaborative linkages formed by a start-up (typically involving large mature pharmaceutical companies, universities and research institutions in varying combinations) - the higher the number of patents. Even more ominously, Oliver (2001) found that a lack of alliances was associated with organizational death for companies in the biotechnology sector. Hence, companies without interorganizational relationships are becoming increasingly rare in the biotechnology field (Powell, 1998; Powell et al., 1996).

In conclusion, researchers have shown, and managers may have some intuitive understanding of, the increasing need for collaborative interorganizational relationships for innovation and new product development under conditions marked by fluid change. The *process* and *means* by which actors can turn their intentions to collaborate across company boundaries into a working reality still constitute an area of great curiosity and concern, however (cf. Van de Ven et al., 1999).

Defining collaborative interorganizational innovation initiatives

It seems appropriate to define the expression *collaborative interorganizational innovation initiatives (or arrangements),* however briefly, before we go on to further specify the subject and purpose of this thesis. To start with, we can describe innovation as the development of 'new combinations' of resources, such as capital and competencies, resulting in a new good or service, a new process or method of production, a new market or the reorganization of any industry, or a new source of supply of raw materials (Schumpeter, 1934; Carson, 1982). These potential new combinations of resources are commonly recognized as new *opportunities.*

A large body of previous research maintains that innovation covers both the efforts aimed at recognizing new opportunities *and* the activities to bring those opportunities onto the marketplace. For example, Roberts (1988) refers to the

invention phase that encompasses all efforts aimed at creating new ideas (i.e. opportunities) and the *exploitation* phase of putting these ideas to work (i.e. the commercialization and first use of a product, service or process) [6].

Innovation is also considered a specific function of entrepreneurship (Drucker, 1985b; Elam, 1993). It entails entrepreneurial thinking, i.e. the ability to see what is there, to see what might be there, and to take the necessary steps to safeguard the vision and create the change. These accounts jointly suggest that the innovation process concerns the set of activities by which individual entrepreneurs recognize (or rather create and develop), evaluate, and implement new opportunities (cf. Shane and Venkataraman, 2000).

Interorganizational relationships, in turn, could encompass several structural forms ranging from situations where companies share equity in the form of assets and skills, create a separate entity (i.e. a joint venture), or acquire one another (i.e. mergers and acquisitions) to collaborative agreements whereby each company pools its resources and knowledge, exclusive of any equity ownership (Harrigan, 1986). The former structure thus refers to *equity* forms of collaboration, whereas the latter corresponds to *non-equity* relationships. With reference to the extent of owner control, the literature sometimes describes these arrangements as tightly vs. loosely coupled (Barringer and Harrison, 2000). Another common differentiating factor for describing interorganizational relationships concerns the type of interdependence, i.e. in terms of a horizontal, vertical, or diagonal relationship. In horizontal relationships, the collaborating companies are competing for the same resources, e.g. for the same circle of customers and/or suppliers. The second type, vertical relationships, refers to collaborations between companies active in the same value chain, i.e. where each company either supplies inputs to, or uses outputs from, its counterpart(s). Finally, diagonal relationships involve companies from different industries.

[6] Roberts (1988, p.11) illustrates his image of innovation as a function of invention and exploitation, i.e. innovation = invention + exploitation. The division between invention and commercialization or exploitation is often referred to as the exploration and exploitation phase (Clark and Wheelwright, 1993). It should, however, be noted that Schumpeter's conception differs from those who insist that entrepreneurship must include both the exploration of inventions (i.e. the discovery of new business opportunities) and their exploitation and commercialization.

Based upon the above representation of innovation and collaborative interorganizational relationship, the present thesis holds that *collaborative interorganizational innovation initiatives* can involve any combination of horizontal, vertical, or diagonal relationship(s) and concerns:

> ... a particular collaborative (non-equity) effort made by individuals from two, or more, independent companies who seek to create or recognize, evaluate and exploit complementarities and new combination possibilities (i.e. new opportunities) to bring into existence 'future' technologies, products and services and/or processes.

Research question(s) and the purpose of the thesis

The overall concern of this thesis is to develop a better understanding of:

> How an established company (like TelCo) can be able to recognize, create and develop opportunities to bring into existence future technologies, products, services and processes under 'fluid conditions' characterized by rapidly-changing technologies and dynamic competition.

It specifically aims to extend premises able to explain the course of events when recognizing and creating new opportunities through collaborative interorganizational relationships. Moreover, it seeks to better understand under what conditions the collaborative process of opportunity recognition and creation functions. My way of seeking answers was by asking the following research questions (RQ):

RQ I. How does the process of collaborative interorganizational innovation initiatives develop? Does the process differ from internal innovation and new product development initiatives?

RQ II. What critical factors are required in order to leverage and take advantage of collaborative interorganizational innovation initiatives?

A company's entrepreneurial posture is mirrored by the entrepreneurial behavior practiced by its employees. Hence, any initiative to create and recognize opportunities for future technologies, products and services is dependent on the corporate entrepreneurs at the company (Stevenson and Jarillo, 1990). Then, we might also ask:

RQ III. What role (if any) do corporate entrepreneurs play in collaborative interorganizational innovation initiatives?

RQ IV. What critical factors enable or disable corporate entrepreneurs' motivation and

> ability to recognize, create and, develop new opportunities through interorganizational collaboration?

The final goal of this thesis would then be to provide innovation managers and corporate entrepreneurs with a better-developed body of knowledge upon which to draw in order to improve their record of recognizing and creating new opportunities through collaborative interorganizational relationships. Moreover, the outcome of this thesis, as much as the actual research process itself, was also meant to contribute to 'useful knowledge' (Louis, 1983) for taking action on the issue, especially for managers and corporate entrepreneurs within my own company setting at TelCo.

Outline of the following chapters

This thesis consists of five articles and a summary, herein identified as the *thesis*. The thesis aims to constitute the entirety of the research conducted, i.e. its practical and theoretical point of departure, its research approach, and its concluding results, presenting and tying the five articles together in this manner. Figure 2 presents a general outline of the overall content.

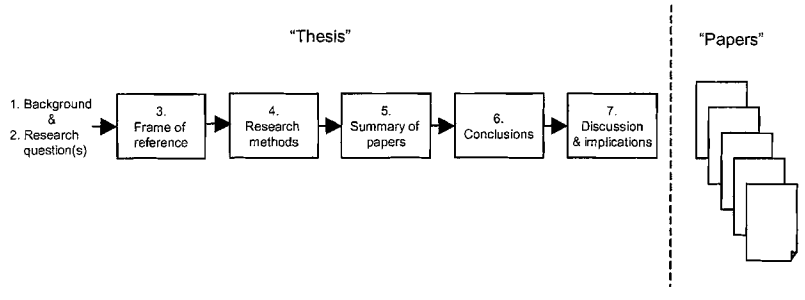

Figure 2. An outline of the thesis.

The two opening chapters aim to describe the research setting, scope and question(s). The subsequent chapter, Chapter 3, discusses the theoretical framework by integrating perspectives from previous literature regarding corporate entrepreneurship, interorganizational relationships, and innovation by means of interorganizational collaboration. Chapter 4 presents the research approach and methods I have used when studying and analyzing

interorganizational innovation initiatives at TelCo. Prior to the presentation of and discussion on the results and the concluding chapter, I shall briefly sum up in Chapter 5 the individual papers and describe how they relate and contribute to the overall aims of the thesis. In Chapter 6, I shall present the results of the conducted research. Finally, Chapter 7 will bring the thesis to an end by discussing the general arguments of this thesis and sketch out some implications for management practice, as well as avenues for further research into the subject.

The five separate papers included in the thesis are:

I. *New product development when the plan has reached its limit* (Title in Swedish: Produktutveckling när planen nått sin gräns). In Engwall, M. (2004), "Produktutveckling bortom kunskapens gränser. Mot en osäkerhetens grammatik", pp.85-118.

II. Marshall, C. (2004) *The dynamic nature of innovation partnering. A longitudinal study of collaborative interorganizational relationships.* Published in European Journal of Innovation Management, 7(2), 128-140.
Two earlier versions, which this paper is based upon, co-authored by Marshall and Hart, were presented at the 8th International Product Development Management Conference, org. by EIASM 2002, Enschede, and The 17th Colloquium, org. by EGOS, 2001, Lyon.

III. Marshall, C. and Segrestin B. (2003) *Managing exploratory partnerships. A case of new business creation in the telecommunications industry.* Submitted to the International Journal of Innovation Management.
An early version was presented at the 9th International Product Development Management Conference, org. by EIASM 2002, Sophia Antipolis.

IV. Marshall, C. (2004). *Bonds beyond Bounds. A study of corporate entrepreneurs' use of external relationships.* To be submitted to an academic journal.

V. Marshall, C. (2004). Collaborative innovation in industries facing discontinuous change: can experiences acquired in biopharmaceuticals be useful for incumbent telecommunications companies? Submitted to Economics of Innovation & New Technology.

3.

FRAME OF REFERENCE

Knowledge of the process of interorganizational innovation initiatives is still at a primitive stage. No generally accepted framework or theory has emerged yet from research or practice. Therefore, this section attempts to explore previous literature on the process of innovation and collaborative interorganizational relationships. In addition, it aims to develop a tentative analysis model and conceptual framework of the process of joint opportunity recognition and creation, and the factors that might influence its form and progress.

Introduction

Relatively few studies have empirically examined how interorganizational innovation initiatives evolve. Without going into detail here, we seem to know much more about the antecedent conditions and motivations of interorganizational relationships, as well as the alternative governance structures, than about the process and practical steps of the collaboration. Researchers in innovation management and corporate entrepreneurship have, for their part, developed comprehensive models of the innovation process using organizational, motivational, and industry variables. The usual assumption has, however, been that most (if not all) innovation and new business creation occurs within a hierarchical framework, either as *de novo* start-ups or as new entities within an existing corporate body (Venkataraman 1997)[7].

The process of interorganizational innovation initiatives (herein with the focus on opportunity recognition and creation) unfolds along several dimensions, e.g. process theories of change, innovation and interorganizational relationships, the influence of environmental contingencies, and learning. In trying to understand

[7] In this connection, the reader may recall how Burgelman (1984), among others, conceptualized the process and practice of corporate entrepreneurship as a mainly internal concern. He proposed that corporate entrepreneurship's aim is "extending the firm's domain of competence and corresponding opportunity set through *internally generated new resource combinations*" (1984, p.154, italics added).

the process and the strategies that might be appropriate to encourage it, no single perspective or dimension seems to be a sufficient guide. Combining different perspectives may offer a better overall picture. Thus, this chapter describes different assumptions regarding change at established companies, the process of innovation and interorganizational relationships, and the process of interorganizational innovation initiatives. The concluding section proposes a conceptual framework of the process and factors that might influence the form and progress of opportunity recognition and creation by means of collaborative interorganizational relationship.

Change and innovation at established companies

Organizations go through changes in order to respond to and take advantage of regulatory, economic, competitive and technological shifts. In line with classic organization theory based on a systems view (or contingency approach), we can assume that what takes place in the environment is likely to affect what takes place inside the organization (Lowrence and Lorsch, 1967). Accordingly, when the environment changes the organization and management practice adherent to it has to change. Most literature based on this view starts out from premises of 'adaptation'. Moreover, it typically deals with the problem of adapting organizational *structure* to the environmental conditions (see, for example, Burns and Stalker, 1961; Woodward, 1967). We can, however, expect that the processes leading to change become just as relevant if we consider the problem from a management view (Miles and Snow, 1984).

The notion of 'system' is also apparent in works of innovation. The concept of the "innovation system" was introduced more than two decades ago by Lundvall (1985) and has since been employed by several researchers (Lindmark et al., 2004). A system-based approach to technical change and innovation puts the emphasis on the interaction between 'system components' - frequently defined as the set of each separate company's own R&D functions, universities, and governments, but at times more widely as actors, markets, networks, and institutions - and their interaction "in the production, diffusion and use of new and, economically useful knowledge" (Lundvall, 1992, p.2). One of the most important insights of the systems model of innovation, however, is the central role played by patterns of interactive learning, which take place in many

activities, many of them outside the company's own R&D function. Interpretation of the 'systemic influence' on innovation varies among the different approaches. At times, it represents a rather deterministic view, while at other times, the system is described as more loosely coupled. The view taken in this thesis relates to the latter approach. Thus, I believe there is also room for intentional actions, which in turn can influence and entail consequences for the system (e.g. influencing new regulatory policies and future technical standards).

Furthermore, in the alliance process literature, we can mention Koza and Lewin's (1998; 1999) co-evolutionary perspective. They view interorganizational relationships and alliances as 'embedded' in the sense that they co-evolve with the company's strategy, with the organizational, institutional, and competitive environment, and with management's intent regarding collaborative interorganizational relationships (Koza and Lewin, 1998). Their point of departure is the individual relationship or alliance. Still other researchers argue that forces on the population level, such as competitive context, alliance experience and the scope of collaborative activities, determine the evolution of interorganizational relationships (e.g. Reuer and Zollo, 2000). Independent of the level of analysis, both perspectives regard the environment as the principal motor and trigger of change. In this view, we can expect that the scope for unconventional behavior and volition is somewhat limited, however.

Recent literature proposes that our understanding of interorganizational relationships can be significantly improved by studying internal tensions and opposing forces such as collaboration *vs.* competition, flexibility *vs.* rigidity, planning *vs.* emergence, vigilance *vs.* trust, and the like (Das and Teng 2000; de Rond 2003). Hence, if we can increase our knowledge of the co-existence of these internal tensions, we may better understand the management challenge inherent in interorganizational relationships (de Rond, 2003).

Liabilities of aging and bigness

Previous research has recognized that companies with an already-established culture and institutionalized set of norms, values, and procedures are often poor incubators for innovation. Even though there is no conclusive evidence that establishment and size are factors determining the tendency towards change, a general view holds that new and small companies are better able to innovate than

their large and established counterparts[8]. It is argued that the essential constraints stem from a tendency to favor well-known formulas for improving the immediate performance over unfamiliar, nascent and completely *de novo* solutions (Leonard-Barton, 1992; Baden-Fuller and Volberda, 1997; Kanter, 1983; Ahuja and Lampert, 2001). The problem is not just organizational inertia, but also the short-term forces that exhort companies to exploit their existing competencies and capabilities (Kanter, 1988). Hence, corporate entrepreneurs may be constrained by organizational policies that rigidly enforce the use of the resources available inside the company (Starr & Macmillan, 1990).

On the contrary, new or small companies are portrayed as more willing to recognize a potential opportunity emerging from unconventional sources. These use unconventional means, for instance by way of unplanned processes with unbudgeted resources, because they have no prior history or commitments. Hence, independent entrepreneurs may employ a particularly unorthodox attitude toward heuristics and unstructured commitments, whereas corporate members (i.e. corporate entrepreneurs) are burdened with demands for formality and rational planning techniques (Alvarez & Busenitz, 2001). This distinction between independent and corporate entrepreneurs suggests that corporate entrepreneurs may get into trouble if they act beyond the scope of their job description and function.

Nevertheless, on several occasions, it has been shown that a great many established companies behave in an 'entrepreneurial manner' that results in successful innovations (Drucker 1985b; Kanter 1983; Covin and Slevin 1991; Sharma and Chrisman 1999).

Assumptions regarding the process of innovation

Innovation – an orderly and linear process?

Most of the work that has been done in the area of innovation processes at established companies has been done for new product development. These writings represent several research streams that provide both overlapping and competing explanations. A typical distinction between the different streams

[8] Previous research uses a 6 - 10 year upper limit for the classification of 'new' firms (Yli-Renko et al., 2001).

concerns the representation of innovation and product development as a series of predictable steps that can be planned out at inception (e.g. Cooper et al. 2002) or as an unpredictable path that is more experiential than planned, and more iterative than linear[9].

The standard model, albeit a stylized portrait, concerns a linear innovation process whereby the activities develop along a cumulative sequence of different stages or phases. Typically, it starts in basic scientific research, followed by technological application, and then the introduction of a new product, service or process.

Theory development during the past 10-15 years has changed our perception, however. An influential work on this issue is the Minnesota Research Program (MIRP), where Van de Ven and colleagues (1999) have made an effort to describe the innovation process in all its complexity[10]. Their findings call into question many of the previously-established explanations regarding the form and process of innovations. They show, in sharp contrast to the linear model, that innovation activities are far more complex and unpredictable than previously assumed. The process is better described as a "nonlinear cycle of divergent and convergent activities that may repeat over time and at different organizational levels" (ibid., 1999, p.16). Neither the flow of the innovation process nor its outcome can be fully defined at the outset, being constructed and shaped over time as an integral part of the process (see also Mytelka, 1991; Lester et al., 1998; Sarasvathy, 2001). A connected conclusion is that innovations frequently imply commitment to a tentative set of actions, with no *a priori* guarantees or estimates regarding success.

The MIRP-studies (1999) also revealed that innovation processes, independent of the organizational setting, follow a similar pattern of divergent and convergent cycles of behavior[11]. In this matter, divergent behavior represents an expanding process of exploring different directions, whereas convergent behavior focuses

[9] For a review and analysis of the literature on new product development processes, see, for example, (Brown and Eisenhardt, 1995).

[10] A synthesis of the results of this research program can be found in *The Innovation Journey* by Van de Ven and colleagues (1999).

[11] These findings are based on the MIRP studies of innovation and new business creation in three different organizational arrangements: an internal venture, a joint interorganizational venture, and a new business venture (i.e. new start-up) (Van de Ven et al., 1999).

on exploiting a given direction. Of great interest is the fact that their conclusion on convergent and divergent cycles also proposes an expanded view of learning in innovation processes. In the words of the authors (ibid. p.202-203):

> Our findings call for an expanded definition of learning that examines not only how action-outcome relationships develop but also how prerequisite knowledge of alternative actions, outcome preferences, and contextual settings emerge. This expanded definition distinguishes between learning by discovery from learning by testing [...] learning by discovery in chaotic conditions is an expanding and diverging process of discovering possible action alternatives, outcome preferences, and contextual settings. Learning by testing during the more stable convergent period is a narrowing and converging process of determining which actions are related to what outcomes.

In this connection it is proposed that learning by discovery is a precondition for learning by testing. Hence, studies of divergent and convergent phases, and the transition between them, create interesting avenues for future research (Van de Ven et al., 1999). Table 1 summarizes some findings from the MIRP studies:

Table 1. Assumptions and observations regarding core innovation concepts, Van de Ven (1999, p.8)

	Literature implicitly assumes	But we see
Ideas	One invention, operationalized.	Reinvention, proliferation, discarding, reimplementation, and termination.
People	An entrepreneur with a fixed set of full-time people over time.	Many entrepreneurs, distracted fluidly engaging & disengaging over time in a variety of roles.
Transaction	Fixed network of people/companies working out details of an idea.	Expanding, contracting network or partisan stakeholders who converge & diverge on ideas.
Context	Environment provides opportunities and constraints on innovation process.	Innovation process created and constrained by multiple enacted environments.
Outcomes	Final result orientation; A stable new order comes into being.	Final result indeterminate; Many in-process assessments and spin-offs; Integration of new orders with old.
Process	Simple, cumulative sequence of stages or phases.	From simple to many divergent, parallel & convergent paths; some related, others not.

Opportunity recognition – a process of discovering?

Although most previous research suggests that the occurrence of opportunities is an absolute condition for innovation to happen, comparatively little research has examined *opportunities* as the outcome variable of the entrepreneurial process. However, as Ahuja and Lampert (2001) indicate, the extent that without opportunities there are no innovations, improving our understanding of the factors and processes that influence the creation and recognition of possible opportunities are critical.

Shane and Venkataraman (2000, p.220) define entrepreneurial opportunities as those which can be "sold at greater than their cost of production". This notion of 'profitable opportunity' seems to assume that we can decide on *valuable* opportunities *a priori*. It partly ignores the uncertainty inherent in innovations and innovation processes.

The view taken in this thesis departs from the literature which regards opportunity recognition as a process of discovering something already formed (cf. Kirzner, 1973, 1979). Hence, wordings such as *exploring* and *creating* possible opportunities are more suitable. For the purpose of this thesis, I have found the definition proposed by Tat Keh and colleagues (p. 125) to be applicable. They describe entrepreneurial opportunity, as a *future situation deemed desirable and feasible*, where the state of "being desirable and feasible" is subjective to the individual(s) in the setting.

Assumptions regarding collaborative interorganizational relationships

Interorganizational relationships – a hybrid form?

A good deal of previous literature has conceptualized interorganizational relationships, e.g. alliances and networks, as hybrids along the market to hierarchy continuum (cf. Powell, 1987; Williamson, 1991). This 'continuum view' has led researchers to advocate the fact that the appropriate set of governance mechanisms for interorganizational arrangements corresponds to a sum, or mixture, of the methods and procedures employed in markets and hierarchies (Grandori, 1998). New streams of thought call these beliefs into question, arguing that collaborative interorganizational relationships and networks represent a distinctive organizational form and an important change in

the way companies do business (e.g. Håkansson, 1987; Jarillo, 1988; Larson, 1988). Powell (1990, p. 298-299) expresses the point convincingly:

> [...] although I was earlier of the view that nonmarket, nonhierarchical forms represented hybrid modes (Powell. 1987), I now find that this mixed mode or intermediate notion is not particularly helpful. It is historically inaccurate, overly static, and it detracts from our ability to explain many forms of collaboration that are viable means of exchange. [...] By sticking to the twin pillars of markets and hierarchies, our attention is deflected from diversity of organizational designs that are neither fish nor fowl, nor some mongrel hybrid, but a distinctly different form.

It is thus suggested that the specific features of collaborative interorganizational relationships, e.g. the partners' reliance on reciprocity, collaboration, complementarities, and mutual gain, entail coordination mechanisms different from those applicable to markets or hierarchies (Larson, 1988; Powell, 1990).

Interorganizational relationships – unstable arrangements?

Scholars have developed various guidelines and measures for the successful formation and development of interorganizational relationships. One area of work considers careful planning and systematic implementation to be a precondition for success, espousing the division of decisions concerning the collaborative venture into sequential stages. The focus of these studies has tended to be on initial conditions, regardless of the actual process going on between the partners. A more common view held today is that interorganizational relationships change over time. The dynamic evolution of interorganizational relationships has thus received increasing attention in recent research (e.g., Ring, 1994; Doz, 1996; Koza, 1998 and Lewin; Ariño and de la Torre, 1998). On a general level, these insights grasp the relationship between preliminary initial conditions and the continual sequences of (re)negotiation, commitment, and execution.

Within this stream of research we can mention Ring and Van de Ven (1994) who previously developed a theoretical framework for the dynamic development of collaborative interorganizational relationships. One basic assumption underlying their framework is the emergent pattern. The relationship is considered to be cyclical and constantly reconstructed by continuing interpretations and events. Another premise in Ring and Van de Ven's (ibid.) model concerns the interactions between the formal and informal courses of action, suggesting that

personal relations, tacit understandings, and psychological contracts are increasingly replacing formal roles, agreements, and legal contracts, as an interorganizational collaboration evolves over time. However, the repetitive execution of acts also leads to the institutionalization of informal terms into formal manifestations and organizational routines. The process they propose consists of three simultaneous stages: (1) *negotiation,* which involves formal bargaining and informal sensemaking between actors and which provides the basis for (2) mutual *commitments* in terms of legal and psychological contracts, which in turn support (3) *the execution* stage, wherein negotiations and commitments are transformed into collective interaction (see Figure 3).

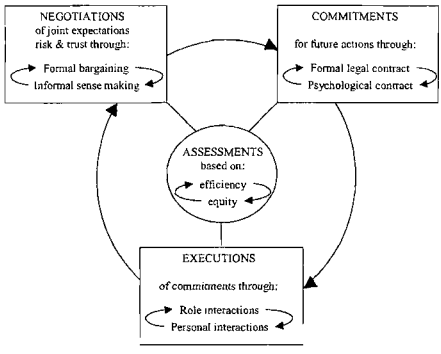

Figure 3. The developmental process of collaborative interorganizational relationships, derived from Ring and Van de Ven (1994, p.97).

More recent articles adopt a learning perspective, arguing that the development of interorganizational arrangements is related to several learning processes that mediate between the initial conditions and outcomes. In this view, the partners' choice; either engaging in renegotiation and modifying their behavior or leaving the collaboration, will be driven by repeating "learning-action-reaction" loops (see Figure 4).

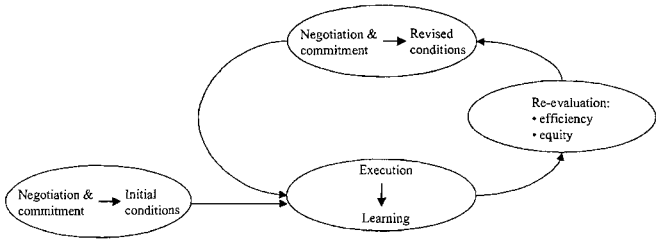

Figure 4. An evolutionary model of collaborative ventures, derived from Ariño and de la Torre (1998, p.308).

Nonetheless, despite the accumulation of a wealth of literature on interorganizational relationships and a growing consensus that interorganizational relationships matter, researchers in the field are equally aware of the confusing results from practice. The combined experience claims that few attempts at interorganizational collaboration turn out the way their promoters had expected them to. From the depressing scenario of a fairly high failure rate (cf. Barringer and Harrison, 2000 who indicate a failure rate of between 50 and 70 per cent), we can draw the conclusion that we still know proportionately little about the practical implementation and management of interorganizational relationships[12].

Indeed, at times, we uncover interorganizational relationships that are ill-designed. Nonetheless, the reasoning above reveals that re-constructions and terminations can, at times, be sensible choices that should not be mistaken for failures. A certain level of change and re-construction forms part of the dynamics (Koza and Lewin, 1998; 1999; McKelvey, 1996). Furthermore, some interorganizational relationships involve projects with a given duration (Doz et al., 2000), while others may consider an interim step (Powell, 1990) or a multistage arrangement towards a merger or acquisition (Buckley and Casson, 1988; Kogut, 1989). Table 1 (see below) is an attempt to compile the potential alternatives.

[12] Much literature holds that the failure rate is significant. It should, however, be mentioned that this is often argued without any comparison being made between the failure rate of collaborative interorganizational arrangements and other innovation or venture initiatives in general.

Table 2. Explanations of alliance instability, based on (Doz, 1996; Duysters and de Man, 2003; Ebers and Grandori, 1997).

1) Ill-designed arrangements (a) Insufficient preconditions. (b) Negative outcome. *2) Temporary arrangements* (a) Explicitly chosen as temporary. (b) Applied as a transitional stage and intermediate form of organizing.	*3) Emerging arrangements,* subject to: (a) Changes in actors' resource base, (b) Changes in actors' information base (e.g. by means of learning), (c) Changes in actors' expectations, which, over time, affect the partners' perceptions of efficiency, equity and adaptability, respectively.

The process of interorganizational innovation initiatives

Ring and Van de Ven (1994) establish that managers practicing an interorganizational strategy run into ambiguities regarding both the future states of nature *and* whether or not the parties will get on well. Their claim corresponds with Bouwen and Steyaert's (1990) image of how an entrepreneur in a start-up situation deals with two interwoven developmental processes at the same time, i.e. the task domain *and* the social relationship. Thus, we can expect that interorganizational innovation initiatives entail developmental challenges in two dimensions (i.e. representing a twin process). The first involves the pursuit of new opportunities, whereas the second concerns the progress of the partner relationship, i.e. the operating mechanism by which collaborating personnel negotiate, make commitments, and act.

In her study of dyadic interorganizational relationships established by high-growth entrepreneurial companies[13], Larson (1992) suggests a process model that evolves in three phases. The initial phase concerns preconditions for collaborative exchanges such as prior relations and prior reputations, both as regards individuals and companies. These historical preconditions serve to set the scene for and to enhance early collaboration by reducing uncertainty, establishing expectations and obligations, and increasing readiness for strong commitments.

[13] The analysis takes the perspective of the *new* entrepreneurial companies (i.e. start-ups). These companies collaborated with established companies, however.

The second phase is largely described as a trial period focusing on making loose ideas concrete (Larson, 1992; see also Kreiner and Schultz, 1993). The collaborating partners will at this stage start to recognize each other's expectations and willingness to engage in a more collaborative relationship. It is also suggested that the trial period results in clear expectations, a norm of reciprocity, and trust, as well as an organizational structure for exchange. Eventually, the third phase concerns the crystallization of collaborative relations, integration and control into a stable and more predictable relationship, structured by the expectations and obligations established during the two earlier phases.

Larson's (ibid.) account of the interorganizational innovation process follows a rather linear path. However, if we are to explain interorganizational innovation initiatives as learning processes, as suggested by the findings of the MIRP studies (see "Assumptions about the innovation process", above), we will need to consider the divergent and convergent periods of activities unfolding over time. As in the process proposed by Larson suggesting that the first cycle focuses on entering into relationships, but, with *various* potential partners. The partners will then fulfill their commitments in an incremental way. The second cycle in turn represents a transition from various independent relationships to an interdependent web where the actions in each separate relationship influence the development of the others, often in an unexpected way (Van de Ven et al., 1999).

Factors assumed to affect the process

Entrepreneurial alertness and alliance proactiveness

Previous research suggests that, in changeable or fluid environments, companies are challenged to maintain close contact with as much of the evolving knowledge field as possible (Miles et al., 1997). Moreover, Cohen and Levinthal (1990) have argued that the degree to which companies learn about new opportunities is a function of the extent of their participation in collaborative activities outside organizational boundaries. It is argued that companies with more valuable relationships and a greater capacity to pursue interorganizational collaborations are well positioned for innovation activities (Uzzi, 1996; Powell et al., 1996; Hills et al., 1997).

It is the prospects of access to knowledge and capabilities crucial to the recognition, creation, and development of entrepreneurial opportunities that

make interorganizational relationships a productive opportunity and the locus of innovation (Powell et al., 1996). Consequently, we can expect that the company's propensity to engage the environment in order to recognize and create alliance opportunities and proactively form interorganizational activities, i.e. its *alliance proactiveness* (Sarkar et al., 2001), will have a constructive impact on its capacity to recognize and respond to hitherto overlooked innovation opportunities, i.e. its *entrepreneurial alertness* (Hills, 1997).

Linking complementary knowledge and resources

On the premise that it is frequently beyond the resources and knowledge of a single company to expand in the direction of all potential business opportunities, a vital function of innovation and entrepreneurship concerns the activity of organizing and combining resources not previously at hand or controlled by the company (Kogut 1991; Jarillo 1989; Mölleryd 1997). Hence, one important variable and function for interorganizational innovation initiatives concerns the function of gaining access to complementary knowledge and resources necessary in pursuing new opportunities.

Obtaining access to external networks and potential partners is, in many respects, considered a social process dependent on the position of a person and/or organization in a certain social network, i.e. their social capital (Granovetter, 1985).

Burt (1992, 2000) suggests that social capital is a function of brokerage across structural holes. Moreover, he concludes that "organizations with management and collaboration networks that more often bridge structural holes in their surrounding market of technology and practice will learn faster and be more productively creative" (2000, 366-67). Hence, to the extent that corporate members (corporate entrepreneurs) provide social capital that bridges structural holes in their surrounding market of technology and practice, we can expect that companies with corporate entrepreneurs that more often bridge structural holes to recognize and capture opportunity will increase these companies' alliance capacity and thus their innovation performance.

Moreover, with some help from Zagenczyk (2004), we can define "linking" (or brokering) social capital as "the resources that result from social structure". Linking social capital is an individual level outcome, as it is determined by an actor's network position. Thus organizational social capital can in turn be defined

as "a resource reflecting the character of social relations *within* an organization realized through members' levels of collective goal orientation and shared trust". Finally, it has been proposed that the linking of connections is an acquired capability (Burt, 2000). We can thus expect that corporate members require not only a certain position in a social network, but also the capability to link social capital.

The people

Recent research into entrepreneurship has provided ample analysis of the ways social ties and networks influence entrepreneurs (in the sense of small business owners and start-ups). Nonetheless, the corporate entrepreneurship literature represents a rather narrow outlook focusing on internal networking and bootstrapping. Advice concerning corporate entrepreneurship thus rarely mentions corporate entrepreneurs' linking activities across company boundaries for the accomplishment of new business creation and product development. Furthermore, much of the folklore and applied literature espouse a top-down approach to the formation and development of collaborative interorganizational relationships. This helps to explain why executive managers' external network contacts and linking activities play such a prominent role in theories and models of interorganizational collaboration. This thesis presumes, however, that corporate members, besides executive management (or specialist roles), possess just as valuable network contacts and ties which make them suitable as intermediaries of possible partners.

Hence, when examining the main characteristics associated with innovation and entrepreneurship, it seems fair to expect that there is a place for corporate members' social capital and linking activities, no matter what their hierarchical position. This is especially true if we consider such initiatives from a practical point of view, i.e. *the how,* with the aim of understanding the process and the managerial practice of interorganizational innovation initiatives.

Alliance capability

Obtaining access to external networks and possible partners requires not only the company's connectedness or motivation to form external ties, but also the company to be attractive to other companies in terms of its assets and its *ability* to manage collaborative relationships (Ahuja, 2000b; Powell et al., 1996).

Advice regarding methods and procedures for interorganizational innovation initiatives is rare, however. The literature has proposed a few meta-capabilities assumed to be particularly important for the process of interorganizational relationships. Among those, we will mention here: absorptive capacity, various perspectives on trust and, alliance experience and routines.

Perhaps most significantly, it is recognized that interorganizational collaboration entails substantial achievements in complex forms of learning and knowledge creation. Knowledge is commonly considered problematic to transfer, however. Despite the declared aim of most companies to codify and formalize knowledge in order to facilitate its transfer and distribution, it is not possible to make all knowledge explicit, since it is not possible to fully replace the tacit part (Polanyi, 1966). Contingencies that influence the partnering company's capacity for joint learning thus become important factors. The concept of *absorptive capacity* proposes that the companies' capacity for learning depends on its ability to recognize the value of outside knowledge, to assimilate it and, ultimately, to make use of it in a business setting (Cohen and Levinthal, 1989; 1990). An extension of the concept to an interorganizational level of analysis suggests that mutual learning depends on the *relative absorptive capacity*, that is similarities between collaborating companies as regards their knowledge bases, the manner in which they incorporate knowledge, and their commercial objectives (Lane and Lubatkin, 1998). A central theme of this literature is that the company's prospects of learning are greatest when the knowledge to assimilate is related to existing knowledge structure.

Resent research reports on an increasing number of interorganizational relationships and alliances based on less formal means of governance (see for example Uzzi, 1997), particularly in the face of discontinuity and unanticipated environmental conditions. This may explain the increasing amount of literature on the company's philosophy vis-à-vis mutual beneficial relationships and willingness to rely on trust when dealing with one another. Persuasive evidence from numerous research streams and disciplines asserts the importance of trust as a complement to other governance and control mechanisms (e.g. Ring and Van de Ven, 1992; Zaheer and Venkataraman, 1995; see also the edited book on trust by Lane and Bachmann, 1998).

According to Ariño et al. (2001, p.123), trust can be regarded as an important complement to other governance and control mechanisms that "encourage

collaboration to go beyond the narrow scope of an agreement and foster the exploration of value-creating actions in innovative and non-calculative ways". In this connection, it is proposed that the extent to which collaborating partners feel comfortable, and are willing to rely on trust as a substitute for formal governance structures, will determine their *relational quality*. However, reliance on trust is a complex decision, which goes beyond trust as a manageable act of faith in people, relationships and organizations. It implies a broader concept that comprises the degree of trustworthiness the partners attribute to each other based on: (1) the initial conditions, i.e. on the basis of the institutional context, their respective reputations for fair dealing, and any prior experience they have had with each other, (2) the confidence that may develop through initial negotiations and the partners' interaction as the collaboration develops, and (3) the partners' behavior outside the context of the joint undertaking, which may affect how they view one another and their relationship (Ariño et al., 2001).

Relational quality increases during a broad bandwidth negotiation process. That is to say, when the partners consent to negotiation beyond the immediate aspects of their proposed venture, thus laying stress upon exploring their interests and motivations by actively observing each other's business judgment, reliability, and functional competence and consenting to altering the initial perceptions and assumptions drawn from the initial conditions.

Powell (1996) claims that trust is neither chosen nor embedded, but learned and reinforced by means of ongoing interaction and discussion. Hence, we can expect that the development of relational quality requires time, effort, and investment. Furthermore, Ariño et al. (2001, p.125) suggest that "when the company is experienced with alliance management and the partner is well known, levels of relational quality are likely to be high from the start and will substitute for controls in many elements of the alliance".

These thoughts are in accordance with the notion of Zollo and colleagues (2002, p.701) regarding *interorganizational routines*, which they define as the "stable patterns of interaction among two companies developed and refined in the course of repeated collaborations". They suggest that partners engaging in multiple interorganizational initiatives with each other tacitly develop 'partner-specific' experience and a set of routines that will foster knowledge accumulation and the performance of collaborative agreements. The importance of the depth of

relationships, as well as the emergence of interpersonal trust between the personnel of both organizations, is thus emphasized.

Type of interorganizational innovation process

We can expect that the process of interorganizational innovation initiative differs between the 'types' of innovation effort and challenge. The three categories identified here depict the extent to which the process concerns exploitation or exploration, causation or effectuation, research-driven innovation or innovation without formal research.

It has been suggested that a company's choice to enter into an interorganizational relationship or alliance can be distinguished in terms of its motivation to exploit an existing capability or to search for new opportunities (Koza and Lewin, 1998). Hence, collaborative efforts initiated for the purpose of creating innovation, exploring new market opportunities for future goods and services, and developing company capabilities correspond to *explorative alliances* (ibid.). Explorative alliances entail collaborating partners making commitments to pool competencies and the resources for a risky project. This raises the possibility of the market or technology possibly developing in another direction than that initially expected. However, companies might benefit from investing today in order to exert an influence and to gain experience regarding a *potential* opportunity. According to this view, investment in an interorganizational collaboration can generate an option to expand in the future, thus obtaining a chance to learn about and make sense of the value of complementary assets, as well as the fit of the partners (Kogut, 1991).

Kogut (1991) borrows ideas from real options theory (financial theory) to explain how some companies might use joint ventures as a mechanism for exploiting and buffering uncertainty in turbulent business environments. That is to say, as a shared investment providing each partner with an option to expand in response to potential business opportunities, as well as to avoid (through sharing) some of the eventual losses if the venture comes to nothing (i.e. in the event of a downside risk). Furthermore, he suggests that real options theory provides a means of grounding the trial and learning aspect on joint ventures. We can assume that these ideas are also applicable to collaborative (i.e. non-equity) relationships with explorative aims.

Another possible distinction, recently proposed by Sarasvathy (2001)[14], is that between the *causation* and *effectuation* processes. Causation is defined as a process that takes a particular effect (or end product) as given and focuses on choosing between the means (e.g. technology) of creating that product. Inversely, the effectuation process takes a set of means as given and focuses on choosing between the possible end products that can be created using that set of means (cf. Adner and Levinthal's notion of new application domains).

Causation and effectuation are both viable alternatives; one does not exclude the other. Their course of action differs, however. A causation process starts with a 'problem or opportunity' and focuses on choosing between effective ways of solving a problem or developing an opportunity. Moreover, the process usually starts out from a larger universe of means, proceeding inwards toward the specifics. Innovation through 'effectuation' corresponds to a process whereby the outcome is not prescribed, but is constructed and shaped over time as an integral part of the process. This in turn implies commitment to a tentative set of actions with no *a priori* guarantees or estimates of success. In this sense, causation processes represent a many-to-one mapping, i.e. many potential means of developing one given effect or product, whereas effectuation models involve one-to-many mappings, i.e. one given set of means of developing many potential effects or products (Sarasvathy, 2001). Sarasvathy (ibid.) describes causation and effectuation as separate categories, however on second thought, we might perceive them as relative. That is to say, as mutually dependent and supporting rather than two separate and disconnected processes.

For the purposes of the present thesis, we may as well distinguish between innovation and new product development processes which are largely research-driven, and processes that, to a considerable degree, involve innovation without formal research (cf. Cowan and Paal, 2000). That is to say, learning and innovating as a by-product of production, i.e. learning by doing (e.g., Brown and Duguid, 2000), or of consumption, i.e. learning by using (e.g., von Hippel, 1986).

[14] Sarasvathy's (2001) research primarily aims to explain the entrepreneurial processes involved in the creation of new firms.

Summary and conclusions

This section aims to develop a frame of reference by integrating concepts that can help to explain the process of interorganizational innovation initiatives. The outcome that we are interested in here is *opportunity*. That is to say, possible future business concepts (e.g. new business models and ways of creating value), products, services and process for further development and implementation. The outcome also refers to 'learning' and knowledge created during the process, which can breed future interorganizational innovation initiatives. This learning involves technology, products and services, as well as new knowledge of the partner company(-ies) and the process of interorganizational opportunity creation and recognition (i.e. the alliance capability).

The process of interorganizational opportunity creation and recognition requires corporate members to continuously engage in recognizing and responding to partnering opportunities across the company's boundaries, i.e. there is a need for alliance proactiveness and entrepreneurial alertness in order to initiate the process. The company's alliance proactiveness and entrepreneurial alertness are in turn dependent on the company's and its corporate members' connectedness and social position, as well as the level of motivation and ability in 'linking social capital'.

The impact of relational embeddedness and that of structural embeddedness on performance are assumed to be co-dependent on one another and partly contingent on the industry context; in the case of this thesis, influenced by the fluid condition.

Finally, it is important to note that I have presupposed an emergent process involving learning and adjustments (cf. the discussion above), although the description in terms of steps and phases might give the impression of a linear path. Figure 5 outline a model of the contingencies and factors we have discussed.

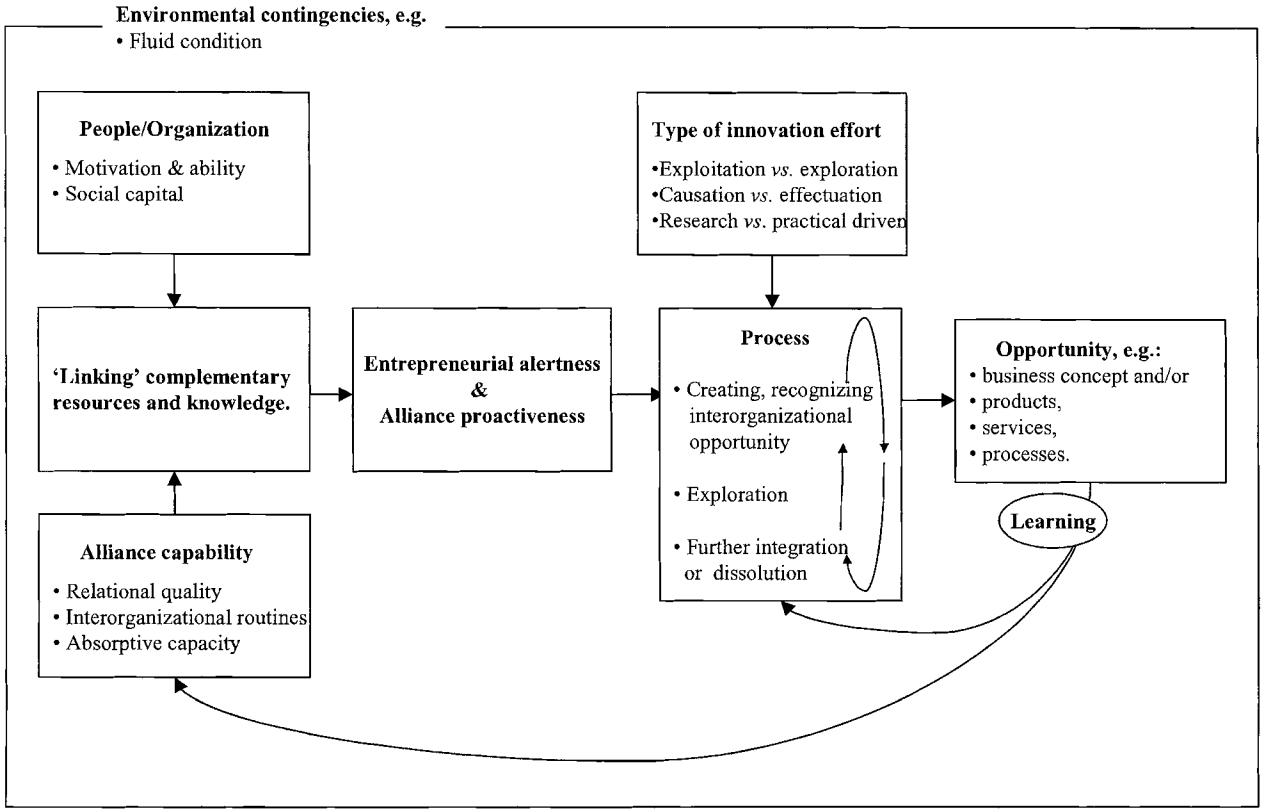

Figure 5. Model of contingencies influencing the interorganizational innovation process.

4.

METHODS

This section aims to shed some light upon how this thesis came about from a methodological viewpoint, i.e. the research approach, procedures, and methods. I will also reflect upon the validity and reliability of the conducted research – not least the strengths and the weaknesses, related to my dual role as a practitioner and part-time researcher during the research process.

The research approach: inquiry during moments of action

The Fenix Research Program

This thesis focuses on understanding and explaining the process of recognizing and creating new opportunities through interorganizational collaboration. The choice of topic was very much influenced by my personal interest and my experience of innovation and product development activities from previous appointments as a product manager. During that period, I was assigned the task of developing new products and services based on the Internet. The established processes and routines guiding innovation and new product development at the company were, at that moment in time, frequently accused of being inflexible and difficult to manage when applied to 'radically new' business ideas. Although adjustments to the application of the process were under discussion, there was limited scope for one's own reflections regarding fertile adaptations, beyond the most immediate needs of a particular development project.

I entered this research project, like many of my colleagues on the Fenix Research Program[15], as a PhD student. The basic idea behind the program was to bring an action dimension to the research process by appointing part-time practitioners. Attending the program confered the promise and the means of simultaneously

[15] FENIX is a research program that employs more than 50 researchers, executives and specialists from different sectors and academic disciplines. The purpose of FENIX is to bridge the boundaries between academia's search for new knowledge and management's search for improved practices.

acting as a reflective practitioner (Schön, 1983) and a researcher. This approach provided the opportunities to study questions and anomalies in my own setting, i.e. in a setting I was already familiar with rather than one of another group of people. Moreover, it held the prospects of conducting research in real time from the perspective of a self-ethnographer (Alvesson, 1999) or an insider action researcher (Coghlan, 2001; Roth et al., 2004).

I was employed on a part-time basis at the focal company, TelCo, throughout the research project. My various roles and assignments during the period were: (1) as a business developer and participant in various interorganizational relationships focusing on innovation and new product development, (2) as a "consultant" supporting ongoing interorganizational collaborations relating to process and organizing issues, (3) as a business strategist proposing strategies and means of partnering activities in the future, and (4) as a doctoral student and researcher.

Contributing to knowledge of use in both theory and practice

Neither academic researchers nor practitioners have a monopoly on knowledge creation (Schön, 1983). Nonetheless, it is argued that knowledge produced in the two different contexts, i.e. in academia and in industry, is different and partial (Argyris, 1985 et al). Consequently, if the diverse streams of knowledge could be co-produced and combined, they might breed a synthesis which would be of use in both theory and practice. This was the basic idea argued in Lewin's early conception of *action research* during the 1940s to describe a participatory approach to solving social and organizational problems (see also Coghlan and Brannick, 2003). Several of today's researchers are emphatic regarding the need for, and the prospect of, conducting research *together with* the people concerned. Action research is the most general heading one might use to span these approaches (Reason and Bradbury, 2001). However, the literature consists of 'nuances' that are variously called: action science (Argyris et al., 1985), collaborative research (Adler et al., 2004), participatory action research (Greenwood, 1991), and similar.

The potential of action research is that it contributes to local theory which is useful[16] for decisions and actions in the actual setting[17], while at the same time

[16] See (Louis, 1983) for an instructive discussion on the meaning of useful and relevant knowledge.

generating a more generalized understanding of the phenomenon for theorizing purposes (Argyris et al., 1985; Shani and Pasmore, 1985). The central tenets of a collaborative action research approach can be expressed as: (1) a *distinctive form of empirical inquiry* that advocates an intimate connection with empirical reality to produce knowledge relevant for action (Reason and Bradbury, 2001), similarly tested and refined in action (Greenwood, 2002); (2) a *collaborative process* applied in order to study and solve real problems in ways acceptable to both organizational members and the scientific community (Shani and Pasmore, 1985); and (3) a means of developing an organization's *self-help capacity* to continuously study, reflect upon, and improve organizational management and practice (Shani and Pasmore, 1985).

One important dimension of an action research approach concerns the researcher's position as a relative outsider or insider (Louis and Bartunek, 1992; Bartunek and Louis, 1996). Insider perspectives on empirical research can be arrayed along a continuum from ideas based on mere observations to ideas about studying individuals in action while acting (Gold, 1958). In conventional social science, empirical data is collected and interpreted by an outside researcher, whereas people in the setting are engaged in the research process as mere 'respondents' (Bartunek and Louis, 1996). Alvesson's (1999) 'self-ethnographer' is engaged in the research process in an active way, not as a mere observer. This is also the reason why he refers to an *observing participant* rather than to participant observation. An action research approach entails that the researcher becomes an active member of the organization in question, likewise that corporate members take an active interest in the process of understanding and change (Coghlan, 2001; Coghlan and Brannick, 2003). Some of the results presented in this thesis can be considered a section of an insider action research effort. While working on my thesis, I continued to act as a complete participant in different projects and interorganizational relationships at TelCo. Hence, perspectives and knowledge from the academic domain influenced my practical work, and *vice versa* (Roth et al., 2004).

The process by which this thesis has developed will briefly be described in the subsequent section.

---

[17] For instance by formulating action plans based on deliberate discussions and observed outcomes.

The research process

While *a priori* defined research questions can help when trying to structure research work, it is reasonable that the researcher (or research team) gains experience that might shift the focus in a way not initially appreciated (Eisenhardt, 1989). The research process employed while working on this thesis might stand out as sequential in the text, but this was not the case, however. The process of recognizing (or negotiating) the research issue and its scope can better be described as fluid, dynamic, and emergent.

As previously mentioned, the research presented in this thesis originated from my own interest in innovation and new product development carried out by established companies. An early study (not included in this thesis) of the impediments to innovation at established companies revealed, among other things, that uncertainty and changing contexts were two major problems for the organization members involved in innovation activities[18]. Based on those findings, I identified what I believed to be an opportunity to generate knowledge about innovation and new product development under conditions characterized by fluid change (The Genesis study). The relevance of the topic was further strengthened and encouraged by my colleagues at TelCo.

Shortly after the initiation of the Genesis study, the organization expressed expectations and needs regarding knowledge and working practices applicable to innovation and new product development through interorganizational collaboration. This guided my path to inquiries regarding innovation through interorganizational relationships. At the same time, I was asked to support two interorganizational innovation initiatives that had process issues, i.e. how TelCo, together with certain partners, could explore new business opportunities by means of a joint innovation project. This resulted in The Bright Study in which a team of practitioners and myself, in the position of a relative insider (Bartunek and Louis, 1996), tried to make sense of the occurrence and process of innovation through collaborative interorganizational relationships. Besides my involvement in these relationships, a small group of five from different parts of the organization gathered together in a series of workshops. These workshops were initially intended for an informal exchange of experiences and advice

[18] The findings were presented in a working paper by Magnusson and Marshall (1999).

among corporate members involved in various interorganizational initiatives. However, the group was soon requested (by the management team) to identify the demand for means and processes to support ongoing interorganizational relationships.

From the Bright study and other alliance activities, discussions at workshops, and informal meetings, it became increasingly evident that certain individuals, here considered to be corporate entrepreneurs, frequently employed personalized bonds outside of TelCo's boundaries to deal with the demand for innovation and new product development. Although the existence and use of interorganizational bonds was not unexpected, the way the respondents felt about these relationships was puzzling. Seeing that research into corporate entrepreneurs' use of external exchange networks and relationships was rare, it was appealing to explore the nature of such bonds further. This led to the initiation of the Entrepreneur Study.

A recent article by Adner and Levinthal (2002) on different 'types of discontinuity' brought the issue of context and generality to the fore. The final study thus aimed to review previous research into innovation through external collaboration in the biotechnology industry as a basis for comparison. The overall question concerned the chances of agents in the telecommunications industry learning from experiences of collaborative innovation activities in the biotechnology industry. Figure 4 outlines the process constituting this thesis' research scope and questions.

