VTT PUBLICATIONS 762

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ISBN 978-951-38-7734-7 (soft back ed.)
ISSN 1235-0621 (soft back ed.)

ISBN 978-951-38- 7735-4 (URL: http://www.vtt.fi/publications/index.jsp)
ISSN 1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)

JULKAISIJA – UTGIVARE – PUBLISHER

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Kopijyvä Oy, Kuopio 2011

Raimo Hyötyläinen. Cellular-networked industrial enterprises in innovation paradigm. 2011. VTT Publications 762. 216 p.

Keywords business and innovation systems, firms, networks, industrial systems, Finnish business systems, medium-sized firms, theoretical and practical frameworks and models, research and development methods

Abstract

In this study, the focus is on business and innovation systems, learning and innovation patterns, innovative enterprises and business networks. In their development and renewal issues, businesses are facing an extensive and complex environment that requires them to have deep knowledge and create new solution alternatives. That is why the development of business and innovation systems and innovative enterprises and business networks must increasingly rely on research knowledge.

The aim of this study is to cover the main areas of business and innovation systems in the enterprise and network context. The objective is to develop new theoretical and practical approaches and openings for analysing innovative enterprises and networks in a complex business environment. The premise of this study is that enterprises that have a fuller understanding of future innovative enterprises and networks as well as their strategic change patterns will be better able to renew their businesses and networks.

The main finding of the study is that a paradigmatic change is ongoing in business and innovation systems as well as in production concepts. One of the reasons for this change is that enterprises are increasingly operating in a complex and changing environment. Another reason is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of business and innovation concepts as well as the concepts of the firm and the network. This study explicates a new concept of cellular-networked enterprises based on an analysis of business systems and production concepts as well as on innovation and networked approaches.

The theoretical view on business and innovation systems and their paradigms as well as on the viewpoints concerning business and industrial models is reviewed and analysed. In this study, the different theoretical approaches to the firm and network are reviewed and explicated. Four theoretical perspectives and

models are analysed. The first three are: the mass production model, transaction cost approach and competence-based approach. The fourth is a new approach to firms and networks that is argued and supported in this study: the hyper-innovation approach. It is based on the premises of complexity theories, and the new theories on strategising and organising.

Suitable strategic change models are then analysed. Three change models are distinguished: the planned change model, evolutionary change model and transformative change model. The transformative change model is an interesting new model that aims at radical steps for renewing businesses.

Learning and innovation patterns are analysed and assessed. There are different means of creating and utilising knowledge in the organisation. Reflective action and the formulation of hypotheses advance the creation of new innovative knowledge and innovation activity. Drafting a development agenda is the key to creating something new in the organisation. However, the actor role is of the utmost importance in the innovation activities and knowledge-creation processes of the organisation.

Innovative collaboration networks and their development are analysed and modelled. Four types of networks are explicated. The core firm model and strategic network model are mainly based on the exploitation of existing resources and competences, while the strategic alliance model and open innovation model are geared towards the exploration of new business opportunities. Collaborative networks cannot be thoroughly planned; there are always spontaneous elements in the formation of these networks. The planning and implementation issues of the competitive supply model, partner model, strategic network model and open innovation model are analysed and assessed.

The development and renewal models of business systems and industries are analysed and assessed. The business systems change model shows the business and industry change dynamics through different dimensions. The business development model shows the many dimensions of transforming business activities. The model of the change patterns of firms and industries shows the meaning of incremental change and radical change for industrial renewal processes.

The Finnish business system and its development are analysed and modelled. The Finnish business system has shown its dynamism. The development of the Finnish business system is modelled through many dimensions, from the beginning of the 1980s to the present. However, the Finnish business system has a number of complicating features, both now and especially in the future. As part of the Finnish business system, the growth and business strategies of medium-

sized firms are analysed and assessed. Four competitive and growth strategies are analysed and modelled: the systems supplier strategy, domestic-based strategy, niche strategy and system integrator strategy.

In this study, the practical subject is business and its change models. Practical management models are reviewed and assessed. The central focus concerns the management issues of industrial services and business systems. Different aspects of firms' capabilities and management systems are reviewed and analysed. The change process and phases for service business as well as the strategic change model of business systems are analysed and assessed.

Twelve business cases are described and analysed. The analysis is based on a model with three dimensions: resource exploitation, business renewal, and growth and internationalisation. A separate summary framework is created. The framework consists of the following: increasing efficiency, business renewal, networks, growth and internationalisation.

Research approaches and methods are analysed and modelled. The cyclical development model is a five-step model for developing and renewing business systems.