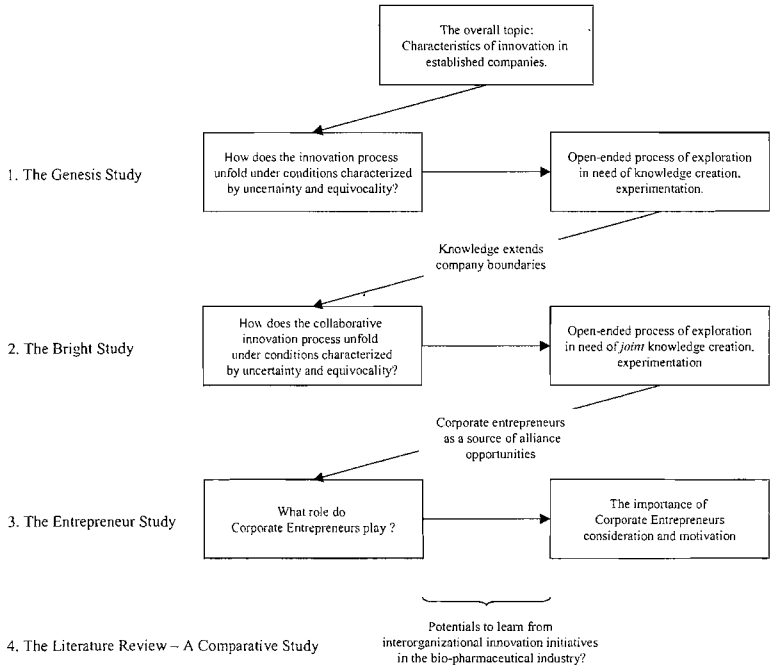

Figure 6. Forming the research scope and questions – an outline of the process.

The emergent research process entailed flexibility and the possibility of continuously modifying the research focus, the level(s) of analysis, and the theoretical framework. Moreover, it appeared reasonable to select a research method for the situation rather than making a general commitment to one method of data collection and analysis. An account of these methods will be given in the following paragraph.

Methods of data collection and analysis

Case studies provide the relevant means of collecting and analyzing empirical facts in situations where *how* and *why* questions are posed in order to explain and better understand a set of events and process issues over time in a real-life context (Eisenhardt, 1989; Yin, 1994). This thesis comprises four different case studies which rest upon a variety of qualitative data. Each case study will be described in more detail in what follows.

The Genesis Study – Product development in the face of uncertainty.

Type of study:	Retrospective single case study.
Method of data collection:	Self-reflection, in-depth interviews with 7 participants, archives.
Method of analysis:	Qualitative. An insider-outsider team of five researchers studied and analyzed 4 separate new product development projects.

The Genesis study was part of a larger research project, commenced in 1999, with the purpose of investigating new conceptions of models and methods in new product development. A team of five research colleagues, four PhD candidates and one senior researcher on the Fenix Research Program collaborated in about four case studies throughout the research project.

Each of the PhD candidates selected and examined a separate case (a product development project) from their own company. The particular case presented in this thesis concerned a product development project at TelCo, for which I had been responsible. Hence, the case data was partially based on self-experiences and self-reflections. Other important sources of data concern in-depth interviews with 7 people who had participated in the product development project and written documentation, e.g. minutes of meetings, project reports, and development plans. The interviews were semi-structured and tape-recorded. The questions asked during the interviews focused on collecting process data. The participants were asked to describe critical situations and events along a timeline (drawn on a sheet of paper where the interviewee marked the actual point in time). Highlighted situations and events were then discussed in terms of their impact on the development project and its progress.

My own understanding of the course of events, critical factors and, eventually, the project outcome was put into words through writing a chronological 'case story'. This text was then jointly discussed and reflected upon by the research team. Thus we attained a way of working similar to what Bartunek and Louis (1992; 1996) have described as an "insider-outsider research team", with the prospects of bringing variety and complementarity to my own interpretations. Each of us played dual roles, i.e. as relative insiders as regards our own personal case studies and as relative outsiders when reflecting upon the cases of fellow researchers.

The preliminary results were presented to other scholars (within Fenix as well as at a conference on new product development) and to fellow workers at workshops and seminars arranged for the involved companies. Those seminars and workshops provided valuable comments not only on the case descriptions and explanations, but also on the relevance of the results for practice and theory.

The Bright Study – Interorganizational innovation initiatives in practice.

Type of study:	Longitudinal case study of three (3) interorganizational innovation initiatives in real-time.
Method of data collection:	Participation, in-depth interviews with eight (8) participants, workshop, and archives.
Method of analysis:	Qualitative. The empirical data was analyzed in two rounds, the second by two researchers representing a relative insider and a relative outsider.

The Bright Study provided an in-depth investigation of the collaborative process between TelCo and its partner company(-ies). Three different interorganizational innovation initiatives were examined: Alpha, Beta and Delta.

The first two, i.e. Alpha and Beta, were examined in real-time from the outset to the closing stage and covered 10 and 11 months (starting in May 2000), respectively. In total, 22 (lasting 59.5 hours) formal and joint meetings and group efforts (i.e. booked in advanced and with at least one representative from each partner in attendance) were carried out during this period. Data acquired on these occasions was organized using a brief diary. This contained notes on the topic and reason for the meeting or interaction, the people that participated, and informative quotes. I also collected my reflections upon particular events that changed the course of action or, at the time, were deemed important to the progress of the joint task or the development of the relationship. Since I participated in the project teams as well as the steering committees, insights and thoughts from both the operational and managerial levels are available. Interviews with participants (2 responsible managers, 3 project leaders, and 1 project participant) and a vast library of written documentation, e.g. minutes of meetings, project reports, letters of intent, and e-mails served as complementary

sources of data. The interviews were conducted either in tandem (i.e. together with a fellow researcher) or by a sole outsider researcher. All the interviews but one (due to technical problems with the tape recorder) were taped and transcribed.

The main part of the empirical data relating to the third collaboration, i.e. the Delta collaboration, was collected from secondary sources, e.g. minutes of meetings, project reports and letters of intent. Interviews were conducted with the alliance project leader, the TelCo project leader and the TelCo representative on the common steering committee. The interviews were semi-structured, conducted in tandem (i.e. together with an 'outsider researcher') dubblett?, and lasted for approximately 120 minutes. Each interview was transcribed verbatim, and then joined with the others to form a whole by writing a 'case history'. Although not actively participating in project activities, I held regular meetings with TelCo participants during the collaboration. This provided access to vital information regarding the course of critical events and discussions between the partners.

The empirical data from the three cases was analyzed in two rounds. The first round aimed to examine and compare the course of events in the different interorganizational innovation initiatives. A framework developed by Ring and Van de Ven (1994) served as a means of sorting the data into order. The second round of analysis was carried out together with an outsider researcher (Blanche Segrestin, co-author, Paper III). By shuttling back and forth between narratives, observations, archival data and existing theory, we tried to make sense of the field data and search for general patterns or themes. These themes were then developed into conceptual categories. Consequently, the themes or categories presented in the papers were not assumed *a priori*, but as a result of this parallel processing. Moreover, a two-hour workshop was arranged for Alpha, at which participants from both companies discussed their experiences of the collaboration. Early results from the Bright Study were gathered in three co-authored conference papers. Taking part in conferences in the academic community contributed valuable comments and discussions on the subject, as well as the particular results.

The Corporate Entrepreneur Study.

Type of study:	Case study. Insider action research project involving participants in the actual interorganizational relationships and a single researcher.
Method of data collection:	Participation, in-depth interviews with fourteen (14) participants, workshops, and archives.
Method of analysis:	Qualitative. The data was analyzed in a cyclical process (action, collecting data, and evaluation) by a single researcher (the author of this thesis) and then elaborated on with participants in the particular interorganizational collaboration and at workshops held by TelCo.

Understanding collaborative actions in the *innovation process* of interorganizational relationships also entails studying the behavior of individuals, i.e. *how* corporate entrepreneurs act within their interorganizational relationships. The Corporate Entrepreneur study focused on the individuals who created opportunities for innovation activities through interorganizational relationships. Data was collected via in-depth interviews with fourteen corporate entrepreneurs. The entrepreneurs were chosen on the premise that they had initiated external collaborative relationships with the purpose of implementing new processes, products or services. They typically held the formal role of a product manager responsible for maintaining and developing a product, or of a business area manager in charge of a product portfolio made up of different items. The interviews were semi-structured and aimed at gathering events and thoughts regarding corporate entrepreneurs' ability and motivation to undertake boundary-spanning activities, rather than answering specific questions. The interviews lasted for approximately 90 minutes (one hour at minimum). The interviews were taped. The data also includes evidence from activities taking place in two interorganizational relationships (Epsilon and Gamma) in which I participated in order to support issues concerning the collaborative process. Participating in these interorganizational innovation initiatives provided the opportunity to reflect upon and discuss the entrepreneurs' situations – their considerations and

behaviors - in real-time. Secondary sources involved documentation from the joint project and minutes of meetings.

The Entrepreneur Study was initiated at a time when I had the role of a 'partner strategist'. Thus, at that moment in time, I arranged a series of strategy workshops at TelCo, where people from various departments participated. This provided the opportunity to include data captured during action while developing and proposing strategies and procedures for interorganizational relationships in new product development at the focal company, TelCo.

A Comparative Study – Reinterpreting findings in biopharmaceuticals.

Type of study:	Literature review and comparison of contingencies influencing interorganizational innovation initiatives in the biopharmaceuticals and telecommunications industry.
Method of data collection:	Review of approximately 50 journal articles on external collaboration in the biopharmaceuticals industry. For the purposes of comparison, the study employed data and results from the Bright and Entrepreneur Studies.
Method of analysis:	Qualitative. Comparison of previous concepts and factors (i.e. perceived problems and proposed governance mechanisms) found in the literature on collaborations in the biopharmaceuticals industry.

This study aimed to compare the conditions of interorganizational relationships in the biotechnology and pharmaceuticals sectors with those of the telecommunications industry. The major source of data is attributed to the existing literature on interorganizational collaboration, especially studies within the domain of the biotechnology and pharmaceuticals industries. The latter was gathered by searching for journal articles using electronic sources. Articles that contained the key words; innovation, product development, alliance, partnership, interorganizational relationships, and/or collaboration together with the words;

biotechnology, pharmaceutical and/or life science, were selected. The articles were then re-selected according to their main subject in innovation and new product development. Eventually, other related articles, books, and book chapters were identified through the different frames of reference in the already selected articles. Data was also collected from practitioner-oriented periodicals and through the Internet to add a dimension of what is currently happening and being discussed within the industry. The different concepts and factors (e.g. perceived problems and proposed governance mechanisms) were then analyzed and discussed in the context of innovation and interorganizational relationships in the telecommunications industry. Table 3 (at the end of this section) describes a chronological outline of the different studies and research activities.

The action part in the research design

The research presented in this thesis can be considered a section of an insider action research effort. Part of the agenda in each of the studied relationships was to learn more about how to pursue interorganizational innovation initiatives. This was the reason why I myself participated in several collaborations at the time. The main idea was that I could help cross-fertilize useful learning from one collaboration to another. Much of the learning was documented in terms of "case stories" and templates.

In addition to participating, I assisted in organizing workshops among corporate members from different departments who were engaged, used to participate or were up to initiate collaborative interorganizational activities. These workshops served as arenas for exchange of experience. Moreover, we applied the workshops as a competence source when preparing plans and forming the basis for TelCo' overall partner strategy. The result from these workshops complemented the case stories with reflections beyond the isolated case. Part of the result was also of a more formal character, e.g. a proposal for future partner strategy for decision in the management team.

Comments on the quality of the research design and strategy

Perspectives on Social Science

Debates on the distinguishing quality of 'first-class science' and the most appropriate research methods for investigating organizational life are somewhat equivocal. Any belief regarding how adequate knowledge can be created (epistemology) or any judgment regarding the credibility and trustworthiness of a particular research finding will depend on assumptions about the nature of reality (ontology) and human behavior. The various orientations towards these issues are commonly described along a continuum representing the 'objectivist approaches' in the positivist tradition, and the 'subjectivist approaches' in the hermeneutic or interpretive tradition (Morgan and Smircich, 1980).

Within the objectivist approach, the social world is assumed to be concrete (e.g. concrete entities, behaviors and relationships) and to exist in nature apart from the interpreting and construing of the individuals. Reality is therefore perceived as an objective phenomenon, i.e. 'a fixed and real thing out there', which lends itself to accurate observation and the measurement of casual relations between variables. Moreover, it is commonly assumed that individuals are forced by, and respond to, 'reality' in a lawful and predictable manner (Morgan and Smircich, 1980). These assumptions have led researchers to emphasize the analysis of concrete laws, regularities, and relationships among the phenomena of the social world. The theory-practice split, to satisfy ideals of objectivity, typically marks the research process (Denzin and Lincoln, 1994; Greenwood, 2002) and the methods used to capture empirical data are dominated by statistical measures and methods (i.e. quantitative research methods). Critiques have been expressed saying that positivist social sciences have lost their relevance to practical human affairs. In particular, the mechanical separation of theory from living process in practice has been the target of criticism (Reason, 1993; Greenwood, 2002).

In contrast, social researchers in the subjectivist tradition believe in reality as it is formed in the minds of individuals on the basis of their experiences, interpretations and social construction. From this perspective, the research process seeks to better understand how individuals shape their reality. While positivist researchers try to be as 'remote' as possible to their subject of study, the subjectivist assumes that objective reality can never be captured and that any serious discussion regarding a phenomenon can only occur if (s)he tries to

investigate it from 'within'. It is also assumed that the researcher influences the research process and its results, like anyone else involved in the situation. Therefore, balancing detachment and the degree of involvement for the purposes of objectivity is irrelevant to the subjectivist researcher. Obviously, there are a variety of orientations in between the extremes of the objectivist and subjectivist positions. My own position lies within the subjectivist span. However, I choose to use the notion of "critical subjectivity" (Reason, 1993), which suggests that all researchers should be alert to their relationships with the others involved in the inquiry. In that way, I dissociate myself from "the naïve subjectivity of 'primary process' awareness" (ibid.).

The traditional set of criteria used to establish quality in empirical social research involves *validity* and *reliability* (Yin, 1994). The results are said to be *valid* when a study has investigated the problem that the researcher intended to investigate and when the categories and values derived from the collected data are in agreement (Dubin, 1969). Different tactics have been suggested to establish validity. One of the most common is *triangulation* by way of multiple sources of evidence (Yin, 1994; Eisenhardt, 1995).

The case studies presented in this thesis involve multiple data collection methods (e.g. interviews, archives, surveys) and a mix of qualitative evidence. However, if we assume that objective reality can never be captured, the use of multiple sources will be better understood as a strategy adding breadth and depth to the understanding of a particular phenomenon than as a strategy for validation (Denzin and Lincoln, 1994).

As regards reliability, an empirical indicator produces *reliable* values if it is independent of a particular observer and proof against haphazard (Dubin, 1969). A research design (e.g. the choice of methods and procedures for data collection and analysis) is thus assumed to be reliable if it produces the same result and conclusion when repeated by another researcher (Yin, 1994; Eisenhardt, 1995). This criterion may be problematic in the sense that the specific actions and events in a collaborative approach are hard to reproduce in another research project.

Problems and potential biases inherent in the design

Case studies as a means of data collection. Although case studies have attracted much attention, it has also been claimed that too many case studies are just thick descriptions with no more than a weak link with theory, or too specific to the

particular situation. Against this backdrop, they are not appropriate for theoretical generalization (Yin 1994). According to Yin, the key is a greater reliance on theory. He thus suggests that the search for relevant theories is a vital part of the design phase and should therefore be conducted prior to any data collection. On the other hand, such a deductive approach[19] becomes problematic if we assume an emergent research process, as is the case in this thesis. As noted by Dubois and Gadde (2002, p. 559): "Theory is important, but it is developed over time". Their suggested solution is an abductive approach which they call *systematic combining,* i.e. a nonlinear and path-dependent process of "continuous movement between an empirical world and a model world" (ibid. p. 554). Among other things, the writing of conference and journal papers all the way through work on this thesis contributed to this combination and the continuous hovering between empirical investigation and theoretical generalization.

Another factor to be cautious of is the fact that the qualitative approach involving just a small set of cases has limits as regards generalization to a wider and more diverse population. For this reason, we cannot claim that the empirical evidence presented in this thesis is representative in the conventional sense. The reader may, however, recall Yin's (1994) suggestion that studies consisting of multiple cases can be viewed as multiple experiments (in a Popperian sense). He writes: "if two or more cases are shown to support the same theory, replication may be claimed" (ibid., p.31).

This thesis aims at providing insights through rich detail and suggesting preliminary premises for further testing. I will return to the possibility of generalizing the results in the concluding section.

The risk of 'staying native'. Time and again, it is pointed out that researchers have to be conscious of their 'closeness' to the actors, events, and situations under study. It is assumed that researchers who live and work in an organization for a long period of time will lose their detachment and become far too involved. Consequently, my familiarity and involvement with the studied object might be considered an obstacle and a potential source of bias.

[19] Deductive approaches are concerned with developing propositions from current theory and making them testable in the real world, and are not to be confused with inductive approaches where theory is systematically generated from data. An abductive approach can be considered a mixture of the two.

If we believe in a constructed reality shaped by anyone in the setting (the researcher included), detachment judged from a positivist view is of little significance. Of significance, however, is the risk of 'staying native' (Alvesson, 1999; Pettigrew, 1990) and becoming blind to new or alternative perspectives. The potential and chance of seeing things from new angles was partly maintained by collaborating with 'relative outsiders' (Bartunek and Louis, 1996). The reader may recall the insider-outsider team in the Genesis study and the fellow researcher acting as a relative outsider in the Bright Study. Moreover, presenting preliminary findings to practitioners and scholars at workshops, seminars, and conferences provided valuable comments and insights, with potential benefits for more robust theorizing.

Problems and potential biases inherent in the operationalization

The choice of cases. As may be evident in the previous account of the research process and methods, the cases in this study were in part selected due to 'ease of access' and the prospects of studying (taking part in) the interorganizational innovation initiatives from start to finish, as well as for their prospect of comparison (e.g. the three interorganizational relationships in the Bright Study). Given the intentions to choose comparable cases with prospects of generating longitudinal data, we may not bother too much about the risk of an uneven representation of cases. However, seeing as a large number of interorganizational innovation initiatives were informally initiated (Paper IV, The Entrepreneur Study), it seems appropriate to pay some attention to the risk of leaving out instructive cases.

A further issue to comment on concerns access to data. Acting as a complete member of some of the collaborations provided insights rich in detail. However, the availability of data was, for obvious reasons, better at TelCo than at the partner companies. The use of relative outsiders (fellow researchers) when interviewing participants at the partner companies has probably facilitated data gathering to some extent. Nevertheless, we should reflect on the possible effect of imperfect availability of data when judging the results of this thesis.

Deciding the unit(s) of analysis. Innovation is a function of actions on multiple levels. A major challenge and problem during work on the thesis was my indecision regarding the 'relevant' unit of analysis. The involvement of more than one unit of analysis, as is the case in this thesis, corresponds to an *embedded*

design (as opposed to a holistic design, Yin 1994). Such a design can be a device providing flexibility. However, on the downside, there is a risk of losing focus. This thesis describes an embedded design. However, any of the particular case studies normally involved one, at most two, units of analysis.

The outcome criterion. Most previous research into entrepreneurial behavior and innovation processes is derived from retrospective case studies conducted after the outcomes had become known (Van de Ven et al., 1989/2000). Consequently, most of the research into innovation and entrepreneurship has examined the process after the opportunities have been discovered (Shane and Venkataraman, 2000; Ahuja and Lampert, 2001). Although informative, a preconceived notion regarding success and failure may affect interpretations and conclusions. The major part of the research presented in this thesis was conducted in real time in the 'real world environment'. Hence, processes and outcomes were examined and documented as they occurred over time. A more general implication of this approach is that the studies began before they had reached their natural conclusion and before we could possibly judge whether or not the joint actions were innovative or successful (cf. the definition of innovation that includes opportunity recognition *and* successful *implementation*). I have found Davidsson's (2002) division of entrepreneurship into a scholarly and a teaching domain to be instructive in this respect. He suggests that entrepreneurial initiatives that do not succeed in introducing a new innovation onto the market are just as interesting as an entrepreneurial phenomenon - within the scholarly domain – but of limited interest when trying to educate future entrepreneurs. Hence, there is a potential for learning and furthering our theories regarding the innovation of interorganizational relationships by additionally including prematurely-terminated initiatives. Furthermore, the view taken in the present thesis is that failures can have positive consequences. There is, thus, a potential for developing a better understanding of what innovating companies can gain from 'failures' and how these returns can be kept and put to some use.

Table 3. Research activities and sources of data used throughout the thesis.

Date	Activity	Purpose/Outcome
The Genesis Study		
1999-2003	Research meetings and think-tanks within the research team (core team involved 5-6 persons). Writing case-stories.	Writing, comparing and analyzing case stories to make sense of the principal problems and potential solutions regarding new product development.
1999	Interviewing participants.	Collect participants' narratives.
January 01	Presentation and discussion of findings at the companies.	Feed the findings back to the companies and get preliminary conclusions and new perspectives on the subject.
The Bright Study		
May 00	Initial meeting with TelCo's project leader and representatives of the joint steering committee in alliances Alpha and Beta.	Discuss the purpose and the researcher's role in each interorganizational relationship.
May-December 00/01	In total, 5 workshops with the 'virtual team', i.e. a group of people (5) from different functions at TelCo assigned with the task of developing strategies and methods for alliance management.	Make an inventory of ongoing external relationships. Discuss the need for, and propose strategies and tools for organizing and managing interorganizational relationships.
	Meeting with representatives from the TelCo executive group.	Present results from inventory work. (Presented by one of the members of the virtual team)
August 00 - March 01	Participating in alliances Beta and Delta (e.g. formal and informal meetings, e-mail, reports).	Trace debates, decisions, actions, outcomes, and process issues over time.
October - December 00	Interviewing participants in Alpha, Beta, and Delta.	Collect participants' narratives.
December 00	Reporting the findings of a pre-study to the TelCo executive group.	Present results and collect data from comments and reflections.
	Writing case history. Involvement of a researcher bringing in an outsider's perspective.	Analysis and comparison between alliances. Write conference paper.
May 01	Follow-up meeting with participants in alliance Beta.	Collect participants' experiences and reflect on the collaborative process and its outcome. Gather additional data and verify early interpretations.
August 02 – June 03	Additional round of analysis	Pattern-matching. To refine and add to previous conclusions.

Continuation of Table 3

Date	Activity	Purpose/Outcome
The Corporate Entrepreneur Study		
August 02 – June 03	Participating in alliances Epsilon and Gamma.	Supplementary data.
November 02 December 02	Strategy workshop 1 at TelCo Strategy workshop 2 at TelCo	Reflect on findings and propose further actions.
December 02	Meeting with the TelCo executive group within the division.	Present results and discuss plans for further work on alliance strategy.
December 02–February 03	Interviewing participants.	Collect participants' narratives.
Mars 03	Bring in new perspectives from participants and fellow researchers.	Early version of analysis presented for interviewees. First version of paper. Discuss results with an 'outsider' researcher to complement the theoretical aspects.
The Literature Review – A Comparative Study		
November 03-Mars 04	1st round of literature review and analysis	
May 04	1st draft of paper	
June 04 – August 04	2nd round of literature review and analysis. 2nd version of paper.	

5.

SUMMARY OF APPENDED PAPERS

This section provides a summary of each of the five papers included in this thesis (see also Figure 5).

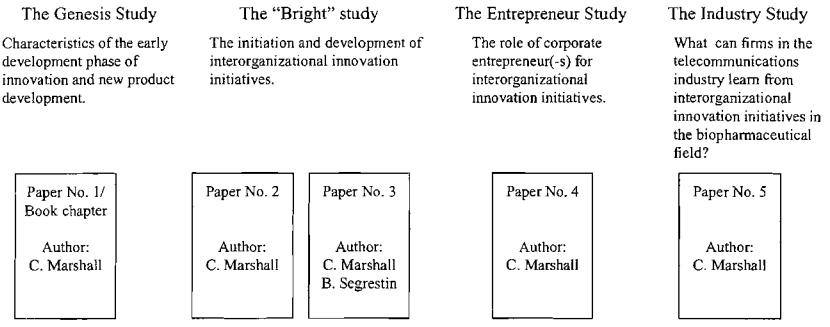

Figure 7. The studies and papers included in the thesis.

The *first* paper, *New product development when the plan has reached its limit* (book chapter), describes a product development project at TelCo. The mission of the project was to develop a business concept and products for "virtual offices" on the Internet.

The case data describes how development work started, in line with the company's stipulated product development process, with conventional planning activities. However, in spite of lengthy analysis and intense strategic discussions among product managers, business strategists, and technical experts, the participants were unable to articulate the distinct characteristics of potential products and services. Unfortunately, the participants got caught in a loop of texts and documents. After additional rounds of planning, and still without any concrete output in terms of a development plan or specification, the project received permission to act and implement its loose ideas in a small-scale prototype (the 'pilot project'). This instituted a new epoch.

This small-scale experiment became an arena for creation and reflection via improvisation. Instead of restricting the scope to developing given business ideas, the participants in the pilot project were expected to get to grips with the uncertainty by acting and experiencing. In other words, it allowed the participants to become conversant with a concrete situation.

The sequences in which goal-consensus and problem-setting must precede problem-solving in the traditional new product development process oppose the need for knowledge creation and learning. The analysis recognizes three different action strategies or process logics that the participants applied during the different phases of development work. The two earliest action strategies differed from the method of working used in the 'pilot project' in one important aspect, i.e. in the relationship between planning and implementation. In TelCo's product development process, as in many other traditional projects and development models, the distinct boundary between planning and implementation was emphasized. The product plan, which determined and governed all future activities, was formulated within the activity 'capturing ideas'. By sanctioning the 'pilot project', the Product Council dissolved the boundaries between the traditional development phases, giving the project participants the scope needed to explore customer demands and the prospects of the technical solutions. The complete plan was no longer an unconditional requirement to commence the subsequent phases. Instead, the plan and knowledge of the end product came to be developed in parallel with the implementation.

The paper concludes that planning, in terms of what is cognitive and verbally articulated, can only be pursued up to a certain limit. If the ideas are not yet tangible, letting the involved parties have the freedom to execute small-scale experiments and gradually reflect upon the results of their actions will better form a new business or product strategy. If experiments and improvisation are considered essential during embryonic phases of new product development, this should affect our attitude toward the management of such projects. Organizations will probably have to alter common practice and their approach to controlling and planning, and allow further space for action. However, arguing that talk can only be pursued up to a certain limit poses the question – *How do we know when to walk the talk?* As one manager thoughtfully put it: "I can hardly let all my projects run without a plan, it would ruin everything that we call resource management."

The *second* paper, *The dynamic nature of innovation partnering*[20], examines the initiation and early development of collaborative interorganizational relationships for innovation and new business creation. Data was gathered from field observations of three ongoing interorganizational relationships. A conceptual framework previously developed by Ring and Van de Ven (1994) served as a means of restructuring and analyzing the data.

Three organizational practices are identified, which may explain the various paths taken by the partners: (1) a process coordinated by rather incomplete and open-ended agreements; (2) a process that involved continuous re-evaluation and reorganization based on experiences from shared activities; (3) a process wherein the 'co-participants' continuously developed their relationships. Furthermore, the results reveal an emergent process that is dependent on the partners' comparative achievements in negotiation, commitment, and execution over time. A lack of achievement in any of the three stages of the negotiation-commitment-execution cycle (the N-C-E cycle) may be seen as a "warning signal" regarding the relationship's continued progress.

The findings reveal yet another quality associated with the dissolution of relationships. When relationships end prematurely, they tend to peter out in secrecy. We should not necessarily condemn their termination. However, the potential for learning from the results and conclusions created during the collaboration may be lost if the termination is concealed.

The *third* paper, *Managing exploratory partnerships*[21], draws on empirical data from the Bright Study. We identify some distinctive features having an influence on interorganizational innovation initiatives under conditions marked by fluid change. The case data indicates that the general uncertainties surrounding the task, relationship, and potential outcome made it difficult to foresee the interactions that might occur between collaborating partners. Occasionally, it was not even possible to identify the competencies and participants to be coordinated. The findings suggest that the exploratory partnership is a logic of exchange whereby the partners aim to explore new opportunities by re-opening the design

[20] Two earlier versions, which this paper is based upon, co-authored by Marshall and Hart, were presented at the 8th International Product Development Management Conference, org. by EIASM 2002, Enschede, and The 17th Colloquium, org. by EGOS, 2001, Lyon.

[21] An early version of this paper, co-authored by Marshall and Segrestin, was presented at the 9th International Product Development Management Conference, Sophia Antipolis, 2002.

space, by identifying constraints and potentials, and by prescribing new learning issues.

On these grounds, the paper suggests that the preconceived view of alliance performance, in terms of stability and longevity, is too narrow an outlook and hardly a reliable measure of success for interorganizational relationships aiming to explore a new innovation field. A framework is proposed that describes some features characterizing exploratory partnerships and the means by which collaborating parties coordinate their joint actions.

The *fourth* paper, *Bonds beyond bounds*, focuses on one aspect of the corporate venturing process, i.e. corporate entrepreneurs' diverse exchange relationships across company boundaries as a vehicle for innovation and new product development. The traditional image of corporate entrepreneurship and innovation as an internally-driven activity is partly being replaced by the inventive use of external relationships in the lower and middle layers of the organization. The main argument is that corporate members possess exchange structures and social relationships that serve as a critical conduit since they might be able to provide both the needs and the opportunities for future interorganizational venture initiatives. Moreover, by analogy with Polanyi's (1983) words on tacit knowledge, we might claim that companies are more connected than their arm's-length ties and formal contracts can prove, i.e. they frequently contain 'tacit structures'. These somewhat 'tacit structures' of people-in-relationships can be considered a strategic resource and productive opportunity.

The findings indicate that, irrespective of the form taken, corporate entrepreneurs' motivation to make use of their external bonds is dependent on the company's alliance capability, as well as the internal attitude toward the employment of personal relationships. There is thus reason for practicing managers and researchers alike to extend the traditional picture of corporate entrepreneurship by taking personalized bonds into consideration.

In summary, the contributions of this study are twofold: the first contribution concerns the examination of relationship patterns, partly in real time and through the perspective of an insider in the 'real world environment', providing an opportunity to capture in-depth narratives about corporate entrepreneurs' exchange relationships. The second contribution concerns further empirical validation of the relative importance of corporate entrepreneurs' diverse

exchange relationships and support for the view that the economic interests of companies and personal social commitments are largely intertwined.

The *fifth* paper, *Collaborative innovation in industries confronted by discontinuous change*, draws on insights from contemporary research into interorganizational relationships. Biotechnology and telecommunications are two sectors understood to represent a dynamic and knowledge-intensive field of business and to predict an increase in interorganizational relationships. Thus, this paper makes inquiries into the chances of incumbents in the telecommunications industry learning from experiences gained in the biopharmaceuticals field. Although managers are increasingly recognizing that outside collaborations with external partners have become critical, some business analysts (cf. Uglow, OVUM 2002) and researchers (Li and Whalley, 2002) claim that incumbent telecommunications companies generally respond to the pressure of change by "doing everything themselves".

Powell et al. (1996) suggest that the pattern of innovation and reciprocal learning found in biotechnology networks and interorganizational relationships is applicable to a range of other industries, especially when that industry is both complex and expanding and the sources of expertise are widely dispersed. This creates an avenue for investigating the prerequisites for, as well as the relevance of, transforming practices learned in the separate fields of biotechnology and pharmaceuticals into telecommunications. The purpose was not to adjudge the value of one form or practice as being better than the other, however, but to highlight the way interorganizational collaborations are created and managed in conditions characterized by dynamic markets and technological turbulence.

The paper involves two main sources of data: observations and concepts from previous literature on interorganizational relationships in the biopharmaceuticals field, and data from action research interventions in interorganizational collaborations carried out by a Scandinavian telecommunications operator. Collaborative arrangements that operate as virtual organizations are in focus. Minority equity investment may be part of the arrangement - a joint venture with its own distinct identity and separate operating facilities is excluded, however. Moreover, we are interested in interorganizational collaborations here only in relation to innovation and new product development activities.

The characteristics of biotechnology and telecommunications may be considered comparatively disparate and, thus, the prospects of comparing experiences

limited. The data suggests, however, that the knowledge and management practices needed to attract valuable partners, deal making, and working relationships are also relevant as regards collaborative innovation in the telecommunications industry. Still, the distinctive feature related to the telecommunications context, e.g. the variety of potential partners, the importance of practice for inventive activity, and the pace at which investment must be made prior to the realization of any market feedback, suggests that incumbent telecommunications companies also need to develop their own means.

6.

EMPIRICAL CONCLUSIONS

The aim of this section is to present the empirical conclusions of the conducted studies and to try and answer the research questions previously posed. These conclusions will then provide the basis for further elaboration in the subsequent discussion.

Conclusions regarding question I.

> How does the process of collaborative interorganizational innovation initiatives develop? Does the process differ from internal innovation and new product development?

The exploration logic of interorganizational innovation initiatives

In order to understand the innovation processes explored in the different case studies, it appears to be important to bear in mind the specific conditions of fluid change that challenge companies to work with a margin of error. The problem concerns the lack of clarity surrounding future outcomes, and so the few given answers or solutions to 'discover'. Findings from the Genesis and Bright Studies are indicative of the fact that innovation initiatives in such conditions can more easily be managed if the work is carried out using more and smaller steps.

The project participants in the Genesis Study (Paper I, see p.10 ff.) advocated this line of reasoning when they discussed the advantages of experimenting and conducting early trials. The project's decision-making data for the internal innovation and new product development project presented to the Product Council contained a rough vision and schematic description of the product design, a few arguments for the choice of market segment, and an idea regarding a limited market introduction. Over and above this, a proposal for time and resource frameworks for a trial was presented. As a development plan, the documentation was incomplete, but at least it proved to be sufficient as a broad outline of potential losses. The delimited trial (or experiment) entailed the Product Council's participants, to some extent, gaining control of the overheads

(in terms of both money and time) for a possible misguided venture. For the project participants, the trial meant that they obtained the latitude to explore and develop a potential opportunity, without the usual demands for complete assessments of the costs, duration, and outcomes *a-priori,* as the internal new product development model prescribed.

Very much like the illustration of the internal new product development project in the Genesis Study, it was found in the Bright Study (see Papers II and III) that the parties agreed upon a rather short and imprecise letter of intent which simply provided the fundamentals for initiating collaborative actions. The reader may once again recall the agreements between TelCo and its partners (the Bright Study, Paper III). According to the formulation, the collaboration aimed to:

> [...] identify, develop and exploit joint business opportunities from a supplier and mobile operator/ISP [Internet Service Provider] perspective, for a wireless e-service system solution.

The letter of intent indicated a preference for a step-wise organization of the work in terms of delimited trials (i.e. joint experiments and prototypes). Hence, what seemed to be at stake was the provision of an environment wherein collective learning could take place through experimentation, without predicting or taking for granted the next joint step. This was expressed in the agreement in following terms:

> The collaboration will initially consist of two to four pilot projects, after which the parties will evaluate the results and establish the final forms for the continued collaboration. Negotiations should continue until the Contract has been signed or a written statement thereof has been received from the other party. The period under which negotiations are being conducted is hereafter called the "Negotiation period". Agreements on activities and projects that are planned together during the negotiation period will be documented as an appendix to this Letter of Intent. (Letter of intent, May 2000)

In contrast to the traditional view of the joint innovation process and, similarly to the internal development models at TelCo, 'the development logic', we might suggest a complementary logic, identified as the 'exploration logic' or 'exploratory partnership' (Paper III, Marshall and Segrestin, 2003, see p.14-16). To put it briefly, the partners initiated an interorganizational innovation initiative as a means of exploring the knowledge necessary for creating, recognizing, and, eventually, developing future opportunities without expecting stable relationships or strong commitments. It is also worth mentioning that the conditional

commitments allowed the partners to commit themselves to negotiations only when they considered it worth negotiating. The different logics, development and exploration, appear to vary in their appropriate governance mechanisms and purpose (see Table 4):

Table 4. Commitments and coordination mechanisms, gathered from Paper III, Marshall & Segrestin (2003, p.14).

Governance Mechanisms & Contractual Arrangements	
Development logic	Exploration logic
1. The interests are predetermined. The negotiation precedes the start of collaborative actions.	1. Preferences, interests and risks are imprecise, and derive from design choices.
2. The partners are bound by the contract and expected to respect the prescribed rules.	2. The partners have the possibility to exit the collaboration.
3. The partners commit themselves to pre-defined objectives.	3. The goal of the collaboration is quite imprecise, but the Letter of Intent is a conditional commitment to negotiate whenever necessary.

Considered from the perspective of a 'development logic', we would have expected the partners to assign resources and competencies and then submit a working application in accordance with a previously-committed specification of requirements. Hence, we would have expected an order corresponding to a 'causation process' in the sense of Sarasvathy (2001). Nevertheless, the interorganizational innovations initiatives studied in this thesis were initiated without any specifications for a certain product or service. This implied that the potential product or service had to be specified and the relevant validation criteria jointly designed during the collaboration. The partners' prime purpose was thus to explore and learn about potential applications, any obstacles that might occur, and the necessary resources to co-ordinate. The case data also shows that the companies did not collaborate purely on the basis of existing knowledge. Instead, they came to understand which areas and issues of knowledge and capability to improve along with their joint activities. Interest and continued motivation, as well as calculated costs and perceived risks, were the outcomes of the collaboration, rather than prescribed beforehand (see Table 5):

Table 5. The purpose of collaborative partnership, gathered from Paper III, Marshall & Segrestin (2003, p.16).

Collaborative Purpose	
Development logic	Exploration logic
The collaboration aims to:	The collaboration aims to:
4. execute development activities in accordance with a pre-defined product specification,	1. explore the opportunities and prerequisites for a new business concept, i.e. preparing the future "specification",
5. acquire complementary resources and competencies in accordance with pre-defined interdependencies, and	2. investigate a new innovation field, identifying interdependencies and necessary competencies, and
6. co-ordinate joint activities in accordance with pre-defined and stabilised interfaces.	3. co-ordinate the exploration and prescribe new knowledge subjects and requests for further learning.

In light of these facts, we may instead liken the course of action to an 'effectuation process' (Sarasvathy, 2001). There is one difference to note, however. The case data suggests that not even the means were provided ahead of the collaboration. Instead, alterations and refinements of working procedures, competencies, and technologies appeared to be the norm (see Paper III for empirical illustrations, p. 12-14).

A further piece of evidence regarding the explorative aim and direction was the involvement of multiple interorganizational relationships. Rather than selecting exclusive relationships with a primary partner, the Bright Study reveals that TelCo continued to collaborate with quite a few different companies (competing companies as well). TelCo made no secret of this strategy. In a way, the partners held a tacit understanding of the need and prospect of various sources of knowledge and resources to explore the 'emerging opportunity arena' (McGee, 1995). Hence, besides their aim to learn about emerging opportunities in terms of new products, services, and processes, they also strove to try out possible complementarities and new business models with actors from the various corners of the ICT industry. This may explain why the partners preferred to agree upon a loose letter of intent rather than developing exhaustive mechanisms to prevent possible partner opportunism.

The emergent process of interorganizational innovation initiatives

As indicated above, the case results reveal an emergent process, in line with previous literature on the development of interorganizational relationships, thus, both vindicating and qualifying an earlier prescription to foster a continuous stream of negotiation, commitment, and execution, as well as an evaluation of the collaboration's further potential (e.g. [Ring, 1994 #214; Doz, 1996; Koza, 1998 and Lewin; Ariño, 1998 and de la Torre).

The case data also indicates that the development of interorganizational innovation initiatives was dependent on the comparative achievements in negotiation, commitment, and execution. The more the partners satisfied the value creation at each stage of the negotiation-commitment-execution cycle (the N-C-E cycle) - the more robust the relationship appeared to be. Moreover, the advancement and vigor of joint efforts seemed dependent on the relative growth in value of negotiation, commitment, and execution. As soon as the value-adding process declined and/or displayed an imbalance between each stage, the entire collaboration ran the risk of ceasing. For instance, in one of the relationships, the partners lost themselves during the commitment stage, spending vast amounts of time on adjusting contractual issues at the sacrifice of value added in sensemaking through negotiation, and the development of something 'tangible' through execution. Yet another partner got stuck during the execution phase, thus sharing the same fate. Given a minimum level, however, it appears possible to compensate for reduced speed and hindrances during one stage by performing better in the other two. This line of reasoning suggests an extension of Ring and Van de Ven's (1999) process model. To be exact, the result suggests that collaborating partners must pay attention not only to the different stages of the N-C-E cycle but also to the relative value-added during each stage over time.

The recurrent N-C-E cycle was the most marked process. However, a reappraisal of the different case studies suggests a parallel process composed of three phases: i.e. initiation, development of joint experiments, and 'reassembly'. The initiation phase, without hesitation the most speedy from the perspective of the outsider, consisted of an initial meeting to discuss the letter of intent, which the parties agreed upon within a couple of days. The second stage focused on finding something concrete to collaborate on in terms of a joint trial, prototype, or a joint presentation for a potential customer. Reassembly concerned considerations and reflections on the joint achievements (assessment in the sense of Ring and Van

de Ven's model) and resulted in one of three alternative paths: continuation, continuation in a new direction, or termination. This reassembly and adherent transition from one relationship state to another appeared troublesome in many respects. Perhaps the most crucial thing was to maintain the exploratory approach and allow for 'openness' in the specification and plan and to make the decision regarding when and how to bring the collaboration to an end. These issues will be further discussed in the following paragraph.

Conclusions regarding question II.

> What critical factors are required to leverage and take advantage of collaborative interorganizational innovation initiatives?

TelCo's various interorganizational innovation initiatives had less to do with the reduction of uncertainty or instability and more to do with the partners' ability to organize activities in support of the 'exploration' of new opportunities and future business relationships. Moreover, they aimed to prepare 'the future specification' (e.g. possible complementarities, functionalities, competencies), and criteria towards successful or unsuccessful design. This approach challenged the partners to: (a) design social interactions and action arenas; (b) maintain openness in the plan and specification; and (c) manage transitional stages in a productive way.

Designing interaction and action

How can collaborating partners design their interaction and joint task when they cannot specify the expected outcome, nor the competencies required? How can they communicate regarding something that has not been specified in detail?

In the interorganizational innovation initiatives referred to as the Bright Cases (Papers II and III), as well as in the case describing an internal new product development project at TelCo (Paper I), the key turned out to be a joint trial. Hence, the collaborating partners gave shape to an early idea and opportunity by acting. This approach required something tangible to interact around, however. A demanding customer seemed productive in this sense. The basic idea was to jointly try to uncover the customer's needs and then meet those needs. Such innovation efforts were sometimes initiated by a customer request. However, the case data also shows examples of partners who were careful about finding a

possible[22] customer they considered to be demanding and experienced in the particular technological area and/or business field of interest. Other collaborations started with one or more early prototypes brought into the collaboration by the partners. Another example is the relationship between TelCo, various software developers, system integrators, a furniture company, and a building proprietor. In this particular collaboration, the partners aimed to explore the concept of "the future office". For this purpose, they developed a platform (administrative as well as technical) for joint experiments. This collaboration has been ongoing for a couple of years. However, the participating partners have changed, and altered their undertakings over time.

The trial approach entailed working with concrete outcomes and served a threefold purpose. First, it helped the partners to find contradictions, constraints and issues to explore further, and second, it facilitated the integration of old knowledge with new insights. In this connection, the reader may recall how the partners of one of the Bright Cases discovered that they had to consider a greater variety of hardware interfaces than had been anticipated. This forced the partners to change their programming language and further develop some of the applications, which in turn entailed new competencies. Finally, it eased the decision regarding subsequent steps and activities. For instance, when the partnering companies realized that they had to adjust to a variety of hardware interfaces, it also became evident what activities were to be done next.

At times, customer involvement and prototyping were not possible alternatives, especially not in the earliest tentative efforts to form a closer relationship. Thus, a recurrent theme concerned the form and procedure for the very first 'date'. The corporate members in this study indicate a great demand for a toolbox containing procedures and means to lean on. They envisaged joint seminars under freer forms for comparing different perspectives and/or different scenario workshops in order to provide context and meaning, then interpreting possible complementarities and joint opportunities. However, they felt they lacked the skills and practice to design and conduct such activities in a productive way. Another problem concerned the steps needed to introduce a potential partner internally. As there was no obvious entrance through which to bring in ideas

[22] I use *possible*, in the sense that the ultimate customer was typically unknown, and would become apparent through joint exploration.

regarding interorganizational innovation initiatives, they were obliged to take potential cases to a 'higher court'. However, this implied a rather detailed specification. The hardship of structuring a first 'date' and introducing the possible partner internally was clearly experienced as a problem (Paper IV, p.14).

In conclusion, the findings emphasize the need to design interaction and action which, in one way or another, will produce consequences to act upon (cf. previous discussion on the revolving N-C-E-cycle). It appeared as if the cultural, technical, and performance capacities for designing these kinds of shared action arenas appeared crucial for interorganizational innovation initiatives.

Maintaining openness in the plan and product specification

The collaborative initiatives described in this thesis were initiated during the concept stage, before the 'product specification' had been defined and designed. The partners were thus challenged to work on specifications and plans that were tentative and incomplete. Moreover, we recognize that the partners' particular aims were idiosyncratic (though complementary), and hence involved subjective evaluations of how the collaboration had developed. Given the need to reposition in case they were wrong or had changed their focus, the collaborating partners required interorganizational arrangements that were fairly flexible. The letters of intent previously described were designed with those intentions.

Furthermore, exploration through joint trials and experiments challenged the partners to hover between two extremes: to maintain openness in the plan and specification, i.e. provide for extensions, modifications, and novel interpretations; while retaining enough focus to direct actions during the trials. The empirical evidence shows that it was hard to hold on to the exploratory aim and direction. The reader may recall the situation when the partners shifted their focus and started to validate existing technologies, instead of exploring related potentials; or when they tried to govern their relationship by means of a market exchange, despite the common perception of the outcome as uncertain and undefined. Another situation was when the partnership was being kept formally alive (in a "wait and see" scheme), even though the learning processes had been trained in new directions, and with other partners. Such inconsistencies between the exploratory logic and the applied governance principles caused tensions between the partners which appeared hard to resolve. We will return to the subject, and possible ways of dealing with it, in the discussion section.

Managing transitional stages

The case data suggests that the partners learned more about opportunities and limitations while work was progressing, thus they could not, in advance, sort out the good and bad opportunities (e.g. possible new products and services) from each other, nor the most appropriate partner constellation. Such insights were more likely the result of learning and supportive data for correcting the course. The decision to continue was dependent on a recurring assessment of the progress (cf. Ring and Van de Ven, 1994). If the first stage collaboration worked, if the collaborating partner was still perceived to be relevant and attractive, and if the possible opportunity still appeared promising, then there was reason to continue.

In this connection, two further aspects emerge. The first concerns the subject of forming a judgment relating to carrying on or bringing the collaboration to an end. Findings from the Bright and Entrepreneur Studies (see Papers II-IV), suggest that, on the one hand, the relationship might be terminated too early, i.e. when the collaboration still has the potential to enter a new explorative phase (continuation in a new direction), while on the other hand, the collaboration might be terminated too late. This is when any (or every) one of the partners, no matter what the reason, has lost the motivation for further involvement but hesitates to reveal its standpoint, thus neglecting to end the collaboration. The consequence of such a situation is that the relationship turns into a 'wait and see' scheme, and eventually peters out by itself, without any closing statement (see Papers II and III for examples). As an example, the reader may recall how the claims regarding further development of the communication platform, in order to better suit TelCo's infrastructure, appeared contrary to Xchange's strategies. As a consequence, the partners had to decide whether they should transform the exploratory partnership into a co-development project, i.e. with new contractual arrangements and co-ordination procedures, and/or maintain the exploratory intent. In this particular case, the partners failed to take a definite stance. Consequently, they ended up in a wait-and-see state and the collaboration eventually petered out.

In either case, we have recognized a wasted opportunity for learning; besides the fact that the potential for learning from results and conclusions arising during the collaboration may be lost if the termination is concealed. In the first case, the partners failed to notice the chances of further exploration and learning in

another, new direction. We found that the participants following the second route expressed a more obvious sense of failure and lost motivation. This brings us to the second subject, namely the way the partners deal with 'prematurely terminated' interorganizational innovation initiatives, as it can have a bearing on their capacity to learn from a particular collaboration, and thus on future opportunities.

Taken together, the findings suggest that, to create a learning opportunity, the partners face the challenge of evaluating the experience of their innovation initiative and jointly closing the books. We may thus question the extent to which a concealed termination negatively affects the chance of organizational learning and the participants' motivation regarding future interorganizational innovation initiatives.

An interorganizational innovation initiative may well be brought to an end as a consequence of successful learning. I thus propose that we cannot deem interorganizational innovation initiatives to be failures solely on the basis of stability or longevity. To make a judgement, we must include the collaborating partners' explorative aims, i.e. ascertain whether they have increased their knowledge of strategic motives and the domain of collaboration, possible new products (services/processes), the characteristics of potential partners, the environmental conditions and opportunities, and the processes and management of inter-firm relationships in general. We have to consider whether they have consciously managed to co-ordinate the actions and processes in order to enhance joint knowledge creation and learning.

Conclusions regarding question III.

> What role (if any) do corporate entrepreneurs play in creating and recognizing new opportunities through collaborative interorganizational initiatives?

The general answer to this question is that corporate entrepreneurs[23] clearly play a role. One of the key findings of the Entrepreneur Study was the number of 'concealed' interorganizational innovation initiatives going on across company

[23] It is important to note that not everyone is an entrepreneur, or always an entrepreneur. Any individual can play the role of entrepreneur each time (s)he takes on the task of 'creating new combinations'/innovations.

boundaries. The most illustrative example was an activity initiated by the management group to identify ongoing collaborative relationships across the boundaries of the company. The presumed stock of 10 partner relationships turned out to be 57 ongoing efforts. The fact that a significant number of interorganizational initiatives were unknown to management might not be surprising *per se,* however. The literature is filled with anecdotes and tales of bootstrapping corporate members acting in informal ways (Kreiner and Schultz, 1993; Bouty, 2000; de Rond, 2003). Based on the case data, I am more inclined to argue that we (practicing managers and scholars), as a consequence of our unawareness, disregard the potential of individual corporate members' social capital and linking activities for innovation and new product development.

Interviews with corporate entrepreneurs echo the figures above. In fact, almost all the cases studied in this thesis were a result of individual encounters. Some had grown out of previous purchasing or sales activities with various suppliers and/or customers, while others had developed from personal ties with entrepreneurs, friends, and/or former colleagues. When asked the reason for their interaction and relationships across company boundaries, corporate entrepreneurs answered that they had been stimulated into coming up with their best ideas regarding future products and services by people outside their own company and line of work. To put it briefly, a sizeable part of the corporate entrepreneurs' linking activities was not coordinated by plan, but rather self-organized, reflecting their knowledge needs and the knowledge-sharing opportunities they recognized (Paper IV, see p.11 ff.).

Why were interorganizational relationships so dispersed and not concentrated in the hands of the executives? Two interpretations of this fact appear possible. The first suggests that management had purposefully designed in a certain degree of 'slack' that allowed corporate members some scope to search for new product ideas across company boundaries. This explanation is, however, contradictory to management's great surprise at the number of linking activities. Another interpretation could be that some interorganizational innovation initiatives escape being managed as management takes little account of personal ties and linking activities across company boundaries.

Conclusions regarding question IV.

> What factors and conditions enable or disable corporate entrepreneurs' motivation and ability to create and recognize new opportunities through interorganizational collaboration?

The previous section proposes that individuals below the level of executive management possess social capital that provides a potential source of new 'alliance opportunities'. On the other hand, the case studies also indicate that interorganizational ties in the possession of corporate entrepreneurs are not necessarily within the reach of the company. The empirical data suggests that access to these ties requires not only the corporate entrepreneurs' connectedness, but also their keenness to make use of them for the company's good. What is more, quite a few corporate entrepreneurs regarded certain exchange relationships as 'hard-earned' and highly 'personal' resources. In this connection, they expressed that there was a risk that other people in the organization might take advantage of influential and 'hard-earned' ties in an unfair way. Although some of these findings can be put down to ego, there may be something else at work here.

The case data suggests that corporate entrepreneurs were constantly mindful of the eventual loss of valuable relationships. How entrepreneurs at TelCo act, as well as their keenness to employ their ties, seems to depend on their assessment of 'social cost', i.e. the risk of damaging their 'social position' and personal reputation, and losing particular bonds. Among other things, they acknowledge the risk of damaging their own reputations or social positions due to the company's ineffectual handling of interorganizational collaboration. Larson (1992) found that the entrepreneurs in her study largely relied on their personal reputations to initiate interorganizational collaboration, as did entrepreneurs in TelCo. Recognizing the potential danger of losing valuable ties for the sake of internal trouble, a lack of support, or inefficiency in managing external collaboration gave reason to keep these exchange relationships at a distance.

We can conclude that practicing managers require knowledge of how to best support and encourage corporate members (entrepreneurs) to make use of their relationships and then share their experience internally. Three types of critical factors stand out in the case data: the organizational attitude toward interorganizational relationships and collaboration, the organizational capability (i.e. alliance capability), and the attitudes toward failures.

The forms of interorganizational linking that can be sustained are intimately bound up with the nature of the norms of reciprocity and knowledge-sharing across company boundaries (entrepreneurial activity) prevailing in the company. The corporate entrepreneurs in this study also emphasized the need to be recognized and supported. Moreover, it was repeatedly mentioned that maintaining a relationship calls for continuous efforts, efforts during which one's personal reputation, identity and position are all at stake.

Finally, it appears as if the way the organization takes care of prematurely terminated initiatives is of great importance to corporate entrepreneurs' keenness to make use of their bonds.

Conclusions regarding generality

One contribution of this thesis is to provide an empirically-grounded representation of how established companies conduct innovation through interorganizational collaboration. As already discussed in the methods section, the empirical evidence is qualitative and based on a small set of cases, thus limiting the prospects of generalization in a conventional sense. A relevant question thus concerns the extent to which the experiences and insights presented in this thesis could be replicated in other contexts.

On the other hand, in-depth qualitative research into the process of interorganizational innovation initiatives is scarce. An interpretation of the empirical evidence provides insights into the process and management practice of interorganizational innovation for further test. Hence, the empirical evidence and heuristic guidelines presented in this thesis may be generalizable to other interorganizational collaborations subjected to fluid environmental conditions.

Moreover, the literature review (Paper V) was initiated with the aim of comparing and linking insights from the biopharmaceuticals industry with the field of telecommunications. It appears as if part of the experience is also applicable to incumbent telecommunications operators. However, the wide spectrum (in number as well as category) of potential partners, the amount of inventive activities besides formal research, and the speed of feedback relative to the pace at which investment must be made all challenge (and allow) telecommunications operators and their partners to think about innovation through interorganizational relationships somewhat differently. In light of these

facts, we may suggest that the evidence presented in this thesis better answer to interorganizational innovation initiatives where the conditions are fluid, but also correspond to the contextual factors present in the telecommunications industry (e.g. the type of opportunity and innovation process, and the variety of possible partners).

Conclusions regarding the method

Action research approaches hold the prospect of simultaneously contributing knowledge to a scientific discipline and practice. The emphasis on action research in the present thesis does not imply that research questions and solutions grounded in the real world of practice automatically contribute to 'useful knowledge'. Scholars have, however, recognized that "few management scholars specify the process that managers should use to implement their theories, concepts, and methods without incurring unintentional consequences. It is also recognized that fewer still take issues of implementation and change into account when choosing their research method", (Beer and Eisenstat, 1996).

Work on this thesis involved a limited number of case studies in which I participated as one member among the other members responsible for different tasks on the particular work agenda. In four of those cases, I hold an additional role – i.e. being supportive in issues concerning the processes, methods, and tools needed to manage the interorganizational relationship. This was meant to be a chance to learn and reflect upon critical processes and factors for the functioning of interorganizational innovation initiatives.

The perspective of action research puts an emphasis on collaborative efforts between practitioners and scholars which aim to simultaneously produce knowledge that is useful for action and theory (Shani and Pasmore, 1985). The goal is both experimental and analytical (Hatchuel, 1999). Hence, "the final test of the achievement of an action research effort is [...] measured in part by the impact it has on problems stated by members of the target systems, not the researcher" (Shani and Pasmore 1985, p. 439). I believe we have learned in the actual setting – at TelCo. During the research work, it was found that organized arenas, e.g. workshops and seminars at TelCo (on one occasion together with the partner members), enabled corporate entrepreneurs and other participants to leverage their experience regarding a particular interorganizational innovation

initiative, as well as with regard to the collaborative process. Even though each individual interorganizational innovation initiative represented unique combinations, insights and experiences, the participants described these events as a learning opportunity. We may thus expect that such 'debriefing activities' can increase the person's (and thus the company's) capacity for recognizing and creating new opportunities through interorganizational innovation initiatives. However, even though the knowledge has been re-used in various interorganizational innovation initiatives and partly incorporated into the strategy process, the learning was largely local. Experiences from work on the thesis suggest that action research approaches have the potential to enhance an organization's capacity for learning about new practices and strategies. However, the crucial question remains; i.e. how to productively incorporate experiences and knowledge gained from a specific interorganizational innovation initiative into the active memory of the company.

Yet another subject concerns the political aspects and the repeated attempts to get management's attention during the research project. As noted elsewhere, "taking the role of an Insider Action Researcher means challenging existing knowledge bases within the organization and initiating new ways of behaving and working" (Roth, 2002, p. 35). Management support appears crucial. However, the different time cycles used in day-to-day practice and research efforts affected work on this thesis insofar as managements' priority, and thus the extent to which corporate members gave precedence to the activities, changed with time. This entailed working under the direction of the management team, as well as informally in 'virtual teams of enthusiasts' and/or temporarily supporting participants in a particular interorganizational innovation initiative.

Finally, the role of 'relative insider' is full of nuances. Bartunek and Louis (1996) have argued that a collaborative 'insider-outsider research team', connecting relative insiders and outsiders, can bring variety and complementarity to the set of interpretive frames, perspectives, or cognitive maps, with potential benefits for more robust theorizing. The following quote describes how they characterize the insider and outsider (ibid., p. 102):

> Typically, the insider(s) will have a role as organizational member when not involved in the study, and the outsider will not. Typically, the outsider(s) will have a role that encompasses research activities when not involved in the study, and the insider will not. The outsider is more likely than the insider to be trained in social science research methods. By definition, the outsider is more

> detached from the setting than is the insider. The outsider is also more concerned than the insider with "uncovering knowledge that can be generalized to many situations" (Evered & Louis, 1981, p.385), whereas the insider is more concerned with the particular situation and with developing knowledge for practical use.

Missing from Bartunek and Louis' (1996) concept are organizational members trained in social science research methods and concerned with developing knowledge for both theoretical and practical use – as in the role of "insider action researcher" (Roth et al., 2004). We can expect that some challenges, e.g. the priority and attention discussed above, are related to this particular role.

7.

DISCUSSION AND IMPLICATIONS

Where does all of this leave us? The aim of this section is to discuss the findings presented in the previous section and propose some future research avenues.

Dating for innovation

Metaphors embody our sense of what we see and interpret as happening. *Dating* is a metaphor, and words like mingle, movement, change, and dynamism apply to it. In this thesis, the dating metaphor serves the purpose of describing interorganizational innovation initiatives in fluid conditions. It invites us to consider how an established organization and its partners are, over time, challenged to design and redesign the subject of their collaboration, the way they collaborate, and with whom they collaborate.

There seems to be consensus among researchers as well as practitioners that companies interact with other organizations to overcome the tensions between capability exploitation, and the continuous demands for change and innovation. Collaborative interorganizational relationships can, in this respect, meet the company's need for new technologies and opportunities.

A good deal of previous literature considers interorganizational innovation initiatives to be a 'stabilizing force' that can help reduce uncertainty in a rapidly-changing technological world. The empirical findings presented in this thesis illustrate how two or more companies enter into emerging collaborative arrangements in order to explore the knowledge necessary for recognizing and creating future opportunities. However, those initiatives have less to do with the reduction of uncertainty or instability and more to do with the partners' ability to organize activities in support of the 'exploration' of new opportunities and future business relationships. The case studies illustrate how collaborating partners *dated* each other with the purpose of innovating.

The dominant perspective within research (and practice) tends to view collaborative interorganizational relationships as enduring arrangements. For

instance, Larson (1992) assumes that the trial period represents incremental movement during which the partners, by degrees, develop a norm of reciprocity and, over time, a more stable relationship. However, the empirical conclusion drawn from the studies presented in this thesis is that we should be cautious about making assumptions about progress and stability in the sense that one stage is implicitly better than the one before.

There are close similarities between conclusions about *dating* and exploratory partnerships, as described in this thesis (Paper 2), and the recent idea of transitory alliances (Duysters and de Man, 2003). Both concepts focus on completing joint trials and experiments within a very short timeframe in order to generate knowledge of future opportunities. Duysters and de Man (ibid. p. 56) define transitory alliances thus:

> Transitory alliances are specifically designed to enable rapid experimentation. It is agreed from the outset that knowledge is exchanged and jointly created during a brief period of collaboration, which can be ended by any of the partners at will.

Duysters and de Man are emphatic about the temporary characteristic. I would not wish to suggest that 'temporary' is an end in itself, however. Short-lived arrangements are, from a *dating* view, a consequence of the circumstances that encompass interorganizational innovation initiatives in fluid conditions. Reasoning from a real option perspective can be illustrative in this matter. The value of a particular option to a particular company is embedded in the strategic context of that company and cannot be considered separately to it (McGrath, 1997, p. 980, see also Kogut, 1991; Koza and Lewin, 1998). Thus, if other activities appear more lucrative or interesting, if interests change, or if it seems that long-term growth is limited, one of the partners might disband the collaboration. Hence, we can expect that both joint recognition and the creation of new opportunities occur along an iterative process of "thoughtful planned action" (Hatchuel, 1999) which advances learning, permits redirection, and allows for stage investments so that expenditure can cease under poor conditions. Conversely, favorable conditions may encourage further investment.

Dating thus challenges the partners to design their interactions in a way enabling them to learn about what has to be learned, or could be learned, and to maintain openness in planning in order to expand the possible innovation space (cf. Hatchuel, 2001). In accordance with the findings of the Minnesota Innovation

Research Program, we recognize that the partners initiated their collaboration with a profound lack of knowledge. For that reason, they had to undergo a period of *exploration* in order to *experience* what courses of action would be possible, what outcome goals and criteria they preferred, and in what kind of environmental context or setting they would work (see Van de Ven et al., 1999, p.203). Exploration and experience appear to be the keywords while the applicable method and mode of procedure appear to be fairly open commitments and joint trials.

Alliance capability.

Arguments relating to short-lived alliances are at odds with theoretical perspectives that stress the normative importance of longevity and stability as prerequisites for developing absorptive capacity, relational quality, and interorganizational routines. For instance, Steinhart and Rodney (2001) conclude from their studies of partnerships in healthcare that: "It is simply not possible to successfully implement a short-term partnership. Time is needed to obtain trust, verify performance, document progress, and learn effective communication". Hence, the contradictory explanations of *dating* and the traditional view of stable relationships prompt two competing predictions, with respect to the performance of interorganizational innovation initiatives.

Furthermore, in line with classic organization theory, there should be a preference for flexible forms that allow learning and speed when conditions are turbulent. However, most advice tells us differently. For instance, scholars have proposed that collaborating companies will choose non-equity arrangements in the presence of prior ties, and equity arrangements in other cases (Gulati, 1995b; Gulati and Singh, 1998; Zollo, 2002). The reason for this is that non-equity arrangements lack the incentive alignment and control properties associated with equity alliances.

Nonetheless, the case results suggest that collaborating partners may engage in more loose collaborative arrangements (i.e. non-equity) on the basis of rather open-ended letters of intent when conditions are fluid. Jalinek and Kraemer's (2002) notion of *dynamically stable commitments* can be useful for illustrating the conditions. According to these authors, such commitments are "*stable* insofar as they endure long enough to achieve something like their intended goals

[...and] *dynamic* insofar as they do indeed shift in response to events, information, and people, and furthermore that their goals can and do change" (ibid.).

Another aspect concerns the partners' willingness to rely on trust when conditions are fluid. It is suggested that trust is subject to considerable growth and evolution, thus entailing that the level of trust will be shaped by the partners' behavior as the collaboration develops. Furthermore, it has been suggested that low levels of initial trust are difficult to overcome (Ariño et al., 2001). The advice would be that companies should be conscious of trust management. Nonetheless, and surprisingly to me, Ariño et al. (2001) conclude that:

> Managers should also recognize that investments in relational quality make less sense in highly turbulent environments, because the level of uncertainty is such that one cannot predict what type of assets will be most relevant to compete in the future. Under these conditions, the firm would be better off building a portfolio of alliances that keeps options open. As the industry stabilizes and uncertainty declines, the choice of valuable assets will become clearer and management can focus their relational investments on those alliances worth maintaining.

From a *dating* perspective, the outcome of a relationship cannot be ascertained *a priori*. Hence, an innovation initiative that starts in dating mode may result in a long-lasting collaboration between the partners. The selective development of trust may thus be an unproductive strategy.

Designing action into knowledge

The assumed difficulties of transferring and sharing knowledge among collaborating partners explain researchers' main emphasis on *how knowledge is shared and transformed into action*. Efforts at improving the prospects of creating and sharing knowledge have led to advice on critical functions such as absorptive and relational capacity.

Although I agree on the importance of these factors, I believe we need to bring to light the reverse aspect as well. The way the people involved in the different collaborations (en)act new opportunities into existence through joint trials and experiments was significant. This suggests that practitioners and researchers should also pay attention to *how action is shared and transformed into*

knowledge. The participants' great demand for supporting methods and procedures concompanies this conclusion.

The crucial role of corporate entrepreneurs

In the empirical analyses presented in the previous section, considerable attention has been paid to the role of corporate entrepreneurs. In particular, as the Entrepreneur Study indicates, to their productive power and role in linking the knowledge and resources needed to create and recognize new opportunities.

Most previous literature assumes (as do managers at TelCo) a classical hierarchical monitoring of interorganizational relationships where executive managers or entrepreneurs, in terms of small business owners, are the ones who conceptualize and design the company's partner and alliance activities. This thesis demonstrates something other than this top-down view, however. It appears from the studies that corporate members[24] at lower levels frequently link resources and knowledge across company boundaries. These results echo previous findings. Moreover, it has been shown that informal collaboration among R&D scientists is of great consequence for learning and innovation (Kreiner and Schultz, 1993; Bouty, 2000; de Rond, 2003).

We can thus expect that the company's alliance proactiveness and its position in a given network of industry actors can, at least partly, be explained by the actions and behaviors of corporate entrepreneurs. As de Rond (2003, p. 20) remarks: "social networks are a macro-level phenomenon, however, they emerge, evolve, and dissolve as a direct consequence of the actions of individual players".

The logical conclusion of this claim would be that we should concern ourselves with making the most of this potential. We can adopt different attitudes as regards this purpose. We may focus on how corporate entrepreneurs' social capital can be transformed into organizational (communal) social capital, or we may deny the importance of individual social capital, given that it cannot easily be transformed. Furthermore, we can emphasize the organizational value of social capital even though its character precludes transformation.

[24] (here, corporate entrepreneurs in the sense that they use their social capital for the purposes of creating 'new combinations)

The latter approach is proposed in this thesis. Accordingly, the argument is that some parts of the company's interorganizational innovation initiatives can be consciously designed and controlled, while others evolve informally and sometimes spontaneously. Moreover, some of corporate entrepreneurs' linking activities can be facilitated but not directed. In consequence, companies that aspire to making everything collective and formal may lose the organizational dynamic connected to individual sources of social capital and the capacity for productive linking activities.

In conclusion, this thesis suggests that some of corporate entrepreneurs' 'linking' activities can be facilitated, but not all of them can be directed. If the organizational environment encourages corporate entrepreneurs to link their resources and knowledge across company boundaries, and provides the time and impetus to do so, it may be that the prospects of corporate entrepreneurs' social capital and linking activities become explicit and better understood, rather than tacit and overlooked.

Outcome powerful beyond traditional measures

Every attempt to create and recognize new opportunities entails the collaborating partners being able to cope with discontinuity, multiple commitments, interruptions, and transient purposes that dissolve, at times without warning. This might be an acquired skill, but it is also the result of attitudes among managers and organization members. A crucial problem facing collaborating companies in this connection is the difficulty they experience in accurately answering the question of performance.

Both practice and established theories alike commonly exaggerate the value of stability, longevity, and traditional economic measures as indicators of alliance performance. Furthermore, the usual view is that targets are either hit or missed. Nonetheless, the notion of performance, with regard to interorganizational innovation initiatives, appears too complex to be thought of in such a prescriptive and two-dimensional way. Hence, a simple *yes-no* evaluation appears to be too simplistic as regards evaluating whether or not the partners have succeeded (not least because many partners have different views or interpretations of performance).

To do full justice to interorganizational innovation initiatives from a *dating* perspective, we should recognize that performance has multiple dimensions that entail diverse measures in order to achieve a truly reflective picture. We have to consider whether the collaborating partners have consciously managed to co-ordinate their actions and processes in order to enhance joint knowledge creation and learning, and if they have succeeded in recognizing constraints, designing new opportunities, and prescribing new learning issues.

Another connected matter concerns the way the company views 'failures'. Indeed, a significant number of interorganizational innovation initiatives never arrive at the stage of committed and profitable opportunities. That is part of the logic of *dating* initiatives. Although success is far from guaranteed, in practice, failure is rarely considered an option. Many companies seem to suffer from an anti-failure bias (McGrath, 1999). This thesis argues that failures can entail positive consequences - from a learning perspective.

Managerial implications

The empirical evidence demonstrates that interorganizational innovation initiatives are fairly unpredictable. This implies that a process theory may never reach the precision that practicing managers expect and desire. However, from the theoretical arguments and empirical evidence presented above, we can identify some implications of importance for those engaged in planning and performing interorganizational innovation initiatives.

If *dating* is of central importance to companies aiming to innovate in conditions marked by fluid conditions, then an important managerial issue will be how companies can manage such initiatives. While management might desire that interorganizational relationships, in all their forms, may be centralized and nurtured by 'alliance departments' or coordinated by certain 'partner managers', the day-to-day world of the corporate members demands something more than just waiting for strategically planned interorganizational innovation initiatives.

To begin with, previous research has identified various mechanisms for linking and mediating knowledge and resources outside company boundaries. Much of its focus has, however, been directed toward boundary-spanning positions in order to scan markets and technology domains for innovative combinations, e.g. gatekeepers, boundary-spanners, or professional knowledge brokers.

In the light of corporate entrepreneurs' influence on the search zone and proactiveness when creating alliance opportunities, it might be insufficient to rely purely on such role specialization. It may help, but also hinder, others in examining potential exchange opportunities. The essential point here is that the process of formalizing all interorganizational relationships, to the exclusion of any personalized bonds, might be self-defeating. Hence, an exclusively centralized supervisory link might fail to appreciate, as well as threaten or restrain, corporate entrepreneurs' use of their personal bonds. Consequently, although the need for external linkages can potentially be controlled and the tasks of alliance management partially institutionalized within the organization's routines and processes, classical hierarchical control and rational planning techniques will only take the organization so far.

Hence, managers are advised to uncover the value of corporate entrepreneurs' diverse relationships across company boundaries. An attitude that sees corporate entrepreneurs' personal bonds as inherently positive and essential, due to their constructive impact on the company's innovation performance, might be a good start. This should not, however, be read as a suggestion to give corporate entrepreneurs complete freedom when conducting interorganizational relationships. There is a need for desirable norms, behaviors, and rules of engagement in order to make sure that the organization maintains a clear business focus and encourages corporate entrepreneurs to make accurate (and ethical) judgments.

Secondly, planning cannot replace the social capital, or the imaginative flash that brings possible complementarities and thus innovation opportunities to mind. However, once interorganizational innovation initiatives take shape, a comprehensive set of facilitating strategies and processes seems crucial. An appropriate management role is to create incentives for such activities, and for alliance departments to create the infrastructure that can facilitate the process. There is, thus, a powerful argument in favor of developing an 'alliance function' that is closely aligned with the day-to-day practicalities of collaborative interorganizational relationships. Of particular value is the development of skills, methods and procedures, as well as learning mechanisms that can facilitate the diffusion of knowledge above and beyond the participants in a particular interorganizational innovation initiative.

Thirdly, there seems to be a preference for collaborating with a 'primary partner', especially because it takes time to develop relational quality and interorganizational routines (Ariño et al., 2001; Zollo et al., 2002). However, selecting a primary partner during the early phases of innovation and new product development would not allow the company to recognize and create possible opportunities from other potential partners. We can thus expect that companies taking a *dating* approach will, to a greater extent, engage in several partnerships at the same time. Thus, another implication of these findings underscores the need to manage a multiple portfolio of various ongoing and parked relationships.

Fourthly, while we can expect that 'successful' joint innovation initiatives, i.e. those which result in a profitable innovation, take care of themselves in that they are implemented and thus incorporated into the company's procedures and products, this may not be the case with initiatives that are prematurely terminated. There is, thus, a potential to develop a better understanding of how the company can learn from 'failures' and how these returns can be kept and put to some use.

The case results also suggest that management can reduce the cost of 'failures' by (1) recognizing and re-defining the class of interorganizational innovation initiatives which are closed down as a result of constructive and productive learning about future business opportunities, (2) securing learning from concealed collaborations as well, and (3) preventing the loss of motivation so that failure is not frightening. In respect of the latter statement, we may as well suggest that alliance management involves the active process of helping the alliance to both perform and be seen to perform.

Avenues for future research

The empirical findings of this thesis have confirmed the need for more in-depth examination of the nexus between interorganizational innovation initiatives and corporate entrepreneurs in order to provide insights into the process of corporate entrepreneurship. The aim of what follows is to propose a few areas for future research directions.

More longitudinal and qualitative work is needed. Previous process literature on innovation through interorganizational relationships has yielded a number of

important findings. This thesis has, I hope, made contributions to this stream of research by empirically studying the progress of interorganizational innovation initiatives in real time. However, one important conclusion of this work is that there is still a great need for process-oriented studies and empirical confirmation in order to address unanswered questions regarding how interorganizational working relationships develop over time.

Do corporate entrepreneurs play a crucial part, and if so, in what way? Even though corporate entrepreneurs represent important actors for innovation and new product development, there has been little discussion about their linking activities across company boundaries.

Previous research into entrepreneurship emphasizes the importance of innovative resource combinations (cf. Jarillo, 1988; Jarillo, 1989), suggesting that not only does the process of developing innovative results correspond to an entrepreneurial act, so does the process of securing the means (resource allocation) of producing the outcome. This thesis suggests that corporate entrepreneurs play an important role in breeding the company's capacity for creating and recognizing possible opportunities through interorganizational collaboration. Nonetheless, despite the fact that mature companies are a major source of technology and innovation (Pavitt, 1994), most previous studies of interorganizational relationships in the field of entrepreneurship concern independent entrepreneurs, new start-ups or small companies. While it is obvious that innovation demands that managers undertake (or at least consider) internal activities that foster entrepreneurial behavior, quite a few studies neglect the relationship between corporate entrepreneurship and activities across company boundaries. The object of analysis has tended to be localized to a single organization or company (Swan et al., 1999). Hence, it is little wonder that many researchers primarily mention *internal* relationships, social networks, and resource combinations in their studies. The results of this thesis suggest that an overstated focus on the internal context can be considered a restraint and an impediment to the further development of the field, and the directions for management practice. Hence, the integration of previous research on corporate entrepreneurship into corporate entrepreneurs networking across company boundaries for the achievement of new business creation and product development appears essential for understanding and improving established companies' innovativeness. Moreover, studies on corporate entrepreneurship less

frequently indicate how companies recognize (or create) potential 'alliance opportunities'. This ignorance represents a gap in our knowledge which keeps us from understanding the role of corporate entrepreneurs in the formation and development of interorganizational innovation initiatives.

Studies across different industries and environmental contexts. It seems to be a widely-held view that interorganizational arrangements are much more common in high technology fields due to the urgency of technology acquisition and the perceived uncertainty of fields undergoing accelerated technical change (e.g., Dosi, 1988; Baden-Fuller and Volberda, 1997; Lambe and Speakman, 1997 #764). Nonetheless, as Powell (1990, p.327) points out: "we do not yet know whether this is a function of a youthful stage in an industry's life cycle or of basic structural features of activities that are highly dependent on the creation of new forms of knowledge". Hence, there is a demand for studies that compare the processes and critical factors of interorganizational innovation initiatives across industries and/or environmental contexts.

Finally, as previously commented on (see Conclusions regarding the method, Chapter 6), even if part of the result has been re-used in various interorganizational innovation initiatives and has contributed knowledge to different interorganizational innovation initiatives and the strategy process, the contribution was largely local. Further research is needed in order to understand how companies can accumulate and develop knowledge of the process and management of interorganizational innovation initiatives.

REFERENCES

Abernathy, W.J. and Clark, K.B. (1985). Innovation: mapping the winds of creative destruction. *Research Policy* 14(1), 3-22.

Adler, N., Shani (Rami), A.B. and Styhre, A. 2004. Collaborative research in organizations: foundations for learning, change, and theoretical development. Thousand Oaks: Sage Publications Inc.

Adner, R. and Levinthal, D.A. (2002). The emergence of emerging technologies. *California Management Review* 45(1), 50-66.

Ahuja, G. (2000a). Collaboration networks, structural holes, and innovation: a longitudinal study. *Administrative Science Quarterly* 45(3), 425-455.

Ahuja, G. (2000b). The duality of collaboration: inducements and opportunities in the formation of interfirm linkages. *Strategic Management Journal* 21(3), 317-343.

Ahuja, G. and Lampert, C.M. (2001). Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal* 22(6/7), 521-543.

Alter, C. and Hage, J. (1993). *Organizations working together*. Newbury Park: SAGE Publications.

Alvarez, S. A. and Busenitz, L. W. (2001). The entrepreneurship of resource-based theory. *Journal of Management* 27(6), 755-775.

Alvesson, M. 1999. Methodology for close up studies - struggling with closeness and closure. Working Paper 1999/4, School of Economics and Management, Lund University, Lund.

Argyris, C., Putnam, R. and Smith, D.M. (1985). *Action science*. San Francisco: Jossey-Bass.

Ariño, A. and de la Torre, J. (1998). Learning from failure: towards an evolutionary model of collaborative ventures. *Organization Science* 9(3), 306-325.

Ariño, A., de la Torre, J. and Ring, P.S. (2001). Relational quality: managing trust in corporate alliances. *California Management Review* 44(1), 109-131.

Arora, A. and Gambardella, A. (1990). Complementarity and external linkages: the strategies of the large firms in biotechnology. *The Journal of Industrial Economics* 38(4), 361-379.

Baden-Fuller, C. and Volberda, H.W. (1997). Strategic renewal: How large complex organizations prepare for the future. *International Studies of Management & Organization* 27(2), 95-120.

Barringer, B.R. and Harrison, J.S. (2000). Walking a tightrope: creating value through interorganizational relationships. *Journal of Management* 26(3), 367-403.

Bartunek, J.M. and Louis, M.R. (1996). *Insider/outsider team research.* Thousand Oaks, CA: Sage Publication.

Beer, M. and Eisenstat, R.A. (1996). Developing an organization capable of implementing strategy and learning. *Human Relations* 49(5), 567-619.

Bonaccorsi, A. and Lipparini, A. (1994). Strategic partnerships in new product development: an Italian case study. *Journal of Product Innovation Management* 11(2), 134-145.

Bouty, I. (2000). Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Journal* 43(1), 50-65.

Bouwen, R. and Steyaert, C. (1990). Construing organizational texture in young entrepreneurial firms. *Journal of Management Studies* 27(6), 637-649.

Brown, S. and Duguid, P. (2000). Balancing act: how to capture knowledge without killing it. *Harvard Business Review* 78(3), 73-78.

Brown, S.L. and Eisenhardt, K.M. (1995). Product Development: past research, present findings, and future directions. *Academy of Management Review* 20(2), 343-378.

Buckley, P.J. and Casson, M. (1988). A theory of cooperation in international business. In Contractor, F.J. and Lorange, P. (eds.) *Cooperative strategies in international business.* Lexington, MA: Lexington Books.

Burgelman, R. A. (1984). Designs for corporate entrepreneurship in established firms. *California Management Review* 26(3), 154-166.

Burt, R.S. (1992). *Structural holes. The social structure of competition.* Cambridge: Harvard University Press.

Burt, R.S. (2000). The network structure of social capital. in Staw, B.M. and Sutton, R.I. (eds.) *Research in organizational behavior.* New York, NY: Elsevier Science Inc.

Cheng, Y-T. and Van de Ven, A. H. (1996). Learning the innovation journey: order out of chaos. *Organization Science* 7(6), 593-613.

Coghlan, D. (2001). Insider action research projects. Implications for practising managers. *Management Learning* 32(1), 49-60.

Coghlan, D. and Brannick, T. (2003). Kurt Lewin: The "practical theorist" for the 21st century. *The Irish Journal of Management* 24(2), 31-37.

Cohen, G., Salomon, I. and Nijkamp, P. (2002). Information-communications technologies (ICT) and transport: does knowledge underpin policy? *Telecommunications Policy* 26(1/2), 31-52.

Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* 17(X), 197-218.

Cohen, W.M. and Levinthal, D.A. (1989). Innovation and learning: the two faces of learning. *The Economic Journal* 99(397), 569-596.

Contractor, F.J. and Lorange, P. 1988. Cooperative strategies in international business. In Contractor, F.J. and Lorange, P. (eds.), Lexington, MA: Lexington Books.

Cooper, R. G., Edgett, S. J. and Kleinschmidt, E.J. (2002). Optimizing the stage-gate process: what best-practice companies do. *Research Technology Management* 45(5), 21-26.

Cowan, R. and van de Paal, G. 2000. Innovation policy in a knowledge-based economy. A merit study commissioned by the *European Commission Enterprise Directorate General (EUR17023).* Brussels-Luxembourg.

Covin, J.G. and Slevin, D.P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice* 16(1), 7-25.

D'Aveni, R. (1994). *Hypercompetition.* New York, NY: Free Press.

Davidsson, P. 2002. The domain of entrepreneurship research: some suggestions. Working Paper, Jönköping International Business School, Jönköping.

Denzin, N.K. and Lincoln, Y.S. 1994. Handbook of qualitative research. Thousand Oaks: Sage Publications Inc.

de Rond, M. (2003). *Strategic alliances as social facts. Business, biotechnology & intellectual history.* Cambridge: Cambridge University Press.

Dosi, G. (1988). Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature* 26(3), 1120-1171.

Doz, Y. (1996). The evolution of cooperation in strategic alliances: initial conditions and learning processes. *Strategic Management Journal* 17(Special issue), 55-83.

Doz, Y.L., Olk, P.M. and Ring, P.S. (2000). Formation processes of R&D consortia. Which path to take? Where does it lead? *Strategic Management Journal* 21 (3), 239-266.

Drucker, P.F. (1985b). The discipline of innovation. *Harvard Business Review* 63(3), 67-72.

Dubin, R. (1969). *Theory Building.* Toronto: The Free Press.

Dubois, A. and Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research* 55(7), 553-560.

Dussauge, P. and Garrette, B. (1999). *Cooperative strategy. Competing successfully through strategic alliances.* Chichester, UK: John Wiley & Sons Ltd.

Duysters, G. and de Man, A.-P. (2003). Transitory alliances: an instrument for surviving turbulent industries. *R&D Management* 33(1), 49-58.

Ebers, M. and Grandori, A. (1997). The forms, costs, and development dynamics of inter-organizational networking. in Ebers, M. (ed.) *The formation of inter-organizational networks.* New York: Oxford University Press Inc.

Eisenhardt, K. (1989). Building theories from case study research. *Academy of Management Review* 14(4), 532-550.

Eisenhardt, K.M. (1989). Making fast strategic decisions in high velocity environments. *Academy of Management Journal* 32(3), 543-577.

Elam, M. 1993. Innovation as the craft of combination. Perspectives on technology and economy in the spirit of Schumpeter. Doctoral Thesis. *Department of Technology and Social Change*: Linköping University.

Fransman, M. (2001). Analysing the evolution of industry: the relevance of the telecommunications industry. *Economics of Innovation & New Technology* 10(2/3), 109-141.

Fransman, M. (2002). Mapping the evolving telecoms industry: the uses and shortcomings of the layer model. *Telecommunications Policy* 26(9/10), 473-483.

Grandori, A. (1998). Preface in Colombo, M.G. (ed.) *The changing boundaries of the firm: explaining evolving inter-firm relations.* New York: Routledge.

Granovetter, M. S. (1974). The strength of weak ties. *American journal of Sociology* 78, p. 1360-1380.

Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology* 91(3), 481-510.

Greenwood, D.J. (1991). Collective reflective practice through participatory action research: a case study from the Fagor Cooperatives of Mondragón. in Schön, D.A. (ed.) *The reflective turn: case studies in and on educational practice.* New York: Teacher's College Press.

Greenwood, D.J. (2002). Action research: unfilled promises and unmet challenges. *Concepts and Transformation* 7(2), 117-139.

Gulati, R. and Singh, H. (1998). "The architecture of cooperation: managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly* 43(4), 781-814.

Hagedoorn, J. (1993). Understanding the rationale of strategic technology partnering: interorganizational modes of cooperation and sectoral differences. *Strategic Management Journal* 14(5), 371-385.

Hagedoorn, J. (1995). Strategic technology partnering during the 1980s: Trends, networks and corporate patterns in non-core technologies. *Research Policy* 24(2), 207-231.

Hagedoorn, J. (2002). Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy* 31(4), 477-492.

Hagedoorn, J. and van Kranenburg, H. (2003). Growth patterns in R&D partnerships: an exploratory statistical study. *International Journal of Industrial Organization* 21(4), 517-531.

Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal* 12 (Special Issue), 83-103.

Hamel, G. and Prahalad, C.K. (1994). *Competing for the future*. Boston, MA: Harvard Business School Press.

Harrigan, K.R. (1986). *Managing for joint venture success.* Lexington, Massachusetts: Lexington Books.

Hatchuel, A. (1999). The Foucauldian detour: a rebirth of organization theory? *Human Relations* 52 (4), 507-519.

Hatchuel, A. (2001). Towards Design Theory and Expandable Rationality: The Unfinished Program of Herbert Simon. *Journal of Management & Governance* 5 (3-4), 260-273.

Henderson, R.M. and Clark, K.B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly* 35(March), 9-30.

Hills, G.E., Lumpkin, G.T. and Singh, R.P. (1997). Opportunity recognition: perceptions and behaviors of entrepreneurs. in D., R.P., Bygrave, W.D., Carter, N.M., Davidsson, P., Gartner, W.B., Mason, C.M. and McDougall, P.P. (eds.) *Frontiers of Entrepreneurship Research 1997.* Babson Park, MA: Babson College.

Håkansson, H. (1987). *Industrial technological development: a network approach*. London: Croom Helm.

Jarillo, C.J. (1988). On strategic networks. *Strategic Management Journal* 9 (1), 31-41.

Jarillo, C.J. (1989). Entrepreneurship and growth: the strategic use of external resources. *Journal of Business Venturing* 4(2), 133-147.

Kanter, R.M. (1983). *The change masters: innovations for productivity in the American corporation*. New York: Simon & Schuster.

Kanter, R. M. (1988). When a thousand flowers bloom: structural, collective, and social conditions for innovation in organizations. *Research in Organizational Behavior* 10, 169-211.

Kogut, B. (1989). The stability of joint ventures: reciprocity and competitive rivalry. *The Journal of Industrial Economics* 38(2), 183-198.

Kogut, B. (1991). Joint ventures and the option to expand and acquire. *Management Science* 37(1), 19-33.

Kogut, B. (2000). The network as knowledge: generative rules and the emergence of structure. *Strategic Management Journal* 21(3), 405-425.

Kogut, B. and Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* 3(3), 383-397.

Koza, M.P. and Lewin, A.Y. (1998). The co-evolution of strategic alliances. *Organization Science* 9(3), 255-264.

Koza, M.P. and Lewin, A.Y. (1999). The co-evolution of network alliances: a longitudinal analysis of an international professional service network. *Organization Science* 10(5), 638-653.

Kreiner, K. and Schultz, M. (1993). Informal collaboration in R&D. The formation of networks across organizations. *Organization Studies* 14(2), 189-209

Lambe, C.J. and Spekman, R.E. (1997). Alliances, external technology acquisition, and discontinuous technological change. *Journal of Product Innovation Management* 14(2), 102-116.

Lane, C. and Bachmann, R. Eds. (1998). *Trust within and between organizations.* New York, Oxford University Press Inc.

Lane, P.J. and Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* 19(5), 461-477.

Larson, A.L. 1988. Cooperative alliances: a study of entrepreneurship. *Business and Sociology*. Cambridge, MA: Harvard University.

Larson, A. (1992). Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. *Administrative Science Quarterly* 37(1), 76-104.

Lawrence, P.R. and Lorsch, J.W. (1967). *Organization and environment.* Boston, MA: Harvard University Press.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal* 13(8), 111-125.

Lester, R.K., Piore, M.J. and Malek, K.M. (1998). Interpretive management: what general managers can learn from design. *Harvard Business Review* 76(2), 86-96.

Li, F. and Whalley, J. (2002). Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy* 26(9-10), 451-472.

Lindmark, S., Andersson, E., Johansson, M. and Bohlin, E. 2004. Telecom dynamics. History and state of the Swedish telecom sector and its innovation system 1970-2003. Final report, VA 2004:04. *VINNOVA, Swedish Agency for Innovation System.*

Louis, M.R. (1983). Useful knowledge and knowledge use: toward explicit meanings. In Kilmann, R.H., Thomas, K.W., Slevin, D.P., Nath, R. and Jerrell, S.L. (eds.) *Producing useful knowledge for organizations*. New York: Praeger Publishers.

Louis, M.R. and Bartunek, J.M. (1992). Insider/outsider research teams: collaboration across diverse perspectives. *Journal of Management Inquiry* 1(2), 101-110.

Low, M.B. and MacMillan, I.C. (1988). Entrepreneurship: past research and future challenges. *Journal of Management* 14(2), 139-161.

Lundvall, B-Å. (1985). Product innovation and producer-user interaction. *Industrial Development Research,* No. 31 Aalborg University Press.

Lundvall, B-Å. 1992. National system of innovation: towards a theory of innovation and interactive learning. London: Pinter Publishers.

Magnusson, P.R. and Marshall, C. 1999. Timing invention and rationalization - NPD issues in large mature companies. *Working paper.*

McGee, J. (1995). Comment on: Formal entrepreneurship theory in economics: existence and bounds, by Baumol in Bull, I., Thomas, H. and Willard, G.

(eds.) *Entrepreneurship: perspectives on theory building.* Oxford: Elsvier Science Ltd.

McGrath, R.G. (1997). A real options logic for initiating technology positioning investments. *Academy of Management Review* 22(4), 974-996.

McGrath, R.G. (1999). Falling forward: real options reasoning and entrepreneurial failure. *Academy of Management Review* 24(1), 13-30.

McKelvey, M. (1996). *Evolutionary Innovations. The business of biotechnology.* Oxford: Oxford University Press

Miles, R.E. and Snow, C.C. (1992). Causes of failure in network organizations. *California Management Review* 34(4), 53-72.

Miles, R. E., Snow, C. C., Mathews, J. A. and Coleman Jr., H. J. (1997). Organizing in the knowledge age: anticipating the cellular form. *Academy of Management Executive* 11(4), 7-20.

Moore, G. (1995). *Inside the Tornado*: Capstone.

Morgan, G. and Smircich, L. (1980). The case for qualitative research. *Academy of Management* 5 (October), 491-500.

Mytelka, L. K. and Smith, K. (2002). Policy learning and innovation theory: an interactive and co-evolving process. *Research Policy* 31(8/9), 1467-1479.

Mölleryd, B.G. 1997. *The building of a world industry - The impact of entrepreneurship on Swedish Mobile Telephony.* Department of Marketing, Distribution and Industry Dynamics, EFI. Stockholm: Stockholm School of Economics.

Oliver, A.L. (2001). Strategic alliances and the learning life-cycle of biotechnology firms. *Organization Studies* 22(3), 467-489.

Oliver, A.L. and Ebers, M. (1998). Networking network studies: an analysis of conceptual configurations in the study of inter-organizational relationships. *Organizations Studies* 19(4), 549-583.

Pavitt, K. (1994). Key characteristics of large innovating firms. in Dodgson, M. and Rothwell, R. (eds.) *The handbook of industrial innovation.* Cheltenham: Edward Elgar.

Pettigrew, A. (1990). Longitudinal field research on change: theory and practice. *Organization Science* 1(3), 267-292.

Pfeffer, J. and Salancik, G.R. (1978). *The external control of organizations. A resource dependence pèrspective.* New York: Harper & Row Publishers Inc.

Powell, W. W. (1987). Hybrid organizational arrangements. *California Management Review* 30(1), 67-87.

Powell, W.W. (1990). Neither market nor hierarchy: network forms of organization. *Research in Organizational Behavior* 12, 295-336.

Powell, W.W. (1998). Learning from collaboration: knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review* 40(3), 228-240.

Powell, W.W., Koput, K.W. and Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly* 41(1), 116-145.

Prahalad, C.K. (1998). Managing discontinuities: the emerging challenges. *Research Technology Management* 41(3), 14-22.

Reason, P. (1993). Sitting between appreciation and disappointment: A critique of the Special Edition of Human Relations on action research. *Human Relations* 46(10), 1253-1270.

Reason, P. and Bradbury, H. 2001. 'Handbook of action research. Participative inquiry & practice.' London: Sage Publications Ltd.

Rigby, D. and Zook, C. (2002). Open-market innovation. *Harvard Business Review* 80(10), 80-89.

Ring, P. S. and Van de Ven, A. H. (1992). Structuring cooperative relationships between organizations. *Strategic Management Journal* 13(7), 483-498.

Ring, P.S. and Van de Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review* 19(1), 90-118.

Roberts, E.B. (1988). Managing invention and innovation: what we've learned. *Research Technology Management* 31(1), 11-29

Roth, J. 2002. Knowledge unplugged. An action research approach to enhancing knowing in R&D organizations. Doctoral thesis, *Department of Project Management*. Gothenburg: Chalmers University of Technology.

Roth, J., Sandberg, R. and Svensson, C. (2004). The dual role of the insider action researcher in Adler, N., Styhre, A. and Shani, A.B. (eds.) *Collaborative research in organizations: foundations for learning, change, and theoretic development.* Thousand Oaks: Sage Publications Inc.

Sarasvathy, S.D. (2001). Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review* 26(2), 243-263.

Sarkar, M.B., Echambadi, R. and Harrison, J.S. (2001). Alliance entrepreneurship and firm market performance. *Strategic Management Journal* 22(6/7), 701-711.

Schumpeter, J. A. (1934). *The theory of economic development.* Cambridge, MA, Harvard University Press.

Schön, D.A. (1983). *The reflective practitioner: how professionals think in action.* New York: Basic Books.

Shane, S. and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review* 25(1), 217-226.

Shani, A.B. and Pasmore, W.A. 1985. Organisation inquiry: towards a new model of the action research process. In Warrick, D.D. (ed.) *Contemporary organisation development - Current thinkings and applications*: Glenview: Scott Foresman and Company.

Sharma, P. and Chrisman, J.J. (1999). Toward a reconciliation of the definitional issues in the field of corporate entrepreneurship. *Entrepreneurship Theory and Practice* 23(3), 11-27.

Starr, J. A. and MacMillan, I. C. (1990). Resource cooptation via social contracting for new ventures. *Strategic Management Journal* 11(5), 79-92.

Stevenson, H.H. and Jarillo, C.J. (1990). A paradigm of entrepreneurship: entrepreneurial management. *Strategic Management Journal* 11 (Special issue: Corporate entrepreneurship), 17-27.

Swan, J., Newell, S., Scarbrough, H. and Hislop, D. (1999). Knowledge management and innovation: networks and networking. *Journal of Knowledge Management* 3(4), 262-275.

Teece, D.J. (1992). Competition, cooperation, and innovation: organizational arrangements for regimes of rapid technological progress. *Journal of Economic Behavior & Organization* 18(1), 1-25.

Trillas, F. (2002). Mergers, acquisitions and control of telecommunications firms in Europe. *Telecommunications Policy* 26(5-6), 269-286.

Tushman, M.L. and Anderson, P. (1986/1996). Technological discontinuities and organizational environments. in Burgelman, R.A., Maidique, M.A. and Wheelwright, S.C. (eds.) *Strategic management of technology and innovation.* Irwin, McGraw-Hill

Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: the network effect. *American Sociological Review* 61(4), 674-698.

Van de Ven, A.H. (1995). The development of an infrastructure for entrepreneurship. in Bull, I., Thomas, H. and Willard, G. (eds.) *Entrepreneurship: perspectives on theory building.* Oxford: Elsvier Science Ltd.

Van de Ven, A.H., Angle, H.L. and Poole, M.S. 1989/2000. Research on the management of innovation. The Minnesota studies, Oxford: Oxford University Press.

Van de Ven, A.H., Polley, D.E., Garud, R. and Venkataraman, S. (1999). *The innovation journey.* Oxford: Oxford University Press.

Weick, K.E. (1979). *The Social Psychology of Organizing.* New York: McGraw-Hill Inc.

Weick, K.E. (1995). *Sensemaking in organizations.* Thousand Oaks: Sage Publications.

Williamson, O. E. (1991). Comparative economic organization: the analysis of discrete structural alternatives. *Administrative Science Quarterly* 36(2), 269-296.

Yin, R.K. (1994). *Case study research: design and methods.* Thousand Oaks, CA: Sage Publications.

Yli-Renko, H., Autio, E. and Sapienza, H.J. (2001). Social Capital, Knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal* 22(6/7), 587-613

Zagenczyk, T.J. 2004. The effect of the physical work environment on the creation of linking and communal social capital. Conference paper. *Academy of Management Meeting.* New Orleans

Zaheer, A. and N. Venkatraman (1995). Relational governance as an interorganizational strategy: an empirical test of the role of trust in economic exchange. *Strategic Management Journal* 16(5), 373-392.

Zahra, S.A. (1991). Predictors and financial outcomes of corporate entrepreneurship: an exploratory study. *Journal of Business Venturing* 6(4), 259-286.

Zollo, M., Reuer J. J., et al. (2002). Interorganizational routines and performance in strategic alliances. *Organization Science* 13(6), 701-713.

Paper I

Marshall, C

2004

New product development when the plan has reached its limit.
(Title in Swedish: Produktutveckling när planen nått sin gräns).

In Engwall, M.(ed.) *Produktutveckling bortom kunskapens gränser. Mot en osäkerhetens grammatik*

New Product development when the plan has reached its limit.

Cassandra Marshall

This paper (book chapter) analyses a new product development project at Telia, where the author played an active part as the product development manager during the period April 1997 to November 1998. The text is based upon a retrospective view of the events and situations that the author and her colleagues have described as crucial with regard to the progress of the development work. The empirical data was based on 'self-experience', interviews with the other participants, and written sources in the form of decision-making data, business plans and specifications.

Keywords: New product development, uncertainty, improvisation.

INTRODUCTION

Are companies unjustifiably obsessed with planning, guidance and control? Do the conditions change when development projects rest on uncertain ground and the participants can, at best, describe "something which could conceivably be true"?

These questions form the basis of this chapter, which gives an account of the development of a new product. The uncertainty came to play a large part in shaping events. Despite the great efforts of product development managers, business strategists and technical experts, clearly and distinctly expressing the plan upon which development work was to be based was a failure. With just a vague idea of the final result, it was difficult to prompt management into starting up the development project.

The project changed its action strategy on four occasions. This chapter gives an account of how this came about and the consequences it entailed for the development work as a whole. The purpose of this description is to increase understanding of what might be involved when creating clarity out of vagueness and commencing development work despite the individuals involved not yet being able to describe the end product clearly and distinctly.

Firstly, a description will be given of the company, its situation, the assignment and the conditions applicable to the development project. Then an account will be given of the activities and events taking place during the development work itself. Using this as a departure point, there will be a discussion about what product development in the face of uncertainty can entail when the participants find it difficult to motivate the development effort in a clear project plan. Some general lessons and reflections round off the chapter.

Background

The business situation

For Telia, conditions during the 1990s changed broadly. The market was deregulated and Telia had to face competition from new players. At the same time, the Internet arrived. Technological developments were rapid. In just a few years, the population of Sweden had learnt to send email, surf, shop, and conduct

their banking business via the *net*. In the beginning, however, many were skeptical as regards the significance of the Internet. The then Minister of Transport and Communications, Ines Uusmann, commented on this new technology in the following way[25]: "The Internet might turn out to be a passing fad, I don't think that people will, in the long-run, want to spend the amount of time it actually takes to surf on the net".

However, the spread of computers and the Internet exceeded all the forecasts. The visions relating to the Internet and its technologies were about new ways of communicating and processing information, independently of time and space. In the media, we were able to read of a future filled with virtual offices, IT-houses and intelligent cars, among other things.

In addition to all the opportunities, there were also limitations to solve. Among other things, many companies considered the Internet to be way too "open" to be a suitable carrier of critical business information. They were worried that unauthorized users might gain access to central information systems, harming companies in a variety of ways. Thus companies began requesting methods that would separate the public Internet from internal communications and information management – there was talk of the possibility of developing special *intra*nets.

Telia's involvement in the Internet and Internet-based services was one of many strategies for enhancing the content and value of its own product portfolio. In the future, Telia wanted to become the customer's natural choice as regards different network services (e.g. Internet and broadband services), but also for products in connection with customer intranets (operation and monitoring, and miscellaneous business applications). The fact that Telia was not alone in seeing the Internet and Internet-based services as a future business opportunity made the timeframe important, particularly the time-to-market. The rapid development of technology further served to highlight the importance of a high tempo[26]. If Telia succeeded

[25] Swedish daily *Svenska Dagbladet*, 12 May 1996. Uusman later claimed that she had been misquoted. The word "fad", according to Uusmann, was the work of a sub-editor and what she had intended to say was: "I was speculating as to whether or not aimless surfing would be a short-lived thing?" (Ingrid Dahlbäck, the Swedish Central News Agency, 16 June 1998).

[26] Not least because various market analysts and technical experts were differentiating between calendar years and "Internet years", where a calendar year was judged to correspond to 7 Internet years.

in being first, or one of the first, to offer intranet services, then much would be gained.

The assignment

Telia TeleCom AB, a product company within the Telia Group, was responsible for developing services in telephony, data communications and the Internet for corporate customers. The company's experience of developing Internet services was one of the reasons it was assigned the responsibility for developing a portfolio of intranet services. Expectations regarding the content of the product portfolio were initially unclear. Many had imagined a portfolio containing network access services in order to be able to reach the intranet, functions for email, security services and various types of web applications for e-commerce, group communications and tele-working. There were also ambitions to develop consultancy services as well as services for operating and maintaining customer intranets.

In April 1997, TeleCom appointed a product development manager who was assigned the task of describing, in a business plan, the business concept, some suitable market strategies and future customer offers in the product portfolio of Telia Intranet. Furthermore, a product plan was to be drawn up which would describe in more detail the product development required. The product development manager was given six weeks to produce these plans. After that, the various development projects were expected to commence.

Product development at TeleCom

TeleCom applied the Group's joint product development process, PDP, which largely had the same appearance and content for all companies in the Group (Figure 1, see also Chapter 2).

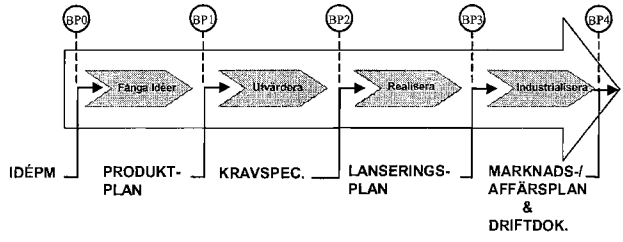

Figure 8. TeleCom's product development process, PDP.