Preface

Research and development efforts concerning enterprises and networks have long been major topics in the Industrial Management area at VTT. This tradition goes back to the mid-1980s. In the first years, the major topics were technical change and the implementation of new technical systems as well as production changes and organisational innovations. As from the mid-1990s, the development objectives expanded to researching and developing business networks, founded on the principles of research-assisted development and based on case studies. Growth and strategy models for businesses emerged as new topics for research and development in the latter part of the 1990s; R&D on these topics were stepped up from the first years of the 2000s to the present. Recently, the innovation efforts of businesses have been the object of interest in research and development. Another closely related topic is the research and development of service business and service innovations. The development of industrial and business systems has become a research topic in recent times, as well.

Based on our research and development efforts, it has been acknowledged that there is an urgent need to conceptualise the characteristics and main features of future enterprises and networks as well as their renewal and innovation patterns. Due to the increasing complexity of the business environment, more dimensions than before underlie the need for profound changes in business and their networks. Businesses compete globally, which requires them to renew their business concepts and create new management and organisational innovations as well as product and service innovations.

For research and development, this is a challenge. It means that new theoretical and practical approaches must be introduced for research and development, because complexity of the development of enterprises and networks has increased. To address this challenge, a new effort to conceptualise the future features and forms of innovative enterprises and networks was launched in the In-

dustrial Management area at VTT in order to serve the future needs of growing enterprises and their networks that are going international, as well as to advance new management and innovation research and development approaches and models.

This publication is focused on business and innovation systems, learning and innovation patterns, innovative enterprises and business networks. As such, the publication covers the main areas of business and innovation systems in the enterprise and network context. This publication is aimed at bringing forward and handling new theoretical issues on production and business systems from the angle of innovation perspectives. Based on the theoretical consideration, the practical frameworks and models are analysed, with cases and their analysis. This publication is directed at researchers as well as advanced management.

In this publication, I will review and analyse the industrial development trends in the area of future innovative enterprises and networks as well as the renewal of business and innovation concepts. Network forms, innovation models, dynamic business models and strategising as well as the management models and new models of organising will be elaborated and conceptualised for research and practical purposes. The special focus in this publication is on the growth and development topics of medium-sized firms, as well as their business concepts and models. The research presented in this publication is also applicable to larger companies.

My own experience covers research and development activity in the Industrial Management area at VTT for over twenty-five years. My research and development topics have involved the development of enterprises and networks as well as the strategic and innovative aspects of business systems. Furthermore, research and development approaches and methods are one of my topics of interest.

I would like to thank all my colleagues in the Industrial Management area at VTT for their interesting and thought-provoking support. We have co-operated on many research and development projects. In addition, I have authored many publications together with some of my colleagues. Here I would like to especially thank Magnus Simons, Katri Valkokari and Maaria Nuutinen.

Espoo, May 2011

Raimo Hyötyläinen

Contents

1. Introduction

1.1 Starting point of the study

The main argument of this study is that a paradigmatic change is ongoing in business and innovation systems. One of the reasons for this change is that companies are increasingly operating in a complex and changing environment. Another reason is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of management and organisational concepts as well as the concepts of the enterprise and the network. This study explicates a new concept of cellular-networked enterprises on the basis of an analysis of business systems and innovative networked approaches. In addition to the theoretical emphasis of this study, the practical aspects of the business and change models are reviewed and assessed. Several of the premises of this study are presented below.

Due to the great changes happening in the global environment and the challenges these changes pose in different industrial sectors, there is a need to develop a new paradigm for business systems and suitable new forms for innovation systems. On the one hand, there is an urgent need to develop measures for increasing productivity in different enterprises and their networks. On the other hand, profound changes must be made in business and innovation systems, organisational and management forms, and production concepts. The paradigmatic changes also concern co-operative networks and industrial systems at large. These have at least three meanings (cf. Nooteboom, 2000; Iansiti & Levien, 2004a). First, they act as strategic platforms, in which different enterprises utilise their action models and are able to both renew themselves and grow – that is, to exploit the action models more effectively than before, as well as to explore new renewal opportunities (March, 1991). Second, they make it possible to create

new products and service concepts that support the creation of new businesses and the formation of new competitive factors. Finally, they can form new business systems and innovation models that lay the foundation for national advantages for firms and innovation systems (cf. Porter, 1990; Edquist & Hommen, 2008)

In recent years there has been growing interest in new business and innovation systems as well as the new management and production concepts of enterprises and networks, which are also major topics of this study. Many sources have touched upon the same kinds of themes, as well as the management issues and the forms of firms and networks. However, there is no clear definition of a firm. Different authors highlight different characteristics (e.g., Penrose, 1959, Williamson, 1975; Morgan, 1997; Fransman, 1998; Loasby, 1999; Birchall & Tovstiga, 2005).