Frequently, the phases of the development work were described on the basis of the various decision-making data and decision points (DPs) of the process. A positive decision at a decision point entails the project's focus, resources and activities for the upcoming sub-process being approved. Deviations or new demands for resources required a fresh decision with a revised plan underpinning it. It was common that development projects "got stuck" at a decision point, i.e. were turned down or were expected to supplement and further particularize the decision-making data. This was most frequent ahead of DP1, when the product plan was to be presented and decided upon. The product plan, with its description of the business and product concept, functions to develop, time schedules and budgets, constituted the basis for the implementation – without it, there would be no project! It was also the reason for a product development manager being sincerely congratulated by his or her colleagues each time a DP1 decision was favorable.

It was the Product Council that decided and prioritized the company's various development projects. The Product Council included, besides the President of TeleCom in the role of Chairman, managers from the various product sectors, the company's development manager and the manager of operation and production. The product development manager was responsible for the operating profit of the development assignment, and subsequently also for managing the products developed.

THE DEVELOPMENT OF TELIA INTRANET

The initial phase – plan and unite

Opinions regarding the future potential of the Internet and its technologies varied widely. Far from everyone at Telia and TeleCom was of the opinion that a venture into intranet services was a natural, or even wise, next step. Telia Intranet was linked to the method of communicating via the Internet, but was otherwise diffusely defined.

Telia had developed an intranet for its own internal requirements for disseminating information, which many regarded as far advanced technically and functionally, but much remained to be explored. Just how separate would an

intranet be in relation to the public Internet? Which functions and types of information would be suitable to handle on an intranet? Moreover, the business and player logic was unclear. Who would customers regard as the most natural supplier of intranet services? The player supplying the customer's communication network (e.g. Telia) or the player developing the customer's business system? Perhaps they would choose to develop their intranets themselves with the support of their own IT departments? There were more questions than answers. There was an idea, but the clear description, which the Product Council was expecting, was still missing.

Uncertainty regarding the internal opportunities was just as palpable as all the question marks surrounding the evolution of the technology and the market. The expertise and the building blocks of existing products that were needed in order to realize an intranet were spread across several business units and companies[27] in a way rendering it impossible for TeleCom itself to develop a coordinated product portfolio. Realizing a joint offer across the various organizational boundaries was a challenge in itself.

The product development manager chose to start off the work at TeleCom together with colleagues who were responsible for and conducted different development activities in the Internet sector. Pretty soon, the participants were able to establish that the group of interested parties needed to be expanded. There was a lack of knowledge of functions and business spheres important for the project. The work group was thus supplemented with representatives from other companies. Together, in a group of approximately 15 people, there would now be an attempt to formulate a business and product plan for Telia Intranet. A whole range of issues was discussed in turn. On several occasions, the discussions got bogged down in a verbal battle over the best definition of an intranet. What is an intranet, is it a technology or a product?

Guidance was sought in Telia's overall plans and business information. These justified the development of intranets, but were otherwise too generally pitched. Even though the business development department's databases were full to the brim with information about customer requirements, competitors and the

[27] For instance. Telia Mobile with the responsibility for mobile telephony services, Telia System with PBXs, computer equipment and other types of hardware products, and Telia Promotor with its solutions to provide secure communications via the Internet.

evolution of technologies and markets, it was difficult "to see the wood for the trees". Everyone was talking about intranets, but no one had succeeded in capturing the phenomenon in concrete terms.

The six weeks were nearly up. The group had to reach agreement about an initial description of Telia Intranet. Similar to previous formulations, this definition and description, too, was more general than specific. The result was compiled in a product plan which was to be put before the Product Council.

The project was turned down. The Product Council deemed the product plan too wooly and thus could not reach a decision regarding the commencement of development work. Several of the members, not least the Chairman himself, wondered what was proving so difficult to capture.

The major customer project – capturing the customer's voice in the plan

A disheartened product development manager had to return to the group bearing the news that the members of the Product Council had been expecting a far more particularized and concrete product plan. But, where to go from here? It was decided to systematically document the existing products which could be included in an intranet offering as building blocks. Maybe that could form the basis of a more concrete description?

While this work was ongoing, the participants were forced to negotiate about and choose between existing products and components which met the same requirements or functions, but in different ways. Thus, an internal comparison of similar products came to be the next battle. The efforts required to bring about concerted action soon used up the time set aside for jointly developing and completing a new product plan ahead of the DP1 decision by the Product Council. The level of commitment began to wane. In order to get the attention that the project so badly needed, while at the same time easing decisions that straddled organizational boundaries, a steering committee was appointed consisting of leaders from the units and companies most involved. The steering committee was an important complement to the Product Council.

When things felt completely hopeless, a participant from Telia's sales and marketing company suggested that the project should start up in concrete business dialogs with a limited selection of customers. In this fashion, the project

would identify in which way and in which direction an intranet would be expected to create benefit for the customer's operations. Armed with this knowledge, it would easier to describe the products and functions that ought to be included in TeleCom's intranet offering. If Telia got the opportunity to develop and deliver intranets to some of these customers, then each solution would constitute a good example to carry on working with.

A new product plan, the second, was drawn up. Seen as supportive data for DP1, the plan was still incomplete. The work group had improved its analysis of the market situation, compiled the products and components of Telia's range which should probably be included in Telia Intranet, but had not as yet formulated any concrete product ideas or customer offers. The primary aim of the supportive data was to obtain decisions regarding ten or so customer projects in support of the continued problem and idea formulation, i.e. for a new round of "idea capturing". The Product Council regarded the idea favorably and the product development manager was given the resources for the customer project. The day-to-day governance and control was assumed by Telia Intranet's steering committee. In this way, the project would rapidly be able to obtain the decisions and support that the work required.

Following the Product Council's favorable decision, planning commenced ahead of the customer projects. Potential target groups were described. The work group in the customer project attempted, among other things, to find out whether, and in what way, requirements varied with regard to industry and size of company. As regards the size of the company, the participants were of the opinion that large companies had a greater need for intranet services than small ones. This was because the sharing and dissemination of information was assumed to be a more central problem for companies with many employees, who were, besides, often geographically spread out.

The list of potential customer projects was added to relatively quickly; but following this, work came to a standstill. The sales staff with customer-responsibility found it hard to understand, and even harder to explain to the customer, just what TeleCom had to offer. Additionally, it was becoming ever clearer that TeleCom was not being seen as the natural supplier of intranets. Internal IT departments or already developed contacts with consultants and system integrators were the first choices of customers. In spite of this

disheartening message, the customer project continued to negotiate a number of deals, which took a long time, however.

During this time, Telia's sales force, among others, were informed of the results and conclusions of the first phase of the work. Each new meeting and discussion saw the further development of ideas. Gradually, the first sections, at least, of the business and product plan had been written down. The planning work that had originally been estimated to take six weeks had now been going on for eight months. In spite of this, there was no supportive data for passing DP1.

The customer that no one saw

At the end of 1997, spontaneous enquiries about intranet services began arriving from small and medium-sized businesses. Initially, it was difficult to assess just how great the interest and demand were. After about a month, however, it became clear that relatively well-defined customer groups were expressing concordant needs. In many ways, it was embarrassing that such an obvious demand in a group of customers could have been entirely overlooked.

Discussions were entered into with some of these customers. One clear message was that they would not be happy to wait for 12 months while Telia took the time to realize the product concept. Two alternatives were raised: developing a unique solution for each customer, which was routine when an individual customer requested something that did not exist in Telia's existing product portfolio, or developing a single product to supply all these customers with. It was the latter that appealed to the product development manager.

Almost simultaneously to the new target group being identified, the product development manager was paid a visit by colleagues from one of Telia's internal development companies, ProSoft. Two system developers, a project manager and their manager had brought with them a presentation in the form of overhead slides showing how an intranet might look. Their ambition had been to develop an intranet quickly and simply. They were convinced that an initial intranet service could be considerably simpler than the large-scale and complex solutions being discussed by TeleCom. Work had been financed via a competition at the unit, where they had won financial scope and three months in order to develop their ideas using a simple prototype.

> Our President wanted us [ProSoft] to devise a number of service ideas and potential product endeavors which we would carry on ourselves [alongside the TeleCom assignment]. Everyone in the organization was approached and asked to scour the organization for ideas [...] after an initial sifting at management level, 10-12 suggestions were picked which were deemed interesting enough to be refined a stage further, one of which was our product concept. We had to describe the concept a bit more detail and became 1 of 3 projects given the green light. (Initiator and project participant, ProSoft)

Reorganization and new conditions for the development company precluded the continued financing of projects after the three months were up. Without a commissioner or financier, the project would have to be terminated. Just a few days before the time was due to run out, they met with the product development manager of Telia Intranet, who badly needed a solution with which to respond to the new customer enquiries.

> Things were very unclear regarding how much money we really had. From the beginning, there was the prospect of money, but we got one crown at a time more or less [...] A colleague came in and said "now there's a rush on", he had got wind of all "loose" projects being stopped, "so now you'll have to shape up and get house-trained", he said. (Project participant, ProSoft)

> At the end of March, the project was to be terminated, so [the product development manager] came in in the nick of time. It's frequently about luck and timing. [...] Things clicked time-wise. Our contribution was a product concept; we had made some headway and that coincided with a need... with a hole in the product portfolio. (Project participant, ProSoft)

Within a couple of weeks, the colleagues from ProSoft and TeleCom had agreed upon a development strategy which was based upon direct customer participation in a small-scale pilot project. The idea was checked out with Telia Intranet's steering committee, where the product development manager's line manager was the Chairman. It was important that he supported the idea of a pilot project.

> Suddenly there was someone to deliver results to and that felt very good. Things really took off. (Project participant, ProSoft)

The pilot project – a workshop for brainstorming

Pushing the work forward now depended on obtaining the Product Council's permission to depart from the traditional product development process. The product development manager suggested to the Product Council that it reach decisions about and assign resources to DP1, DP2, DP3 and DP4 at one and the same time. The product plan, which the Product Council had to decide upon, contained no details other than the date of the pilot launch, an upper budgetary limit and a vague idea of the product's functionality. Details of opportunities and

limitations would be looked into as the project progressed. The suggestion was approved and the project was awarded the funds to further develop the prototype and launch the product on a small scale. The Product Council's counter-demand was that the pilot project should keep to the times and resource frameworks envisaged in the decision-making data. All resources over and above this framework would be reported.

> A great deal happened during April [1998]. On 30 April, the product development manager, and this I still think is one of the greatest milestones in the history of the project, was handed decisions about four DPs at the same Product Council meeting. It was a very clear starting signal, where [on the Product Council] we were handed DP1 for the PDP project and DP1-DP4 for the pilot project. (Project participant, ProSoft)

Motivated by the opportunities and ideas sketched out in ProSoft's prototype, the project started off with frantic activity. The tempo was high. Life centered around one date, which was the pilot launch in August. A lot had to fall into place in a short period of time and it was impossible for the product development manager to control the course of events in detail. In order to coordinate the development work, a project manager from ProSoft was appointed.

The prototype formed the foundation of the development work. Many ideas for the product's primary function were found and discovered there. The development team openly discussed different suggestions for changes, additions and further development of the early prototype. The fact that there was also a target group to relate to created beneficial conditions for discussing the product with potential customers. Ideas which appealed to the team and which were appreciated by the customers were realized via the prototype, while futile alternatives were rejected. Furthermore, there was an attempt to apply what the participants called *continual delivery*, i.e. many smaller presentations of new product versions in order to continually, while work was progressing, obtain the customers' points of view regarding new functions and improvements.

> We wanted to try this thing called "continual delivery"; we had drawn up a plan whereby we would have a new delivery every other week – every other Wednesday with improvements and new things. We quite simply installed the new stuff on the server, so every other Wednesday something emerged. If there weren't any major changes, then it could be a flaw, or some small function. We'd also set up a product information channel for the service, which kept the customers informed, using brief notices, about new things coming out. [...] Some of the pilot customers were interviewed and raised this – they thought it was good. Once they had submitted their views, the changes would be implemented quickly (Project participant, ProSoft)

> The customers felt that we were in control of the situation. (Systems analyst, ProSoft)

The way of working in the pilot project came internally to be called the *Concept Workshop*. The objective was to sculpt and test a new business concept on a small scale. This way of working in combination with a "good team" who knew each other and sat together was described as crucial to the project.

> We have had a very good team. The opportunity to work in a small team, but with a lot of personal responsibility and great freedom, produced a lot of results in a short space of time. (Project participant/business developer ProSoft)

> I didn't find it particularly clear at all, we had an assignment, we had a budget, we had a lab time the whole year. We had ambitions of making frequent software releases. I didn't feel the commissioner was placing any great demands on us as regards *what* we would be delivering. This created great freedom... (Systems analyst /programmer, ProSoft)

> One advantage was that everybody was sitting here [geographically gathered]; that I think is one reason why the project succeeded. (Project administrator, ProSoft)

Work on the pilot project was also described as very "down-to-earth" and concrete:

> We have been working on a very down-to-earth level. Working in this small-scale way has entailed working with everything, all the letters to be sent out to the customers, we've sat down and formulated ourselves, the forms and everything else belonging to developing the service, like formulating routines and...all that we've sat down and done ourselves, it gives you a lot of depth. (Project participant/business developer ProSoft)

Once the budget of the pilot project had been approved, it was relatively easy to gain access to the enthusiasts who had devised the prototype. Furthermore, the pilot project was staffed by additional colleagues from ProSoft. Difficulties arose, however, when resources for the small-scale production, selling and invoicing of the pilot product were to be recruited. As the pilot project was being conducted alongside the PDP, it ended up outside of the normal procedures for resource allocation[28]. The project thus spent many hours negotiating and procuring resources. TeleCom's development and operations unit was very skeptical. Their opinion was that there was a lack of routines for managing a pilot product in the same environment as *industrialized* products. They were afraid that the pilot product would sneak past quality control and in time be redefined as

[28] Resource allocation, of both financial means and staff, was dealt with via the Product Council, where resource owners from the organization's various functions were represented. Likewise, all reporting and monitoring of resources was linked to the different process stages and decision points of the development process.

an industrialized product in spite of its preliminary status. There was no doubt that the unit was reluctant to accept responsibility for a product that was "as-near-as-dammit-finished".

> There was a period when [the development and production unit] didn't really want to take this onboard, they didn't feel for it and thought it was difficult and hard work, as they didn't have things fully under control. Quite simply, things just ground to a halt. (Manager, ProSoft)

The only alternative for the pilot project was to build up its own operating environment and administrative organization. When it was time to launch, customer registers had been set up in binders and invoicing was partly being done manually. Via personal contacts at different units, a network of individuals and small departments was created which jointly came to make up the operating organization needed to launch the product with a satisfactory level of quality[29].

The development team dubbed the product Telia Instant Office – *instant* because it had been established that the requirements of small and medium-sized companies were: "simple and quick - an office in an instant". In June 1998, the pilot product was launched. Via direct advertising, 2,000 customers were offered the opportunity to try out Telia Instant Office at an introductory rate. The first customers, then rather few in number, were given service in August according to plan. The goal was, by January 1999, to have at least two hundred customers connected to the service. The product concept was further developed and concretized along with the customers' feedback. Furthermore, the project participants discovered that the pilot product's basic functions were also suitable for other applications along with the "virtual office" (e.g. for classrooms, project groups or for tenants of the same residential area). Minor changes to the basic product provided opportunities to broaden the target group.

The PDP project – the pilot project is industrialized

The assignment that the product development manager had approved by the Product Council in April 1998 also included the starting up of a development project conforming with the traditional process, the PDP. That work would ensure that the pilot project's results could be upgraded and launched on a large

[29] How this would be done had to be accounted for by the product development manager before the steering committee and Product Council prior to the launch being implemented.

scale, i.e. that it would bet *industrialized* in the proper manner[30]. On the very day after the Product Council's favorable decision, the activities of the pilot project had started up. Things were not going quite so well with the industrialization project. The project was given a lower priority than other development endeavors and did not succeed in obtaining the necessary resources. On the Product Council, the line of reasoning seemed to be that the project was coping, for the time being, with its operation in the pilot project, irrespective of whether parallel development had been started.

> [The project] had ideas about the link between the two projects and how they would supply each other with knowledge and information. It was also the [product development manager's] intention to immediately start up a PDP project, but that didn't succeed unfortunately. In actual fact, the PDP project did not start up until a lot later on, a whole lot later on ... (Business developer, ProSoft)

The original idea of close collaboration and crosspollination between the two projects was thus partly lost. Several of the project's participants described this as the largest and most serious shortcoming of the development work. The delayed start of the PDP project also meant that the development course of events took longer. Those responsible for improving and developing the various versions were also of the opinion that the pilot project would gradually reach a stage where new ideas and notions would run dry. The product was considered ready at the idea stage and thus the pilot project had done its bit, unless the scope was provided to carry on working with a new product concept.

> If you look at the entire period, maybe there's not so much to show for one and a half years, but that depends on the fact that there have been periods of waiting for political decisions [concerning resource allocation for the PDP project]. At the same time, there have been some very intensive periods, like the period just before we were about to do the first release for the first pilot customer and a few other developments like that when we achieved great results in a short period of time. (Business developer, ProSoft)

> We should have stopped [the pilot project] a bit sooner, but the product development project didn't get going. The final months [of the pilot project] didn't produce so much (Technical project manager)

[30] The work of the *industrialization project* ensured that the product met quality standards and was able to cope with large-scale production. Besides safeguarding the product's technical function, the industrialization project was very much about securing all the routines, processes and support systems affecting the product, i.e. routines and procedures for sales staff, customer services, invoicing, production and maintenance. This also included the development of courses for the staff concerned, marketing and sales materials and user manuals, i.e. everything that made the product marketable, saleable and deliverable as a coordinated offer.

New initiatives to realize and industrialize the pilot product on a large scale were taken about six months after the launch of the pilot. At that point, the product development manager had concrete information showing that the service was appreciated and an influx of customers was anticipated which the pilot product would not be able to cope with. The product development manager[31] chose to initiate a new development project, i.e. compile further DP1 supportive data (the fourth) to put before the Product Council for a decision. Unfortunately, it was difficult afterward to try to achieve the synergies that it had been hoped to obtain between the pilot project and the new PDP project. This came as a disappointment to some of the participants.

> A new project is to be started up, the entire process is to be forced through [i.e. the PDP], start over with everything [...] the DP2 supportive data has always been criticized for producing desktop products, that's what we wanted to get away from. But, when we entered the PDP, we had to start again and produce [the documents] from scratch. We really never got to try the concept of running in parallel. (Business developer, ProSoft)

The conditions had now changed. The content of the product was no longer a matter of uncertainty. The pilot project constituted the template. This uncertainty primarily affected *how* given functions would best be realized. For example, the project was forced to take a stance on a new technological platform with the capacity for a far greater number of concurrent customers and users than was the case during pilot operation. Furthermore, during the pilot trials, new ideas and functions had been discovered which required another technological platform than the one being used for the pilot product.

> The pilot project was carried on right up until the day when the "real" product was launched. During the spring, the pilot product was closed to new customers, at the same time as existing pilot customers were informed about the impending migration to the new "industrialized" service. The migration of customers worked well and, in August 1999, the product Telia Instant Office was launched onto the market. Not so much had been gained in terms of time, but lessons had been learned regarding which services customers were demanding.

[31] In November 1998, the product development manager was appointed to another post and succeeded by a new product development manager who continued to develop the PDP project.

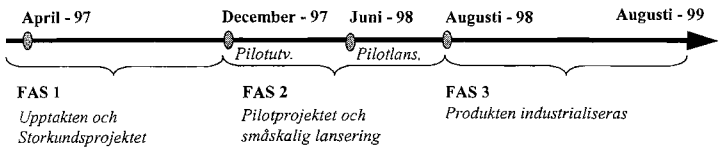

Figure 9. Summary of the development project's course of events.

Additionally, several people claimed that the project was on the market early, which was regarded as being very important.

> We gained nothing in terms of running time because the PDP project got going so late that the pilot period had almost finished. It took almost exactly one and a half years to launch the finished service, but then, of course, we had already been out on the market for a year. (Business developer, ProSoft)
>
> We actually got into the real product with a number of customers. (Systems analyst/programmer, ProSoft)
>
> If it had turned out to be the wrong concept, then we would've been very happy that we didn't start everything up at once. (Manager, ProSoft)

What happened next?

For a time, the development team played with the idea of retaining the technological platforms and the product being developed in the pilot project in parallel with the industrialized product. Behind that idea lay the assumption that existing pilot customers had improved their knowledge of the product during the pilot project, thus becoming ever more competent demand-makers and an important resource for the product's further development. Besides, it was being contemplated whether or not the customers who had participated in the pilot project would perceive the industrialized product as old-fashioned once it had arrived. However, the choice was made to close down the pilot environment and migrate the pilot customers to the industrialized product as soon as it was launched. The Product Council and the new product development manager were of the opinion that, among other things, it was becoming too costly to develop two products in parallel.

The method of working applied during the development of Telia Instant Office was evaluated in conjunction with a review of the PDP. It was trialed in another project but never gained a foothold as a general method of working. Similar initiatives were implemented at other product and development units of Telia. Here the "LITE" and "9-week" models can be mentioned; these were devised for

development projects with high standards as regards time-to-market. The focus was on the possibility of trying out and reconsidering early assumptions, before the plan was set in stone for large-scale development. However, neither of these two methods is being applied by Telia today.

What was initially difficult to describe and did not allow itself to be captured in planning documentation became, in time, a product line of its own. A number of documents were written which accounted in detail for the product's function, target groups, and market potential, etc. The product took on a character which was difficult to disregard. With new variants of the same basic function, there was soon talk of an "Instant Family". In hindsight, it can be difficult to understand what was so difficult to express. The relatively simple product should really have been within the capabilities of the product development manager, together with the other members of the development team, to describe and plan for right at the start?

PLANNED PRODUCT DEVELOPMENT UNDER UNCERTAINTY: AN UNREASONABLE PREMISE?

The image of a project manager who has analyzed the situation and movement of the market and then succeeded in compiling sufficient information about competitors, customers and other factors in a clear development plan is an image that tallies badly with the above case study. During the project's initial eight months, product development managers, technical experts and business strategists struggled to describe a future business and product concept, but there were not enough words. Superficially, the task was about putting together a plan for a new business and product concept. Fundamentally, this account has more to say about the conditions of product development in the face of uncertainty.

The project applied three different action strategies over time: the traditional product development process, the customer project and the pilot project. Work commenced in accordance with the stipulations of the PDP, with the activity "capturing ideas". The name removes a notion of given and impervious ideas which are merely to be captured and noted down. Afterward, we are able to establish that it was not so easy. The project did not succeed in achieving as complete a product plan as the Product Council required in order to give the development project the go-ahead. As the plan formed the basis for all future

activities, the project got stuck in a "planning loop" between decision points DP0 and DP1 (Figure 3).

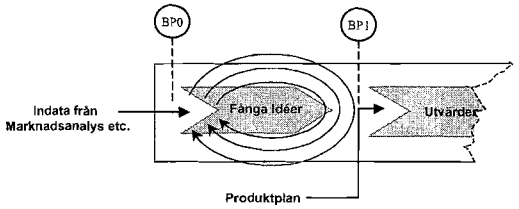

Figure 10. The "planning loop" between DP0 and DP1

The difficulties of the product plan encouraged the project participants to look outside the confines of Telia in order to conduct a dialog with potential customers regarding the benefits of an intranet. Via the major customer project, it was hoped that help would be provided in describing what an intranet should include, thus also clarifying what the project should achieve. However, the participants met with surprises right from the start. The sales force had difficulty describing what an intranet offer from TeleCom entailed. Furthermore, the sales staff lacked anything concrete to make available or demonstrate. Even though the participants had been given extra time and resources, they had difficulties progressing with their work.

It was not until the project had succeeded in raising the resources to, on a small scale, improvise and research vague assumptions that the work was given the scope needed to develop ideas and show concrete results. Telia ProSoft's prototype, as an initial potential product, in combination with concrete customers' enquiries, developed the notion of *what* an intranet could be, *how* it could be produced and *who* would be affected by any future business. The pilot project satisfied the need for something concrete and practical to reflect upon alongside the otherwise very abstract planning work. Opinions and ideas regarding how a future intranet service should be composed and how it should work were in this way developed in parallel with the tangible design and development work. As the work progressed, there was an increase in the prerequisites for assessing and specifying what the continuing development work would require in terms of time, resources and specific competencies.

When the "real" industrialization project finally started up, the conditions had changed vis-à-vis the start of development work. The product development manager and the other project participants had a clearer idea about what an

intranet could be. The lack of clarity and the ambiguity which had previously characterized the project had diminished. Furthermore, the pilot project customers hade confirmed that the project's product concept was of interest. The pilot project had thus contributed to reducing the level of uncertainty in the product. From this point in time, the majority of questions dealt with *how* to realize, in the best way, a given (not necessarily resistant) product, i.e. how to deal with the process uncertainty (cf. Chapter 1). The project now had a greater chance of being conducted in accordance with the PDP. From the case study's final stage, we also get a feeling of how the circle is completed when the product concept of the "virtual office" becomes a phenomenon difficult to disregard and the express knowledge becomes, to a certain extent, something that TeleCom "takes for granted"[32].

Below there follows a discussion about the differences and motives behind the different action strategies, as well as what these came to mean for the project. Three aspects are dealt with: the notion and view of the development work, the focus of management and the logic behind the various development processes. The scope for improvising via experiments, both in terms of *what* the project would achieve and *how* this would come about, came to mean a lot for the course of events and deserves to be a discussion in its own right. The chapter concludes with some general lessons learned from the project.

The view of development work

Business and product development deals with creating something new – creating something that one's own organization and surroundings initially lack or have insufficient experience of. A lot of the time, the challenge lies on the borderline of what the individual does not yet know or is able to do, which allows us to understand that product and knowledge development go hand in hand[33]. Besides that uncertainty, the individual is forced to deal with unclear conditions due to an unstable market. According to Lester and Piore[34], who have, among other things,

[32] Compare Nonaka and Takeuchi (1995), who describe how knowledge development begins in tacit knowledge which, during development work, becomes explicit and is then, as soon as the knowledge is established, taken for granted and becomes tacit again.
[33] Nonaka (1991), Floyd and Wooldridge (1999).
[34] Lester and Piore (1998).

studied companies on the mobile telephony market, this means that neither the work process nor the final result can be determined in advance:

> Today's markets are increasingly unstable and unpredictable [...] managers can never know precisely what they're trying to achieve or how to best achieve it. They can't even define the problem, much less engineer a solution." (Lester and Piore, 1998, s.86)

Göranzon[35], who has studied how the individual's occupational knowledge is converted into action, has in turn shown that the development project's principal challenge lies in finding a "describable whole, a business concept, a structure or a working method in principle which will subsequently have to be developed and refined". In a similar way, the participants of Telia Intranet tell of how they wrestled with their assignment to sufficiently clearly express the content of the business concept. What is described is more a case of exploring new opportunities than *capturing* and exploiting an already given product concept (cf. the sub-process of capturing ideas in the PDP). We can establish that more than just information gathering was required in order to develop the concept of Telia Intranet. Efforts of another kind were also required:

> In real-world practice, problems do not present themselves to the practitioner as given. They must be constructed from the materials of problematic situations, which are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He must make sense of an uncertain situation that initially makes no sense (Schön, 1983, s.39).

Insufficient information creates an uncertainty which can be remedied using more effective methods and processes of information gathering. Varying perceptions of how a situation should be understood and dealt with instead create an ambiguity which requires that the individuals jointly *interpret* the situation and *give* it meaning[36].

The literature on management methods and processes has often put logical analysis and theoretical knowledge at the center[37]. For the same reason, knowledge is expected to be presented in its abstract form, in plans and documents, prior to being put into action. This is also reflected in companies' models and processes for product development. One possible explanation for the difficulties experienced at Telia Intranet is that the participants were offered a

[35] Göranzon (1998).

[36] Weick (1995).

[37] Schön (1983), Göranzon (1998).

process (in our case the PDP) for problem solving when the task actually required problem formulation.

During the initial eight months of development work, efforts were concentrated on gathering in and analyzing information, first via formal data sources and then via ten or so potential customers participating in the major customer project. The need to explore and try out early ideas in the real environment was initially met via the pilot project. The customers became "real" users and the project participants were prodded into forcibly dealing with the unclear points existing in connection with the new business concept.

The pilot project or pilot trial was no new phenomenon at TeleCom. Customers were often recruited in order to try out a new product (ahead of DP3, see Chapter 2). The major difference lay in the purpose of the trial. While the traditional pilot project's aim was to verify and check that an already developed product tallied with "frozen" plans and requirement specifications, Telia Intranet's pilot project aimed to create the plan and the specification. A project participant described the pilot project as a *living requirement specification* with scope for new ideas and product versions.

The management focus

Stability, predictability and quality are traditional motives behind companies' use of project and development models[38]. From that point of view, TeleCom's product development process was an important instrument. The PDP would ensure that the Product Council made its decisions on the basis of accurate information, so that mistakes could be avoided and work conducted efficiently. Using the plans and progress reports drafted during the process, the Product Council would continually be able to assess the performance of the participants and check that product development was maintaining the course previously decided upon.

The high level of product uncertainty and the difficulties of creating a complete product plan changed the preconditions for governance and control in the

[38] Cf. Chapter 7.

traditional sense. The original ambition to develop an intranet was still strong, but what could replace the plan?

A lack of clarity surrounding future results means working with a margin of error which, according to Cheng & Van de Ven (1996), can more easily be managed if the development work is carried out in more and smaller steps. The same line of reasoning was advocated by the project participants when they discussed the advantages of a pilot project. The project's decision-making data for the Product Council contained a rough concept and vision of developing a virtual office, a schematic description of the prototype, a few arguments for the choice of a new customer segment and an idea regarding a limited market introduction. Over and above this, a proposal for time and resource frameworks for the pilot project was presented. As a product plan, the supportive documentation was incomplete, but sufficient for assessing and delimiting the size of the risk. The pilot project entailed that the Product Council's participants gained control of the cost (in terms of money and time) of a possible misguided venture or, perhaps, of a new experience. For the project participants, the pilot project meant that they obtained the latitude to explore what the relevant customer group and ProSoft's prototype might provide, see Figure 4.

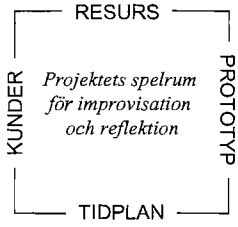

Figure 11. The pilot project's "latitude".

When product development means that the participants learn more about opportunities and limitations while work is progressing, we cannot in advance sort out the good and bad product concepts from each other. That insight is more likely a result of newly-found knowledge and supportive data for correcting course. Thus, it is also reasonable in such projects that situations arise when the product concept is deemed of no interest due to the technology not being up to scratch, the customer benefit being limited, or the business potential being dubious. Correcting course can thus also entail that the project is terminated.

The process logic

In one important aspect, the early action strategies differ from the method of working used in the pilot project – i.e. in the relationship between *planning* and *implementation.* In TeleCom's product development process, as in many other traditional projects and development models, the distinct boundary between planning and implementation was emphasized. The product plan, which determined and governed all future activities, was formulated within the activity "capturing ideas".

$$\text{Plan} \Rightarrow \text{Implement}$$

The case description shows how the Product Council stuck to its requirement for a complete plan for a long time. So much faith was put into planning that the project encountered difficulties in taking off, finally ending up in a never-ending spiral of constantly new decision-making data[39].

In the literature on innovation and product development, both practitioners and theoreticians have attempted to show the identity of, and describe, the conditions of the difficult and often unclear preparatory phase ("the fuzzy front end")[40]. The focus has been on methods and models for increasing knowledge of the market trend, new customer requirements and technological innovations as the supportive data for planning work. Put simply, the linear process model has been supplemented by activities for effective idea and problem formulation during the project's initial phase. Many measures seeking to solve problems during the "fuzzy front end" are thus expressions of the traditional strategy of dividing up development work into planning and implementation.

$$\text{Learn} \Rightarrow \text{Plan} \Rightarrow \text{Implement}$$

Maybe this can explain why the decision to sanction the major customer project was a relatively undramatic measure. It was no crime against the sequence of the development process, content-wise. The participants were given more calendar time and man hours for "idea capturing". The objective, as previously, was to achieve a complete plan which, when the chips were down, would be able to

[39] Compare Pfeffer and Sutton's (2000) description of "the knowing-doing gap".

[40] Cooper and Jackson (1997), Cooper et al. (2002), Khurana and Rosenthal (1997), Khurana and Rosenthal (1998).

ensure effective implementation. But, when the project participants tried to enlist the help of customers in order to look into and analyze requirements and expectations regarding a future intranet service, work ground to a halt because there was no object of reference to relate to. It was difficult to talk about functions which there were no words for. Despite their new tactic for information gathering, the participants did not succeed in completing a product plan. Instead, they met the same fate as during the project's initial phase.

Using the pilot project, the Product Council dissolved the boundaries between the PDP's various phases and gave the project participants the scope to explore which opportunities the relevant customer group and ProSoft's prototype could provide. The complete plan was no longer an unconditional requirement to commence the subsequent phases, even if the product development manager was still compelled to respect the Product Council's expectations regarding a number of framework conditions. Otherwise, the plan and knowledge of the end product came to be developed in parallel with the implementation[41].

Learn ⇒
Plan ⇒
Implement ⇒

In the pilot project, too, the participants encountered problems. In the TeleCom organization, there was no room for a pilot or concept-developing project. This resulted in the project losing the structure that normally supported development work with decisions in various issues. The project was instead forced to seek other, new ways of safeguarding its needs.

So far, the analysis has focused on the difference between a more traditional view of product development, where the product concept is given, if difficult to articulate, and where management tries to guide the development work supported by a sequential process entirely based upon the plan that the participants had produced during the initial phase. In opposition to that tradition, the pilot project becomes an anomaly. The uncertainty changed the conditions for managing and governing the work (see Table 1).

[41] Here the connection is illustrated in parallel in order to clearly show that the knowledge, plan and product are being developed throughout the entire course of events. The connection can also be described as cyclical, i.e. as a continuous process wherein learning, planning and implementing do not have a clear beginning or end (cf. Kolbs (1984) "experiential learning cycle").

Table 6. Overview of the action strategies used at Telia Intranet.

	Project in the PDP	Major customer project	Pilot project
View of the development work	Given problems, ideas and solutions, just a matter of "capturing".	Given problems, ideas and solutions which are difficult to articulate.	Problems, ideas and solutions are not given, they are explored and created in situ, in the actual environment.
Management focus	Create stability and predictability. Reduce uncertainty prior to implementation. Maintain course in accordance with set plan.	Create stability and predictability. Reduce uncertainty prior to implementation. Maintain course in accordance with set plan.	Accept a lack of clarity and ambiguity. Reduce the size of the risk. Correct course on the basis of newly-acquired knowledge.
Process logic (L=learn, P=plan, I=Implement)	P → I	L → P → I	L → P → I →
Problems	Got stuck in planning.	Got stuck in planning.	"Alienation".

Improvise – when the plan has reached its limit

One way to understand the pilot project is to regard it as a process based upon improvisation. Several researchers have suggested that improvisation via experiments and practical trials is a suitable strategy for managing an unstable and uncertain environment[42]. Among others, Moorman and Miner[43] have described improvisation as a special case of product development. According to their definition, improvisation is characterized accordingly:

> [...] the composition and execution of an action converge in time so that, in the limit, they occur simultaneously [...] the narrower the time gap between composing and performing (or planning and implementation), the more the act is improvisational. (Moorman & Miner, 1998, p.1)

In accordance with Moorman and Miner's description, the Product Council sanctioned an action strategy based on improvisation when giving the go-ahead for the pilot project. What this could entail is described in the following section.

Improvisation and structure

Improvisation is often linked to actions that are spontaneous and lack reflection, far away from our conception of an organized activity. A development process

[42] See for instance Eisenhardt and Tabrizi (1995), Brown and Eisenhardt (1997), Weick (1998), Moorman and Miner (1998), Kamoche and Pina e Cunha (2001).

[43] Moorman and Miner (1998).

which employs improvisation does not, however, need to be chaotic and lacking in structure. On the contrary, improvisation often entails an ability to achieve structure and flexibility at the same time. Brown and Eisenhardt (1997) describe the need for semi-structures, while Kamoche and Pina e Chuna (2001) talk in terms of minimal structures. In both cases, the need for both social and formal structures is emphasized in order that the company's ambitions to improvise do not descend into unbridled chaos. One clear perception, for instance, is that you cannot improvise with nothing[44] - improvisation requires a first verse (idea) and an outer framework of rules to relate to (i.e. a certain degree of social and formal structures).

Social structures primarily concern individuals' trust and faith in each other, as well as everyone's expertise, while formal structures relate to the project team's view and understanding of the task. The formal structure also encompasses factors such as a common vision, agreed milestones, existing knowledge about the market and technology plus any templates or early prototypes to start out from.

Different factors formed the basis for improvisation during the pilot project. Firstly, ProSoft's prototype and the decision to focus attention on a new target group. This gave the participants a product idea to base their improvising on. To this can be added the Product Council's decision to accept the pilot project as a form of work. The fact that the Product Council set a clear milestone for the launch of the pilot product also created a level of formality that contributed toward providing the work with a meaningful focus and priority. Over and above these more formal structures, the pilot project was characterized by a project group where the participants knew each other and each other's capabilities relatively well. The core of the development team consisted of individuals from ProSoft. They all had the vision of supplying an "office on the network".

Another aspect of the relationship between improvisation and structure can be illustrated by the participants' differing perceptions of the pilot project's deviation from the customary development process. Some of the people in the project perceived the form of work as radically different, with constantly new challenges. Among other things, the pilot project's principal project manager

[44] See for instance Weick, (1998), Kamoche and Pina e Cunha (2001).

thought it a major challenge to improvise one's way forward in the political corridors and to continuously be seeking sponsors who legitimized both the content and form of the pilot project. Others noticed little or no difference between their own work on the pilot project and a typical development project at Telia. Two programmers on the project recounted that they had largely followed the routines and methods of working which were normal for developing and commissioning a new program version. To all intents and purposes, the development of program code was one of the functions and activities only marginally affected by being conducted in a pilot project. Perhaps that contributed toward maintaining a beneficial relationship between structure and flexibility for the project as a whole.

Improvisation and the power of examples

Improvisation is based on practical action. Eisenhardt and Tabrizi have described how companies on an unstable market carry out product development by means of applying an iterative process, where small trials and experiments gradually give shape to a new product. Their results are in line with Daft and Weick's perception that organizations deal with uncertainty by creating their own interpretation of their surroundings through "learning by doing", as well as Schön's arguments for reflection in action. Common to all is the theory that individuals learn via examples[45].

The pilot project became a meeting place for reflection and learning via experiments. Instead of restricting the scope to developing given business ideas, the participants in the pilot project were expected to get to grips with the uncertainty by acting and experiencing. It was not until the participants were allowed to act on a small scale that the development of ideas gained fresh momentum. The pilot project saw the development of the notion of *what* an intranet could turn out to be, *how* it should be realized and to *which* customers the product would be of interest. In other words, the pilot project allowed the participants to become conversant with a concrete situation. While a function was being developed, problems as well as opportunities showed up immediately. The pilot customers' reaction confirmed the function and governed which changes would be given priority.

[45] Eisenhardt and Tabrizi (1995), Daft and Weick (1984), Schön (1983).

The approach can also be compared with Kolb's (1984) description of experimental learning, where knowledge and new concepts are created and modified while the participants are acquiring concrete experiences. This, according to Kolb, is a process that requires the participants to:

- dare to act at the time using their intuitive understanding of the situation,
- have the ability to reflect upon and transform their experiences into logically sound ideas,
- actively seek new experiences via experiments as the foundation for verifying, modifying or rejecting previous assumptions.

Kolb describes *actors,* who *act* in a role which reaches beyond information gathering and the analysis required for drawing up a plan.

Individuals who learn while they are acting do not, as a rule, have any problems correcting their actions on the basis of what they have learned[46]. While the participants in the pilot project were learning what the concept entailed, they were also making conscious decisions as regards the objectives and subsequent steps. Afterward, we can describe development work as the interplay between an early idea regarding what to achieve, the knowledge already possessed, difficulties along the way and new lessons learned. The plan and the complete product description were developed in parallel with the prototype, later becoming an important contribution to the work of equipping the product for a large-scale launch.

Improvisation and supporting the organization

During a follow-up meeting when methods and processes for pilot projects were discussed, the manager of a development unit commented:

> I wouldn't like to allow all projects to start up without a plan, that would make a mockery of everything we call resource planning.

The development manager's remark sheds light upon the fresh concerns arising from the pilot project's deviation from TeleCom's customary process. Processes and functions central to resource allocation and the establishment of development projects were strongly linked to the process. This resulted in the pilot project's

[46] Pfeffer and Sutton (2000).

participants devoting a lot of time to solving organizational problems which traditional development projects tackled with the aid of Product Councils, routines and principles linked to the product development process.

Simultaneously laying claim to both deviation and support is, in certain respects, contradictory. Practical trials and improvisations can shorten the lead-times of product development under uncertain circumstances; but at the same time there is also a risk that the time gained will be lost if the project loses its normal product development infrastructure.

All things considered, product development in the face of uncertainty challenges the company's attitude as regards risks and risk-taking. It could, perhaps, be an overstated respect for *faux pas* that is the reason behind the company not seeking alternative management methods based upon planning. This is the assertion of Christensen and Kreiner[47], in any case, who are of the opinion that companies and organizations, in the absence of alternatives, attempt to create predictable living conditions for themselves by continuously expanding the boundaries of the rational plan.

The need for enhancements to traditional governance and follow-up models for product development becomes clearer when we accept that participants create knowledge and actually learn what the task is all about *while work is ongoing*. Regarding product development as a learning process entails, among other things, the entire knowledge and the product of the pilot project's efforts not being available until work has been completed and the participants have the results to hand. Under such circumstances, it is reasonable that development work is assessed on the basis of other premises than the traditional retrospect in a "bygone" plan[48]. In the pilot project, the customers' opinions regarding the prototype and the product to be test-launched later on came to carry a lot of weight. A project participant described it as follows:

> [The Product Council] would have terminated the project if it weren't for the fact that there were customers [....]. Having pilot customers saved us. We had something to show which worked. (Project administrator, ProSoft)

[47] Christensen and Kreiner (1997).

[48] Gustafsson (1994), Christensen and Kreiner (1997, p.67 et seq.).

An assessment based on the customers, company and other interested parties assessing the value of the development project's actual achievements can thus be one alternative as regards product development based on improvisation.

CONCLUSIONS

The Telia Intranet case study shows that analysis and planning can be conducted up to a certain point. Product development in the face of uncertainty is more about exploring and improvising with the aid of delimited experiments than processing and commissioning given ideas.

The purpose and challenge of the product development process becomes, in other words, the reverse. Instead of structuring what one is *supposed* to arrive at, product development via improvisation is about structuring what one *has* arrived at (learnt) via practical experiments in a real situation.

Seen from a knowledge perspective, deviations from the original plan can apply to both progress and *faux pas*. Correcting the plan, perhaps terminating an endeavor ahead of time, can thus be a result of learning or adapting to a situation not previously predictable.

There is a risk that companies that are continually experimenting and trying out new things will neglect activities aimed at completing and commissioning (exploiting) their new product concepts[49]. In the worst-case scenario, the company will never succeed in transforming its product concepts into revenue-generating business. Companies choosing to utilize improvisation must also be able to assess when it is time to evaluate the "experiment", terminate the project or scale it up. Similarly, it is about assessing in individual cases whether or not improvisation is a suitable action strategy.

Management can, in different ways, create the prerequisites to enable the development project's participants to explore and reflect upon the opportunities and limitations of a new product concept, but not to control the process fully. Instead, they will be forced to put their faith in individuals creating the results.

[49] See for instance March (1991).

Management's task lies in creating the prerequisites for product development that allow improvisation via practical experiments. Among other things, this can be a matter of:

- safeguarding the structures necessary to enable improvisation and experiments to gather momentum without descending into chaos,
- finding forms for motivating and coordinating collective actions without a complete plan,
- seeking alternatives to traditional impact assessment,
- giving some thought to the company's attitude to risk and risk-taking.

One final reflection: Is there a limit to the plan – is the company unjustifiably obsessed with planning?

The case study shows that it is not about finding the best sequence, by choosing either planning or action as the initial activity. Neither is it about choosing an optimum position of balance where the amount of planning equals the amount of action. Planning supports action and action supports planning – simultaneously. In doing so, they are related and inseparable. Seen as one cohesive unit instead of separate elements, the choice between planning and action loses practical significance. The plan is still central to coordinating collective actions, but is not always the best tool. The ability of a company to deal with the tension represented by the relationship between plan and action is what determines its ability to carry on product development in the face of uncertainty. Improvisation via experiments may be the link that unites planning and action.

REFERENCES

Brown, S. L. & Eisenhardt, K. M. (1997). The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly.*(42), 1-34.

Cheng, Y.-T. & Van de Ven, A. H. (1996). Learning the innovation journey: order out of chaos" *Organization Science* 7(6), 593-613.

Christensen, S. & Kreiner, K. (1991/1997). *Projektledning - Att leda och lära i en ofullkomlig värld.* Lund, Jurist.

Clegg, S. R., Cunha, J. V. et al. (2002). Management paradoxes: A relational view. *Human Relations* 55(5), 483-503.

Cooper, C. L. & Jackson, S. E., Eds. (1997). *Creating tomorrow's organizations: a handbook for future research in organizational behavior.* West Sussex, John Wiley & Sons Ltd.

Cooper, R. G., Edgett, S. J. et al. (2002). Optimizing the stage-gate process: what best-practice companies do. *Research Technology Management* 45(5), 21-26.

Daft, R. L. & Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review* 9(2), 284-295.

Eisenhardt, K. M. & Tabrizi, B. N. (1995). Accelerating adaptive processes: product innovation in the global computer industry. *Administrative Science Quarterly* 40(1), 84-110.

Floyd, S. W. & Wooldridge, B. (1999). Knowledge creation and social networks in corporate entrepreneurship: the renewal of organizational capability. *Entrepreneurship Theory and Practice.* Spring.

Gustafsson, C. (1994). *Produktion av allvar.* Stockholm, Nerenius & Santérus Förlag AB.

Göranzon, B. (1998). En mötesplats for reflektion. *Precision and improvisation. Om systemutvecklarens yrkeskunnande.* In C. Hoberg. Stockholm, Dialoger, 11-28.

Kamoche, K. & Pina e Cunha, M. (2001). Minimal Structures: from Jazz improvisation to product innovation. *Organization Studies* 22(5), 733-764.

Khurana, A. & Rosenthal, S. R. (1998). Towards holistic "front ends" in new product development. *Journal of Product Innovation Management* 15, 57-74.

Khurana, A. &. Rosenthal, S. R. (1997). Integrating the fuzzy front end of new product development. *Sloan Management Review* Winter, 103-120.

Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development.* Englewood Cliffs, NJ, Prentice Hall.

Lester, R. K., Piore, M. J. et al. (1998). Interpretive management: what general managers can learn from design. *Harvard Business Review* (March-April), 86-96.

Moorman, C. & Miner, A. S. (1998). The convergence of planning and execution: improvisation in new product development. *Journal of Marketing* 62(July), 1-20.

Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review* (November-December), 96-104.

Nonaka, I. & Takeuchi, H. (1995). *The knowledge-creating company : how Japanese companies create the dynamics of innovation.* New York, Oxford University Press.

Pfeffer, J. & Sutton, R. I. (2000). *The knowing doing gap. How smart companies turn knowledge into action.* Boston, MA, Harvard Business School Press.

Schön, D. A. (1983). *The reflective practitioner: how professionals think in action.* New York, Basic Books.

Turner, R. J. & Cochrane, R. A. (1993). Goals-and-methods matrix: coping with projects with ill defined goals and/or methods of achieving them. *International Journal of Project Management* 11(2), 93-102.

Van de Ven, A. H. & Ferry, D. L. (1980). *Measuring and assessing organizations.* New York, John Wiley Sons.

Van de Ven, A. H. & Polley, D. (1992). Learning while innovating. *Organization Science* 3(1): 92-116.

Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, Sage Publications.

Weick, K. E. (1998). Improvisation as a mindset for organizational analysis. *Organization Science* 9(5), 543-555.

Paper II

Marshall, C

2004

The dynamic nature of innovation partnering: a longitudinal study of collaborative interorganizational relationships.

European Journal of Innovation Management, 7(2)

The dynamic nature of innovation partnering: a longitudinal study of collaborative interorganizational relationships.

Cassandra Marshall

This paper provides insights into the initiation and early development of collaborative interorganizational relationships (IORs) for innovation and new business creation. Data was gathered from field observations of three ongoing collaborative IORs. A conceptual framework previously developed by Ring and Van de Ven (1994) served as a means of restructuring and analyzing the data. The results reveal an emergent process that is dependent on the comparative achievements in negotiation, commitment, and execution. Three organizational practices were identified: volatile agreements, continuous reevaluation and reorganization through real practice, as well as a process wherein "co-participants" were challenged to work on their relationships. The limited prospects of specifying agreements ex ante, combined with continuous variation in conditions, entail active management and continuous re-design of the relationship. This suggests that managers play the role of the architects of relational linkages.

Keywords: *Interorganizational relationship, innovation, new product development*

INTRODUCTION

The perception of the organizations' use of collaborative interorganizational relationships (IORs) as an important source of innovation and new business creation is far from new (cf. Kanter, 1989; Pennings and Harianto, 1992; Powell, Koput et al., 1996; Teece, Pisano et al., 1997; Van de Ven, Polley et al., 1999). Jarillo (1988, p.39) reminds us that "in any case it is an essential characteristic of entrepreneurs to end up using more resources than they can control, for they are motivated primarily by the pursuit of opportunity, rather than feeling constrained by using the resources they control". Jarillo (1988) thus considers the accumulation of and access to the necessary resources and capabilities as the "first entrepreneurial problem". Analogously, Sarkar and colleagues (2001, p.701) argue that: "entrepreneurial opportunities also [besides product markets] exist in factor markets". According to their reasoning, a capable firm with the capacity to explore and exploit new business opportunities with complementary partners, referred to as 'alliance proactiveness', may be rewarded with increased competitiveness.

Collaborative ventures are, however, frequently viewed as difficult to manage (cf. Powell, 1987; Alter and Hage, 1993; Das and Teng, 1996). Innovation is seen as an uncertain and equivocal endeavor, and a significant rate of failed outcomes in new business development has repeatedly been considered typical. The remarkable failure and dissolution rate of business alliances (somewhere between 30 and 50 per cent) further accentuates the joint challenge (Barringer and Harrison, 2000; Das and Teng, 1997; Das and Teng, 2000).

The question of how partners in a collaborative interorganizational relationship (IOR) obligate themselves to general commitments and specific courses of action has thus been of particular interest to a number of scholars and practicing managers.

Nevertheless, in a comprehensive analysis of previous empirical studies, Sobrero and Schrader (1998) found that understanding the "how" falls far behind the tested insights into justifying whether or not to start an alliance. They also found that the link between contractual and procedural coordination within the relationship has been rather neglected. Scholars who invoke the transaction cost perspective generally concentrate on the choice of contractual mechanisms and

governance structures that minimize the sum of the production and transaction costs. On the other hand, research based on structural contingencies and organizational learning addresses the exchange of information and knowledge, which in turn evinces a primary interest in procedural coordination. Even though research taken from a resource-based view supplements a contract-oriented outlook with procedural orientation by linking it to "day-to-day" communication and the conditions for transacting resources that are not perfectly transferable, the related empirical work pertains mainly to contractual coordination (Sobrero and Schrader, 1998). Scholars are thus encouraged to examine, in detail, routines and processes that facilitate coordinated action and value-creating linkages between organizations (Ring and Van de Ven, 1994; Dyer and Singh, 1998).

This paper examines how interorganizational partners jointly accomplish and support the initial phases of innovation and new business creation. This is accomplished by: (1) presenting empirical data from the formation of collaborative IORs between a Scandinavian telecommunications company and its partners in the context of new product development; (2) analyzing and elaborating on the characteristics of the case; and (3) discussing the implications of the findings.

The next paragraph begins with a discussion on the theoretical framework that has guided current study, followed by a more detailed account of the method used during the data collection process. Then, the empirical data from a case study of three ongoing interorganizational relationships will be presented. The concluding sections expound upon and analyze the findings and propose some managerial implications.

THE EMERGENT PROCESS OF COLLABORATIVE IORs

Researchers have developed various guidelines and measures for successfully managing IORs. One field of work considers careful planning and systematic implementation to be a precondition for success, and cultivates a division into sequential stages of decisions concerning the collaborative venture. However, the implications of uncertainty in cases where at least some information about future events is not possible to know in advance, e.g. in innovative endeavors, have caused other researchers to stress an emergent view of the process. For instance,

Doz and colleagues (Doz, 1988; Doz, 1996; Doz and Hamel, 1998; Doz, Olk et al., 2000) argue that a positive attitude toward renegotiations and additional commitments, over time, becomes critical.

Ring and Van de Ven (1994) previously developed a theoretical framework for the development of collaborative IORs. One basic assumption underlying the framework is the emergent pattern. The relationship is considered to be cyclical, and constantly reconstructed by continuing interpretations and events. Another premise concerns the interactions between the formal and informal courses of action, suggesting that personal relationships, tacit understandings and psychological contracts are increasingly replacing formal roles, agreements and legal contracts as a collaborative IOR evolves over time. However, the repetitive execution of acts also leads to the institutionalization of informal terms into formal manifestations and organizational routines. The process they propose consists of three simultaneous stages: (1) *negotiation,* which involves formal bargaining and informal sense-making between actors and forms the basis for (2) mutual *commitments* in terms of legal and psychological contracts, which in turn support (3) *the execution* stage, wherein negotiations and commitments are transformed into collective interaction (Figure 1).

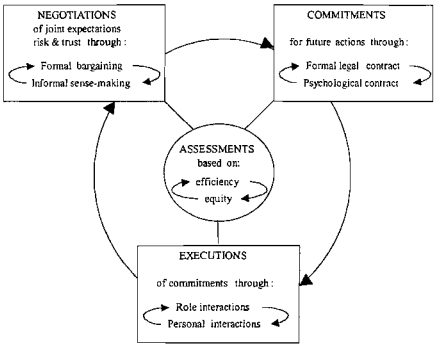

Figure 12. Developmental processes of collaborative interorganizational relationships, (Ring and Van de Ven 1994).

The negotiation stage affects the way the potential partners and actors involved *think* about the upcoming venture. It is a process of developing a common understanding and definition of purposes and expected outcomes. Through the exchange of values and priorities, the negotiation will, if successful in its formal or informal context, lead to the congruent conceptualization of future joint action

and increase the chances of establishing commitment between the partners. Thus, the commitment stage concerns the establishment of agreements and terms of coordination and action. To a great extent, the early moves in negotiation and commitment constitute a "cognitive anchor" (ibid, p. 102) that is critical for subsequent negotiations and goal-setting. The execution stage, finally, puts intentions and plans into effect.

The innovation agenda commonly involves discontinuity, multiple commitments, interruptions, and transient purposes, thus challenge the partners to explore their common future. Although previous research has described important stages and key issues in the developmental process of IORs, limited attention is paid to the relationship between negotiation, commitment and execution for coordinated action under unpredictable conditions (Sobrero and Schrader, 1998). Ariño and de la Torre's (1998) concept of 'relational quality' is, however, informative in this case. Building on Doz (1996) and Ring and Van de Ven (1994), the authors advance an evolutionary model of collaborative ventures that focuses on continuous learning-action-reaction loops. Their tentative model also takes into account the development of "relational quality" on a cumulative basis, i.e. considered as both an initial condition and an output of the relationship. The authors argue that processes for conflict resolution are among the most important initial conditions for promoting positive renegotiation loops. A recent article by Ariño, de la Torre and Ring (2001) further elaborates on the partners' ability to manage relational quality and improve the prospects of attaining common goals.

METHODS

The focal level of analysis in the current study was the *process* of engaging in relational acts, which makes time a significant frame of comparison. However, time as used in this study refers to "event time" rather than "clock time", i.e. time as measured by particular events that have affected or created the process direction (McPhee, 1990). Since the empirical data sought were generated at a level of detail that only the actual participants could provide, the research was carried out as a longitudinal in-depth case study (cf. Yin, 1994; Eisenhardt, 1995). Yin's (1994) previous description of case studies as: '...the most popular research strategy when *how* and *why* are the questions posed, when the researcher has little or no control over the events and when interest concerns some everyday

phenomenon within some context of real life', applies to the overall circumstances and aims of this study.

The object concerned three collaborative arrangements between an incumbent telecommunications company (TelCo) and its partners (Alpha, Beta, Delta and Epsilon). Permanently employed by one of the companies (TelCo) and under instructions to outline the prerequisites and strategies for interorganizational collaborations, the author was fortunate to participate in activities carried out in two of the three relationships (at Alpha and Beta). Consequently, a considerable part of the process of different events and episodes was collected in real time from the perspective of an insider or "observing participant" (Alvesson, 1999). Insights and thoughts from events occurring at the operational and managerial levels were captured by means of participating in both project teams and steering committees. The two particular relationships were studied during their first 10 months of existence (from May 2000 to March 2001). A total of 22 (59.5 hours) formal and joint meetings and group efforts (i.e. booked in advanced and with at least one representative from each partner attending) were spent during the period. Notes were taken and documented in a chronological diary in each case. As a complement to the observations and narratives of individuals, the study also included written text sources, e.g. 'formal descriptions' of joint agreements in contracts and minutes of meetings, as well as conversations conducted by e-mail.

The kind of self-ethnography described above was also planned for the third relationship (TelCo-Delta-Epsilon). However, the author entered the relationship when the collaboration had been under way for about six months and, unfortunately, the first and only meeting was to be the last before the relationship ended. Further data was thus collected by means of interviews with TelCo's representative on the steering committee and the appointed project leader, and by analyzing written agreements in letters-of-intent, minutes of meetings and final project reports from each of the participating firms.

Given the risk of 'going native' (Alvesson, 1999), my familiarity with and closeness to the studied object may be considered an obstacle and a potential source of bias. To preclude any misrepresentation of the results, semi-structured face-to-face interviews with key participants from "each side" of the collaboration provided additional data. The interviews were conducted either in tandem, i.e. together with a research colleague, or by a researcher not directly involved. Archives and interviews thus served as a complement to the data

collected by observation, as well as a means of triangulating the validity of the data (cf. Eisenhardt, 1995).

In one of the three IORs (case Alpha), a structured follow-up meeting was arranged with the main purpose of discussing and reflecting on the experiences gathered from the collaboration. Besides additional data regarding the relational process itself, this particular meeting facilitated the selection of what was to be expressed in the text describing all that had been said and observed during the study of TelCo and its partners.

THE TELCO CASE

Background

The telecommunications industry has repeatedly been described as a relatively turbulent and competitive arena, due to rapid technological change, deregulation, and fresh competition. Product innovation has become known, in this context, as a viable way of carving out new market niches and adapting to changing environments.

The case study reported in this paper refers to TelCo, a department of an incumbent and reasonably large (30,000 employees) Scandinavian telecommunications company that was commissioned to explore and develop new customer applications based on mobile communications. The narrative begins in the late 1990s, when a supplier, with whom the parent company had been collaborating for considerable periods of time, developed a new technological platform for future mobile services. In the light of increased customer demand for mobile solutions, the company decided to invest resources in early testing and evaluation of the platform. Even though the prospect seemed promising, there were uncertainties regarding future business models and market players, as well as customer demand for business applications based on the platform. As a result, one division of the parent company was instructed to establish an organization to explore and develop new products and services based on the platform. Thus TelCo was born. The fairly small group of ten colleagues was assigned with exploring new business opportunities, beyond the present scope of the firm, which would require an understanding of how this particular technology could bring customer benefit by means of improved functionality and

innovative user applications. They had to expose themselves to new sets of knowledge in somewhat unknown territory in order to expand their techno-market insight (Dougherty, 1992). This made them consider the prospect of collaborative relationships with other firms in order to gain complementary capabilities and expertise. Thus, even at take-off, the individuals involved realized their need for affiliates who knew more about software and application services.

TelCo's manager at the time had useful contacts among some firms whose main business concerned system integration and software development. Through these contacts, TelCo entered into negotiations with two firms, Alpha and Beta, referred to as alliance TelCo-Alpha and alliance TelCo-Beta, respectively. Alpha portrayed themselves as "digital business creators". Alpha's approximately 1,900 employees, located throughout Europe, were mainly involved in projects aimed at developing and redesigning major companies' various business processes. Beta was in e-commerce. With 29 offices in 18 countries and almost 2,000 employees, they worked with new e-business solutions across different Internet platforms. Both companies were supposed to have a degree of authority in areas of interest to TelCo. As consulting firms, the two companies differed from TelCo in their overall business logistics. While TelCo mainly targets a mass market, Alpha and Beta's market strategies were based on exceptional customized solutions.

TelCo was also involved in a project together with the supplier of the platform in question, Delta, and a hardware/software supplier called Epsilon, for the purpose of testing current functionality and proposing further development. Delta and Epsilon can be described as mature international companies, twice as large as the combined group of companies in TelCo. This latter collaboration is subsequently referred to as alliance TelCo-Delta-Epsilon. According to Van de Ven and Ferry's (1980) way of classifying IORs, the collaboration with Alpha and Beta corresponds to an "interorganizational set" of dyadic relations, wherein TelCo played the part of the focal agency, while the collaboration between TelCo, Delta, and Epsilon is more along the lines of a network relationship (Figure 2).

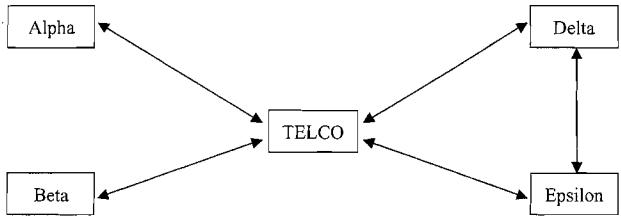

Figure 13. The structure of TelCo's interorganizational relationships.

Each relationship was structured so as to have a joint steering committee with two or three representatives from each company, plus an operational project group directed by a joint project leader. The number of participants in the project group varied, being approximately seven in TelCo-Beta, ten in TelCo-Alpha and twenty in TelCo-Delta- Epsilon.

Initial interorganizational motivation

Even though the assignment was ambiguous and the territory somewhat unknown, all parties felt the future prospects for the mobile platform to be promising. This mutual enthusiasm shaped the 'interorganizational motivation'. For Alpha and Beta, the collaboration was an opportunity to learn more about an emerging technology for future application development. Furthermore, the collaborative venture was supposed to start from customized solutions with a view of learning about new functionality, which could eventually result in future products or services on a mass-market. The collaboration was thus expected to be a perfect fit for both Alpha and Beta. The partners of the third-party relationship, TelCo-Delta-Epsilon, had long-term ambitions regarding common product development in the area of 'mobile e-services'. The partners made the point that the chance of success is based on each party's complementary qualifications. Their overall aim was described as follows:

> The Parties' common objective is to continue to jointly evaluate, both from a technical and a market perspective, [Delta, Epsilon, and TelCo's] mobile e-services system solutions, applications and hosting services for generating competitive, brokered e-services to the B-2-B marketplace, thereafter jointly marketing and providing these services on a revenue-sharing basis between the Parties. (LoI, May 2000)

Without exception, the initial commitments were based on wide-ranging terms set forth in "letters of intent" (LoI). No lawyers were involved at this stage. Any details about the objectives of the relationships and the future products were to be

decided later on. One person at TelCo characterized this first stage as an unsophisticated, but somewhat preventive measure paving the way for 'concrete discussions':

> "You agree on entering into an agreement. In that way, you are eliminating the risk of the other party running away with crucial knowledge. Thus, you can allow free scope for concrete discussions without the risk of the other party suddenly bailing out". (Participant TelCo, from interview in September 2000)

The LoI was also regarded as a time-saver:

> There is a written letter-of-intent, since we tried to keep away from big deals with contracts and layers who scrutinize every word and formulation. [...] I like this model, doing something simple in the beginning to see what we can actually achieve instead of spending a lot of time preparing press releases and drafting contracts by the hundreds. Suppose we don't achieve anything, then it would all be a waste of time. (Participant Beta, from interview in October 2000)

The willingness to collaborate was negotiated and committed to by virtue of the LoI. As a result, the very first achievement represented a common understanding and a desire to collaborate in the wireless Internet business, based around 'mobile e-services'. So far only senior managers had carried out the negotiations. At this point, middle managements and members of various functions were supposed to get on board.

The TelCo-Alpha case

In TelCo-Alpha, the two participating firms jointly decided to put their resources at each other's disposal with each one bearing its own expenses. Hence, without further ado, a project staffed by three or four members from each company was organized in order to carry out the very first joint action.

In the opening workshop, the agenda became rather action-oriented. The participants tried to outline the prerequisites for activities in the immediate future, i.e. the first two to four weeks, supplemented with a few words about the expected results six months down the line. The subjects discussed varied from technological issues to market strategy, and people related situations from previous experience they had gained from other projects. Throughout the conversations, all the conditions they agreed on were noted on a big flipchart. Results from the workshop were supposed to be discussed by the steering committee later that same day. It should be noted that all members but one (who participated during the final hour) of the steering committee were present

throughout the meeting. A matter of vital importance during the workshop was the decision to start with a limited prototype based on a real business case together with a common customer. This idea came into full focus when one participant pointed out that:

> We should do tests on a couple of trial customers. It's easier to describe examples of services if you are working with a concrete customer. (Participant Alpha, workshop in October 2000)

Thus, the strategy was to present a customized application, which could in turn become a potential product or service and the basis for further collaboration between Alpha and TelCo. On the participants' advice, the joint steering committee decided that the initial efforts would be conducted in the sense of a trial with a common trial customer.

This focus on a common customer turned out to be the guiding characteristic of the continued collaboration, as well as the overall basis for assessing the contributions. The ensuing weeks were characterized by intense activity. The participants at both companies agreed on the joint task of listing fifteen prospective customers, and together putting forward ideas about suitable wireless applications. Nonetheless, after a couple of weeks, it became apparent that the list of customers was hard to pin down. Some of the participants were rather frustrated and felt that time was slipping by:

> So far we have not reached a point where we disagree. However, this is a process where we have to learn each other's language. For this to work we need common customers; if we can't reach that goal then there will be no point [in continuing]. (Chairperson of steering committee, from interview October2000)

With the steering committee's permission, the project group decided to adjust its strategy. Still emphasizing the importance of customer-driven development, the group decided to choose a single customer. At this stage, the parties began to allocate roles among themselves. While one person answered for all customer contacts, two or three individuals took on the responsibility of preparing the mock-up, and another two for organizing the forthcoming customer presentation.

> It was rather frustrating, until we decided to go for customer Y. Moreover, we were discussing several topics simultaneously [...]. When we divided the customer case into different tracks, it felt a lot better – the burden was lifted and the job became easier to deal with. (Participant from Alpha, follow-up meeting in January 2001)

Joint knowledge creation was described as an impossible task before one had come to understand parts of the others' knowledge. The participants thus arranged a joint training course for those who required deeper technical

knowledge of the platform, which, according to the participants, helped in fostering a common language. Another example in the same vein was the time when it became apparent that the representatives of TelCo were, first and foremost, business developers based in the area of market expertise, while Alpha's participants mainly possessed a technical skill set. This difference resulted in a 'comprehension gap', and led to communication trouble between the members. When the issue came to light, the parties decided to add one participant from each company. Consequently, one technician from TelCo and one business developer from Alpha entered the project. During the interviews, one of the participants remarked that the project was biased toward technical questions from the outset:

> Initially, we focused very hard on technology. I think it was very useful when person X joined the project with his complementary skill set. (Participant Alpha, follow-up meeting in January 2001)

An initial mock-up in the form of an interactive multimedia presentation was developed to illustrate ideas regarding the concept of wireless applications. The idea was to elaborate the mock-up further so that it could serve as a mediator of ideas and form the basis of a customer presentation. Eventually TelCo and Alpha arranged a meeting with the customer to present the emerging concept. Based on the positive response, an additional idea seminar was arranged with more representatives of the customer firm a few weeks later. TelCo and Alpha had thus come to the stage where a common customer was seriously interested in the kind of wireless applications being proposed. It was time to prepare a joint offer to further specify requirements. Discussions took place regarding how to approach the customer jointly, and how to divide investments and returns. Two people were assigned with the task of planning and outlining the basis for further collaboration, thus preparing portions of a future negotiated agreement between the parties. Instead of conducting activities one after the other in a predetermined sequence, the partners gave the impression that they were continuously trying to find a more effective way of turning their respective competencies into work. When carried to the ultimate negotiation, commitment and execution took place concurrently.

In addition to meetings and workshops for carrying out a task, participants in TelCo-Alpha held follow-up meetings where the members asked themselves the question; How are we doing? They evaluated the results of various activities, as

well as how they were doing them, i.e. the process. Those meetings most likely had an impact on their future undertakings, and how they were being conducted.

For information sharing, the partners established a common "virtual-office" on the Internet, and at the same time the project was named TelCo-Alpha (*TelCo* and *Alpha*), an arrangement that further instilled the sense of community. The relationship went public in February 2001, launched at a European trade fair 10 months after the parties had met for the first time.

The TelCo-Beta case

When representatives of Beta and TelCo opened their first joint meeting, the level of enthusiasm was high, and everyone was ready to "step on it". Besides getting to know each other, the participants aimed at articulating each partner's expectations and concerns. Another matter of import concerned the working method. As was the case with TelCo-Alpha, the parties emphasized the importance of shared experience through early trials and prototypes:

> The collaboration will initially consist of two to four trial projects, after which the parties will evaluate the results and establish the final forms for the continued collaboration. Negotiations should continue until the Contract has been signed or a written statement thereon has been received from the other party. The period during which negotiations are conducted will subsequently be called the "Negotiation period". Agreements regarding activities and projects that are planned together during the negotiation period will be documented as an appendix to this Letter of Intent. (LoI, May 2000)

In spite of this, TelCo and Beta became deeply involved in examining their contractual obligations. The partners held different views as regards how to acquire suitable customers for the trial. Participants from Beta regarded TelCo as the natural owner of the wireless concept and thus thought it best that TelCo put forward a candidate. These remarks made representatives of TelCo suspicious of their partner's intentions and willingness to collaborate on equal terms. TelCo and Beta entered into a discussion about whom the project belonged to. The already strained discussion got even more heated when the Beta manager expressed the following:

> You are the ones largely in control. We are willing to support you, but it is your show. In this collaboration, you own the customer. (Participant Beta, workshop September 2000)

Participants from TelCo began to question whether the joint venture would actually come to anything, and whether all the discussions about collaboration had simply been a pretext for obtaining access to their large customer base:

> If the reason for collaborating with us is just a consultant's fee, without sharing any of the risks – then there are many consultants to choose from. (Project leader TelCo. Collected from an informal discussion after a meeting with Beta, September 2000)

Correspondingly, the Beta participants thought that TelCo was trying to withhold essential details of its future development plans. They could not understand their partner's sudden displeasure:

> I don't think that TelCo is willing to allow us in too far. If I were in their position, I'm not sure I would have let us in (Participant Beta, from interview October 2000)

Once the collaboration had started to falter, key players in the alliance gradually lost contact. Shared appointments were rescheduled, and occurred at longer intervals. After a couple of months, the collaboration dissolved into silence without any final meeting or formal notice of termination.

The TelCo-Delta-Epsilon case

The third-party relationship in TelCo-Delta-Epsilon was initially based on a joint test of a technical platform developed by Epsilon for application service provisioning (ASP), i.e. a platform that could facilitate the further elaboration and integration of end-user applications from different service providers. Based on individual and common objectives, the parties agreed on four phases: (1) a joint trial of the communications and application platform; (2) the development of future principles of collaboration regarding the business model, revenue-sharing and joint marketing; (3) the launch of the trial offer into commercial operation; (4) collaboration on new products. In contrast to the previous two relationships, TelCo agreed to largely finance the trial. The partners appointed an outside (from a fourth company) project leader to manage the joint project. The participants were spread across Scandinavia, Europe and the US, a circumstance characterized as an additional challenge. As in the relationship between TelCo and Alpha, a common knowledge base and face-to-face interaction were regarded as determining factors. For those reasons, the participants traveled quite a lot, e.g. TelCo participants in Scandinavia traveled to Epsilon's office in the US to learn more about the platform.

> Participant X and Participant Y [both from TelCo] also had a one-week lesson on how [the platform] worked and how it was being developed...and then [Epsilon participants] sent all the drafts and documentation for the codes. (Project leader, from interview)

The initial stages of the trial lived up to expectations. Epsilon put an exploratory version of their application platform at the alliance's disposal. They also supplied the trial with an application already being used by their field engineers. All the parties found the application in question useful, and praised the original concept. Even so, over time, TelCo and Epsilon found that Delta had failed, for undeclared reasons, to fulfill its commitments. At the same time, they tried to bring another application into the trial. The joint project leader explained:

> Delta's participants suddenly understood that they wouldn't get so much out of the project. And that's why they felt forced to try out as many of its products as possible, to have something to show their sponsors that [the project] was more than just a money pit. [...] Delta came up with the idea of using a system that had not originally been included. People from Epsilon who had worked with all the interfaces said: oh no, not more, we don't have the time. (Project leader, from interview)

Every extra hour of delay and each evasive answer from Delta annoyed the other two parties. Since Epsilon and TelCo felt unconvinced about their common partner's continued interest in collaborating, they considered the prospect of continuing with the project by themselves, leaving Delta out. Consequently, in addition to their regular meetings, TelCo and Epsilon arranged separate meetings to discuss their common interests and ideas regarding future collaboration. One of the topics discussed was whether Delta should still be one of the members. Eventually the trial came to an end and the overall experience gained from it was summarized in a joint report. Even though TelCo and Epsilon felt that Delta had not fulfilled its commitments, the first stage had been completed.

However, previous experience negatively affected the climate for further negotiations. When the parties initiated discussions in accordance with the stipulated second phase, the dialog revealed the differing views of the alliance partners. As a result, they entered an endless process of negotiation in order to ensure future commitments and results. Almost six months after the start of the second-round of bargaining, the three alliance partners were still investigating, and occasionally negotiating about, the chances of starting the next phase. In conformity with the Telco-Beta case the partners gradually lost contact – again, the collaboration dissolved into silence without any final meeting or formal notice of termination.

ANALYSIS

A brief comparison of the three cases

The three cases provide us with narrative regarding how the formation of collaborative ventures has varied as a result of the partners' initial negotiation-commitment-execution cycles (referred to henceforth as N-C-E cycles). The various cycles, identified as junctures at which significant achievements were observed in the relationship (e.g. the distribution of roles) or in the innovation idea (e.g. the development of a prototype), are summarized below, Table I.

Ring and Van de Ven (1994) have proposed that partners in collaborative IORs continually negotiate, make commitments and put their intentions into action, a description that corresponds to the findings in the current study. The crucial task, however, was to get the N-C-E cycle moving, and to sustain that motion. Once the achievements declined, or displayed an imbalance between the three stages, the entire collaboration ran the risk of ending.

Three organizational practices can be identified which may explain the various paths taken by the partners: (1) a process coordinated by rather volatile agreements; (2) a process that involved continuous reevaluation and reorganization through actual practice; (3) a process wherein 'co-participants' were challenged to work on their relationship.

Furthermore, the findings reveal yet another quality associated with the dissolution of relationships. When relationships ended, they petered out in secrecy. That condition will be discussed in the last section.

Table 7. A summary of the collaboration in TelCo-Alpha, TelCo-Beta, and TelCo-Delta-Epsilon.

	Achievements in the formation process		
	TelCo-Alpha	TelCo-Delta-Epsilon	TelCo-Beta
The 1st cycle: Negotiation	An initial idea about combined resources, products and services.	An initial idea about the future prospect for the trial application.	An initial idea about combined resources, products and services
Commitment	Wide-ranging LoI	Wide-ranging LoI	Wide-ranging LoI
Execution	Joint seminar	Establishment of various project teams	Joint seminar
The 2nd cycle Negotiation	- Task domain and an idea about business concept/ initial offer. - Proposed time schedule for the joint development of a mock-up (a limited test application). - Division of the work	- Division of the work	- Task domain and an idea about business concept/ initial offer. - Future business model between the partners - Proposed time schedule for the initial phase
Commitment	- Customer target group - Vital activities of the process - Time schedule, stage I - Initial task distribution	- Project plan regarding human, technical and financial resources - Time schedule for development of the test application	None
Execution	-Initial meeting with joint customer	- Development of test application - First implementation and evaluation of the test application	None *Eventually the relationship was dissolved*
The 3rd Cycle *Negotiation*	Outline of future business model between the partners	- Division of the work - Delayed activities	
Commitment	- Joint Offer - Time schedule, stage II - Task distribution & match of competencies	None	
Execution	- Development of a mock-up - Workshop with customer - Public launch of the relationship	None *Although formally in progress, all project activities ceased while the partners adopted a wait-and-see strategy.*	
Total cycle time	*May 2000-February 2001*	*November 1999-May 2001*	*May 2000-January 2001*

Evolving contracts

From a governance and co-ordination point of view, contractual agreements are supposed to legally define the mutual exchange of rights between interorganizational partners. The concept of joint coordination and control is, in this respect, embodied in the agreed and specified outcomes. Nevertheless, the nascent market for mobile e-services constituted an "emerging opportunity arena" (Hamel and Prahalad, 1994) in which both the business concept and the boundaries of the industry were waiting to be shaped. The unpredictability of outcomes made it hard for the partners to predict and even harder to apportion a guaranteed outcome or result prior to its realization, thus diminishing the value of fixed commitments as a relationship management form. In place of discrete agreements, the partners introduced themselves through less formal negotiations that, in all three cases, resulted in fairly vague letters of intent (LoI). As an illustration, you might recall the LoI between TelCo and Beta, in which the partners agreed to initiate joint activities and trials during the "negotiation period". The LoI was thus supposed to mark the start of mutual activities and further negotiation, rather than to represent a conclusive deal. This particular arrangement reveals a permissive attitude toward a wide range of possible outcomes, and the changing nature of the relationship. Furthermore, it replicates Salbu's (1997) persuasive request for 'evolving contracts' as a means of flexible coordination and control.

However, the wiggle room for contingencies and the evolving nature of the contractual process required the parties involved to have the ability and motivation to take the risk of acting between different states of negotiation and commitment. For this to happen, we can expect that each partner tried to transform the perceived ambiguity into a point of clarity it regarded as sufficient for action. Nevertheless, the level of clarity regarded as 'sufficient' may differ from one organization to another (Weick, 1979). Returning to the participants in TelCo-Beta, we notice how they opposed to their initial images of a trial period adopted a role of formal negotiators trying to scrutinize and assert their rights regarding future division of expenses and results. Their explicit preference for contractual considerations forced them to (en)act the process according to a structure-conduct-performance pattern and to deny inversion and fusion between planning and action before they had obtained control through a classic contracting process. As a result, they failed to initiate the N-C-E cycle, likewise

the associated accumulation of knowledge about the innovation idea, each other's capabilities, and the potential of the collaborative arrangement itself.

Trial cycles

The somewhat relaxed attitude toward specific guarantees or instant results seems to have had a constructive effect on the initial collaboration between TelCo-Alpha and TelCo-Delta-Epsilon. However, keeping the N-C-E cycle moving forward without contractual closure requires the ability to detect, create and complete incomplete knowledge.

The key turned out to be shared experience. In both cases, the participants decided to employ a tryout-strategy through joint trials. In the words of one participant: '...the collaboration involves adding a number of pieces, competence and energy; if you don't take that step, the relationship gets very strained'. The chairman of the TelCo-Alpha steering committee similarly claimed the need for real-time experience to assess the potential of the joint venture, saying: '...one can write any amount of papers. However, of major importance is whether you find a customer to work with, who can actually confirm the state and existence of the market - since you can't create that by entering into a partnership agreement'.

Thus, creating in real-time was considered a major source of comparative data, where different perspectives and expectations could be brought together in a more concrete account of the content and conduct of the continued relationship. Accordingly, the participants described the process as alternating between what they initially aimed to do and what they might do given the opportunities (or constraints) realized through customer interaction and the real-time development of product ideas. Encouraged to 'rework the preliminaries', the participants also continually made choices regarding the structures and processes for getting along. You might recall how participants in TelCo-Alpha decided to add project members in order to overcome the perceived comprehension gap and how they started to divide work among the participants in terms of roles and responsibilities as soon as they had agreed on a joint customer project. The rapid pace erased the dividing lines between each stage of the N-C-E cycle and the actions became increasingly improvisational. According to the joint project leader, the participants in TelCo-Delta-Epsilon described a similar pathway: '...something very significant [for the relationship] was that it changed a lot

during the project. The parties' focus and interest changed. These accounts of incremental movement through a developmental trial period agree with Larson's (1992) depiction of the formation process of entrepreneurial dyads.

Not only did the platform prefigure the task domain and reflect the initial conceptualization of the business (cf. Bouwen and Steyaert, 1990), it also formed the essential capabilities and competencies to start out from. Furthermore, face-to-face and day-to-day activities were valued, and regarded by the majority as an absolute necessity. In addition to meetings and workshops with a view to carrying out a particular task, the participants in TelCo-Alpha and TelCo-Delta-Epsilon held follow-up meetings where the members asked themselves the question; how are we doing? They evaluated results from various activities, as well as the ways of doing them, i.e. the process. All these kinds of meetings had an impact on future undertakings and how these were carried out.

The above emphasize sensemaking over decision-making when the nature and properties of the joint endeavor presented a changing pattern that was vague and initially hard to discern (Weick, 1998). Considering the option of early involvement in joint activities, it appears as if experience of actual practice facilitates such formation by framing concepts and choices, thus suggesting that those parties who lack the ability to stir themselves to action, i.e. those who do not expose themselves to the process of learning and joint sensemaking, are in the greatest danger.

Co-participants

A move towards interorganizational relationships is dependent on players who practice and encourage collaborative rather than adversarial behavior. The contributor's authority and ability to play the role of a co-participant thus become a decisive factor. According to Dixon (1998), this implies members sensing the motivation to collaborate and jointly transform organizational actualities, rather than just seeing themselves as players in someone else's game.

The distinction between co-participants and 'guided players' was apparent in the relationship between TelCo and Beta. Their debate about project ownership had a negative effect on the extent to which the partners felt comfortable and were willing to rely on trust when dealing with one another. As a result, within TelCo-Beta, the participants primarily played the roles of formal negotiators trying to

assert their rights, while in TelCo-Alpha the partners gradually developed personal roles as they got to know each other by name, and reputation, and as new knowledge was acquired through joint action. In TelCo-Delta-Epsilon, the roles changed as a result of increased mistrust between the partners. In response to breached commitments and increased mistrust, they put on their "lifejackets" (Ring and Van de Ven, 1994), adopted a more formal attitude and enforced structural safeguards. Eventually the N-C-E cycle ceased as the participants became deeply rooted in contractual considerations.

These results suggest, in agreement with Ring and Van de Ven (1994) that behaviors shift with role relationships, but also that individuals may don and doff their "lifejackets" depending on how the collaborative process develops. Furthermore, the findings correlate with Ariño and de la Torre's (1998) description of 'relational quality' as a cumulative variable that challenges the partners to learn from their interactions and gradually affect the level of inter-partner trust and intimacy. Trust became both an input and an outcome. Unfortunately, in two cases of three, the relationship ended in impaired relational quality.

Concealed termination

Although trust and intimacy are valued, a one-sided representation of intimate relations as being essential to collaborative behavior runs the risk of overlooking the significance of relationships, which at the outset are not so intimate. On the basis of the belief that IORs can evolve and be adjusted over time, we can expect that prospective partners incrementally signal their motivation for further engagement (Larson, 1992). The case study thus reveals yet another quality related to the unpredictability and essentially fragile nature of joint endeavors.

The findings suggest that partners authorize discussions and trials with external parties in order to explore 'embryonic possibilities' and evaluate the relationship's business potential. By this means, it seems reasonable to give up or leave the venture when one of the partners discovers, for whatever reason, that the relationship would not be relevant to future plans. This is in accordance with Larson's (1992, p.100) view that "...partnerships cannot and should not necessarily last indefinitely". Sustained survival is thus altered by a pattern wherein firms move in and out of relatively stable relationships over time.

Furthermore, a firm may well be 'dating' more than one potential partner at the same time, just as TelCo did. Not to set one off against the other, rather to find the most suitable partner. The cases thus reveal how partners engage in a 'dating process' with exploratory aims.

Attempts to explore new business opportunities imply that the parties concerned can "cope with discontinuity, multiple commitments, interruptions, and transient purposes that dissolve without warning" (Weick 1995). Furthermore, to create a learning opportunity, the partners are challenged to evaluate their experience and jointly close the books. We may thus question the extent to which the concealed termination in TelCo-Beta and TelCo-Delta-Epsilon negatively affected their prospects for learning.

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

This paper examined the formation process of IORs in response to new business opportunities under volatile conditions. The empirical findings suggest a multi-level and fairly explorative process. Multi-level because the challenge includes coordination and development in two dimensions: (1) the operating mechanism through which key personnel negotiate, make commitments and act in order to develop their relationship (i.e. the N-C-E cycle), and (2) the entrepreneurial effort of new product development. Explorative because the appropriate alliance strategy can hardly be identified prior to its execution.

Even though contracts will still be needed, the findings suggest that a good number of activities will be left to reciprocal co-ordination, reflecting individuals creating new behaviors while executing them. In these respects, the results echo Eisenberg's (1990, p.13) description of coordination under conditions of limited consensus, as characterized by: 'coordination of action over the alignment of cognitions, mutual respect over agreement, trust over empathy, diversity over homogeneity, loose over tight coupling, and strategic communication over unrestricted candor'.

The limited prospects of specifying agreements and contracts in advance, combined with constant changes in conditions, imply the active management of an emergent process in which collaborating partners negotiate throughout the collaboration. This process is maintained by a permissible attitude to 'bottom-up planning' and each participant's permission, as well as responsibility, to act as a

co-participant. Managers are thus challenged to design relational linkages that simultaneously embody elements of a 'joint agenda' and prospects for renegotiation. Moreover, either party must be given a chance to generate detailed records of reference and learn about their own values and assumptions from what they are doing.

Managers need to ensure that the N-C-E cycle gains momentum. Characterized as a revolving N-C-E cycle, managers might also see a lack of achievements during any of the three stages as a "warning signal" for the relationship's continued progress. Moreover, the emergent path wherein participants delimit the knowledge-gap and become increasingly 'connected' as events unfold calls for managers who make arrangements without dictating the outcome.

Interorganizational arrangements during nascent stages of innovation and new business creation suggest that partners may terminate the relationship if either one of them discovers that the collaboration is irrelevant to future plans. Considering the exploratory aims, we should not necessarily condemn the termination. However, the potential for learning from results and conclusions created during the collaboration may be lost if the termination is concealed. Even though each relationship represents unique combinations, insights obtained from a previous collaboration can improve the performance of managers and co-workers as architects of relational linkages and potential value combinations. Furthermore, a concealed termination without a "closing statement" may unintentionally bring a sense of failure that will have a negative impact on the participants' motivation regarding future interorganizational initiatives.

The results presented provide insights into some aspects of how organizations "date" each other based on the prospect of innovation and new business creation. However, it is important to tie these results to an understanding of the limitations of the proportionately small number of cases included in the study. There are also restrictions related to examining a given stage, i.e. in this study, the initial formation, in advance of its ultimate outcome. In other words, further research into process activities and even more longitudinal studies are needed in order to move towards a conceptually richer understanding of the formation of interorganizational ventures.

REFERENCES

Alter, C. and Hage, J. (1993). Organizations working together. SAGE Publications, Newbury Park.

Alvesson, M. (1999). Methodology for close up studies - struggling with closeness and closure. School of Economics and Management, Lund University, Lund.

Ariño, A. and de la Torre, J. (1998). "Learning from failure: towards an evolutionary model of collaborative ventures." Organization Science, Vol 9, No 3, pp. 306-325.

Ariño, A., de la Torre, J., et al. (2001). "Relational quality: managing trust in corporate alliances." California Management Review, Vol 44, No 1, pp. 109-131.

Barringer, B. R. and Harrison, J. S. (2000). "Walking a tightrope: creating value through interorganizational relationships." Journal of Management, Vol 26, No 3, pp. 367-403.

Bouwen, R. and Steyaert, C. (1990). "Construing organizational texture in young entrepreneurial firms." Journal of Management Studies, Vol 27, No 6, pp. 637-649.

Das, T. K. and Teng, B. S. (1996). "Risk types and inter-firm alliance structures." Journal of Management Studies, Vol 33, No 6, pp. 827-843.

Das, T. K. and Teng, B. S. (1997). "Sustaining strategic alliances: options and guidelines." Journal of General Management, Vol 22, No 4, pp. 49-64.

Das, T. K. and Teng, B. S. (2000). "Instabilities of strategic alliances: an internal tensions perspective." Organization Science, Vol 11, No 1, pp. 77-101.

Dixon, N. M. (1998). "The responsibilities of members in an organization that is learning." The Learning Organization, Vol 5, No 4, pp. 161-167.

Dougherty, D. (1992). "Interpretative barriers to successful product innovation in large firms." Organization Science, No 3, pp. 179-202.

Doz, Y. (1996). "The evolution of cooperation in strategic alliances: initial conditions and learning processes." Strategic Management Journal, No 17, pp. 55-83.

Doz, Y. L. (1988). Technology partnerships between larger and smaller firms: some critical issues. Cooperative strategies in international business. F. J. Contractor and P. Lorange. MA, Lexington Books, Lexington.

Doz, Y. L. and Hamel, G. (1998). Alliance advantage. The art of creating value through partnering. Harvard Business School Press, Boston, Massachusetts.

Doz, Y. L., Olk, P. M., et al. (2000). "Formation processes of R&D consortia. Which path to take? Where does it lead?" Strategic Management Journal, No 21, pp. 239-266.

Dyer, J. H. and Singh, H. (1998). "The relational view: cooperative strategy and sources of interorganizational competitive advantage." Academy of Management Review, Vol 23, No 4, pp. 660-679.

Eisenberg, E. M. (1990). "Jamming: transcendence through organizing." Communication Research, Vol 17, No 2, pp. 139-164.

Eisenhardt, K. (1995). "Building theories from case study research", in Huber, G. P. and H. Van de Ven, A. (Ed.), Longitudinal field research methods: studying processes of organizational change, SAGE Publications, Inc, California, pp. 65-90.

Hamel, G. and Prahalad, C. K. (1994). Competing for the future. Harvard Business School Press, Boston, MA.

Jarillo, C. J. (1988). "On strategic networks." Strategic Management Journal, No 9, pp. 31-41.

Kanter, R. M. (1989). When giants learn to dance: mastering the challenge of strategy, management, and careers in the 1990s, Simon and Schuster, New York.

Larson, A. (1992). "Network dyads in entrepreneurial settings: a study of the governance of exchange relationships." Administrative Science Quarterly Vol 37, No 1, pp. 76-104.

McPhee, R. (1990). "Alternate approaches to integrating longitudinal case studies." Organization Science, Vol 1, No 4, pp. 393-405.

Pennings, J. M. and Harianto, F. (1992). "Technological networking and innovation implementation." Organization Science, Vol 3, No 3, pp. 356-382.

Powell, W. W. (1987). "Hybrid organizational arrangements." California Management Review, Vol 30, No 1, pp. 67-87.

Powell, W. W., Koput, K. W., et al. (1996). "Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology." Administrative Science Quarterly, No 41, pp 116-145.

Ring, P. S. and Van de Ven, A. H. (1994). "Developmental processes of cooperative interorganizational relationships." Academy of Management Review, Vol 19, No 1, pp. 90-118.

Salbu, S. R. (1997). "Evolving contract as a device for flexible coordination and control." American Business Law Journal, No 34, pp. 329-384.

Sarkar, M. B., Echambadi, R., et al. (2001). "Alliance entrepreneurship and firm market performance." Strategic Management Journal, No 22, pp. 701-711.

Sobrero, M. and Schrader, S. (1998). "Structuring inter-firm relationships: a meta-analytic approach." Organization Studies, Vol 19, No 4, pp. 585-615.

Teece, D. J., Pisano, G., et al. (1997). "Dynamic capabilities and strategic management." Strategic Management Journal, Vol 18, No 7, pp. 509-533.

Van de Ven, A. H. and Ferry, D. L. (1980). Measuring and assessing organizations. John Wiley & Sons, New York.

Van de Ven, A. H., Polley, D. E., et al. (1999). The innovation journey. Oxford University Press, Oxford.

Weick, K. E. (1998). "Improvisation as a mindset for organizational analysis." Organization Science, Vol 9, No 5, pp. 543-555.

Weick, K. E. (1979). The Social Psychology of Organizing, McGraw-Hill Inc., New York.

Weick, K. E. (1995). Sensemaking in organizations. Sage Publications, Thousand Oaks, CA.

Yin, R. K. (1994). Case study research: design and methods. Sage Publications, Thousand Oaks, CA.

Paper III

Marshall, C and Segrestin, B

2003

Managing exploratory partnerships: a case of new business creation in the telecommunications industry.

Submitted to International Journal of Management, November 2003

Managing exploratory partnerships: a case of new business creation in the telecommunications industry

Cassandra Marshall and Blanche Segrestin[50]

A substantial body of literature, from a number of theoretical approaches, has been cautious as regards the difficulties of managing the emergence or evolution of strategic alliances. Nonetheless, empirical evidence of how bonding conditions or capacities are managed and developed over time is comparatively rare. Using empirical data from action research into venture initiatives between an incumbent telecommunications company and its partners, the authors explore the specifics of the management of exploratory partnerships. The data suggests that parties make use of exploratory partnerships to explore new opportunities, to identify both constraints and potentials, and to prescribe new learning issues. It demonstrates the need for specific governance mechanisms in order to maintain the explorative intent. In accordance with the findings, we suggest some implications for practice and further research.

Keywords: *Interorganisational relationship, Strategic alliance, Partnerships, Innovation, Telecommunications*

[50] Centre de Gestion Scientifique, Ecoles des Mines de Paris, 60 boulevard Saint-Michel, 75272 PARIS Cedex 06
blanche.segrestin@paris.ensmp.fr

INTRODUCTION

Interorganisational relationships (IORs) and strategic alliances have become core prescriptions for managers and organisations trying to cope with the variety and variability of markets and innovation opportunities. Despite the craze, it also perplexes scholars and practising managers. A considerable amount of unproductive and prematurely terminated IORs, sometimes estimated to be as high as between 50 and 70 per cent, has been reported in the literature (see, for example, reviews by Barringer & Harrison, 2000, and Das & Teng, 2000). These reports give rise to ambiguities regarding the usefulness of such arrangements and the way they are managed, hence urging managers and researchers alike to pay attention to factors that influence stability and longevity in order to improve alliance performance. We may, however, question whether stability or longevity can be considered indicators of success irrespective of context and purpose?

As noted elsewhere, the prevalent treatment of success might be misleading (Koza & Lewin, 2000; Ariño & Doz, 2000). Although many alliances aim to develop and deliver a result (e.g. product, service, or process), according to a clear specification of requirements and at an appointed time, this is not always the case. And although the termination of an IOR or alliance often reveals a failure, this might not always be the case. Consequently, neither the delivery of a product nor its stability or longevity can at all times be the best indicator of success. It seems reasonable to distinguish between different modes or types of IORs and the managerial means that go with them (Hagedoorn 1993; Powell et al. 1996; Koza & Lewin, 1998).

In this paper, we are particularly interested in the management of innovation promoting IORs, or what we have referred to as *exploratory partnerships*. The demand for examining the distinctive features and requirements for managing exploratory partnerships emanates from an in-depth study of three ongoing IORs between an incumbent telecommunications company and its counterparts. The partners aimed to explore the combined concept of Internet and wireless telecommunications, i.e. a business concept that constituted a new field of innovation (Hatchuel et al., 2001) and brought together organisations from somewhat separate domains. Being less certain about the potential value of each partner's contributions and prospective product-market combinations, the collaborative venues became something to design through action rather than to

determine at inception. In two of the three collaborations, the partners did not manage to develop or implement a joint product; neither did they make any commitments to a future commercial project. At first sight, and according to conventional analysis, they would presumably be considered prematurely dissolved and so evaluated as failures. One might argue that they failed because of an inability to structure stable relationships. Data gathered from action research into the actual IORs suggests a somewhat different view however. We found that an exploratory perspective throws a different light on the purpose, as well as on the managerial challenges involved. As seen from an explorative range of motives and potential outcomes, we can acknowledge the firms' united efforts as a process of designing new business opportunities and collaborative R&D venues for future product-market combinations.

The current study is an attempt to capture the distinctive features of the process and the management of exploratory partnerships. Furthermore, it should add to the emerging literature that emphasizes a dynamic view of IORs and strategic alliances.

The paper proceeds as follows. The subsequent section deals with previous perspectives and notions regarding the management of IORs. We then introduce the research setting and the methods guiding our inquiries, before presenting our empirical findings. Based on these findings, we discuss the nature and management of exploratory partnerships as well as some implications for management practice and future research. The last section concludes the paper by summing up our findings.

THEORETICAL APPROACHES TO INTERORGANISATIONAL MANAGEMENT

Enhancing the robustness of collaboration

Previous literature distinguishes between several theoretical perspectives on IORs, each of which offers different explanations as to why companies might bring their resources together and how they should arrange, manage, and monitor joint action. Among these, the sources of difficulties and the associated solutions are interpreted in different ways.

Conventional economic perspectives such as transaction cost economics (cf. Williamson, 1985) or game theory (Axelrod, 1984), commonly consider IORs between self-interested and autonomous firms to be hybrid forms, which, due to the weaker incentive structure vis-à-vis an integrated organisation, incur the risk of opportunistic behaviour and ex-post exploitation. This behaviour uncertainty renders both firms vulnerable and creates instability (Kogut, 1989). Accordingly, it increases the demand for IOR structure which creates the conditions for robust collaboration. In transaction cost economics, it is assumed that governance structures evolve in response to the attributes of the transaction in question (Williamson, 1985). The thrust of the analysis is directed towards negotiation tactics and the regulation of exchange behaviour to protect transaction-specific assets and predict effective performance via contingent claim contracts and formal safeguards (Child & Faulkner, 1998). The act of negotiating and monitoring these contractual arrangements entails energy and expense (Tripsas et al., 1995; van Waarden, 2001). Hence, an appropriate governance structure also needs to be affordable. In line with the basic assumptions of the theory, we can expect that the partners will refrain from joint investments and collaboration if the threat of opportunism results in soaring transaction costs. An essential assumption within this stream of research is that the actors are mainly driven by *pre*-calculation.

Other researchers assert a socio-economic view, claiming that legal contracts and formal safeguards are inadequate under circumstances characterised by uncertainty and complex exchanges of intangible resources (Achrol & Gundlach, 1999; Zaheer & Venkatraman, 1995). Furthermore, as the perception of opportunistic behaviour is dynamic rather than constant in a given relationship, the focus is typically on the means by which collaborating partners develop a common ground and interest over time. Much explanation holds the importance of relational norms and social sanctions to secure the fulfilment of joint commitments (Lane & Bachmann, 1998). Of the governance mechanisms, trust is most frequently mentioned, playing a major role in minimising the threat of opportunism (Bachmann, 2001). Other means consider shared investments in financial or real assets to display each partner's willingness to realise longer-term benefits, thus providing a basis for reciprocal action (Zaheer & Venkatraman, 1995; Heide & John 1988; Kogut, 1988).

Still other streams of researchers advocate a knowledge or learning perspective which maintains the idea that firms frequently engage in IORs with a view to developing their current set of knowledge and capabilities. An IOR thus corresponds to a learning entity which has the opportunities to share skills between firms. However, given that part of firm knowledge is tacit and socially embedded (Granovetter, 1985), knowledge is commonly considered to be problematic to transfer. The capacity for joint learning thus becomes an important criterion (Doz, 1988; Kogut, 1989; Ariño & de la Torre, 1998). Researchers have suggested that this capacity depends on the firm's absorptive capacity, i.e. its ability to recognise the value of outside knowledge, to assimilate it and, ultimately, to make use of it in a business setting (Cohen & Levinthal, 1990)[51]. Central to this literature is the fact that specific skills, accumulated knowledge, and superior learning processes need to be present prior to joint action (Hamel, 1991; Kogut, 1989; Lane & Lubatkin, 1998). Moreover, the importance of a 'corresponding partner' implies information and processes for selecting the firm to collaborate with in terms of a cognitive, strategic, and cultural match.

Limitations to prevailing theory

We should bear in mind that the different explanations involve various units of analysis, i.e. the transaction, the relationship, and the partner characteristics. Hence, they need not necessarily be competing views (Powell, 1998), instead complementing each other (Barringer & Harrison, 2000). It is of importance for the purposes of this paper, however, to make a note of the approaches that we found difficult, or unfeasible, to apply to the IORs studied in the current article.

Firstly, the emphasis remains on *pre*-conditions, e.g. contractual agreement, common interest and absorptive capacity, in order for collaborative relationships to be stable and long lasting and, in that sense, successful. Secondly, risks, knowledge, and interdependencies among actors are frequently considered to be *pre*-established dimensions. For instance, most studies based on an economic

[51] An extension of the concept to the interorganisational level of analysis suggests that mutual learning depends on the "relative absorptive capacity", referred to as the firms' similarities in their knowledge bases (know-what), the manner in which they incorporate knowledge (know-how), and in their commercial objectives (know-why) (Lane & Lubatkin, 1998).

view share the presumption that managers rationally choose between alliance options and regulate their expectations via contracts before initiating joint actions. This careful weighing up of costs, risks, and partner matching implies, in turn, executives who are purposeful and relatively clear about objectives and outcomes in advance. Thirdly, even though previous studies demonstrate that collaborating partners may have diverse, and at times incompatible, expectations regarding a given partnership or alliance (Osborn & Hagedoorn, 1997), it is repeatedly assumed that they aim to align their interests, or that their interests will simply fuse together over time. Finally, a growing recognition in the literature of the dynamic or evolving nature of IORs indicates that: "...cooperation will generally increase firms' knowledge about the characteristics of partners, the domain of collaboration, the environmental conditions and opportunities, and the management of inter-firm agreements in general" (Bureth et al., 1997, p.520)[52]. It follows that, at times, the motive is to "explore for new opportunities" rather than "exploit an existing capability" (Koza & Lewin, 1998, p. 256). Even so, the literature on how bonding conditions or capacities are managed and developed over time is still rare.

DATA COLLECTION AND ANALYSIS FROM "WITHIN"

Research purpose and question

We are concerned with the issue of managing exploratory partnerships. The purpose was to provide a greater understanding of the meaning of exploratory partnerships and how these can be managed so that value will be created. The research questions can be stated as follows: How can we distinguish exploratory partnerships from development partnerships[53]? What are the characteristics of

[52] See also Hamel et al., 1989; Kogut, 1991; Ring & Van de Ven, 1994; Powell et al., 1996; Koza & Lewin, 1998, 2000.

[53] In this paper, we use the expressions development or development logic, when referring to a converging process towards clear and predefined goals. Furthermore, we distinguish development from exploitation in the dichotomy of exploration and exploitation described by March (1991), since we consider learning to be just as important for development as it is for exploratory processes. Exploratory is, in turn, understood to be a process directed towards learning and designing new opportunities, as well as the conditions allowing them to emerge.

each case? What are the consequences for the outcomes and performance criteria? What are the implications for management practice and action?

Research approach

The current study forms part of a three-year research project dealing with innovation through collaborative IORs. The research is based upon qualitative methods, the main part being conducted in real time from the perspective of an observing participant (Alvesson, 1999) or an "insider action researcher" (Roth et al., 2003). This inquiry strategy has the potential to carry out research *with* the participants. Moreover, it contributes to local theory relevant to decision and action in the actual setting and, at the same time, generates a more generalised understanding of the phenomenon, for theorising purposes (Shani & Pasmore, 1985; Greenwood, 2002).

This approach was made possible by the active participation of one of the authors, from start to finish, in activities carried out in two of the three IORs presented in the paper. The author was permanently employed by TelCo (i.e. the focal company) and accountable for developing strategies and working methods for collaborative IORs, thus an insider. At the same time, she held an outsider role as a part-time researcher in academia. In other words, the researcher was actively involved in action with the possibility to trace events and gather complex and inter-subjective data from observations when participating (Alvesson, 1999). Moreover, the firm participants were actively involved in the research process and contributed to the result as actors, as well as through dialogue and reflections at follow-up-meetings and workshops.

The textual cases were supplemented by interviews with key participants (i.e. representatives on the steering committee and project managers) who were, or had been, involved. The interviews were semi-structured and aimed to collect narratives rather than answers to specific questions. Secondary sources, e.g. the minutes of meetings, project reports, and letters of intent, provided further dimensions regarding the context, the actions, the relationship, and the participating firms' backgrounds. Since the author participated in both project teams and steering committees, insights and thoughts from the operational and managerial levels are available. Furthermore, data was collected from both formal and informal meetings, as well as conversations between the participants.

In one of the two IORs, a follow-up meeting was arranged to discuss the participants' experiences and the significance of critical events, as well as their confidence in the empirical evidence.

The empirical data, as regards the third collaboration, involves interviews and archival sources. Although not actively participating in project activities, the author was in continuous contact and dialogue with participants from TelCo throughout the collaboration. This provided access to vital information regarding the course of critical events and the discussions going on between the partners. Thus, in all three cases, the research design allowed the examination of process issues over time. The real time analysis covered 10 and 11 months (starting in May 2000).

Two of the three IORs were dissolved during the study, thus giving us a chance to analyse issues connected with the termination of collaborative relationships.

The narratives were analysed using an interactive and dynamic process. Occasionally, the authors decided upon additional data collection, e.g. another interview or a search for additional documents. An early and preliminary analysis of the findings revealed ambiguities regarding management practice during innovation-promoting IORs. This in turn posed new questions and suggested an alternative outlook. Hence, our conceptual ideas gradually emerged during the course of time. When tangible, these ideas were transformed into analytical themes which we compared with the debates regarding alliance management in the theoretical literature.

Handling the boundary between the researcher and the research object during action research might, in some respects, be considered a problem. The risk of "staying native" (Alvesson, 1999; Pettigrew, 1990) was mainly dealt with by tandem-interviews and co-authorship, complementing the 'insider' perspective with 'distant' reflections by the second author. The different types of data sources (i.e. direct observations, interviews, and archival) also served as a way of increasing the internal validity of the findings (Yin, 1994; Eisenhardt, 1995). An overview of the research project and its data sources is presented in Appendix A.

JOINT CONTRIBUTIONS IN TELECOMMUNICATIONS

The telecommunications industry represents an attractive setting for researching the management of exploratory partnerships. It is an example of a sector at the crossroads of new regulatory policies, diverging technologies, and somewhat transformed market structures. Firstly, the previous value-chain has been simultaneously restructured with new regulatory conditions that allow new companies to offer telecommunications services without building and operating their own networks. Secondly, a shift in technology is bringing about new technical platforms and services. Among the most prominent features of technological change might be the growth of the Internet, with the accompanying development of globally-accepted technical rules and advancements in the field of wireless communication technology. Thirdly, in accordance with the changes in regulatory policies and technology, we are experiencing an extended industry, the information and communication technology industry (ICT), with the prospect of sharing technical platforms that have historically performed in disparate fields, as well as opportunities for a new range of applications and services. Although some building blocks are mature (e.g. databases, transmission infrastructure with a sufficient flow, and hardware such as mobile phones and computers), the challenge remains to bring conceptual clarity to what the ICT entails and the kind of future applications customers may be demanding (McLoughlin, 1999). Just whom the future business territory belongs to is unclear, which is also true for the sources of revenue flows between actors who aim to develop and deliver future products and services. The reshaped telecommunications industry has made firms from different sectors interdependent on joint contributions. Hence, future innovation and new business creation will most likely entail a co-operative framework (cf. Pisano et al., 1988; Li & Whalley, 2002).

This study concerns three separate non-equity arrangements between TelCo, an incumbent telecommunications company (up until 1993, state-owned in a [de facto] monopoly position) operating in the Nordic Area and the Baltic States, and its partners. TelCo's long tradition in technical development has enabled it to keep a leading position in its core businesses, e.g. fixed telephony, mobile services, and the Internet. Nevertheless, the transformed conditions forced TelCo to investigate new business opportunities and concepts in emergent sectors, e.g.

IP-telephony, electronic commerce, wireless Internet, and customer applications complying with these technologies, in order to maintain its position. The centre of attention in this paper is wireless Internet services, named "mobile e-services" by the partners.

The overall motive for seeking external partners can be illustrated by the goals set forth in one of the letters of intent (May 11, 2000): "[The partners will] identify, develop and exploit joint business opportunities from a supplier and mobile operator/ISP perspective, for a wireless e-service system solution [...]".

One of the collaborations presented in text considered a joint R&D project between TelCo, i.e. the mobile operator and Internet service provider; Xchange, a global manufacturer with several years' experience in developing network infrastructure and mobile handsets, and E-quip, a global hardware and software supplier. The project's origin lay in E-quip's ideas for a software platform for application service provisioning. The partners agreed that E-quip's proposed solution was promising. It would allow WAP browser equipped devices (cell phones or other PDAs) to access electronic services from multiple service providers.

The partners had different reasons for embarking upon the development project. E-quip had an interest in demonstrating the potential of the technical platform. Xchange's intention was a more rigorous evaluation of the platform's functionality and its suitability for WAP technology. Finally, TelCo's ambition was to explore new services and products for end-users. The joint project involved participants from all parties and from different disciplines.

Furthermore, to explore the customers' demands, TelCo considered collaboration with the suppliers and providers of business applications to be a necessity. It searched for actors that were well informed and experienced in potential customers' business processes and operations, i.e. those who had developed and implemented the business applications currently in use. TelCo thus discussed the prospect of collaboration with various consulting firms and system integrators. Besides the third-party alliance between TelCo, Xchange, and E-quip, this study includes two alliances between TelCo and two separate system integrators, i.e. alliance Alpha and alliance Beta. Both these system integrators were globally represented, with a business focus in the area of communication and application development. Hence, TelCo employed multiple relationships in order to explore

the potential of wireless e-services. The number of participants ranged from 30 in the third-party collaboration to about 12 in each of the collaborations involving system integrators.

THE CASE OF MOBILE INTERNET

Exploring functionality, tasks and resources

From a development project to a design process

The focus within the studied alliances was on developing concepts for the 'virtual office', which would enable mobile employees' computing capabilities to be just as connected as those of the office staff. Even though most industry experts believed (and still do) in a substantial increase in mobile communication, the technical and social implications of total mobility were (are) fairly unknown. This is also true for customers' demands for specific applications. According to the agreement between TelCo, Xchange and E-quip, the collaboration aimed to: "[...] identify, develop and exploit joint business opportunities from a supplier and mobile operator or Internet service provider perspective, for a wireless e-service system solution". Furthermore, they were heading for a common platform that could host "[...] an unlimited number of services". The purpose was neither to test nor validate existing technologies and building blocks (e.g. databases, transmission infrastructure). Nor was it to demonstrate the scope of a particular application. On closer examination, we may argue that the principal rationale for the collaboration was *to explore and structure the scope of business opportunities within the broad field of Mobile Internet.* The involved parties' aim was thus to learn about potential applications and how to carry out their joint exploratory process. The former was also the reason why TelCo decided to go into partnership with actors that were well-informed and experienced in potential customers' business processes and operations, i.e. those that had developed and implemented the business applications currently in use. Considering that the functionality and related requirements of the future applications were unknown, how then would the parties be able to design them?

Without exception, a short and rather imprecise letter of intent (LoI) provided the basis for initiating joint actions between the partners. Even though the appearance of a "complete contractual agreement" was described as a mere

figment of someone's imagination, the early LoI provided a sign of motivation for collaboration, which, according to one participant in the third-party alliance: "...allow[ed] free scope for concrete discussions".

A design process based on prototyping

TelCo and its partners adopted a strategy based on joint experimentation and early prototypes to develop simple illustrations and something tangible to respond to[54]. This approach provided vital feedback to the participants regarding what worked and what did not, both in respect of the task domain and the way the involved parties carried out different tasks.

The informants stated the importance of inviting prospective customers to gain learning opportunities in real situations. For example, the partners in Alpha worked together with a bank in order to develop an application for remote queries to central databases. The purpose was to learn about customer demands, and to examine functional requirements, capture the necessary adjustments to existing database and telecommunications technology, as well as other implications for the surrounding applications and devices (e.g. the required screen size for mobile handsets, the level of security during transactions).

Another illustration is TelCo, Xchange and E-quip's joint prototyping of a dispatch solution for distributing information and co-ordinating service engineers working in the field. The test application was implemented among a limited group of service engineers at one partner's office site. The prototype was developed through collaboration. Xchange was in charge of providing the positioning system, whereas E-quip was responsible for delivering the application platform and TelCo for the network access services. It was as much a means of testing existing technological facilities and guiding the need for further development as it was of interacting with users and learning about their values and needs and their ability to use the prospective application.

[54] The following was written into the letter of intent: "The collaboration will initially consist of two to four pilot projects after which the parties will evaluate the results and establish the final forms for the continued collaboration."

Mapping obstacles and further learning issues

The prototyping project started in November 1999, from a fairly vague specification. Hence, the expected result of the joint process was a clearer definition and a specification of the essential functionality, i.e. from general functionality (e.g. dispatch broker, security, billing) to detailed and quantitative performance criteria. By means of prototyping, the parties were able to illustrate the most crucial issues and domains in need of further development. Interviews and project documents reveal a long list of ifs and buts, as well as alterations made over time, e.g. multiple and successive beta versions of the core application, the mobile phones being planned for were not yet available, neither was the WAP-gateway due to a delayed launch. Furthermore, according to one of the project reports, the partners had discovered at a fairly late stage a variety of hardware interfaces. Moreover, as noted in the report, "the software that was deployed in the cell phones [...] was different from the one used in the simulator. This resulted in that we from now on had, not only three interfaces, but a great number of different [interfaces and handsets] to consider". This forced the parties to change the programming language, which in turn implied a variation in the range of knowledge. The participants also became aware that the existing brokering system required further development in order to suit future applications. Furthermore, Xchange came to the conclusion that, without a positioning system, there would be no learning opportunities for them. Thus, they insisted on including their positioning platform in the trial project. Altogether, these illustrations indicate that the scope and issue of collaboration changed with time, because of technical reasons and for the reason that the early ideas appeared to be more or less valuable than expected.

In consequence, the parties had to continuously re-evaluate the required knowledge and competence. In one of the alliances, the initial level of staffing has been solidly revised over time in order to bring much more specialised technical expertise into the project. Speaking about the collaborative process without reflecting upon the significance of these modifications and reconsiderations would be misleading. From the development point of view, we would have expected the partners to assign resources and competencies and then submit a working application in accordance with a pre-committed specification of requirements. Though in our cases, the collaboration was initiated without any specifications for a certain product or service. This implied that the application

had to be specified and the relevant validation criteria jointly designed during the collaboration. The partners' prime purpose was thus to explore and learn about potential applications, any obstacles that might occur, and the necessary resources to co-ordinate. We also note that the firms did not collaborate purely on the basis of existing knowledge. During the collaboration, they came to understand which areas and issues of knowledge and capability were in need of further improvement. The following table (Table 1) summarises the purpose of the exploratory alliances from the view of the purpose of the collaborations, in comparison with the traditional development logic.

Table 8. The purpose of collaborative partnerships

Collaborative Purpose	
Development logic	Exploration logic
The collaboration aims to:	The collaboration aims to:
7. execute development activities in accordance with a pre-defined product specification,	4. explore opportunities and prerequisites for a new business concept, i.e. preparing the future "specification",
8. acquire complementary resources and competencies in accordance with pre-defined interdependencies, and	5. investigate a new innovation field, identifying interdependencies and necessary competencies, and
9. co-ordinate joint activities in accordance with pre-defined and stabilised interfaces.	6. co-ordinate the exploration and prescribe new knowledge subjects and requests for further learning.

Exploring future relationships and business models

Emerging opportunities and business models

In our case, the partners began to interact with a view to defining, conceptualising and understanding the meaning and implications of "mobile Internet" and thereto related ideas. We might suggest that the partners' primary purpose concerned 'creating a concept'. It thus follows that interests, or calculated risks and costs, were not pre-existent. The understanding of a particular concept, e.g. the corresponding business models and the criterion as well as attitude towards successful or unsuccessful design, was created and agreed upon during the joint exploratory process. This entails partners who are open to negotiation regarding differing perspectives and competing claims. The third-party alliance serves as an example: the joint test application had almost

been implemented when the participants discovered that some changes were required in the associated platform. The platform in question was an existent 'technology' as well as an essential building block for other services and products. During the prototyping project, disagreements arose regarding the scope of the changes made to the platform,, which made the proprietor partner withhold some of its activities. Part of the dispute concerned the extent to which the platform in question would be seen as generic vis-à-vis other telecommunications operators than TelCo. The proposed changes would probably have made the platform 'TelCo-tailored', whereas Xchange regarded TelCo as merely one of several telecommunications operators that would be using the platform in the future. Hence, negotiations concerned the technical solution as well as expectations in relation to potential business models. We acknowledge, however, that the principal purpose of the initial stage of the collaboration was neither to implement this revision nor to decide each partner's particular contribution.

The same alliance also illustrates how the change in the market conditions and strategic direction became the reasons for altering the previous terms of the relationship. In our case, customer interest in sophisticated mobile applications declined during the period of collaboration; the race to build an information technology infrastructure to meet every potential need was thus being questioned. Eventually, Xchange decided to withdraw the platform and all thereto-related development activities, internally as well as externally to the firm. Although formally in progress, joint alliance activities ceased while the partners adopted a wait-and-see approach. The remaining partners made an attempt to find another 'platform partner', an alternative they had discussed even earlier.

The fate of the TelCo-Xchange-E-quip alliance also had an influence on TelCo's other two collaborations since most of their ideas were based upon the existence of a common infrastructure and platform for mobile e-services.

Our case study suggests that innovations may require major revision of previous technical choices, and may also imply further development. Likewise, some adaptations to relationships may be required. The problem is not sharing an anticipated business model, but taking action in order to shape a new business activity. Stating that interests and risks are the results of collaboration, rather than the inputs, implies that the individual partner may discover that it values the

evolving concept differently. The firmness of the relationship will thus depend on each partner's *continued* motivation to collaborate.

Exploratory partnerships: how to co-ordinate interests not necessarily converging

The Telco case had less to do with reducing uncertainty or instability, and more to do with the partners' ability to organise activities in support of the exploration of potential business concepts and future business relations. We also observed that joint efforts ceased as soon as the partners entered a development phase, i.e. when the main parameters were frozen. Furthermore, in the alliances we have studied, the appearance of a "final contractual agreement" was constantly described as far off. A complete contract was not a goal *per se* since the partners did not insist on the convergence of goals or interests. Given the explorative aims, the partners were not able to predict the future nature or conditions of their relationship. They aimed to learn about appropriate partnerships for future venture activities. Without expecting stable relationships or strong commitments, the parties agreed upon a short and rather imprecise letter of intent (LoI) which provided the fundamentals for initiating collaborative actions. It is also worth noting that the LoI was based on conditional commitments that allowed the partners to abandon their relationship, and to commit themselves to negotiations only if the previous and prospective result of co-operation was considered worth negotiating for. The table below (Table 2) summarises the logic of exploratory alliances, from the governance and contractual points of view, in comparison with the traditional development logic.

Table 9. Governance mechanisms and contractual arrangements for exploration.

Governance Mechanisms & Contractual Arrangements	
Development logic	Exploration logic
10. The interests are predetermined. The negotiation precedes the start of collaborative actions.	4. Preferences, interests and risks are imprecise, and derive from design choices.
11. The partners are bounded by the contract and expected to respect the prescribed rules.	5. The partners have the possibility to exit the collaboration.
12. The partners commit themselves to pre-defined objectives.	6. The goal of cooperation is quite imprecise, but the Letter of Intent (LoI) is a conditional commitment to negotiate whenever necessary.

Following the above discussion, we cannot deem TelCo's alliances to be failures solely on the basis of stability or longevity. To make a judgement, we must include the alliance partners' explorative aims, i.e. ascertain whether they have increased their knowledge of strategic motives and the domain of collaboration, the characteristics of potential partners, the environmental conditions and opportunities, and the processes and management of inter-firm relationships in general. We have to consider whether they consciously managed to co-ordinate actions and processes in order to enhance joint knowledge creation and learning.

DISCUSSION

We opened this paper by questioning the relevance of using instability and longevity as a management principal or an absolute indicator of alliance performance. The empirical evidence suggests that the exploratory partnership is a means by which collaborating partners identify and create the knowledge necessary for recognising future opportunities. Moreover, it suggests that the exploratory partnership is characterised by a logic that involves particular governance mechanisms. What seems to be at stake is the provision of an environment wherein collective learning can take place through experimentation without predicting or taking for granted the next joint step. On these grounds, we intend to re-examine the question and discuss some implications for managerial practice and further research before bringing the paper to its conclusion in the subsequent section.

Implications for action and management practice

Arguing from the perspective of joint learning and exploration implies a co-operative process that involves continuous re-evaluations of conditions previously agreed upon (c.f. (Ring & Van de Ven, 1994; Doz, 1996; Ariño & de la Torre, 1998; Koza & Lewin, 1998, 2000). Our findings are consistent with this evolutionary conception of IORs. It is, however, important to make further observations regarding the management of these evolving processes in exploratory partnerships.

Empirical evidence suggests that managers find it challenging to maintain the exploratory aim and direction. Inconsistencies between the exploratory logic and

the applied governance principles appear to give rise to tensions which are hard to resolve. Examples of this type of tension are evident in the study. We may recall the situation when the partners shifted their focus and started to validate existing technologies instead of exploring related potentials. Or when they tried to govern their relationship by means of a market exchange despite the common perception of the outcome as uncertain and undefined. Moreover, when the partnership was being kept formally alive (in a "wait and see" scheme), even though the learning processes had been trained in new directions, and with other partners.

If collaboration with exploratory aims presupposes some specific co-ordination mechanisms, what hints and directions will we then be able to propose in the light of our empirical findings?

Firstly, the collaboration has to be organised in a way that tolerates step-by-step revisions both on the contractual and co-ordination levels. The partners are thus advised to make the conditions clear and to prepare procedures that can support any changes or transformations that might arise. Successful conclusions of exploration activities, as well as the emergence of the divergent strategic intents of the partners, might as well end in a decision to dissolve the relationship. The advice would be to clarify the conditions for leaving the alliance, e.g. agree upon explicit exit rules. For instance, the claims regarding further development of the communication platform in order to better suit TelCo's infrastructure appeared contrary to Xchange's strategies. In consequence, the partners had to decide whether they should transform the exploratory partnership into a co-development project, i.e. with new contractual arrangements and co-ordination procedures, and/or maintain the exploratory intents. In this particular case, the partners failed to take a definite stance. Consequently, they ended up in a wait-and-see state and the collaboration eventually petered out.

Secondly, exploratory activities imply an experimental way of working which is broad enough to allow the partners to engage in the joint exploration of potential opportunities, and limited enough to put the range of efforts and the upper limit of the risk on a level perceived to be "reasonable". We would expect that the more delimited the first experiment - the easier it would be for the partners to engage in joint actions. In this respect, a step-by-step process allows the partners to tackle uncertainties by agreeing upon a similar stepwise commitment to risks

and efforts. It would, however, seem necessary to clarify the broader field of exploration and the issues to learn about in advance.

Thirdly, since exploratory partnerships mainly aim to identify opportunities and further learning areas, a successful outcome would be dependent on each partner's continual tracking of the progress, the sequence of decisions, and the lessons learned (e.g. obstacles, alternative solutions to problems, new innovation opportunities, and new alliance opportunities). They will thus have to organise a way of capitalising on the paths of exploration, rather than on a discrete series of alliances.

Fourthly, exploratory partnerships entail methods of evaluating progress and performance, distinct from those applicable to measuring relationships which aim to reach already specified outcomes. From a development point of view, joint efforts would be considered successful when they deliver a result that is in accordance with predefined specifications. On the contrary, the success of exploratory partnerships should instead be evaluated in accordance with what each partner has learnt (about the other's potential contribution, joint opportunities, obstacles, and the way of organising further exploration or development).

Defining alliance performance appears to be a multifaceted undertaking. Irrespective of the governance mechanisms, it seems clear, however, that the outcome of joint action will depend on the partners' shared understanding of the essence and dynamics of exploratory partnerships. Consequently, we emphasise the importance of further efforts to distinguish the specifics of exploratory partnerships.

Implications for research

There are, without doubt, essential research problems awaiting empirical investigation in order to further explain the phenomena collaborative IOR and to test existing theories. The current study provides some tentative directions for further research into the dynamics of IORs that have an explorative intent.

Firstly, we anticipate more empirical studies to explain the phenomena of exploratory alliances. The possibilities of longitudinal empirical studies of the determinants of alliance development in real time seem limitless. We believe that

one important issue will be empirically acknowledging further distinctive features of such exploratory alliances.

Secondly, the findings show that firms, for the sake of exploration, might collaborate with several partners at the same time. The unit of analysis in previous research has, however, tended to focus on the single partnership or strategic alliance. A promising avenue of future research would thus be examining *portfolios* of alliances and collaborative venues. These studies might ask whether or not the fact that firms, at times, enter into several collaborative arrangements has any impact on the alliance strategy, the governance mechanisms, or the implementation of a particular partnership.

Thirdly, besides studying the critical structures and collaborative processes, the study suggests that partners need to monitor new types of contracts (e.g. evolving or recurrent contracts, cf. Ring & Van de Ven, 1994). Hence, questions concerning judicial procedures and requisites will become essential for future studies.

Fourthly, the parties featured in this study were aiming to explore new business opportunities, competencies and the potential relationships required for the future development of products and services, rather than developing a pre-specified product. Under such a premise, alliance termination might be considered a sensible alternative whenever one of the parties discovers that the relationship would not be relevant to their future plans (e.g. due to a shift in preference or exogenous events). Even so, there is a need for additional research in order to explore the various reasons for termination, as well as the different *modes of exit* selected by the firms, e.g. the partners might decide to end the exploratory phase in order to start a co-development project or they might substitute one field of exploration for another. Moreover, it has been claimed that: "although termination is certain to occur sooner or later, when it happens must be uncertain in order to sustain a self-enforcing agreement" (Telser, 1980:44 in Parkhe, 1993). Consequently, researchers may as well study whether the termination is typically proactive or reactive and what that implies for the firm's exploratory aims (cf. Ucbasaran et al., 2001).

Finally, although we suggest that firms might engage in open-ended and uncertain collaborations without conventional contractual safeguards or without securing previously recommended preconditions, it is entirely possible that they

will avoid joint exploratory actions if investments are (far too) heavy. The extent to which exploratory partnerships are applied might thus depend on possibilities to make recurrent and delimited investments through common trials and prototypes. What will this mean for industries or technologies that involve a high "entrance stake"? Consider, for instance, the development of new drugs in the pharmaceutical industry. Will such conditions lead firms to abandon exploratory partnerships? Comparative studies of exploratory partnerships involving different industries, technologies, and development conditions can help to test this causation.

CONCLUSION

Exploration is clearly an important motive for firms to enter into collaborative IORs. Whether or not they are sensibly managed is a more open question, however. The conventional wisdom of alliance management is valuable, but it is only part of the story. While it is true that predefined conditions, e.g. contractual agreements, common interest, and absorptive capacity, usually facilitate collaborative action, these conditions would not appear to be sufficient to explain the course of action when the joint activities, or their outcomes, have not yet been given a concrete form. In this article, we have considered the importance of adapting the governance mechanisms to the explorative intent, i.e. when the partners aim to explore new innovations and alliance opportunities by reopening the design space, identifying constraints as well as potentials, and prescribing new learning issues. A major challenge appears to be the partners' capacity to keep the exploratory process open just enough to evolve with the results of joint action. Practice and established theories alike commonly exaggerate the value of stability, longevity, and traditional economic measures as performance indicators for alliance performance. To do full justice to exploratory partnerships, however, there is a need for the complementary addition of measures based on whether or not the partners have succeeded in recognising constraints, designing new opportunities, and prescribing new learning issues.

The present study contributes to alliance management practice and theories by opening the "black-box" of joint explorative processes. It also proposes some implications for both practising managers and researchers. Given the relevance of the subject and the exploratory nature of our findings, exploratory partnerships appear to be a fertile area for future studies. It is to be hoped that the perspective

presented in this article will serve to encourage further efforts to understand more fully the management of exploratory partnerships and the measurements most suited to evaluating their performance.

Appendix A: The research project, its activities and data sources

Date	Activity	Purpose/Outcome
May 00	Initial meeting with TelCo's alliance participants (project leader, and representatives on the joint steering committee).	Discussion about purpose and the researcher's role in the IORs.
August 00	Initial meeting with alliance participants (project leader, project members, and representatives on the joint steering committee from each firm)	Discussion about the aims and activities of the joint collaboration. Describe and discuss the researcher's role in the IORs.
May-December 00/01	Think Tanks with selected people from TelCo assigned with the task of developing strategies and methods of managing IORs.	Discussion about required strategies and management tools at TelCo.
August 00 - Mars 01	Participating in two ongoing IORs (formal and informal meetings, e-mail discussions and the like).	Tracking debates, decisions, actions, outcomes, and process issues over time.
October - December 00	Interviewing participants	Collecting participants' narratives.
May 01	Follow-up meeting with participants, Alpha.	Collecting participants' experiences and reflecting on the collaboration: its process and outcome. Additional research data and validating early interpretations.
November 00/January 01	Describing industry context. Writing case history and narratives.	Broader understanding of the context and informing the co-author of the circumstances behind the cases.
January 00 - April 01	Analysis and development of the concept (during and after data collection) through data reduction, data display and drawing a conclusion.	Pattern-matching, eventually resulting in the tables being presented in text.
May 02	Presenting conference paper.	Testing our initial idea within the scholarly domain
June 02	Additional interviews, in the third-party alliance.	Collecting the participants' narratives and validating early interpretation based on project documents and archives.
August 02 – June 03	Additional round of analysis (see above)	Pattern-matching. Refining and adding to previous conclusions.
(August 02 – June 03)	(Participating in 2 additional IORs, not included in this paper)	(Comparative data)
November 02 and December 02	Strategy workshop 1 at TelCo Strategy workshop 2 at TelCo	Reflecting on findings and proposing further actions.
December 02	Meeting with the executive group of the division (at TelCo) in question.	Presenting results and discussing plans for further work on strategy.

REFERENCES

Achrol, R.S. and Gundlach, G.T. (1999). Legal and social safeguards against opportunism in exchange. *Journal of Retailing,* 75(1), 107-124.

Alvesson, M. 1999. Methodology for close up studies - struggling with closeness and closure. *Working Paper Series.* Lund: Institute of Economic Research, Lund University.

Ariño, A. and de la Torre, J. (1998). Learning from failure: towards an evolutionary model of collaborative ventures. *Organization Science,* 9(3), 306-325.

Ariño, A. and Doz, Y. (2000). Rescuing troubled alliances... before it's too late. *European Management Journal,* 18(2), 173-182.

Axelrod, R. (1984). *The evolution of cooperation.* New York: Basic Books.

Bachmann, R. (2001). Trust, power and control in trans-organizational relations. *Organization Studies,* 22(2), 337-365.

Barringer, B.R. and Harrison, J.S. (2000). Walking a tightrope: creating value through interorganizational relationships. *Journal of Management,* 26(3), 367-403.

Bureth, A., Wolff, S. and Zanfei, A. (1997). The two faces of learning by cooperating: the evolution and stability of inter-firm agreements in the European electronics industry. *Journal of Economic Behaviour & Organization,* 32(4), 519-537.

Child, J. and Faulkner, D. (1998). *Strategies of cooperation: managing alliances, networks, and joint ventures.* Oxford: Oxford University Press.

Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly,* 17, 197-218.

Das, T. K. and Teng, B.-S. (2000). Instabilities of strategic alliances: an internal tensions perspective. *Organization Science,* 11(1), 77-101.

Doz, Y. (1996). The evolution of cooperation in strategic alliances: initial conditions and learning processes. *Strategic Management Journal,* 17, 55-83.

Doz, Y.L. (1988). Technology partnerships between larger and smaller firms: some critical issues. In *Cooperative strategies in international business*, ed. F.J. Contractor, and P. Lorange, pp. 317-338. Lexington, MA: Lexington Books.

Eisenhardt, K. (1995). Building theories from case study research. In *Longitudinal field research methods: studying processes of organizational change*, ed. G.P. Huber and A.H. Van de Ven, pp. 65-90. California: SAGE Publications, Inc.

Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology,* 91(3), 481-510.

Greenwood, D.J. (2002). Action research: unfilled promises and unmet challenges. *Concepts and Transformation,* 7(2), 117-139.

Hagedoorn, J. (1993). Understanding the rationale of strategic technology partnering: interorganizational modes of cooperation and sectoral differences. *Strategic Management Journal,* 14(5), 371-385.

Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal,* 12 (Special Issue), 83-103.

Hamel, G., Doz, Y.L. and Prahalad, C.K. (1989). Collaborate with your competitor and win. *Harvard Business Review,* 67(1), 133-139.

Hatchuel, A., Le Masson, P. and Weil, B. 2001. From R&D to R-I-D: design strategies and the management of innovation fields. *8th International Product Development Management Conference.* Enschede: European Institute for Advanced Studies in Management (EIASM).

Heide, J. B. and John, G. (1988). The role of dependence balancing in safeguarding transaction-specific assets in conventional channels. *Journal of Marketing,* 52(1), 20-35

Kogut, B. (1988). Joint ventures: theoretical and empirical perspectives. *Strategic Management Journal,* 9, 319-332.

Kogut, B. (1989). The stability of joint ventures: reciprocity and competitive rivalry. *The Journal of Industrial Economics,* 38(2), 183-198.

Kogut, B. (1991). Joint ventures and the option to expand and acquire. *Management Science,* 37(1), 19-33.

Koza, M. and Lewin, A. (2000). Managing partnerships and strategic alliances: raising the odds of success. *European Management Journal,* 16(2), 146-151.

Koza, M.P. (1999). The co-evolution of network alliances: a longitudinal analysis of an international professional service network. *Organization Science,* 10(5), 638-653.

Koza, M.P. and Lewin, A.Y. (1998). The co-evolution of strategic alliances. *Organization Science,* 9(3), 255-264.

Lane, C. and Bachmann, R. 1998. *Trust within and between organizations*. New York: Oxford University Press Inc.

Lane, P.J. and Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal,* 19(5), 461-477.

Li, F. and Whalley, J. (2002). Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy,* 26(9-10), 451-472.

March, J.G. (1991). Exploration and exploitation in organizational learning. *Organization Science,* 2(1).

McLoughlin, I. (1999). *Creative technological change. The shaping of technology and organizations.* London: Routledge.

Osborn, R. N. and Hagedoorn, J. (1997). The institutionalization and evolutionary dynamics of interorganizational alliances and networks. *Academy of Management Journal,* 40(2), 261-278.

Parkhe, A. (1993). Strategic alliance structuring: a game theory and transaction cost examination of interfirm cooperation. *Academy of Management journal,* 36(4), 794-829

Pettigrew, A. (1990). Longitudinal field research on change: theory and practice. *Organization Science,* 1(3), 267-292.

Pisano, G.P., Russo, M.V. and Teece, D.J. (1988). Joint ventures and collaborative arrangements in the telecommunications equipment industry. In *International collaborative ventures in U.S. manufacturing*, ed. D.C. Mowery, pp. 23-70. Cambridge, MA: Ballinger Publishing Company.

Powell, W.W. (1998). Learning from collaboration: knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review,* 40(3), 228-240.

Powell, W.W., Koput, K.W. and Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly* 41(1), 116-145.

Ring, P.S. and Van de Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review,* 19(1), 90-118.

Roth, J., Sandberg, R. and Svensson, C. (2004). The dual role of the insider action researcher. In *Collaborative research in organizations: foundations for learning, change, and theoretic development*, ed. N. Adler, A.B. (Rami) Shani and A. Styhre, pp. 117-134. Thousand Oaks: Sage Publications Inc.

Shani, A.B. and Pasmore, W.A. 1985. Organisation inquiry: towards a new model of the action research process. In *Contemporary organisation development - Current thinkings and applications*, ed. D.D. Warrick, Glenview: Scott Foresman and Company.

Tripsas, M., Schrader, S. and Sobrero, M. (1995). Discouraging opportunistic behaviour in R&D consortia: A new role for the government. *Research Policy,* 24(3), 367-390.

Ucbasaran, D., Westhead, P. and Wright, M. (2001). The focus of entrepreneurial research: contextual and process issues. *Entrepreneurship Theory and Practice,* 25(4), 57-80.

van Waarden, F. (2001). Institutions and innovation: the legal environment of innovating firms. *Organization Studies,* 22(5), 765-795.

Williamson, O.E. (1985). *The economic institutions of capitalism: firms, markets, relational contracts.* New York: Free Press.

Yin, R.K. (1994). *Case study research: design and methods.* Thousand Oaks, CA: Sage Publications.

Zaheer, A. and Venkatraman, N. (1995). Relational governance as an interorganizational strategy: an empirical test of the role of trust in economic exchange. *Strategic Management Journal,* 16(5), 373-392.

Paper IV

Marshall, C

2003

Bonds beyond bounds: a study of corporate entrepreneurs' use of external relationships.

To be submitted to an academic journal

Bonds Beyond Bounds: A study of corporate entrepreneurs' use of external relationships.

Cassandra Marshall

The present paper explores corporate entrepreneurs' use of personalized bonds for innovation and new product development. Much has been written about the importance of networks for entrepreneurial action. However, proportionally few studies have explored corporate entrepreneurs' cultivation and development of direct and indirect bonds beyond the firm's internal network. The paper presents empirical results from a qualitative study of corporate entrepreneurs and interorganizational relationships at a multinational telecommunications company. The result emphasizes the value of corporate entrepreneurs' diverse external bonds for innovation performance. Furthermore, it stresses the importance of the social-effective dimension and the corporate entrepreneur's own motivation for making use of these bonds. A model is proposed of corporate entrepreneurs' personalized bonds and their implication for managerial practice and further research.

Keywords: Interorganizational relationships; strategic alliances; innovation; corporate entrepreneurship; social network.

INTRODUCTION

The emphasis on innovation through highly-interactive knowledge work suggests that firms need to manage and organize their activities both within and across boundaries (Kogut & Zander, 1992; Kanter, 1988; Larson, 1992; Powell et al. 1996; Jarillo, 1989; Johannisson, 1998). A study by Hills et al. (1997) indicated that 'network entrepreneurs' who learn of opportunities through contacts with outsiders pursue significantly more opportunities than do 'solo entrepreneurs' with limited networks. A growing number of contributions echo these findings (see Hoang & Antoncic, 2002 for a recent review of network-based research in entrepreneurship).

Previous research into corporate entrepreneurship and corporate venturing processes has served our understanding of venture activities within established organizations. The unit of analysis has, however, tended to be localized to a single organization or company (Swan et al., 1999). Hence, it is little wonder that many researchers primarily mention internal social networks and resource combinations in their studies. While it is obvious that innovation requires managers to undertake (or at least consider) internal activities that foster entrepreneurial behavior, quite a few studies neglect the relationship between corporate entrepreneurs and their activities across firm boundaries. The overstated focus on the internal context can be considered both a restraint and an impediment to further development of the field and the directions of management practice. For example, Bouty refers to a previous study by Allen (1977 in Bouty 2000, p. 50) regarding information flows in R&D laboratories, where it was found that 40 percent of potential solutions and opportunities were derived from personal external contacts.

The research presented in this paper has originated from a qualitative field study at a multinational telecommunications company. The topic concerned collaborative interorganizational relationships with the purpose of innovation and new product development. During the study, it became evident that the individuals involved in interorganizational arrangements frequently employed personal direct and indirect bonds (or bonds that became highly personal during collaboration) to deal with their innovation activities. The existence and use of these types of external bonds was not unexpected, however, with the number of relationships unknown to the executive management group being quite

surprising. Moreover, the way some informants experienced these relationships was puzzling. In some cases, the informants even expressed a feeling of shame and insufficiency when describing their exchange networks and relationships. A number of informants also felt that they might risk their own personal reputations and, for the same reason, valuable relationships, due to the firm's attitude toward the use of 'personalized' bonds and/or the organizational inability to deal with collaborative ventures.

By 'personalized' bonds, I refer to bonding activities and interorganizational collaborations created and conducted by corporate entrepreneurs – on their own, and not at the behest of the firm. The use of the term corresponds to what Kreiner & Schultz (1993, p.206) have referred to as 'personalized' collaboration. In particular, it is argued in the present paper that these bonds are an important source for the company's cultivation and development of collaborative interorganizational relationships for innovation purposes. Since previous research into corporate entrepreneurship rarely touches upon these issues, there seems to be an avenue for *explaining and predicting the occurrence of interorganizational relationships pursued by corporate entrepreneurs.* Furthermore, to discover unexpected connections is to discover a new set of implications (Weick, 1989). Hence, the findings pose questions about *the challenges and responsibilities of executive managers* and *the implications for further research* in this matter. Accordingly, the present paper aims to contribute to models of corporate entrepreneurship by bringing in the cultivation and evolution of personalized bonds beyond the internal network structure i.e. bonds beyond the company's bounds[55]. Studying such relationships also enhances knowledge of the dynamic process of interorganizational relationships and the development of the organizational alliance capacity (Sarkar et al., 2001).

The remainder of the paper is divided into five principal sections. The following section presents a selected picture of previous research literature on entrepreneurship and innovation through external collaboration. The research approach and methods are then described. A brief introduction to the context of the study precedes the reporting of empirical results. The proposed model and implications for management practice and further research are discussed before the paper concludes.

[55] Cf. Larson and Starr's (1993) previous request for further research in this direction.

THEORETICAL BACKGROUND

Independent and corporate entrepreneurship

Entrepreneurship is associated with innovation, and corporate entrepreneurship with innovation by established firms (Drucker, 1985; Baden-Fuller, 1995; Covin and Slevin, 1991; Covin & Miles, 1999; Sharma & Chrisman, 1999). For the purposes of this paper, I hold that individuals pursue corporate entrepreneurship when they engage in the discovery, evaluation, and exploitation of opportunities with a view to developing and commercializing future products and services and/or moving into new markets that are (or at least intended to be) strategically consistent with the firm's mission (cf. Shane & Venkataraman, 2000; Brazeal & Herbert, 1999). Furthermore, the entrepreneur can be found all over the organization, among both corporate members and managers. It is the innovating function that makes the entrepreneur.

Even though there is no conclusive evidence that establishment and size are factors determining innovativeness, a general view holds that new[56] and small firms are better able to innovate than their large and established counterparts. Among a number of reasons, it is argued that established firms are subject to organizational inertia that undermines the process of new business venturing (Leonard-Barton, 1992; Katz & Allen, 1997). This accompanies the tendency to do more and more internally as time goes by (Jarillo, 1988; Bauer, 1997). On the contrary, new or small firms are portrayed as more willing to recognize a potential opportunity emerging from unconventional sources. They use unconventional means, e.g. by way of unplanned processes with unbudgeted resources, because they have no prior history or commitments. Hence, independent entrepreneurs may employ a particularly unorthodox attitude toward heuristics and unstructured commitments, whereas corporate entrepreneurs are assumed to be burdened with demands for formality and rational planning techniques (Alvarez & Busenitz, 2001). Corporate entrepreneurs may also be constrained by organizational policies that rigidly enforce the use of resources available inside the firm (Starr & Macmillan, 1990). This distinction between corporate and independent entrepreneurs suggests that corporate entrepreneurs

[56] Previous research uses a 6 to 10 year upper limit for the classification of 'new' firms (Yli-Renko et al., 2001).

may get into trouble if they act beyond the scope of their job description and function, or beyond the boundaries of the firm.

Nevertheless, research also demonstrates that significant commonalities exist between the innovation processes of independent entrepreneurs and the new business venturing of established firms (Van de Ven et al. 1999). According to Jarillo (1988; 1989), the typical entrepreneur, whether independent or corporate, faces two kinds of entrepreneurial dilemmas. The first concerns the accumulation of adequate resources and knowledge, whereas the second refers to the risks of losing the entrepreneurial posture and flexibility that previously served the firm so well. He asserts that the strategic use of resources outside the entrepreneur's, or the established firm's, control constitutes an effective means of resolving these problems. A broader view of entrepreneurship thus involves the means entrepreneurs apply in order to gain access to the resources and knowledge necessary to pursue innovation (Stevenson & Jarillo, 1990).

Entrepreneurship through Interorganizational Collaboration

A number of past and recent contributions have clarified our understanding of the reasons for interorganizational arrangements. For example, we know that entrepreneurs seek outside assistance in order to recognize and develop opportunities into full-blown business concepts, to examine and evaluate the venture's underlying potential, to secure the necessary technology, and to provide the credibility and legitimacy needed to overcome liabilities of newness (Hoang & Antoncic, 2002). One fundamental is the widespread belief that interorganizational relationships and networks represent opportunities for value creation through the acquisition and exploitation of knowledge and capabilities critical to innovation (Kanter, 1988; Kogut & Zander, 1992; Lane & Lubatkin, 1998; Johannisson, 1998). For example, the frequently-cited paper of Powell et al. (1996) illustrates how interorganizational relationships and networks in the changing biotechnology industry provide knowledge that is crucial to innovation. Based on the concept of "absorptive capacity" (Cohen & Levinthal, 1990), these two researchers argue that the degree to which firms learn about new opportunities is a function of the extent of their participation in collaborative activities outside organizational boundaries. The locus of innovation is thus

found in the firm's, or entrepreneur's, access to external networks and communities of learning.

Hence, contemporary research portrays entrepreneurship as a social endeavor, highly concerned with social exchange relationships (Aldrich & Zimmer, 1986; Uzzi 1996). Granovetter's (1985) influential theory on "embeddedness", as an important process by which ongoing social ties shape economic action, has thus encouraged scholars to investigate how embedded ties promote innovation and entrepreneurship. Social networks for exchanging knowledge and resources draw attention to interpersonal and informal relationships, which may consist of friends, classmates, colleagues from former workplaces, and associates in the same or a connected industry. Johannisson (1987) suggests that there are three kinds of social exchange networks: (1) the production network that concerns the flow of transactions between "colleagues" at business meetings and fairs or via various trade associations; (2) the symbolic network that originates from communities such as the ethnic group or the professional association; and (3) the personal network that is built upon true friendship. The first two entail rather distinct and well-defined arenas for the creation of new relationships, whereas personal networks emerge tie-by-tie in a rather loose setting of network creation. A common characteristic of the key resources and knowledge that may be gained via these networks is that they are not located at the firm or in any formal governmental arrangement (e.g. joint venture). They are not available in the marketplace either as they are not easily priced or contractually enforced (cf. Bouty, 2000).

The characteristics of interpersonal and interorganizational relationships are very much a consequence of the 'bonding process', which is generally described as an evolving and continuous variable embedded in hands-on working (Larson and Starr, 1993). This is due to key attributes such as trust and confidence, which develop over time through successive adaptations to everyday activities (Dubois & Håkansson, 1997; Eisenhardt & Schoonhoven 1996). In the light of these facts, Larson and Starr (1993) have proposed a stage model commencing with a "trial period" during which the prospective partners evaluate each other and learn about their respective businesses, their performance capabilities and, ultimately, their credibility. The second stage involves more extensive and frequent communications, as well as reciprocated investment in terms of time, people and equipment. Lastly, the third stage concerns the "layering process", which results

in the tighter integration of additional business functions, activities and levels of integration (cf. organization formation). This model corresponds to suggestions by scholars that entrepreneurs frequently form a pre-organization through the use of active social networks that may evolve into more formal strategic alliances over time (Hitt & Bartkus, 1997).

Limitations to previous literature

The accumulated argument thus far has been that interpersonal and interorganizational relationships are influential during the process of innovation and new product development. Although a growing body of research indicates that the ability to coordinate external ties and social networks is a distinctive advantage for the entrepreneurial organization, there is a curious gap in the literature concerning corporate entrepreneurship. And although prior studies have proved that both corporate and independent entrepreneurs use boundary-spanning strategies, a defining characteristic of considerable research on corporate entrepreneurship is the focus on activities within the firm (e.g. communication and collaboration across boundaries between the R&D, marketing, manufacturing, and sales areas). Research efforts have thus been directed toward understanding how opportunities are recognized and transformed into viable innovations by analyzing internal organizational structures and their impact on entrepreneurial phenomena. Moreover, the literature on interorganizational relationships frequently assumes a classical hierarchical monitoring of interorganizational relationships, and executive managers are presumed to be the ones shaping the firm's partner and alliance activities. Hence, there is little room for the corporate entrepreneurs' motivation and considerations in those descriptions and explanations. Based on the present review of theory on entrepreneurial activities, we may, however, expect that corporate entrepreneurs also engage in external relationship and networks during the innovation process. Hence, understanding of the extent to which corporate entrepreneurs engage in personalized bonds, their motives, and the challenges facing corporate entrepreneurs who make use of external bonds becomes an essential area of inquiry. The present paper proposes some answers to these questions. Before presenting the results, some words on the methods used and the empirical setting are in order.

METHODS

Research approach

As already mentioned in the introduction, the somewhat surprising findings encouraged me to dig more deeply and try to uncover reasons, relations, and implications related to the use of interorganizational relationships for innovation activities by corporate entrepreneurs. The different positions and conditions of independent *vs.* corporate entrepreneurs imply that the challenges or problems need not be the same. Accordingly, explanations regarding independent entrepreneurs' use of interorganizational relationships and social networks need not necessarily be the most advisable point of departure. As an alternative to testing hypotheses developed in the context of independent entrepreneurs, I decided upon an inductive qualitative case study to make sense of, and propose, relationships and connections that had previously not (or rarely) been considered. The purpose is neither to test nor to refute existing theory. To be more precise, I sought to formulate propositions for future testing. Yet another purpose was to provide knowledge relevant to action in the actual research setting. Finally, the study emphasized behavioral and cognitive issues (i.e. shared representations and a system of meanings among corporate entrepreneurs) rather than the knowledge exploitation or innovation process *per se*. This position has influenced the methods and procedures employed in the present study.

The study basically concerns two levels of analysis. First, the interpersonal level between the corporate entrepreneur and its personal network, referred to as the corporate entrepreneur's personal ties or bonds. Then there is the interorganizational relationship referring to the collaborative relationship between two or more independent companies.

Research process and data collection

This study forms part of a three-year research project dealing with innovation through collaborative interorganizational relationships. The main part of the study was conducted in real time from the perspective of an observing participant (Alvesson, 1999), or an insider action researcher (Roth et al., 2003). The

potential of this inquiry strategy lies in conducting research *together with* the people concerned. Moreover, it contributes to local theory relevant to decisions and actions in the actual setting, while at the same time generating a more generalized understanding of the phenomenon for theorizing purposes (Shani & Pasmore, 1985;Greenwood, 2002).

The approach was made possible by active participation in real-time activities, from start to finish, in four collaborative interorganizational relationships. I was employed on a part-time basis by the focal company (TelCo) and was assigned the task of conducting a pre-study of how to organize alliance activities, in addition to playing a supportive role in policy and process issues vis-à-vis ongoing collaborations. This made me an insider who had the possibility of tracking events and gathering complex and inter-subjective data, while my parallel role as a researcher from academia made me an outsider. Finally, participants from TelCo and its partner firms were actively involved in the research process, contributing to the findings by means of dialogs and reflections at follow-up-meetings and workshops. Since I was participating both in project teams and in steering committees, insights and thoughts from both the operational and managerial levels are available.

The interorganizational relationships studied were deliberately, not randomly, selected from the prospects of tracking the progress in real-time, from the outset right to the end. They were not necessarily previously or formally known to the executive management group. However, most relationships were known to me as an insider and through my professional role and assignment at TelCo. The real-time study was supplemented by in-depth interviews with fourteen participants. The informants were chosen on the premise that they had initiated external collaborative relationships with the purpose of implementing new processes, products or services. They typically held the formal roles of either a product manager (PM), responsible for maintaining and developing a product, or a business area manager (BAM), in charge of a product portfolio made up of different products. The interviews were semi-structured and aimed at gathering incidents and thoughts relating to the corporate entrepreneurs' ability and motivation as regards boundary-spanning activities, rather than answering specific questions. The interviews lasted for approximately 90 minutes (slightly more than one hour at minimum). Secondary sources, e.g. the minutes of

meetings, project reports, letters-of-intent, gave a further dimension to the context, the actions, the relationship, and the participating firms' backgrounds.

The method used to analyze the empirical evidence rests upon a pattern-matching logic (Yin, 1994). By shuttling back and forth between narratives, observations, archival data and existing theory, I tried to make sense of the field data and search for general patterns or themes. These themes where then developed into conceptual categories. Hence, the analytical themes or categories in the subsequent section, and in the model presented, were not assumed *a priori*, but were a result of this parallel processing.

This somewhat delicate subject might have had an effect on the informants' frankness regarding their use of certain social ties, which in turn might have influenced the analysis and conclusions of this paper. On the other hand, discussions with an insider who is familiar with the internal circumstances might have made the informants more outspoken. My familiarity with and closeness to the studied object may also be considered an obstacle and potential source of bias due to the risk of 'staying native' (Alvesson, 1999). To preclude any misrepresentation of the findings and explanations, the empirical descriptions were checked and verified by the informants and then discussed at follow-up meetings and workshops. Furthermore, during the research project, I collaborated with other researchers at my university department (e.g. tandem interviews, joint analysis of data, and the production of joint articles and conference papers). These research colleagues contributed complementary aspects from an outsider's perspective.

THE TELCO CASE

The telecommunications industry is currently undergoing a transformation, with previously monopolistic and vertically-integrated telecommunications operators being forced (for both regulatory and technical reasons) to untangle the various elements of their businesses. The convergence of industry boundaries across telecommunications, computers, and media companies has shaped the so-called ICT[57] market, redefining the overall business model, i.e. the business concept, the value created, and how that value might be distributed among the different stakeholders. The result is a highly complex and competitive industry that consists of a wide range of players with differing motives. Another consequence of this industry restructuring is that few firms have all the skills needed to develop and offer future products and services. Innovation and new business creation are becoming increasingly dependent on a company's ability to create new value via the recognition and exploitation of value combinations using interorganizational arrangements, e.g. networks, strategic alliances, and outsourcing. The studied company is an incumbent provider of telecommunications services whose main interests lie in the Nordic and Baltic markets. The company provides a portfolio of services ranging from traditional geographical and mobile telephony to products and services based on the Internet. Its customer base consists of both private consumers and businesses. The current study was conducted at one of its business divisions, *TelCo Division*, which was responsible for the development, administration, and sale of products and services designed for business customers. The division had approximately 4,600 employees (of a total of 30,600), of whom about 700 specialized in innovation and new product development activities.

Telco saw product and business development as an apparent need as regards ensuring that its products and product portfolios surpassed the standard of upcoming, competing alternatives. New product development has traditionally been internally directed and governed by highly standardized development processes. It has, however, generally been realized that many business-venturing initiatives imply interorganizational collaboration.

[57] Information and Communications Technology.

RESULTS

The occurrence of personalized bonds

An initial step in the present study was to develop an understanding of the extent that individuals beyond senior management were involved in collaborative interorganizational relationships. Analysis of the field data revealed that middle managers and employees, to a much higher degree than expected, were active in external negotiations and relationships. Generally, senior managers or corporate strategists expected that only the firm's top management conducted this activity. The most illustrative example of this was an activity initiated by the TelCo Division's executive group (partly to inform the present study) in order to identify ongoing collaborative relationships across the boundaries of the company. The results revealed a significant amount of extended bonds and ongoing cross-border activities, the majority being unknown to the executive group. The expected stock of 10 prospective partner relationships turned out to be 57 ongoing efforts. Hence, although not formally sanctioned, the task of negotiating and linking with external partners proved to be highly dispersed. The initiatives had emerged from managers and organization members in the middle and lower layers of the organization.

The unexpected information regarding 57 ongoing activities across firm boundaries led to debates on the need for control and coordination. The issue of control concerned the overall business strategy and who the firm considered to be a close business partner, whereas coordination primarily embraced the management of quantities of ties, which on more than one occasion were directed toward the same external partner. The executive group decided to initiate an internal project to make an additional inventory of ongoing external collaborations and, based on the result, carry out a plan for developing policies and procedures in respect of this matter. However, almost a year later, and on the advice of the inventory project, the new management group decided to make use of existing projects and ongoing trials with external partners to learn, from real practice, about strategic consequences and the need for coordination. Furthermore, as one manager put it, "Partnerships exist all over the organization and there cannot be a monopoly on that, even though certain units try [...] coordination within the company is important, we need an [information] bank

containing what we are doing, but you cannot have a monopoly on partnerships – it won't work".

The reasons for using personalized bonds

What were the motives encouraging corporate entrepreneurs to cross firm boundaries for external support? The reasons seem to be similar to those which, according to previous literature, encourage independent entrepreneurs to make use of external relationships and network contacts: i.e. complementary knowledge and resources; financial support; risk sharing; and legitimacy.

One PM remarked that he had become increasingly interdependent on the outside assistance of suppliers, customers and other business partners as regards conducting his tasks. He felt a growing demand for the exchange of ideas, knowledge and resources with external partners in order to create, evaluate, and exploit new opportunities for the use of multi-call services. He also recognized the potential of collaborating with other companies along the value-chain for developing and producing a more integrated customer solution.

Another example features a PM who, for the sake of financial support and risk-sharing, had contacted her former colleagues who were previously 'outsourced' from TelCo into a separate consulting firm. The main competence needed for the particular product development scenario was to be found among these former colleagues. Being business consultants, they were used to pricing their work by the hour. The proposed development activities were defeated in the internal race for funds, though. Still motivated by the prospects of the business idea, the former colleagues entered into informal discussions regarding the chances of having the consulting firm invest its resources in exchange for a share of future profits. This would postpone some of TelCo's resource commitments to the commercialization phase and decrease the entrepreneurial risk. The colleagues jointly prepared a business model and proposal for a future partnership, which they brought "back home" to their respective companies and executive management groups. The parties reached an agreement as regards initiating a common trail. The PM explained that the proposed business model, in combination with the consulting firm's confidence in the business concept (i.e. to such an extent that they were willing to take the risk of early investment), had finally helped to justify the proposed venture. Consequently, in addition to

financing reasons, a partner might serve as a means of internally legitimizing the value of a proposed business concept.

The cultivation and development of interorganizational relationships

The majority acknowledged that they would hardly have been able to anticipate the exact outcome of an external relationship prior to collaborating. They agreed on the need for invention to form the purpose and reciprocal order. Hence, in most cases, the collaboration started with a pragmatic exploration of rather vague ideas and working models. Rather than adding value by degrees, according to a predetermined plan or contract, the collaborating partners continuously reinvented their exchange relationships through improvisation and early trials. Accordingly, one PM said; " I think [the collaboration] will have improved our prerequisites for success, if you start on a small scale [...] check each other out a little bit, start up a couple of projects together, see how it works, see if we can talk to each other and then go on from there". A BAM further described this in following manner: "The collaboration was taking shape and in mid-December [about three months after the collaboration had been initiated], we started looking around internally for legal expertise". A project member working on the same collaboration confirmed the emergent path; "The collaboration was formalized step-by-step – we acted first and then we formalized". Yet another BAM claimed that external collaboration entails courage, i.e. "...daring to put yourself in a situation, or making sure to put yourself in a situation where a common gain arises". Finally, on the same subject, another PM said; "I think it's a process of learning and experience. I have no solution – the learning process lies in ensuring that you get started and learn from what is happening. [...] it's a question of starting to learn from what goes well or what goes badly".

The informants acknowledged that a previous social or affective relationship with a certain partner facilitated the initiation of collaboration. However, they also described how a formal dimension was added during the process of collaboration. Inversely, however formal the search for potential partners might be, an effective or social dimension was added during the process of collaboration. For example, a BAM responsible for the development of Internet-based contact centers provided details of her team collaborating with partners all over the world. Although initiated via formal and contractual agreements, she

acknowledged that the partners were slightly more than business colleagues. Similarly, a PM explained that he was a frequent visitor to his partner's corridors in order to chat with people who had "become more than just business relationships". Furthermore, the informants agreed that their personal bonds are important as most of them open doors to other precious relationships. Hence, bonds breed bonds. By way of example, a PM described how some of his relationships with people at other companies remain, even though employers vary, thus creating opportunities for collaborating with other firms. Similarly, each collaborative interorganizational relationship provided an opportunity to take part in the partner's wider web of contacts.

Corporate entrepreneurs' considerations as regards using personalized bonds

The informants also declared that balancing their obligations to the firm with personal commitments to those with whom they interact constituted a real challenge. One issue concerned executives' and colleagues' impressions regarding the reasons for collaborating with a certain partner. Another issue concerned the risk of breaking personal bonds.

Starting with the first issue, the informants argued that personalized bonds were occasionally misunderstood to be preferential treatment and a deceitful use of personal dealings. Indeed, the knowledge or resources each partner obtained from joint action could at times entail potential benefits for one partner alone. The general opinion, however, was that any unequal allocation would even itself out over time. You may recall the PM who proposed a joint development project with her former colleagues at a consulting firm. She described her disappointment over "management's unwarranted mistrust". In her mind, the executives suspected that the collaboration was an excuse to hire consultants over and above budget, or that the other party had a hidden agenda. These doubts were also revealed during a meeting with the executive management group (a meeting where I was asked to report on ongoing relationships). Another issue concerned overblown expectations. When involving external parties in any activities, the organization was, according to the informants, "expecting great things". Hence, if the collaboration turned out to be unsuccessful in reaching its instrumental aims, it would be considered a complete failure. One PM felt that the sense of

shame was one reason why some of the collaborations she had experienced had remained concealed or had just faded away and dissolved into silence, without any final meeting or formal notice of termination.

Secondly, although they were not always prepared to admit it, the informants regarded certain relationships principally as personal resources. The potential risk of damaging their own reputations and breaking personal bonds for the sake of internal trouble, a lack of support, or the inefficient handling of external collaboration was a frequent subject for discussion. Occasionally, this provided a reason to keep valuable relationships at a distance or to refrain from a potential collaboration. One explicit example is the PM who acknowledged that he had carefully considered the risk of losing his personal "credibility capital". He said: "My [credibility] capital is not for sale! Then I'd rather be doing nothing [...] I can't make promises [to partners] that I'm not sure I can keep". Another dilemma concerned other people in the organization who "unjustly" take advantage of influential and "hard-earned" ties. One informant explained that the relationship occasionally changed beyond his control as a consequence of colleagues, unbeknown to him, "exploiting and mingling with my contacts". That risk, according to the informant, was especially apparent when the actual relationship was a well-known or influential person or firm, i.e. relationships that were considered to be attractive contacts. At times, it occurred that other persons or internal departments took charge of the relationship and the related projects, thus leaving the initiator out.

Formalizing the informal

It is important to make one further observation in connection with the 'social-affective perspective' described above. Corporate entrepreneurs seem to puzzle a great deal over how to behave properly. Few people question independent entrepreneurs' or senior managers' use of personal relationships, e.g. friends and prior business contacts outside the organization. However, when confronting corporate entrepreneurs in the middle and lower layers of the organization, these relationships were described as a potential dilemma, which occasionally made them potential hesitant with regard to acknowledging them.

The informants admitted that the kind of collaborative improvisation and experimentation they were engaged in went against most internal routines. It was

argued that the involvement of external parties made the organization (in particular middle management) obsessed with formal methods and processes for ensuring the future outcome. One BAM acknowledged this in the following statement; "Internally, there is a high mountain to climb. Everything I do goes up before, and is given the once over by, the [President]. Despite my having a high priority with the [President]...it can't be dealt with in that way [...]". Another PM pointed to the time-consuming internal negotiation of working methods, rules for decision-making, staffing, and not least, the efforts needed to convince the management team about the joint opportunity.

A considerable amount of time related to the establishment of contractual agreements. Although respected as a formal means of securing outcomes, the routines concerning contracts and careful signup were frequently considered a problem. The PM of electronic invoicing services, who initiated collaboration with a previously unknown supplier specializing in developing applications for 'file conversion', serves as an example. The two parties recognized a clear business opportunity to benefit from the combination of product offerings and joint process development. Although quick with regard to the decision to collaborate, they encountered difficulties during the legal procedure. Referring to the many internal turnabouts, she remarked that the process occasionally restrained collaborative intent by creating a note of suspicion and distrust among the parties. Moreover, she claimed that coordination through confidence which develops over time seemed to be more solid than the legal clause.

The results indicate demands for a common "toolbox", i.e. methods and guiding principles for initiating and managing interorganizational collaboration. However, the toolbox was only considered something to start out from. Most informants argued that interorganizational bonds, as well as the capability to pursue them, develop from the very experience of boundary-spanning activities. One PM reflected on the experiments and the trial-projects that he had initiated with external parties. He maintained that; "What is needed is a model and approval that it is okay to work like this [in collaborative interorganizational relationships]. Perhaps a group that is used to working with these kinds of things, e.g. with lawyers who don't just see problems. Moreover, there is a need for budgetary funds for new deals to give the collaboration a chance to show what it can do, before grinding its way through the usual mills on all sides".

Finally, some of the informants argued that their counterparts had expected TelCo to be experienced in organizing and managing external collaboration, hence they felt embarrassed when the firm's inadequate internal support became obvious. One PM explained this in the following manner; "When working in close collaboration and meeting fairly often, our internal problems cannot be glossed over, they just shine through". Time and again she considered the alternative of abandoning the current collaboration with her external partners "due to internal difficulties". A further account of the same matter, by another PM, went as follows: "I've told [the partner] that we've had to change lawyers, etc. I've been forced into this as we've promised things on certain dates and I don't want the responsibility of things being delayed the whole time. It's embarrassing, it's very embarrassing".

DISCUSSION

A model of corporate entrepreneurs' use of personalized bonds

This section seeks to advance a model from the empirical findings presented above. The model proposes topics and relationships with which researchers and practicing managers alike should concern themselves. It acknowledges the significance of corporate entrepreneurs' personalized bonds for innovation activity and suggests that the company's attitude toward, and/or its ability to handle, collaborative interorganizational relationships can affect the consideration and motivation of entrepreneurs to make use of these bonds. Furthermore, the model suggests that companies which fail to notice and utilize alliance opportunities created by corporate entrepreneurs might overlook future innovation opportunities. Hence, efforts are made to extend the analysis of corporate entrepreneurship by explaining the antecedents, moderators and outcomes of interorganizational initiatives posed by corporate entrepreneurs, see Figure 1.

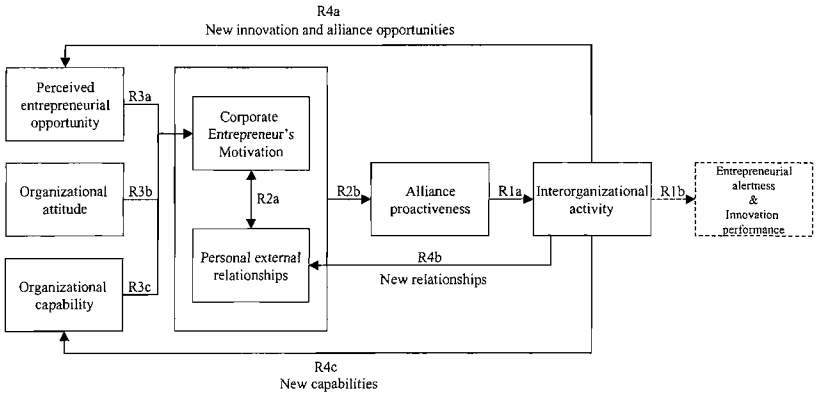

Figure 14. Proposed model of corporate entrepreneurs' influence on interorganizational venture initiatives.

Personalized bonds as an important source of corporate entrepreneurship

It is argued that companies with more valuable relationships and a greater capacity to pursue interorganizational collaborations are well positioned for innovation activities (Uzzi, 1996; Powell et al., 1996; Hills et al., 1997). It is the potential for access to the knowledge and capabilities crucial to the recognition, creation, and development of entrepreneurial opportunities that makes interorganizational relationships a productive opportunity. Consequently, the company's propensity for engaging the environment to recognize and create alliance opportunities and proactively form interorganizational activities, i.e. its *alliance proactiveness* (Sarkar et al., 2001), has a constructive impact on the company's capacity to recognize and respond to hitherto overlooked innovation opportunities, i.e. its *entrepreneurial alertness* (Hills, 1997). Although not empirically derived from this study, relations R1a and R1b represent these thoughts in the proposed model.

The present study reveals that corporate entrepreneurs play a more significant role as the channels and creators of alliance opportunities than is commonly assumed (see also Rosenkopf et al., 2001). Furthermore, the findings suggest that entrepreneurs frequently utilize interorganizational bonds that have a previous relationship history and/or are connected to a specific community wherein the exchange takes place. We can thus expect that some interorganizational relationships are distinctive and available only to individuals possessing the specific bonds. In addition, this gives us an idea about the fact that the extent to

which the company can make use of certain interorganizational relationships depends on the corporate entrepreneur's personal initiative. In other words, the relationships represented by R2a and R2b suggest that corporate entrepreneurs' motivation to make use of their external bonds influences the company's search zone for alliance opportunities, as well as the its overall alliance proactiveness.

Putting personalized bonds to use

The motivating factors that make corporate entrepreneurs engage in collaborative activities across firm-boundaries correspond to those described in the literature on independent entrepreneurs, e.g. knowledge, financing, and legitimacy. However, there might be greater significance in the relationship suggesting that organizational *attitudes* and the *capability* to manage boundary-spanning activities seem to be closely connected with corporate entrepreneurs' consideration and motivation as regards using their external bonds. One theme in this respect was "the feeling of shame". Firstly, the study provides examples of corporate entrepreneurs' fear of being accused of deceitful use or the preferential handling of a personal relationship (e.g. a friend, a former business relationship). However, although careers and egos are part of the agenda, we can assume that corporate members seek to behave ethically and do not purposefully harm their employers or their exchange partners. Instead, individual choice and motivation were frequently inhibited by moral commitments to what seemed fair, right, or appropriate (see corresponding results in Starr and Macmillan, 1990; Bouty, 2000). The above basically suggests that the incentives for personal investment in external exchange activities are dependent on the 'organizational attitude' to, and tolerance of, different forms of interorganizational collaboration.

Secondly, getting access to external networks and relationships requires the firm to be valued as a capable partner in terms of its assets, as well as in terms of its organizational routines and ability to manage collaborative relationships. This ability proved to be yet another source of "shame" and impediment. The risk of damaging a precious relationship or losing one's status in a particular social arena due to the firm's inability to handle interorganizational relationships made corporate entrepreneurs hesitant to employ their relationships. In summary, we can assume that the corporate entrepreneurs' motivation and propensity to make use of their personal bonds is positively associated with: (R3a) perceived entrepreneurial opportunities; (R3b) the firm's tolerance and handling of

different forms of interorganizational collaboration; and (R3c) the firm's ability and experience in organizing interorganizational relationships. See relations R3a-c in the proposed model.

Bonds breed bonds and further opportunities

The study also indicates that an interorganizational relationship has the potential to reproduce itself. Hence, realized interorganizational activities might result in new collaborative relationships in new directions and with new content. This systemic aspect is emphasized by the "backward links" between interorganizational activity (i.e. alliance experience) and the firms' organizational capability, the perceived entrepreneurial opportunity, and the corporate entrepreneurs' personal external bonds, respectively. To be more precise, the relationships R4a-c suggest that: (R4a) new innovation and alliance opportunities, (R4b) new relationships, and (R4c) new alliance capabilities, respectively, are the potential results of corporate entrepreneurs' alliance proactiveness and actual involvement in collaborative activities across firm boundaries.

Implications for action and management practice

Previous research has identified various mechanisms for linking and mediating knowledge and resources outside firm boundaries. Much of its focus has, however, been directed toward boundary-spanning positions in order to scan markets and technology domains for innovative combinations, e.g. gatekeepers, boundary-spanners, or professional knowledge brokers (cf. Tushman, 1977; Tushman & Scanlan, 1981; Hargadon, 1998). In the light of corporate entrepreneurs' influence on the company's search zone and proactiveness in creating alliance opportunities, it might be insufficient to purely rely on such role specialization. It may help, but also hinder, others in examining potential exchange opportunities (Cohen & Levinthal, 1990). The essential point here is that the process of formalizing all interorganizational relationships, to the exclusion of any personalized bonds, might be self-defeating. Hence, an exclusively centralized supervisory link might fail to appreciate, as well as threaten or restrain, corporate entrepreneurs' use of their personal bonds. Consequently, although the need for external linkages can potentially be devised

and the tasks of alliance management partially institutionalized within the organization's routines and processes, classical hierarchical control and rational planning techniques will only take the organization so far.

Firstly, managers are advised to uncover the value of corporate entrepreneurs' diverse relationships across company boundaries. An attitude that sees corporate entrepreneurs' personal bonds as inherently positive and essential, due to their constructive impact on the company's innovation performance, might be a good start. This should not, however, be read as a suggestion to give corporate entrepreneurs the complete freedom to conduct interorganizational relationships. There is a need for desirable norms, behaviors, and rules of engagement in order to make sure that the organization maintains a clear business focus and encourages corporate entrepreneurs to make accurate (and ethical) judgments. An internal alliance department may facilitate the development of a company-wide policy and the infrastructure for an improved alliance capacity, not as gatekeepers, but as a support function directly serving the needs and desires (i.e. toolboxes, guidelines, and examples) of corporate entrepreneurs in control.

Secondly, knowing how to develop and deploy interorganizational collaborations is just as important a learning process as the actual innovation process. Thus, a challenge to executives lies in providing corporate members with the opportunity to expose themselves to a varied cross-section of acquaintances and exchange interactions. Some of these initiatives will be aborted because they do not meet commercial expectations, while others will be encouraged in order to capitalize on unpredicted opportunities, and some will follow anticipated paths to fruition. Recognizing that a portfolio of maintained, developed, and parked exchange relationships is a reservoir of entrepreneurial opportunities and the development of alliance capability requires strategies focusing on a portfolio of multiple interorganizational relationships.

Thirdly, efforts are needed to develop and combine the corporate entrepreneurs' exchange relationships into those of an organization-wide resource without exerting a negative influence on the relationship, or robbing an individual of his/her personal bonds. The acknowledgement of personal bonds as a resource which is of value for the company might encourage corporate entrepreneurs to share the value as well as the experiences of conducted interorganizational activities, rather than keeping them solely for personal use. However, there also seems to be a need for a common arena and the relating processes to enhance the

effective interchange of experiences from interorganizational collaboration, as well as of actual bonds (i.e. new alliance opportunities). Activities similar to the two workshops carried out during the present study, where the participants discussed their motives and experiences relating to using personalized bonds, can serve as example.

Avenues for further research

A challenging research question for future research into corporate entrepreneurship is not just if or how firms make use of external bonds for innovation actions, but also how collaborative opportunities are created in the first place. The present study supports the request for further inquiries into the influence of individual-level factors on the cultivation and use of collaborative interorganizational relationships (Larson, 1992; Ghoshal & Moran, 1996; Kreiner & Schultz, 1993; Andersson et al., 2002).

A managerial approach to the matter calls for inquiries into possible moderator variables and mechanisms enhancing the superior use of personalized exchange relationships. We may, for instance, ask if the entrepreneurial orientation of a firm's executives will moderate the relationship between corporate entrepreneurs' personal networks and the firm's alliance proactiveness. Previous research has reported on firms that employ internal alliance departments. However, we have no evidence that these firms are more efficient or effective when it comes to ensuring superior collaborative relationships across company boundaries, nor if they contribute to innovation performance. One issue concerns the extent to which personalized bonds can be devised and the tasks of alliance management institutionalized within regular routines and processes. Another concerns the 'ownership' of relationships and methods for 'relationship sharing' (cf. Jarvenpaa & Staples, 2001 discussion on the perception of ownership of information and expertise). Answers to these issues are awaiting further research.

Finally, over and above all the predictions that corporate entrepreneurs' personalized bonds will come to be of significant importance, we also need to account for situations that might be in contrast to the expected advantages. Some researchers have argued that firms run the risk of losing innovativeness due to their relationships becoming too strong and insulated from outside influences, or becoming too dependent on one or only a few external partners. Hence, corporate

entrepreneurs' bonds can likewise be negatively associated with overembeddedness and organizational inertia (Uzzi, 1997; Yli-Renko et al., 2001; Andersson et al., 2002).

CONCLUSION

This paper focuses on one aspect of the corporate venturing process, i.e. corporate entrepreneurs' diverse exchange relationships across firm-boundaries as a vehicle for innovation and new product development. The traditional picture of corporate entrepreneurship and innovation as an internally-driven activity is partly being replaced by the inventive use of external relationships in the lower and middle layers of the organization. The main argument is that corporate members possess exchange structures and social relationships that serve as a critical conduit since they might be able to provide both the needs and the opportunities for future interorganizational venture initiatives. Moreover, by analogy with Polanyi's (1983) words on tacit knowledge, we may claim that firms are more connected than their arm's-length ties and formal contracts can prove, i.e. they frequently contain 'tacit structures'. These somewhat 'tacit structures' of people-in-relationships can be considered a strategic resource and a productive opportunity. Moreover, the result indicates that, irrespective of the form taken, the motivation of corporate entrepreneurs to make use of their external bonds is dependent on the firm's alliance capability, as well as the internal attitude toward the employment of personal relationships. There is, thus, reason for practicing managers and researchers alike to extend the traditional picture of corporate entrepreneurship by taking personalized bonds into consideration.

In summary, the contributions of this study are twofold: the first contribution concerns the examination of relationship patterns, partially in real time and through the perspective of an insider in the 'real world environment', providing an opportunity to capture in-depth narratives regarding corporate entrepreneurs' exchange relationships. The second contribution concerns further empirical validation of the relative importance of corporate entrepreneurs' diverse exchange relationships and support for the view that the economic interests of firms and personal social commitments are largely intertwined.

Appendix A. the research project, its activities, and its data sources.

Table 10. Research process and sources of data

Date	Activity	Purpose/Outcome
May 00	Initial meeting with TelCo participants in IOR nos. 1 and 2 (i.e. project leader and representatives on the joint steering committee).	To discuss the purpose and the researcher's role in the IORs.
May-December 00/01	Think Tanks with selected people at TelCo assigned the task of developing strategies and methods of managing IORs.	To make an inventory of ongoing external relationships. To discuss the need for and propose strategies, as well as tools for organizing and managing IORs.
August 00 - March 01	Participating in IOR nos. 1 and 2. (formal and informal meetings, e-mail dialogs and the like).	To track debates, decision, actions, outcomes, and process issues over time.
October - December 00	Interviewing participants	To collect participants' narratives.
December 00	Reporting findings of pre-study to the TelCo executive group.	To internally (within TelCo) present results.
May 01	Follow-up meeting with participants of IOR no.1.	To collect participants' experiences and reflect on the collaborative process and its outcome. Additional research data and validate early interpretations.
August 02 – June 03	Additional round of analysis (see above)	Pattern-matching. To refine and add to previous conclusions.
August 02 – June 03	Participating in IOR nos. 4 and 5.	Supplementary data.
December 02– February 03	Interviewing participants	To collect participants' narratives.
November 02 December 02	Strategy workshop 1 at TelCo Strategy workshop 2 at TelCo	To reflect on findings and propose further actions.
December 02	Meeting with executive group within the division (TelCo).	To present results and discuss plans for further work on alliance strategy.

REFERENCES

Aldrich, H., Zimmer, C. 1986. Entrepreneurship through social networks. In D. L. Sexton and R. W. Smilor, eds., *The art and science of entrepreneurship.* Cambridge, MA, Ballinger Publishing Company.

Alvarez, S. A., Busenitz, L. W. 2001. The entrepreneurship of resource-based theory. *Journal of Management* (27): 755-775.

Alvesson, M. 1999. *Methodology for close up studies - struggling with closeness and closure.* Lund, School of Economics and Management, Lund University.

Anderson, A. R., Jack, S. L. 2002. The articulation of social capital in entrepreneurial networks: a glue or a lubricant? *Entrepreneurship & Regional Development* (14): 193-210.

Andersson, U., Forsgren, M., Holm, U. 2002. The strategic impact of external networks: subsidiary performance and competence development in the multinational corporation. *Strategic Management Journal,* 23(11): 979-996.

Ariño, A., de la Torre, J. 1998. Learning from failure: towards an evolutionary model of collaborative ventures. *Organization Science* 9(3): 306-325.

Baden-Fuller, C. 1995. Strategic innovation, corporate entrepreneurship and matching outside-in to inside-out approaches to strategy research. *British Journal of Management* 6 (Special issue): 3-16.

Bauer, J. M. 1997. Market power, innovation, and efficiency in telecommunications: Schumpeter reconsidered. *Journal of Economic Issues* XXXI(2): 557-565.

Bouty, I. 2000. Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Journal* 43(1): 50-65.

Brazeal, D. V., Herbert, T. T. 1999. The genesis of entrepreneurship. *Entrepreneurship Theory and Practice* (Spring): 29-45.

Brown, S. L., Eisenhardt K. M. 1995. Product Development: past research, present findings, and future directions. *Academy of Management Review* (20): 343-378.

Cohen, W. M., Levinthal, D. A. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* (17): 197-218.

Covin, J. G., Miles, M. P. 1999. Corporate entrepreneurship and the pursuit of competitive advantage. *Entrepreneurship Theory and Practice* (Spring): 47-63.

Covin, J. G., Slevin, D. P. 1991. A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice* (Fall): 7-25.

Das, T. K., Teng, B-S. 2000. A resource-based theory of strategic alliances. *Journal of Management* 26(1): 31-61.

Das, T. K., Teng, B.-S. 2000. Alliance constellations: a social exchange perspective. *Academy of Management Review* 27(3): 445-456.

Doz, Y. 1996. The evolution of cooperation in strategic alliances: initial conditions and learning processes. *Strategic Management Journal* 17: 55-83.

Drucker, P. F. 1985. The discipline of innovation. *Harvard Business Review* (May-June): 67-72.

Dubin, R. 1969. *Theory Building*. Toronto, The Free Press.

Dubois, A., Håkansson, H. 1997. Relationships as activity links. In M. Ebers, eds., *The formation of inter-organizational networks*. New York, Oxford University Press Inc.

Dyer, J. H., Singh, H. 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review* 23(4): 660-679.

Eisenhardt, K. 1995. Building theories from case study research. In G. P. Huber and A. H. Van de Ven, eds., *Longitudinal field research methods: studying processes of organizational change.* California, SAGE Publications, Inc.

Eisenhardt, K. M., Schoonhoven, C. B. 1996. Resource-based view of strategic alliance formation: strategic and social effects in entrepreneurial firms. *Organization Science* 7(2): 136-150.

Ghoshal, S., Moran, P. 1996. Bad for practice: a critique of the transaction cost theory. *The Academy of Management Review,* 21(1): 13-47.

Granovetter, M. 1985. Economic action and social structure: the problem of embeddedness. *American Journal of Sociology* 91(3): 481-510.

Greenwood, D.J. 2002. Action research: unfilled promises and unmet challenges. *Concepts and Transformation,* 7(2): 117-139.

Hagedoorn, J., Duysters, G. 2002. External sources of innovative capabilities: the preference for strategic alliances or mergers and acquisitions. *Journal of Management Studies* 39(2): 167-188.

Hargadon, A. B. 1998. Firms as knowledge brokers: lessons in pursuing continuous innovation. *California Management Review* 40(3): 209-227.

Hills, G. E., Lumpkin, G. T., Singh, R. P. 1997. Opportunity recognition: perceptions and behaviors of entrepreneurs. In P.D. Reynolds et al, eds., *Frontiers of Entrepreneurship Research 1997.* Babson Park, MA, Babson College.

Hitt, M. A, Bartkus B. R. 1997. International entrepreneurship. In J. A. Katz, eds., *Advances in entrepreneurship, firm emergence, and growth.* Greenwich, JAI Press Inc.

Hoang, H., Antoncic B. 2002 *(In Press).* Network-based research in entrepreneurship. A critical review. *Journal of Business Venturing.*

Håkansson, H., Snehota, I., eds. 1995. *Developing relationships in business networks.* London, Routledge.

Jarillo, C. J. 1988. On strategic networks. *Strategic Management Journal* 9:31-41.

Jarillo, C. J. 1989. Entrepreneurship and growth: the strategic use of external resources. *Journal of Business Venturing* (4):133-147.

Jarvenpaa, S.L., Staples, D.S. 2001. Exploring perceptions of organizational ownership of information and expertise. *Journal of Management Information Systems,* 18(1): 151-183.

Johannisson, B. 1987. Beyond process and structure: social exchange networks. *International Studies of Management & Organization* XVII(1):3-23.

Johannisson, B. 1998. Personal networks in emerging knowledge-based firms: spatial and functional patterns. *Entrepreneurship & Regional Development* 10(4):297-312.

Kanter, R. M. 1988. When a thousand flowers bloom: structural, collective, and social conditions for innovation in organizations. *Research in Organizational Behavior* 10:169-211.

Kanter, R. M. 1989. When giants learn to dance: mastering the challenge of strategy, management, and careers in the 1990s. New York, Simon and Schuster.

Kanter, R. M. 1994. Collaborative advantage. *Harvard Business Review* July-August:96-108.

Katz, R., Allen, T. J. 1997. Organizational issues in the introduction of new technologies. In R. Katz, eds., *The human side of managing technological innovation: a collection of readings*. New York: Oxford University Press.

Kogut, B., Zander, U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* (3):383-397.

Kreiner, K., Schultz, M. 1993. Informal collaboration in R&D. The formation of networks across organizations. *Organization Studies* 14(2):189-209.

Lane, P. J., Lubatkin, M. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* 19:461-477.

Larson, A. 1992. Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. *Administrative Science Quarterly* 37(1): 6-104.

Larson, A., Starr, J. A. 1993. A network model of organization formation. *Entrepreneurship Theory and Practice* (Winter):5-15.

Larsson, R., Bengtsson, L., Henriksson, K., Sparks, J. 1998. The interorganizational learning dilemma: collective knowledge development in strategic alliances. *Organization Science* 9(3):285-305.

Leonard-Barton, D. 1992. Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal* (13):111-125.

Li, F., Whalley, J. 2000. Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy* 26(9-10):451-472.

Polanyi, M. 1983. *The tacit dimension*. Gloucester, Doubleday & Company, Inc.

Powell, W. W., Koput, K. W., Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly* (41):116-145.

Rosenkopf, L., Metiu, A., George, V.P. 2001. From the bottom up? Technical committee activity and alliance formation. *Administrative Science Quarterly* 46: 748-772.

Roth, J., Sandberg, R., Svensson, C. 2003. The dual role of the insider action researcher. In N. Adler, A. Styhre, and A. B. Shani, eds. *Collaborative research in organizations: foundations for learning, change, and theoretic development*. Thousand Oaks, Sage Publications Inc.

Sarkar, M. B., Echambadi, R., Harrison, J. S. 2001. Alliance entrepreneurship and firm market performance. *Strategic Management Journal* (22):701-711.

Shane, S., Venkataraman, S. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* 25(1):217-226.

Shani, A.B, Pasmore, W.A. 1985. Organisation inquiry: towards a new model of the action research process. In D.D. Warrick, eds. *Contemporary organisation development - Current thinkings and applications*, Glenview, Scott Foresman and Company.

Sharma, P., Chrisman, J. J. 1999. Toward a reconciliation of the definitional issues in the field of corporate entrepreneurship. *Entrepreneurship Theory and Practice* (Spring):11-27.

Starr, J. A., Macmillan, I. C. 1990. Resource cooptation via social contracting for new ventures. *Strategic Management Journal* (11):79-92.

Stevenson, H. H., Jarillo, C. 1990. A paradigm of entrepreneurship:entrepreneurial management. *Strategic Management Journal* 11 (Summer):17-27.

Swan, J., Newell, S., Scarbrough, H., Hislop, D. 1999. Knowledge management and innovation: networks and networking. *Journal of Knowledge Management* 3(4):262-275.

Tushman, M. L. 1977. Special boundary roles in the innovation process. *Administrative Science Quarterly* 22 (December):587-605.

Tushman, M. L., Scanlan, T. J. 1981. Characteristics and external orientations of boundary spanning individuals. *Academy of Management Journal* 24(1):83-98.

Uzzi, B. 1996. The sources and consequences of embeddedness for the economic performance of organizations: the network effect. *American Sociological Review* 61(4):674-698.

Uzzi, B. 1997. Social structure and competition in interfirm networks: the paradox of embeddedness. *Administrative Science Quarterly* 42:35-67.

Van de Ven, A. H., Polley, D. E., Garud, R., Venkataraman, S. 1999. *The innovation journey*. Oxford, Oxford University Press.

Weick, K.E. 1989. Theory construction as disciplined imagination. *Academy of Management Review,* 14(4): 516-531.

Yin, R. K. 1994. *Case study research: design and methods*. Thousand Oaks, CA, Sage Publications.

Yli-Renko, H., Autio, E., Sapienza, H. J. 2001. Social Capital, Knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal* (22):587-613.

Paper V

Marshall, C

2004

Collaborative innovation in industries facing discontinuous change: can experiences acquired in biopharmaceuticals be useful for incumbent telecommunications companies?

Submitted to Economics of Innovation & New Technology.

Collaborative innovation in industries facing discontinuous change: can experiences acquired in biopharmaceuticals be useful for incumbent telecommunications companies?

Cassandra Marshall

This paper takes an interest in innovation through collaborative interorganizational relationships and alliances. Insights from contemporary research in the emerging biopharmaceutical industry are discussed in the context of the similarly emerging telecommunications industry. It concludes that management practices acquired through years of experience in the biopharmaceuticals industry are also applicable to incumbent telecommunications operators. However, the wide spectrum of potential partners, the amount of inventive activities besides formal research, and the speed of feedback relative to the pace at which investment must be made challenge (and allow) telecommunications operators and their partners to think about innovation through interorganizational relationships somewhat differently.

Keywords: Interorganizational relationships, innovation, telecommunications, biopharmaceuticals

INTRODUCTION

The case of telecommunications presents a significant stage of change, with new regulatory policies, technological discontinuity, transformed market structures, and changing customer demands (Fransman, 2001; Fransman, 2002; Joshi et al. 1998). It is argued that no individual company can hope to dominate either the technology or every skill required to take new products and services to the market (cf. Li and Whalley, 2002; Moore, 1995). Under these circumstances, the greatest capability-development requirement appears to be the effective management of interorganizational relationships. So what should managers within the industry be doing?

There seems to be little disagreement with the fact that collaborative interorganizational relationships have become a major strategic factor for innovation activities in turbulent and fast-changing markets (Hagedoorn, 2002; Hagedoorn and van Kranenburg, 2003). When studying the emerging biotechnology industry, Powell and colleagues (1996; see also Oliver, 2001) found that requirements to comply with new technologies were driving companies to establish collaborative interorganizational relationships. They concluded that alliances and networks act as the locus of innovation within the field. Recent statistics give further support to their conclusions. For example, Sachs' (2002) study of the biopharmaceuticals industry shows that 52% of the products expected to launch in 2002 were a result of interorganizational collaboration. Yet another recent study reveals that, of the present top 25 drugs, 12 were discovered or developed by a company other than the one that launched them (Ameet et al., 2004). Moreover, Powell et al. (1996) suggest that the pattern of collaboration and reciprocal learning found in biotechnology networks and interorganizational relationships is applicable to a range of other industries, especially when the industry is both complex and expanding and when the sources of expertise are widely dispersed. This creates an avenue for investigating the relevance of practices learned in the field of biotechnology to other fields disrupted by technological change, e.g. the telecommunications industry.

This paper thus inquires into the opportunities for incumbents in the telecommunications industry to learn from innovation through collaborative interorganizational relationships carried out by companies in the

biopharmaceuticals industry. The purpose was not to adjudge the value of one form or practice over another, but to develop a better understanding of the factors that contribute to managing innovation through collaborative interorganizational relationships in industries disrupted by major changes (e.g. technology, regulations, competition). Hence, the overall research questions guiding the study were: What practices (if any) can telecommunications companies learn? In what respect do they need to find their own way?

The paper involves two main sources of data: observations and concepts from previous literature on interorganizational relationships in the biopharmaceuticals field, as well as data from action research interventions in interorganizational collaborations carried out by a Scandinavian telecommunications operator. Collaborative arrangements that operate as virtual organizations are in focus. Minority equity investment may be part of the arrangement, however, a joint venture with its own distinct identity and separate operating facilities is excluded. Moreover, here we are interested in interorganizational collaborations only in relation to innovation and new product development activities.

The data suggests that knowledge of dynamic complementarities and the skills needed for attracting valuable partners, deal making, and working relationships acquired in the biopharmaceuticals field is also relevant to collaborative innovation in the telecommunications industry. However, a distinctive feature related to the telecommunications context, e.g. the variety of potential partners, the importance of practice for inventive activity, and the pace at which investment must be made prior to the realization of any market feedback, suggests that incumbent telecommunications companies also need to develop their own means.

The paper proceeds as follows. With a view to making the basis for comparison clearer, the subsequent section outlines the value-chains in the biopharmaceuticals and telecommunications industries, respectively. There then follows a brief account of arguments relating to discontinuous change, the need for complementary knowledge, and the innovation process in previous literature. The third section provides a note on the methodology, followed by a discussion on the plight of incumbent telecommunications operators (henceforth *telcos*) in the fourth section. The fifth section discusses the relevance of practices learned in the field of biopharmaceuticals to telcos. A brief conclusion of the findings ends the paper.

VALUE CHAINS OF DYNAMIC COMPLEMENTARITIES

Figure 1 suggests a generic picture of the industry value chain[58] in terms of: the research system carrying out basic research; the development system which involves agents focusing on product R&D regarding generic research results; the mediating system that pursues full vertical integration and commercialization of the product; and the delivery system bringing the products to the customers and final users.

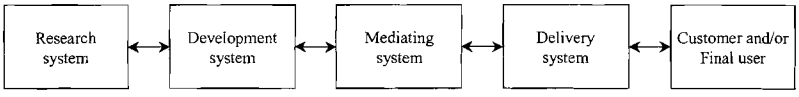

Figure 15. A generic outline of the value chain.

Applied to the biotechnology industry, we find that each actor involved, e.g. dedicated biotechnology firms (DBFs), established companies such as pharmaceuticals and large chemical companies, and universities, has its advantage in specific functions along the value chain and innovation process. Universities and publicly-owned research institutes are often leading patent-holders providing critical input to the innovation process in the form of basic and generic research. The DBFs provide a quasi-academic environment with distinctive advantages in product R&D and the commercialization of university research. However, most DBFs cannot pursue full vertical integration. This creates an avenue for incumbents, e.g. established pharmaceutical and chemical companies, to gain access to established processes regarding development, or channels for sales or distribution [Pisano, 1988 #755]. Hence, pharmaceuticals may have limited R&D[59] capabilities and may experience difficulties putting together the appropriate mix of skills. However, they hold the financial strength and the required competency for managing the movement from basic research,

[58] In the present paper, a value chain concerns the sequence of activities involved in the transformation of inputs to outputs; it includes all the transactions performed before a product reaches the end customer or final user.

[59] Although some of the literature holds that the amount and productivity of R&D carried out by pharmaceuticals' continues to decline, they are still spending considerable amounts of time and money on R&D activities.

through regulatory procedures, development and implementation to the introduction of new products onto the market. These distinctive advantages arising from *dynamic complementarities* (Dodgson, 1991) of company-specific resources provide the reason for the co-existence, and the basis, of interorganizational collaboration in the field of biotechnology (Jones et al., 1997; Riccaboni and Pammolli, 2002). Figure 2 outlines the biopharmaceuticals value chain as described in this paper.

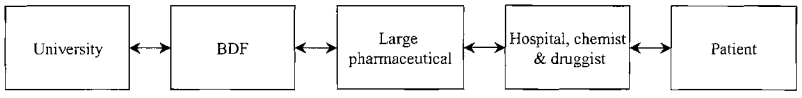

Figure 16. An outline of the biopharmaceuticals value chain.

In the telecommunications industry, we are witnessing how new regulatory policies and advances in technology have resulted in an extended industry, increasingly referred to as the ICT-industry[60]. What was previously a single industry or business is divided up into several businesses, new business models, and new industrial structures. Li and Whalley (2002) suggest that the former linear value chain develops into a series of inter-twined value chains or value networks (Figure 3).

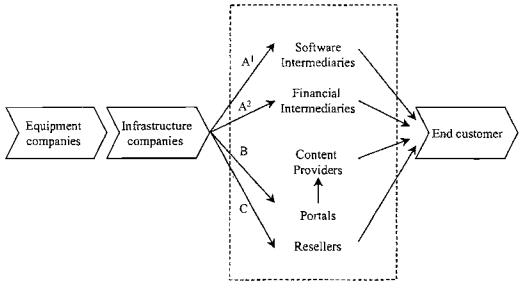

Figure 17. The deconstruction of the telecommunications value chain. (Li and Whalley 2002, p. 462). (A^1, A^2, B and C represent different new business models.)

[60] ICT (Information and Communication Technology) represents a collection of technologies and applications which enable the electronic processing, storage, and transfer of information to a wide variety of users (Cohen et al., 2002). The "enabling" character of information and communication technology has made telecommunications companies involved in more than one value chain at the same time, e.g. the media and finance value chains.

The evolution of the Internet undoubtedly unleashed a wave of entrepreneurial activities and new start-ups financed by venture capital institutions during the 1990s. The new entrants include different service providers, e.g. software and application developers, aggregators who integrate services provided by others, and several resellers who make inroads into the 'opening' between the infrastructure provider (i.e. the telcos) and the end customer. Others are the result of spin-offs from universities, i.e. very similar to the case of the majority of DBFs. Although the scientific community is an important source of knowledge, basic research fairly often lags behind the work done by the industry [Pisano, 1988 #755]. Hence, large companies such as telecommunication equipment firms, Internet equipment firms, and independent software firms (e.g. HP and Intel in Silicon Valley) often nurture critical competencies and research activities (Figure 4).

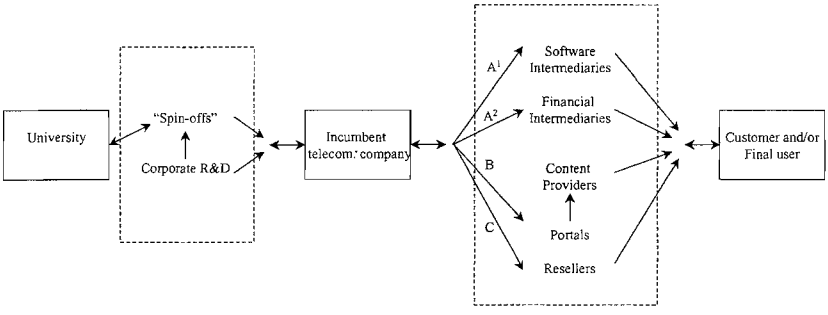

Figure 18. An outline of the telecommunications, or ICT, value chain (transformed from Li and Whalley, 2002).

In a sense, the above representations distinguish between upstream 'pure' and downstream 'applied' research. It is worth noting, however, that this basic distinction has been increasingly called into doubt during recent years. Rather than presupposing 'pure research activities', we can expect that experience and knowledge gained from development and manufacturing contribute to insights and new discoveries in the research process, and vice versa.

Finally, the present paper focuses on the mediating system. Hence, in the current paper corresponding to the roles and challenges of incumbent pharmaceutical companies (pharmaceuticals) and telecommunications companies (telcos). Before describing the innovation practices of each industry, it seems appropriate, however, to provide some general aspects of innovation in the face of discontinuous change, as well as of the methods of data collection and analysis.

INNOVATION IN THE FACE OF DISCONTINUOUS CHANGE

Industries disrupted by technological change

Technological change[61] has been characterized by periods of incremental adjustments punctuated (or disrupted) by periods of major scientific or technological breakthroughs, i.e. *discontinuities*, which have the potential to quickly transform the competitive landscape and the overall definition of the relevant problems in a specific industry (Tushman and Anderson, 1986:1996; Dosi, 1988). While stimulating new visions of future technological advances and opportunities in the case of innovation and new product development, such changes may just as well be 'competence destroying' in the case of established firms (Abernathy and Clark, 1985; Tushman and Anderson, 1986:1996; Prahalad, 1998). These may alter the set of relevant competencies by creating a new product class or a substitute for an existing product and/or a new way of making a given product. Hence, previous core competencies may turn into core rigidities (Leonard-Barton, 1992). Moreover, major technological discontinuities promote a sense of turbulence and uncertainty. Dosi (1988), p.1134, describes the 'pre-paradigmatic phases' of technological change in the following terms:

> During these highly exploratory periods one faces a double uncertainty regarding both the practical outcomes of the innovative search and also the scientific and technological principles and the problem solving procedures on which technological advances could be based.

Previous literature on disruptive or discontinuous change has focused on the technology's scientific and technological development. However, in a recent article, Adner and Levinthal (2002) provide a complementary framework that differentiates between the technology's technical development and the its market application. They depict technology evolution in terms of *technological speciation events*[62], i.e. significant shifts in the domain of the application of an existing technology. Hence, from their point of view, 'discontinuities' can spring

[61] In this paper, I adhere to the (Tushman and Anderson, 1986:1996), p.382, definition of 'technology' as "those tools, devices, and knowledge that mediate between inputs and outputs (process technology) and/or that create new products or services (product technology)".

[62] As described by Adner and Levinthal (2002, p.50), a *speciation event* denotes "the separation of one evolving population from its antecedent population, which in turn allows the two populations to follow different evolutionary paths".

not only from advances in the underlying technology, but also from discoveries of new domains of application.

The technological changes or advances required for a shift in market application may, in an immediate sense, be modest. However, experience shows that such shifts set the mode and pace of technology development on a new course, which in turn may result in rapid and radical technological change. Firstly, a shift in the application domain usually implies a re-evaluation of the relevant selection criteria, i.e. critical functions and needs. This in turn brings about a process of technological change and adaptation. Secondly, the pace of technology development will depend on the availability of substantial resources to support innovative efforts in the specific domain. Limited resources or means will quite likely reduce the speed, whereas vast resources may result in a rapid phase of technological evolution. Hence, "it is the combination of distinct selection criteria and the availability of substantial resources to support innovative efforts that results in a speciation event with dramatic consequences for subsequent technological development" (Adner and Levinthal, 2002, p.54).

It follows that the distinguishing characteristic between technology development and a technology's market application lies in the different pattern of innovation activities and learning. According to Adner and Levinthal's (2002) image of technological speciation events, innovating companies, in addition to the traditional focus on selecting technologies for a fixed market context, should also be directed toward discovering new potential application domains and market contexts for an existing technology.

Demands for complementary knowledge and resources

Knowledge is a decisive input into innovation and technological progress. Along with Schumpeter's [Schumpeter, 1936 #111] classical definition, we can describe innovation as the recombination of existing ideas or knowledge in a new way. There is today a large body of research describing how the changing nature of economic life, by reason of increasing inter-disciplinary and complexity of knowledge, is impacting on innovation activity[63]. On an overall level, there is

[63] See, for example, Cohen and Levinthal, 1989; Brown and Duguid, 1991; Van de Ven and Polley, 1992; Cheng and Van de Ven, 1996; Powell, 1998; Mytelka and Smith, 2002.

consensus that one single company or organization cannot hold essential knowledge and that interorganizational relationships and networking constitute a source of technical and commercial advantage. Firstly, it is frequently referred to "systems of flexible specialization" (Larson, 1988; Lipparini and Boari, 1999), whereby individual firms become specialized in a particular step or business activity in the value chain or in a specific industry, e.g. industrial district (Brusoni and Prencipe, 2001; Brusoni and Geuna, 2003). Secondly, as previously recognized by Polanyi (1966), although the declared aim of most companies is to codify and/or formalize knowledge to simplify knowledge transfer and distribution, it is not possible to make all knowledge explicit – since it is not possible to fully replace its tacit part. The presence of tacit knowing entails that knowledge diffusion and creation is an interactive process frequently in need of close contacts through joint efforts.

Since interorganizational relationships and alliances seem to foster learning (Powell et al., 1996; Powell, 1998; Hamel, 1991), one would expect more collaborative arrangements in situations and contexts where knowledge is frequently changing and distributed. The increasing incidence of specialized, dispersed, and tacit knowledge forces managers and corporate members to rethink the way they pursue new opportunities. Consequently, we can assume that innovation is likely to take place in collaborative interorganizational relationships and networks in industries faced by disruptive change.

The innovation process

The standard model for the innovation and new product development process[64], albeit a stylized portrait, entails a linear process whereby the activities develop along a cumulative sequence of stages or phases. However, it is now widely observed that the innovation process corresponds to a repeating cycle of a wide variety of divergent as well as convergent activities, some of them being outside the formal research process (Cowan and Paal, 2000; Van de Ven et al., 1999).

[64] The bulk of the??? work that has been carried out in the area of innovation processes at established companies has been done for new product development. Those writings represent several research streams that provide both overlapping and competing explanations. For a review and analysis of the literature on new product development processes, see Eisenhardt and Tabriz (1995), for example.

There is also increasing consensus that innovation involves several people with a variety of roles and competencies, rather than a 'sole entrepreneur'. Moreover, the standard model usually assumes the existence of an opportunity or product idea, as well as the relevant market, merely awaiting the 'discoverer', whereas recent theory development holds the view of an unpredictable activity involving ambiguous, changing, and constructed goals and values (Lester, 1998; Van de Ven et al., 1999). It is most likely that it is the latter conditions which correspond to innovation in industries disrupted by technological change.

For the purposes of the present paper, we may as well distinguish between innovation and new product development processes that are largely 'research driven', as well as processes that to a considerable degree involve 'innovation without formal research' (cf. Cowan and Paal, 2000). That is to say learning and innovating as a by-product of production, i.e. learning by doing (e.g. Brown and Duguid, 2000), or of consumption, i.e. learning by using (e.g. von Hippel, 1986). Yet another possible distinction, recently proposed by Sarasvathy (2001)[65], is that between 'causation' and 'effectuation' processes. *Causation* is defined as a process that takes a particular effect (or end product) as given and focuses on selecting the means (e.g. the technology) to create that product. Conversely, the *effectuation* process takes a set of means as given and focuses on selecting the possible end products that can be created using that set of means (cf. Adner and Levinthal's (2002) notion of new application domains).

Causation and effectuation are both viable alternatives, one does not exclude the other. Their courses of action differ, however. A causation process starts out with a 'problem or opportunity' and focuses on selecting effective ways of solving a problem or developing an opportunity. Moreover, the process usually starts out from a larger universe of means, proceeding inwards to the specifics. Innovation through 'effectuation' corresponds to a process whereby the outcome is not prescribed, but is constructed and shaped over time as an integral part of the process. This in turn implies commitment to a tentative set of actions with no *a priori* guarantees or estimates of success. In this sense, causation processes represent a many-to-one mapping, i.e. many potential means of developing one given effect or product, whereas effectuation models involve one-to-many

[65] Sarasvathy's (2001) research is primarily aimed at explaining the entrepreneurial processes involved in the creation of new firms.

mappings, i.e. one given set of means of developing many potential effects or products (Sarasvathy, 2001).

Sarasvathy (ibid.) describes causation and effectuation as separate categories, though on second thought, we might perceive them as relative. That is as mutually-dependent and supporting, rather than two separate and disconnected processes.

A NOTE ON METHODOLOGY

In this paper, the issue of innovation through collaborative interorganizational relationships is addressed by combining an industry-level perspective (the biopharmaceuticals and telecommunications industries) with a perspective centered on the role of interorganizational relationships for innovation at the company level.

The major source of empirical data used in the study is attributable to existing literature on interorganizational relationships, especially studies that relate to collaborations for innovation in the biopharmaceuticals[66] and telecommunications industries. The data was gathered by searching for journal articles using electronic sources. Articles that contained any of the following keywords: biotechnology, pharmaceutical, or life science were selected. Similarly, articles describing the emerging telecommunications (or ICT) industry were collected on a broader basis since it was hard to single out specific sectors. The articles were then re-selected according to their main subject in innovation and new product development. Eventually, other related articles, books, and book chapters were identified via the different frames of reference in the already-selected articles. Data was also collected from practitioner-oriented periodicals and through the World Wide Web, to add a dimension of 'what's happening' and currently being discussed within the two industries. Yet another set of articles, of limited extent however, relating to the semiconductor industry were collected

[66] Most of the research in the biopharmaceuticals industry has been conducted in the US. Figures for new chemical and biological entities show the predominance of the North American market (the US and Canada having a 50.9% share of the world pharmaceuticals market) and the US as the dominant inventor of new molecules worldwide. This dominance is also reflected in the empirical data provided by the previous literature.

with the intention of making a further comparison with a sector connected to the telecommunications industry.

Being permanently employed by a Scandinavian telecommunications operator (ScanTel), the author has a relatively clear insight into contingencies affecting decision-making and conduct at companies in the telecommunications field. This particular position also provided a chance to collect data on-site from the perspective of a *self-ethnographer* (Alvesson, 1999) or, rather, an insider action researcher. Hence, another important source of data (for the purposes of comparison) corresponds to a three-year study of interorganizational collaborations carried out by the telecommunications company in point. Data from this study was collected in real-time through participation and interventions in interorganizational initiatives, as well as via work on developing strategies and methods for alliances and partnerships, in-depth interviews with participants at several hierarchical levels, and various archival sources (i.e. the minutes of meetings, project documentations, and written agreements).

The process of building the conceptual framework that would determine the structure of this paper involved recurrent stages of drafting and redrafting the arguments presented in the following sections. The first stage involved reviewing the factors (e.g. the perceived problems, structures, and processes) assumed to have an influence on the pattern of learning and innovation in the biopharmaceuticals field. This review resulted in an, initially, growing list of topics based on observations, explanations and theories from the literature, which was then reduced by gradual stages. Some were excluded for not being grounded in the data. Others were eventually excluded due to the limited data on the topic in the literature, and hence difficulties forming coherent arguments around them. For example, the sparse data on management practice for handling and making the most of prematurely-terminated relationships entailed that this paper hardly breathed a word about it, although the topic is considered important. Finally, the remaining topics and factors constituted the basis for an elaboration of the possible parallels, discrepancies, and learning potentials existing between the biopharmaceuticals and telecommunications industries. Nevertheless, space constraints preclude a detailed elaboration of all the data, so the particular topics addressed should be regarded as indicative rather than as a complete representation.

THE PLIGHT OF INCUMBENT TELECOMMUNICATIONS COMPANIES

Previous literature and case-study data from ScanTel constitute the basis of the following section, which aims to briefly comment on the challenges confronting incumbent telecommunications companies (telcos) in the emerging telecommunications industry.

Hunt for the 'relevant' knowledge partners

The former telecommunications value chain is becoming more complex. As already stated, no individual company can hope to dominate either the technology or every skill needed to take ICT solutions to market. Content providers, software and financial intermediaries, portal owners, and others are likely to have different roles to play. Going along with Adner and Levinthal's (2002) model, we may argue that discontinuities in the telecommunications industry (or evolving ICT industry) are as much discoveries of new domains of application (e.g. Internet banking) as they are advances in the underlying technology (e.g. Internet technology). Seeing as the knowledge being sought resides at each end of the value chain (i.e. upstream expertise in technology and downstream expertise in new application domains), we can expect a great many different opportunities for collaborative interorganizational relationships. Some might lend themselves to an outsourcing approach, others to joint ventures, alliances and/or partnerships.

At present, it is less clear how the field will develop, however. The uncertainty does not only concern new technologies, but also: the actual impacts of ICT on the society of the future and the kinds of products and services that will attract end-users, where the required competencies and resources will reside in the future, the division of activities and revenue flows (i.e. the business model) between those who contribute to the development and delivery of integrated solutions, and the most advantageous position for detecting and accessing complementary competencies and resources. Moreover, most products and services based on telecommunications depend on the coordination of technical rules and standards. Innovation and product development thus involve the design and development of compatible components, products, and processes (Pisano, 1988), further influencing the need for collaboration across company boundaries.

Exactly who will dominate the development of the future standards is, however, uncertain.

Inexperience of the new type of interorganizational relationships

Most telcos have experience of external collaboration, especially in the development and coordination of technical rules and standards for public communications, and more recently in the process of industry globalization (Dussauge and Garrette, 1999). A great deal of those relationships involved long-term relationships between large state-owned telecommunications companies and/or a few mature equipment companies. We might claim, however, that previous experience is different from the capabilities presumed to be of importance in future collaborations. The emerging value chain suggests that telcos need to manage a greater variety of partners and different forms of collaborative interorganizational relationships, e.g. with small niche companies that possess valuable content and/or applications.

Although telcos are increasingly recognizing that outside collaborations with external partners have become critical to completing the development and commercialization of new products and services, some business analysts (cf. Uglow, OVUM 2002) and researchers (Li and Whalley, 2002) claim that telcos generally respond to the pressure arising from change by "doing everything themselves". Empirical data from ScanTel reinforces their findings. During recent years, ScanTel has announced internal visions and strategies for increasing the number and types of interorganizational relationships. In practice, despite what the visions say regarding interorganizational collaborations and alliances, there were few actions taken to support such arrangements, either on a broad basis or as a natural feature of innovation and new product development. Some respondents thought this was a symptom of ever-decreasing planning cycles and limited scope for experimenting with new ways of working. Others regarded the lack of an internal climate and reward system that favors innovation activities across company boundaries as the major problem.

It was generally held that previous and ongoing interorganizational relationships could serve as valuable sources of lessons for the future. However, case data revealed that such knowledge was hardly distributed in-house, and thus inaccessible to personnel not involved in those particular collaborations.

The traditional innovation process

The formal innovation and new product development processes found at incumbent telecommunications companies usually correspond to a linear process whereby the activities follow a cumulative sequence of stages or phases (Marshall, 2004). These processes and models are 'remnants' from a period when most of the innovation and product development was conducted in-house (or together with a few partners) by state-owned telecommunications operators. However, experience indicates that, every now and then, innovation and new product development follow a more unconventional process (e.g. trials and experiments) involving customers, suppliers and other contributing actors along the (prospective) value chain. Furthermore, industry observers and practicing managers anticipate that we can expect shortened product lifecycles, in turn demanding a faster innovation and development process.

The need for new ways of working is further confirmed by case study data originating from ScanTel. It was shown that valuable partners time and again seem suspicious and hesitant as regards collaborating with the large and mature telecommunications company. According to the respondents, this holds especially true for small and medium-sized companies that deem ScanTel's product development process far too bureaucratic and lengthy than they would be able to bear (for reasons of cost and time). Furthermore, business and product managers responsible for carrying out interorganizational collaborations expressed a need to relax demands for tangible and immediate returns from joint innovation efforts. They asked for an approach that provides the flexibility to develop the collaboration concurrently in a stepwise manner as a way of managing the uncertainty inherent in inventive activities. Finally, the respondents indicated the organization's inability to deal with prematurely-dissolved relationships. In most cases, these dissolved in silence, without any effort to gather the experience gained and the lessons learned.

WHAT COULD TELCOS LEARN FROM THE BIOPHARMACEUTICALS INDUSTRY?

The biopharmaceuticals industry has accumulated a vast inventory of experience concerning innovation and R&D through collaborative interorganizational relationships. This section reflects upon observations and explanations regarding

such collaborations and the potential for telcos to learn from these. Four topics will be in focus. The first concerns arguments regarding distinctive capabilities and dynamic complementarities which make collaboration a strategic choice in the first place. The remaining three concern the skills required to manage innovation through interorganizational relationships. Based on the challenges presented regarding collaborative interorganizational relationships in biopharmaceuticals, we can identify the 'alliance capability' as a skill needed to manage the complexity of: (1) attracting and gaining access to valuable partners, (2) deal making, and (3) working relationships, including the problems of co-development and learning, coordinating employees, and aligning territories. Before discussing these topics, it seems relevant to first mention some words on the characteristics of innovation in the biopharmaceuticals industry, however.

Innovation in the biopharmaceuticals industry

Biotechnology has been defined as a methodology for modifying and producing products using biologically-derived tools (e.g. genetic engineering and large cell culture technology) which build on contributions made by a variety of technical and scientific disciplines (for instance, of about 20, we can mention immunology, protein chemistry, computer science). That is to say, a new area of expertise and technology in the identification of disease pathology, as well as the formulation of new compounds.

The 'modern' biotechnology industry, in commercial terms, is only 25 years old (cf. Cometta, 1989). The genesis of biotechnology goes back to discoveries made in university laboratories in the early 1970s[67], however. These findings created a number of scientific and technological opportunities for new start-ups, which have become known as dedicated biotechnology firms (DBFs), in the mid to late 1970s. In 1980, another historic moment occurred when genetically-engineered life forms became patentable and motivated entrepreneurs in their hundreds started to enter the field, with investors providing the capital.

[67]Zucker and Darby (1997) date the 'biotechnology revolution' starting with Prof. Cohen (Stanford) and Prof. Boyer's (University of California at San Francisco) discovery of the basic technique for recombinant DNA in 1973.

Biotechnology is not a technology or industry *per se*, but a multidisciplinary technology increasingly integrated into many research and manufacturing processes. It thus has the potential to transform various industry sectors (e.g. pharmaceuticals, agriculture, food and feed, chemicals, waste management, instrumentation), of which pharmaceuticals is the largest sector of the overall product market (Powell et al. 1996; Cometta, 1989). The multidisciplinary nature of biotechnology has profound consequences for the drug development process, as well as the way in which value is created and profits distributed throughout the industry (Champion, 2001). Moreover, it is suggested that advances in biotechnology require skills fundamentally different from those with which established pharmaceutical companies are/were familiar (Pisano, 1990). So, what is the innovation purpose of pharmaceuticals? Walker and Parish (in Webster and Swain, 1991, p.129) tell us:

> The goal of innovation in the pharmaceutical industry is to identify compounds which represent improvements in the effective treatment of a particular disorder or disease and which can safely be administered to patients.

The innovation activities of the biotechnology and pharmaceutical industries can broadly be divided into two stages: discovery and development. Discovery concerns the identification of new 'targets' whereas development concerns the generation of marketable products (Panchagnula and Thomas, 2000). Using this division, we can assign the new entrants (i.e. the DBFs) with the role of *discoverers* exploring technological opportunities, and established firms (i.e. pharmaceuticals) with the role of *developers* who rely on the former for access to R&D knowledge and potential innovations, in exchange for complementary assets (cf. Riccaboni and Pammolli, 2002; Dodgson, 1991). Champion (2001, p. 110) portrays the drug development process as follows:

> Pills and serums are the end products of a long, complex *discovery* [italics added] process. It starts with an identification of the genes involved in a particular disease. Next, you identify and validate the protein - or targets - that different genes produce in different parts of the body. It's those targets that cause the malfunctions in cells that become diseased. Third, you try to identify small molecules that will attach to the target protein and prevent it from causing the disease. After you've identified these leads, you enter the testing phase. The leads are tested first on animals and then on humans. Finally, you have to find ways of economically manufacturing the drugs on a large scale and marketing them successfully to doctors and patients. (In some instances, the problem may be the absence of proteins – such as a growth hormone, for example – in which case, the challenge is to find ways to synthesize and deliver the missing proteins. But these "large molecule" treatments account for only 10% of the industry.)

The above account corresponds to what Sarasvathy (2001) calls 'causation'. It starts with a disease, which researchers try to cure using different technologies packed and market as pills and serum. However, the development of penicillin in 1928, and of Viagra in present times, demonstrates the serendipitous nature of drug discovery (de Rond, 2003).

Recent literature portrays traditional pharmaceutical companies as being in the midst of a productivity crisis in R&D, combined with soaring development and launch costs. To make up the shortfall in products and to increase the scale needed to fund new research technologies and product development, pharmaceutical companies have made a serious commitment to external collaboration with DBFs and other pharmaceutical companies. Estimates indicate that alliances account for 50 percent of the pharmaceuticals industry's overall R&D and that the top fifteen pharmaceutical companies account for 50 per cent of the current collaborations with DBFs (de Rond, 2003). Furthermore, innovation and product development in the biotechnology industry are extremely time-consuming, expensive, and risky. A typical drug takes 12-15 years and costs USD 500-900 m to bring to market (Champion, 2001; see also EFPIA, 2003). In general, the lengthiest part of the process is the clinical trials and tests. This is partially a consequence of the complexity and tightening up of regulations associated with safety (Webster and Swain, 1991). Long development times, in turn, increase the overall development costs. Finally, attempts to use the relatively immature technology to explore novel drug targets increase the risks and discovery costs, in the short term. Many compounds will emerge for which the anticipated potential will be decreased by the knowledge acquired further down the development process (Bonduelle and Pisani, 2003). Recent figures show that, on average, one or two out of every 10,000 substances synthesized (compounds) in R&D laboratories pass all the stages necessary in order to become a marketable drug (EFPIA, 2003). Table 1 summarizes the industry characteristics.

Table 11. Summary of industry characteristics

	Industry	
	Biotechnology	Telecommunications/ICT
Major technological changes:	- Technology development	- Shift in application domain - Technology development and convergence
Other disruptive changes:	- Tightening of regulations	- Deregulation
Typical knowledge and innovation partners:	- - Pharmaceutical and large chemicals - Research-based DBFs Universities - Venture capital firms - Research hospitals and government laboratories	- Telecommunications operator - Equipment companies - Software intermediaries - Content providers - Portal owners - Resellers - Customers
Innovation process	- Scientific discoveries at the furthest upstream end, i.e. basic research. - A highly formal development process due to regulations - Lengthy, costly, and risky.	- Learning without formal research, i.e. learning-by-doing and using. - Primarily a company-specific development process.

Nurturing distinctive capabilities

As previously indicated, the main argument for extensive collaborations in biopharmaceuticals rests on the idea that each company has its own and distinctive niche for competitive advantage. For example Pisano (1990, p. 155) claims that:

> While biotechnology was competence destroying on the R&D end, it was competence preserving at the commercialization end. The potential new protein drugs made possible by the biotechnology must all go through the same clinical tests and regulatory approval process and are sold through the same distribution channels as traditional drugs. With years of commercial experiences and existing organizational capabilities in these "downstream" functions, established pharmaceutical companies had an advantage over new entrants in bringing new drugs from the laboratory to the market.

It thus follows that the distinctive capabilities regarding negotiating government regulations and managing the complex process technology required to develop a marketable product have prevented pharmaceuticals from being passed over and

replaced by the new entrants (Arora and Gambardella, 1990; Dodgson, 1991; Rothaermel, 2001; Powell et al., 1996).

The picture has become less clear, however. There are indications that the pharmaceutical companies' R&D productivity continues to decline while the competition regarding new compounds developed by DBFs increases (PricewaterhouseCoopers, 2001). New entrants who only a decade ago would have been happy to sell marketing rights are becoming increasingly aware of the seller's market for their discoveries. To a greater extent, they are demanding participation in the design of clinical trials and the formulation of marketing campaigns (Mallik et al., 2004). Furthermore, some DBFs have reduced their commitments to more speculative academic research, restructured their R&D to make it more similar to a traditional pharmaceutical company, and established marketing and sales functions. In contrast to the prevailing wisdom, they show an interest in acquiring downstream capabilities and developing into a fully-integrated 'biopharmaceutical company' (Dodgson, 1991; Champion, 2001)[68]. In view of this, the DBF's lack of manufacturing capability and interest in extensive collaborations may also be a result of the developmental stage of the industry (Feldman and Ronzio, 2001; de Rond, 2003). Such a perspective also helps to explain concerns about safeguards (Pisano, 1990; Pisano, 1991) to reduce the risk of losing intellectual property, and eventually the risk of being replaced.

The biopharmaceuticals literature thus provides two complementary arguments. The first suggests that discontinuous change generates differences in distinctive competencies and capabilities (Pisano, 1990), and eventually a need for extensive collaboration. It appears as if the DBF's strategy and desired position have, in some respects, changed over time, however, thus arguing in favor of a complementary 'lifecycle approach' that makes allowances for alterations to each actor's competitive advantage and/or strategic agenda. Occasionally, we may experience how collaborating partners develop into competitors.

To the extent that the distinctive niche and position act upon each actor's competitive strategy, a fresh look at the telco's own distinctive capabilities and

[68] On inquiry, Feldman and Ronzio (2001) found that 80% of the DBFs in the State of Maryland would like to integrate forward in order to control their own manufacturing. The author surveyed small DBFs, as identified by the 1996-97 *Directory of Maryland BioScience Companies*. A total of 41 out of 88 companies responded to the survey.

place in the telecommunications (or ICT) value chain can help to shape a practical alliance strategy. Notwithstanding the DBF's 'advancement', it seems as if pharmaceuticals hold a more explicit and sanctioned position in the value chain than do incumbent telcos. Although in some respects still limited by, for instance, licenses, the deconstructed telecommunications value chain has resulted in multiple entry and exit points for new entrants (Li and Whalley, 2002). Different telecommunication equipment firms, Internet equipment firms, and independent software firms will most likely carry out much of the future R&D and innovation. External actors, occasionally from other industries, may similarly perform their marketing and distribution activities. The conclusion would be that telcos should try to envisage the level of access to desirable technology, partners, and customer base. On this basis, they can develop hypotheses regarding how and where different actors' efforts might fit in with the telco's categories and opportunities. Conclusions drawn from the biopharmaceuticals also suggest that telcos need to be aware of those niches in which other actors seek to make inroads. Moreover, the struggle for compatibility gives reason to belong to alliances dominant when it comes to setting standards (Axelrod in Holbrook, 2003). Thus, it is just as important to be aware of niches where collaborative arrangements have already been established.

Alliance appeal

Writings on interorganizational relationships and alliances sometimes seem to presume that the appropriate partner and alliance opportunity is easily identifiable and the process of initiating an interorganizational collaboration fairly straightforward. Recent studies on collaborations in the biopharmaceuticals industry indicate that this is not the case, however. On inquiry, business analysts at PricewaterhouseCoopers (Partnering capabilities survey, 2000) found that the majority of managers considered skills to attract great partners and then carry out high-performing alliances to be the most important competency area to cultivate in the future (PricewaterhouseCoopers, 2001).

As a result of biotechnology's academic origin, biotechnology companies tend to cluster in regions where academic institutions and government laboratories are situated in order to get close to the scientific expertise essential for realizing new products (Feldman and Ronzio, 2001; Champion 2001). A critical mass of

researchers and companies also seems able to entice venture capitalists into the area, which in turn entices even more entrepreneurs and biotechnology companies since these tend to cluster in regions where venture capital is abundant (Niosi, 2003). It follows that, in the case of biotechnology, geographic specialization or 'clustering' is primarily characterized by the ability to access and transfer knowledge, rather than by economies of scale (Çetindamar and Lage-Hellman, 2003). Another feature influencing access to valuable partners' knowledge and resources concerns the structural position between otherwise unconnected actors (cf. Granovetter, 1973). In this case, most studies indicate that a central or strategic position (i.e. a position between otherwise unconnected actors) is of strategic importance (Hoang, 1997; Powell et al., 1996). Moreover, a better-positioned company appears to be valued as a more attractive partner by others (Powell et al., 1996; Hoang 1997; de Rond, 2003).

The great demand for new compounds allows DBFs to be increasingly selective when choosing pharmaceutical partners (The Partnering Capabilities Survey, 2000). This is an interesting finding because it indicates that pharmaceuticals need to compete for valuable partners and licensing deals. Consequently, having a reputation of being an attractive and 'preferred partner' has risen from important to critical (de Rond, 2003). Most studies examining the influence of reputation concern new entrepreneurs or small companies, however. For example, Stuart et al. (1999) found that young DBFs' relationships with well-known and high-status organizations had a positive effect on their reputation, which in turn affected their ability to acquire crucial resources such as capital. A similar result regarding the possibility of 'status transfer' was reported in a recent case study of collaborations between large mature actors in the oil industry (Lerpold, 2003). Hence, we might propose that the reputation of being a prominent, experienced, and trustworthy collaborator is just as important for established companies.

Sarkar et al. (2001, p. 701) have elsewhere defined "the extent to which an organization engages in identifying and responding to partnering opportunities" as the organization's alliance proactiveness. In this sense, Kalamas et al. (2002) propose that pharmaceuticals having the courage and ability to assess the risks of early-stage compounds and to secure the access and rights to the most promising among them will be rewarded. Other researchers propose that benefits could result from dealing with many developers in a fluid manner so as not to stifle

innovations (PricewaterhouseCoopers, 2003). Implicit in these interpretations is the fact that pharmaceuticals need capacity in order to be responsive to partners and opportunities that are not anticipated; hence a "wait and see" strategy could mean missing out on the most potent source of innovation and growth.

Obviously, no company will collaborate for the collaboration's own sake. The telecommunications and ICT market is still moving and telcos may be inclined to reach the conclusion that they are best off waiting for the industry boundaries and responsibilities to become more clearly delineated. However, as the increasing demand for new compounds in the biopharmaceuticals field shows, holding off for another year may be a destructive strategy. Telcos that wait and see how a trend develops could find themselves locked out of the game before it even begins. The emerging interest in providing 'content' is but one example, as noted elsewhere; "exclusive content is not important – yet". Thus alliances and partnerships formed today may become the basis for future opportunities. In order to become more vigilant as regards when, how, and who they should collaborate with, telcos may need to experiment to find their way. In the sense of alliance proactiveness, we might propose that interorganizational relationships sometimes involve creating collaborative learning opportunities.

The emerging value network proposed by Li and Whalley (2002) challenges telco managers to attract a variety of partners. For instance, they may seek to explore future opportunities by means of a technology alliance with software integrator *A*, develop an integrated product via a joint project with equipment company *B*, obtain economies of scale through joint action with another telco, *C*, and a joint-marketing agreement with reseller *D*. Some of these partners will most probably belong to value chains distant from the 'traditional' telecommunications value chain (e.g. the media and finance value chains). We can assume that the broad collection of potential partners is geographically widespread and the telcos' ability to put together the appropriate mix of skills less dependent on geographic specialization. Furthermore, it is argued that practice plays a principal role in technological progress and promotion in the telecommunications sector (Cohen et al., 2002). Whereas biotechnology breakthroughs in most cases correspond to scientific discoveries at the furthest upstream end of the industry value chain, the downstream expertise in new application domains seems to be the knowledge much sought after in the telecommunications industry. Hence, telcos need to keep abreast of

developments and breakthrough applications downstream in the value-chain(s), in addition to upstream technological progress. Thus, a university at the center of innovative activity helps, but it is neither a necessity nor a sufficient prerequisite.

Deal making

Although regarded as a reasonable response to market and technological discontinuities, collaborative interorganizational relationships do not always work as anticipated. Practice shows that the majority of strategic alliances involving pharmaceutical and biotechnology companies fail to meet their expected or potential value (PricewaterhouseCoopers, 2001). However, researchers are increasingly proposing that the notion of performance is somewhat problematic (cf. McGrath, 1999; de Rond, 2003). They argue that alliance performance is too fluid and complex to be thought of in terms of targets that are either hit or missed. For example, the partners may have different views or interpretations of performance, even when considering the same object.

Nevertheless, the chief argument seems to be that interorganizational relationships, as well as innovation activities, are partly products of events and experiences that are hard to anticipate upstream in the development process (de Rond, 2003), and thus can neither be fully specified nor controlled prior to execution. Given the need to reposition if they are wrong, or change their focus, collaborating partners require interorganizational arrangements that are fairly flexible. This conclusion is in agreement with prior research suggesting that interorganizational relationships (e.g. Ring and Van de Ven, 1994; Doz, 1996; Ariño and de la Torre, 1998) correspond to a cyclical rather than a sequential developmental process. From this perspective, the collaboration is best maintained by means of a recurring sequence of negotiation, commitment and execution through which the partners learn, reevaluate, and revise their joint agenda and conduct.

The speed of feedback relative to the pace at which investments have to be made will most likely have an impact on management's decision whether to maintain flexibility or commit to a particular interorganizational innovation initiative. In this case, we can expect the conditions to differ between pharmaceutical companies and telcos. The drug development process involves large fixed investments which must be made prior to the realization of any market feedback,

whereas in telecommunications, large scale investments are often related to scaling up for mass production downstream in the innovation process. This means that the production capacity, and the related investments, can to some extent be built incrementally in parallel with activity in intermediate markets, e.g. trials with lead-users and the limited introduction of trial products. The prospects of engaging in intermediate markets provide telcos with the flexibility to delay commitment decisions; to think about early-stage collaboration differently. Interorganizational relationships as a way of exploring new opportunities (cf. exploration through exploitation as described by Adner and Levinthal (2002)) further emphasize the requirements for 'deal making' based on a consistent evaluation of investments and performance. Telcos should also recognize that 'alliance performance' has multiple dimensions which entail diverse measures in order to achieve a truly reflective picture.

Researchers have recognized that interorganizational collaboration in the biopharmaceuticals field frequently has its basis in informal interactions and linkages between people who know and trust each other. This suggests that management should also take the social aspect into account. The key point would be that telcos "have to be careful in assuming management to be the primary force in alliance process, driving them progressively to predefined objectives" (cf. de Rond, 2003). Consequently, telcos need to consider ways of deal making that allow more informal control.

Working relationships

We have argued that a major challenge facing pharmaceuticals lies in their ability to learn about the potential of the biotechnology field. Learning through interorganizational collaboration is difficult, however (Inkpen, 1998). Empirical data suggests that interorganizational relationships can only become truly effective if the collaborators develop mechanisms through which they can share knowledge with one another (Powell et al., 1996). For example, Dodgson's (1991) study of shows how two large DBFs, with ambitions to become integrated biopharmaceutical companies, acknowledged their deliberate strategies for maximizing returns (learning) from their collaborations. A major focus was placed on "creating systems and structures conducive to exogenous learning and transfer of that learning internally" (ibid.). Among other things, it is argued that

the complex and tacit character of the emerging technology has made direct links between basic and applied research necessary (Pisano et al., 1988). This helps to explain the occurrence of organizing practices where employees are encouraged to interact with individuals directly involved in science-based activities and to publish their work as scientists in the scientific community (Powell et al., 1996).

There seems to be consensus that what can be learned is a function of what is already known (de Rond, 2003; Powell et al., 1996). Hence, an effective process of knowledge creation and diffusion needs to be matched by an adequate 'absorptive capacity' (Cohen and Levinthal, 1990). Hence, the company's R&D skills have to be constantly upgraded to a level where company members are able to observe, evaluate and integrate new knowledge that has been developed elsewhere (Cowan and van de Paal, 2000). Being mainly interested in the drug development process, pharmaceutical companies might not engage in so many cooperation efforts with universities as DBFs. Nonetheless, they are advised to maintain their absorptive capacity through hiring, training, and participating in research activities in order to keep pace with the overall progress of biotechnology (Lechner and Dowling, 2003). Moreover, there is some evidence that efficient knowledge-sharing can help the partners to enhance their collective competitive advantage over their rivals and their rivals' partners. However, differing learning abilities among the partners might entail problems, not only for the individual partner, but also for the collaborative relationship as a whole.

Researchers argue that a feature of smoothly-functioning working relationships has been the extent to which each partner has collaborated with external organizations. This suggests that alliance management is an acquired capability. Consequently, people involved in interorganizational collaboration should be encouraged to learn from working practices as this enables the company to improve its capability to conduct future interorganizational collaborations.

As telcos attempt to develop their alliance capacities, they are required to modify their innovation processes and corporate cultures in order to achieve the required level of interorganizational integration. Experiences from the biopharmaceuticals industry suggest that they should learn to integrate people in a new way, as carriers of tacit knowledge, paying attention to knowledge-sharing routines.

The emerging ICT industry is increasingly becoming multidisciplinary and precludes the prospects of developing absorptive capacity in all directions.

However, although other actors will carry out much of their future R&D and some of their marketing and distribution activities, telcos are advised to constantly upgrade their R&D skills and competency vis-à-vis customer needs. They need to develop not just their distinctive capabilities and technical knowledge, but also their competencies as regards embracing the knowledge of their potential partners (i.e. their absorptive capacity) in order to keep pace with technological and market progress.

Finally, a consequence of the large number of prematurely-terminated alliances could be that managers are challenged to handle and make the most of terminated initiatives as well. Empirical studies on this topic appear sparse, however.

CONCLUDING COMMENTS AND AVENUES FOR FUTURE RESEARCH

The present paper argues that incumbent telcos need access to strong capabilities and learning opportunities, both upstream and downstream in the emerging value chain. Given the discontinuities facing the telecommunications field (or ICT), they require collaborative relationships that can act as the company's virtual R&D laboratory (e.g. via universities and new entrepreneurs) and delivery system (e.g. via software intermediaries, portals, and resellers). At first sight, we might argue that the characteristics of biotechnology and telecommunications are comparatively disparate, thus the prospects of comparing experiences will be limited. However, on second thought, there appear to be practices that incumbent telcos could derive insights from. The conclusion could be that telcos should take two basic steps. Management must first recognize that it has entered a period of competition which requires of them a collaborative strategy and a mastery of attracting important partners. Secondly, they will need to develop a set of in-house capabilities, now commonplace among many companies in the biopharmaceuticals field, in order to skillfully manage collaborative interorganizational relationships with key partners. Such capabilities are most probably different from those found in the telco's traditional internal R&D organization.

This paper also proposes that telcos may experience a greater demand for, as well as a chance of, joint efforts aimed at "exploration through exploitation", due to their relatively wide spectrum of potential partners, the amount of inventive

activities conducted besides formal research, and the speed of feedback relative to the pace at which investment has to be made. We might expect the future telco to be a collaborator, endowed with a portfolio of several ongoing alliances and experimenting with new product and business opportunities.

Case study after case study has shown the unmistakable influence of collaborative interorganizational relationships on innovation and new product development in the biopharmaceuticals industry. This research has yielded a number of important findings to acquire knowledge of – the same going for companies in industries other than biopharmaceuticals. However, rather few process-oriented studies, and only partial empirical confirmation, exist to enable us to address unanswered questions regarding how the actual working relationships are organized and how they develop over time. This creates an avenue for further research, especially for longitudinal and qualitative studies. Among the topics to be examined, it seems essential to mention the need for better knowledge of how to manage and make the most of terminated initiatives. Furthermore, management practice and theory development would also benefit from further studies across industries.

REFERENCES

Abernathy, W.J. and Clark, K.B. (1985). Innovation: Mapping the winds of creative destruction. *Research Policy* 14(1), 3-22.

Adner, R. (2002). When are technologies disruptive? A demand-based view of the emergence of competition. *Strategic Management Journal,* 23(8), 667-688.

Adner, R. and Levinthal, D.A. (2002). The emergence of emerging technologies. *California Management Review,* 45(1), 50-66.

Alvesson, M. 1999. Methodology for close up studies - struggling with closeness and closure. . Lund: School of Economics and Management, Lund University.

Ariño, A. and de la Torre, J. (1998). Learning from failure: towards an evolutionary model of collaborative ventures. *Organization Science* 9(3), 306-325.

Arora, A. and Gambardella, A. (1990). Complementarity and external linkages: the strategies of the large firms in biotechnology. *The Journal of Industrial Economics,* 38(4), 361-379.

Brown, J.S. and Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovation. *Organization Science,* 2(1), 40- 56.

Brown, S. and Duguid, P. (2000). Balancing act: how to capture knowledge without killing it. *Harvard Business Review,* May-June(.

Brusoni, S. and Geuna, A. (2003). An international comparison of sectoral knowledge bases: persistence and integration in the pharmaceutical industry. *Research Policy,* 32(, 1897-1912.

Brusoni, S. and Prencipe, A. (2001). Managing knowledge in loosely coupled networks: exploring the link between product and knowledge dynamics. *Journal of Management Studies,* 38(7), 1019-1035.

Champion, D. (2001). Mastering the value chain. An interview with Mark Levin of Millennium Pharmaceuticals. *Harvard Business Review,* June(, 109-115.

Cheng, Y.-T. and Van de Ven, A.H. (1996). Learning the innovation journey: order out of chaos. *Organization Science,* 7(6), 593-613.

Cohen and Levinthal (1989). Innovation and learning: the two faces of learning. *The Economic Journal,* 99(397), 569-596.

Cohen, G., Salomon, I. and Nijkamp, P. (2002). Information-communications technologies (ICT) and transport: does knowledge underpin policy? *Telecommunications Policy,* 26(, 31-52.

Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*17), 197-218.

Cometta, S. (1989). Strategic considerations for the biotechnology business to the year 2000. *Arzneimittel-Forsch.,* 39(8), 929-934.

Cowan, R. and Paal, v.d. 2000. Innovation policy in a knowledge-based economy. . Brussels-Luxembourg.

de Rond, M. (2003). *Strategic alliances as social facts. Business, biotechnology & intellectual history.* Cambridge: Cambridge University Press.

Dodgson, M. (1991). Strategic alignment and organizational options in biotechnology firms. *Technology Analysis & Strategic Management,* 3(2), 115-125.

Dosi, G. (1988). Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature,* 26(3), 1120-1171.

Doz, Y. (1996). The evolution of cooperation in strategic alliances: initial conditions and learning processes. *Strategic Management Journal* 17(Special issue), 55-83.

Duysters, G. and de Man, A.-P. (2003). Transitory alliances: an instrument for surviving turbulent industries. *R&D Management,* 33(1), 49-58.

Eisenhardt, K.M. and Tabrizi, B.N. (1995). Accelerating adaptive processes: product innovation in the global computer industry. *Administrative Science Quarterly,* 40(1), 84-110.

Feldman, M.P. and Ronzio, C.R. (2001). Closing the innovative loop: moving from the laboratory to the shop floor in biotechnology manufacturing. *Entrepreneurship & Regional Development,* 13(, 1-16.

Fransman, M. (2001). Analysing the evolution of industry: the relevance of the telecommunications industry. *Economics of Innovation & New Technology,* 10(2/3), 109-141.

Fransman, M. (2002). Mapping the evolving telecoms industry: the uses and shortcomings of the layer model. *Telecommunications Policy,* 26(9-10), 473-483.

Hagedoorn, J. (2002). Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy,* 31(4), 477-492.

Hagedoorn, J. and van Kranenburg, H. (2003). Growth patterns in R&D partnerships: an exploratory statistical study. *International Journal of Industrial Organization,* 21(4), 517-531.

Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal* 12(Special Issue), 83-103.

Hamel, G. and Prahalad, C.K. (1994). *Competing for the future*. Boston, MA: Harvard Business School Press.

Hoang, H. (1997). The consequences of network participation for acquisition and alliance activity in the biotechnology industry. *Academy of Management Proceedings*, 267-271.

Jones, C., Hesterly, W.S. and Borgatti, S.P. (1997). A general theory of network governance: exchange conditions and social mechanisms. *Academy of Management Review,* 27(4), 911-945.

Jones, C., Hesterly, W.S., Fladmoe-Lindquist, K. and Borgatti, S.P. (1998). Professional service constellations: how strategies and capabilities influence collaborative stability and change. *Organization Science,* 9(3), 396-410.

Joshi, M.P., Kashlak, R.J. and Sherman, H.D. (1998). How alliances are reshaping telecommunications. *Long Range Planning,* 31(4), 542-548.

Lagendijk, A. (2001). The dynamics of industrial clustering. International comparisons in computing and biotechnology. *Research Policy,* 30(2), 353-354.

Lane, P. J. and Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* 19, 461-477.

Larson, A. (1992). Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. *Administrative Science Quarterly,* 37(1), 76-104.

Larson, A.L. 1988. Cooperative alliances: a study of entrepreneurship. *Business and Sociology*. Cambridge, MA: Harvard University.

Lechner, C. and Dowling, M. (2003). Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms. *Entrepreneurship & Regional Development* 15, 1-26.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal*13, 111-125.

Lerpold, L. 2003. 'Reputation by association: exploring alliance formation and organizational identity adaptation.' Doctoral thesis. *Institute of International Business*. Stockholm: Stockholm School of Economics.

Lester, R.K., Piore, M.J. and Malek, K.M. (1998). Interpretive management: what general managers can learn from design. *Harvard Business Review,* 76(2), 86-96.

Li, F. and Whalley, J. (2002). Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy,* 26(9-10), 451-472.

Lipparini, A. and Boari, C. (1999). Networks within industrial districts. The organization of knowledge creation and access. *Submitted to the Journal of Management and Governance.*

Marshall, C. (2004). Produktutveckling när planen nått sin gräns. (Eng. Product development when the plan has reached its limit.), in Engwall, M. (ed.) *Produktutveckling bortom kunskapens gränser.* Lund: Studentlitteratur.

McGrath, R.G. (1999). Falling forward: real options reasoning and entrepreneurial failure. *Academy of Management Review* 24(1), 13-30.

McKelvey, M., Alm, H. and Riccaboni, M. (2003). Does co-location matter for formal knowledge collaboration in the Swedish biotechnology-pharmaceutical sector? *Research Policy,* 32(3), 483-501.

Moore, G. (1995). *Inside the Tornado*: Capstone.

Mytelka, L.K. and Smith, K. (2002). Policy learning and innovation theory: an interactive and co-evolving process. *Research Policy,* 31(8-9), 1467-1479.

Niosi, J. (2003). Alliances are not enough explaining rapid growth in biotechnology firms. *Research Policy,* 32(5), 737-750.

Oliver, A.L. (2001). Strategic alliances and the learning life-cycle of biotechnology firms. *Organization Studies,* 22(3), 467-489.

Panchagnula, R. and Thomas, N.S. (2000). Biopharmaceutics and pharmacokinetics in drug research. *International Journal of Pharmaceutics.,* 201(, 131-150.

Pangarkar, N. (2003). Determinants of alliance duration in uncertain environments: the case of the biotechnology sector. *Long Range Planning,* 36(, 269-284.

Parise, S. and Henderson, J.C. (2001). Knowledge resource exchange in strategic alliances. *IBM Systems Journal,* 40(4), 908-924.

Pisano, G.P. (1990). The R&D Boundaries of the firm: an empirical analysis. *Administrative Science Quarterly* 35, 153-176.

Pisano, G.P. (1991). The governance of innovation: Vertical integration and collaborative arrangements in the biotechnology industry. *Research Policy* 20(3), 237-249.

Pisano, G.P., Shan, W. and Teece, D.J. (1988). Joint ventures and collaborative arrangements in the biotechnology industry. In *International collaborative ventures in U.S. manufacturing*, ed. Mowery, D.C., pp. 183-222. Cambridge, MA: Ballinger Publishing Company.

Polanyi, M. (1966/1983). *The tacit dimension.* Gloucester: Doubleday & Company, Inc.

Powell, W.W. (1998). Learning from collaboration: knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review,* 40(3), 228-240.

Powell, W.W., Koput, K.W. and Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly,* 41(1), 116-145.

Prahalad, C.K. (1998). Managing discontinuities: the emerging challenges. *Research Technology Management* (May-June), 14-22.

Riccaboni, M. and Pammolli, F. (2002). On firm growth in networks. *Research Policy,* 31(8-9), 1405-1416.

Ring, P.S. and Van de Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review* 19(1), 90-118.

Rothaermel, F.T. (2001). Complementary assets, strategic alliances, and the incumbent's advantage: an empirical study of industry and firm effects in the biopharmaceutical industry. *Research Policy,* 30(, 1235-1251.

Sarasvathy, S.D. (2001). Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review,* 26(2), 243-263.

Stuart, T.E., Hoang, H. and Hybels, R.C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly* 44(2), 315-349.

Swann, P. and Prevezer, M. (1996). A comparison of the dynamics of industrial clustering in computing and biotechnology. *Research Policy,* 25(7), 1139-1157.

Tushman, M.L. and Anderson, P. (1986/1996). Technological discontinuities and organizational environments. In *Strategic management of technology and innovation.*, ed. Burgelman, R.A., Maidique, M.A. and Wheelwright, S.C., pp. 381-401: Irwin, McGraw-Hill.

Van de Ven, A.H. and Polley, D. (1992). Learning while innovating. *Organization Science,* 3(1), 92-116.

Van de Ven, A.H., Polley, D.E., Garud, R. and Venkataraman, S. (1999). *The innovation journey.* Oxford: Oxford University Press.

Vanhaverbeke, W., Duysters, G. and Noorderhaven, N. (2002). External technology sourcing through alliances or acquisitions: an analysis of the application-specific integrated circuits industry. *Organization Science,* 13(6), 714-733.

Von Hippel, E. (1986). Lead Users: A Source of Novel Product Concepts. *Management Science,* Vol 32(No 7), 791-805.

Webster, A. and Swain, V. (1991). The pharmaceutical Industry: towards a new innovation environment. *Technology Analysis & Strategic Management* 3(2), 127-142.

Zucker, L.G. and Darby, M.R. (1997). Present at the biotechnological revolution: transformation of technological identity for a large incumbent pharmaceutical firm. *Research Policy,* 26(4-5), 429-446.

STOCKHOLM SCHOOL
OF ECONOMICS
HANDELSHÖGSKOLAN I STOCKHOLM

EFI, The Economic Research Institute

EFI, the Economic Research Institute

Reports since 1999

A complete publication list can be found at www.hhs.se/efi

Published in the language indicated by the title

2004
Andersson, A., Essays in Behavioral Finance.
Grönqvist, E., Selection and Moral Hazard in Health Insurance: Taking Contract Theory to the Data.
Jutterström, M., Att påverka beslut – företag i EUs regelsättande.
Larsson, P., Förändringens villkor. En studie av organisatoriskt lärande och förändring inom skolan.
Lagerwall, B., Empirical Studies of Portfolio Choice and Asset Prices.
Malmsten, H., Properties and Evaluation of Volatility Models.
Nilsson, C., Studies in Environmental Economics: Numerical Analysis of Greenhouse Gas Policies.
Regelexplosionen. Ahrne, G. och Brunsson, N. (red).
Salabasis, M., Bayesian Time Series and Panel Models – Unit Roots, Dynamics and Random Effects.
Skallsjö, S., Essays on Term Structure and Monetary Policy.
Söderström, J., Från Produkt till Tjänst. Utveckling av affärs- och miljöstrategier i produktorienterade företag.
Talia, K., The Scandinavian Currency Union, 1873-1924 – Studies in Monetary Integration and Disintegration

2003
Andersson, H., Valuation and Hedging of Long-Term Asset-Linked Contracts.
Bergman, M., Essays on Human Capital and Wage Formation.
Damsgaard, N., Deregulation and Regulation of Electricity Markets.
Eklund, B., Four Contributions to Statistical Inference in Econometrics.
Exploring Patterns in Information Management. Concepts and Perspectives for Understanding IT-Related Change. Sundgren, B, Mårtensson, P., Mähring, M. och Nilsson, K., (editors)
Globalization and its Enemies. Lundahl, M. (editor).
Hakkala, K., Essays on Restructuring and Production Decisions in Multi-Plant Firms.
Holgersson, C., Rekrytering av företagsledare. En studie i hoimosocialitet.

Ivaschenko, I., Essays on Corporate Risk, U.S. Business Cycles, International Spillovers of Stock Returns, and Dual Listing.
Lange, F., Brand Choice in Goal-derived Categories – What are the Determinants?
Le Coq, C., Quantity Choices and Market Power in Electricity Market.
Magnusson, P.R., Customer-Oriented Product Development – Experiments Involving Users in Service Innovation.
Meisiek, S., Beyond the Emotional Work Event Social Sharing of Emotion in Organizations.
Mårtensson, A., Managing Mission-Critical IT in the Financial Industry.
Nilsson, G., Processorientering och styrning – Regler, mål eller värderingar?
Sandberg, R., Corporate Consulting for Customer Solutions Bridging Diverging Business Logics.
Sturluson, J.T., Topics in the Industrial Organization of Electricity Markets.
Tillberg, U., Ledarskap och samarbete – En jämförande fallstudie i tre skolor.
Waldenström, D., Essays in Historical Finance.
Wallén, U., Effektivitet i grundskolan i anslutning till en stadsdelsnämndsreform.
Ögren, A., Empirical Studies in Money, Credit and Banking – The Swedish Credit Market in Transition under the Silver and the Gold Standards, 1834 – 1913.

2002
Barinaga, E., Levelling Vagueness – A study of cultural diversity in an international project group.
Berglund, J., De otillräckliga – En studie av personalspecialisternas kamp för erkännande och status.
Bolander, P., Anställningsbilder och rekryteringsbeslut.
Damjanovic, T., Essays in Public Finance.
Ekman, M., Studies in Health Economics – Modelling and Data Analysis of Costs and Survival.
Företagerskan – Om kvinnor och entreprenörskap. Holmquist, C. och Sundin, E. (red)
Heyman, F., Empirical Studies on Wages, Firm Performance and Job Turnover.
Kallifatides, M., Modern företagsledning och omoderna företagsledare.
Kaplan, M., Acquisition of Electronic Commerce Capability – The Cases of Compaq and Dell in Sweden.
Mähring, M., IT Project Governance.
Nilsson, M., Essays in Empirical Corporate Finance and Governance.
Rekrytering av koncernstyrelsen – Nomineringsförfaranden och styrelsesammansättning med focus på kvinnors ställning och möjligheter. Sjöstrand, S-E. och Petrelius, P.,(red)
Scener ur ett företag – Organiseringsteori för kunskapssamhället. Löwstedt, J. och Stymne, B.,(red).
Schenkel, A., Communities of Practice or Communities of Discipline – Managing Deviations at the Øresund Bridge.
Schuster, W., Företagets Valutarisk – En studie av horisontella och vertikala styrprocesser.
Skogsvik, S., Redovisningsmått, värderelevans och informationseffektivitet.
Sundén, D., The Dynamics of Pension Reform.
Ternström, I., The Management of Common-Pool Resources – Theoretical Essays and Empirical Evidence.

Tullberg, J., Reciprocitet – Etiska normer och praktiskt samarbete.
Westling, G., Balancing Innovation and Control – The Role of Face-to-face Meetings in Complex Product Development Projects.
Viklund, M., Risk Policy – Trust, Risk Perception, and Attitudes.
Vlachos, J., Risk Matters – Studies in Finance, Trade and Politics.

2001
Adolfson, M., Monetary Policy and Exchange Rates – Breakthrough of Pass-Through.
Andersson, P., Expertise in Credit Granting: Studies on Judgment and Decision-Making behavior.
Björklund, C., Work Motivation – Studies of its Determinants and Outcomes.
Center for Management and Organization 50 (1951-2001).
Charpentier, C., Uppföljning av kultur- och fritidsförvaltningen efter stadsdelsnämnds-reformen.
Dahlén, M., Marketing on the Web – Empirical Studies of Advertising and Promotion Effectiveness.
Eckerlund, I., Essays on the Economics of Medical Practice Variations.
Ekelund, M., Competition and Innovation in the Swedish Pharmaceutical Market.
Engström, S., Success Factors in Asset Management.
Ericsson, D., Kreativitetsmysteriet – Ledtrådar till arbetslivets kreativisering och skrivandets metafysik.
Eriksson, R., Price Responses to Changes in Costs and Demand.
Frisell, L., Information and Politics.
Giordani, P., Essays in Monetary Economics and Applied Econometrics.
Gustavsson, P., Essays on Trade, Growth and Applied Econometrics.
Hedlund, A., Konsumentens erfarenhet – och dess inverkan på livsmedelsinköp på Internet.
Hill, M., Essays on Environmental Policy Analysis: Computable General Equilibrium Approaches Applied to Sweden.
Hvenmark, J., Varför slocknar elden? Om utbrändhet bland chefer i ideella organisationer.
Hägglund, P.B., Företaget som investeringsobjekt – Hur placerare och analytiker arbetar med att ta fram ett investeringsobjekt.
Höök, P., Stridspiloter i vida kjolar, om ledarutveckling och jämställdhet.
Johansson, C., Styrning för samordning.
Josephson, J., Evolution and Learning in Games.
Kjellberg, H., Organising Distribution – Hakonbolaget and the efforts to rationalise food distribution, 1940-1960.
Lange, F. och Wahlund, R., Category Management – När konsumenten är manager.
Liljenberg, A., Customer-geared competition – A socio-Austrian explanation of Tertius Gaudens.
Lindkvist, B., Kunskapsöverföring mellan produktutvecklingsprojekt.
Ljunggren, U., Nyckeltal i grundskolan i Stockholms stad före och efter stadsdels-nämndsreformen.
Läkemedel – Kostnad eller resurs för sjukvården? Jönsson, B.,(red).
Löf, M., On Seasonality and Cointegration.
Martensen, K., Essays on Entry Externalities and Market Segmentation.
Matros, A., Stochastic Stability and Equilibrium Selection in Games.

Mårtensson, P., Management Processes – An Information Perspective on Managerial Work.
Nilsson, A., Market Transparency.
Norberg, P., Finansmarknadens amoralitet och det kalvinska kyrkorummet – En studie i ekonomisk mentalitet och etik.
Persson, B., Essays on Altruism and Health Care Markets.
Rech, G., Modelling and Forecasting Economic Time Series with Single Hidden-layer Feedforward Autoregressive Artificial Neural Networks.
Skoglund, J., Essays on Random Effects Models and GARCH.
Strand, N., Empirical Studies of Pricing.
Thorén, B., Stadsdelsnämndsreformen och det ekonomiska styrsystemet – Om budget-avvikelser.

2000
Berg-Suurwee, U., Styrning före och efter stadsdelsnämndsreform inom kultur och fritid – Resultat från intervjuer och enkät.
Bergkvist, L., Advertising Effectiveness Measurement: Intermediate Constructs and Measures.
Brodin, B., Lundkvist, L., Sjöstrand, S-E., och Östman, L., Koncernchefen och ägarna.
Bornefalk, A., Essays on Social Conflict and Reform.
Charpentier, C., Samuelson, L.A., Effekter av en sjukvårdsreform.
Edman, J., Information Use and Decision Making in Groups.
Emling, E., Svenskt familjeföretagande.
Ericson, M., Strategi, kalkyl, känsla.
Gunnarsson, J., Wahlund, R., och Flink, H., Finansiella strategier i förändring: segment och beteenden bland svenska hushåll.
Hellman, N., Investor Behaviour – An Empirical Study of How Large Swedish Institutional Investors Make Equity Investment Decisions.
Hyll, M., Essays on the Term Structure of Interest Rates.
Håkansson, P., Beyond Private Label – The Strategic View on Distributor Own Brands.
I huvudet på kunden. Söderlund, M (red). *EFI och Liber Förlag.*
Karlsson Stider, A., Familjen och firman.
Ljunggren, U., Styrning av grundskolan i Stockholms stad före och efter stadsdelsnämndsreformen – Resultat från intervjuer och enkät.
Ludvigsen, J., The International Networking between European Logistical Operators.
Nittmar, H., Produktutveckling i samarbete – Strukturförändring vid införande av nya Informationssystem.
Robertsson, G., International Portfolio Choice and Trading Behavior.
Schwarz, B., och Weinberg, S., Serviceproduktion och kostnader – att söka orsaker till kommunala skillnader.
Stenström, E., Konstiga företag.
Styrning av team och processer – Teoretiska perspektiv och fallstudier. Bengtsson, L., Lind, J., och Samuelson, L.A., (red).
Sweet, S., Industrial Change Towards Environmental Sustainability – The Case of Replacing Chloroflouorocarbons.
Tamm Hallström, K., Kampen för auktoritet – standardiseringsorganisationer i arbete.

1999

Adler, N., Managing Complex Product Development.
Allgulin, M., Supervision and Monetary Incentives.
Andersson, P., Experto Credite: Three Papers on Experienced Decision Makers.
Ekman, G., Från text till batong – Om poliser, busar och svennar.
Eliasson, A-C., Smooth Transitions in Macroeconomic Relationships.
Flink, H., Gunnarsson, J., Wahlund, R., Svenska hushållens sparande och skuldsättning– ett konsumentbeteende-perspektiv.
Gunnarsson, J., Portfolio-Based Segmentation and Consumer Behavior: Empirical Evidence and Methodological Issues.
Hamrefors, S., Spontaneous Environmental Scanning.
Helgesson, C-F., Making a Natural Monopoly: The Configuration of a Techno-Economic Order in Swedish Telecommunications.
Japanese Production Management in Sunrise or Sunset. Karlsson, C., (red).
Jönsson, B., Jönsson, L., och Kobelt, G., Modelling Disease Progression and the Effect of Treatment in Secondary Progressive MS. Research Report.
Lindé, J., Essays on the Effects of Fiscal and Monetary Policy.
Ljunggren, U., Indikatorer i grundskolan i Stockholms stad före stadsdelsnämndsreformen – en kartläggning.
Ljunggren, U., En utvärdering av metoder för att mäta produktivitet och effektivitet i skolan – Med tillämpning i Stockholms stads grundskolor.
Lundbergh, S., Modelling Economic High-Frequency Time Series.
Mägi, A., Store Loyalty? An Empirical Study of Grocery Shopping.
Mölleryd, B.G., Entrepreneurship in Technological Systems – the Development of Mobile Telephony in Sweden.
Nilsson, K., Ledtider för ledningsinformation.
Osynlig Företagsledning. Sjöstrand, S-E., Sandberg, J., och Tyrstrup, M., (red).
Rognes, J., Telecommuting – Organisational Impact of Home Based – Telecommuting.
Sandström, M., Evaluating the Benefits and Effectiveness of Public Policy.
Skalin, J., Modelling Macroeconomic Time Series with Smooth Transition Autoregressions.
Spagnolo, G., Essays on Managerial Incentives and Product-Market Competition.
Strauss, T., Governance and Structural Adjustment Programs: Effects on Investment, Growth and Income Distribution.
Svedberg Nilsson, K., Effektiva företag? En studie av hur privatiserade organisationer konstrueras.
Söderström, U., Monetary Policy under Uncertainty.
Werr, A., The Language of Change The Roles of Methods in the Work of Management Consultants.
Wijkström, F., Svenskt organisationsliv – Framväxten av en ideell sektor.