In this study, the different theoretical approaches to business and innovation systems as well as to the enterprise and network will be reviewed and new approaches and models will be explicated. A new approach to business and innovation systems – called the hyper-innovation approach – will also be argued and supported, based on the premises of complexity theories and the new theories on strategising and organising. Strategic change patterns will also be considered and modelled. Three strategic change models are distinguished: the planned change model, evolutionary change model and transformative change model. The transformative model is a promising new model that supports profound changes in business and innovation systems.

1.2 Theoretical and practical aspects of the study

In this study, the theoretical view on business and innovation systems and their paradigms as well as the practical viewpoints concerning business and change models will be analysed and assessed. Next, these different aspects of the study are described.

Innovations and innovation systems are emerging one of the leading productional and financial trends that will shape enterprises and the economy in the future (e.g. Johnson, 1992; Nelson & Rosenberg, 1993; Gergils, 2006; Hommen & Edquist, 2008). There are many indications of this. Many authors have highlighted the importance of different aspects of the innovation paradigm. Open innovation has become an important perspective for business systems, enterprises and networks (Chesbrough, 2003). At the same time, there is ongoing discus-

sion about open business models and business model innovations (Chesbrough, 2003, 2006 and 2010, Hamel, 2007). Hippel (1988a and 2005) has developed the concept of user-driven innovation and constructed the concept of the democratisation of innovation. The main argument is that, in many cases, users and the user organisation develop technical and organisational solutions on their own. Suppliers then adapt these solutions and sell them on to their customers. Discussion on open and knowledge-creating organisational structures and networks has begun (e.g., Nonaka, 1991; Nonaka & Takeuchi, 1995). The new forms of epistemic communities and their network dimensions in the knowledge-based firm are conceptualised and evaluated (Cohendet & Amin, 2006). In the same way, Nooteboom (2004) emphasises the meaning of inter-firm collaboration for learning and innovation in the network context. However, innovation is also seen as the mission dimension in enterprises and networks (Lester & Piore, 2004).

It could be assumed that the innovation paradigm may develop further and assume more cohesive forms in the future. At the moment it is a collection of the new concepts of innovation and knowledge perspectives. If it is to become techno-economic paradigm, a pervasive technology must arise, such as some form of energy-saving technology (cf. Freeman & Perez, 1988; Freeman, 1990) that is connected to the aims of achieving a more sustainable environment and economy (Ekins, 1999; Worldwatch Institute, 2008; Palmberg & Nikulainen, 2010). It is evident that this will mean many profound changes in enterprises and networks. In the same way, there is a need to change the mindsets and perspectives of the management in enterprises and networks, as well as to adopt new organisational structures, management concepts and flexible economic systems. Hence, there is a great need to conceptualise the characteristics and forms of future enterprises and networks, which are the focus in this study.

Theoretical discussion on the new techno-economic revolution and the formation of the new production paradigm was already ongoing over two and a half decades ago. This discussion has been based on the view of information and communication technologies (ICT) as a general-purpose technology that will produce profound changes in the whole economy (Dosi, 1984; Freeman & Perez, 1988). However, the pace of change has varied in different countries, regions and branches of industry due to ICT and other structural transformations (e.g. Storper, 1997; Porter, 1990; Dunning, 2000; Guerrieri et al., 2001; Lincoln & Gerlach, 2004).

Freeman (1987, 110–117) stated that the structural crisis of the 1980s involved the transition of the world economy to a new phase based on information-intensive products and processes. He compares this to the 1930s, when the transition to a new energy-intensive mass- and flow-production system occurred. Paradigm changes of this kind give rise to a period of instability because they affect decision making in organisations and intensify the uneven development of the world economy. At the same time, such changes usher in the need for new regulatory institutional operations, both at national and international level.

In structural crises, enterprises are confronted with the need to change their production paradigm to cope with an entirely new techno-economic paradigm. That means changes in production processes, product mix, management and organisational systems, skill profiles and marketing (see Freeman, 1987; cf. Schumpeter, 1934). These changes are not only succeeding by incremental improvements. This process involves radical innovations and a major upheaval in industries. At the same time, it means structural changes in industrial structure. These changes depend upon structural reorganisation and institutional reforms as well as social innovations on a broad scale.

Nowadays, the techno-economic paradigm is changing. As Perez (2002) already stated ten years ago, this paradigm change will involve certain turning points. When assessing the long waves of the economy, it becomes apparent that the movement is now towards the deployment period of information and communication technologies. Due to that, the hectic phase of financial capital – the frenzied early phase of the techno-economic paradigm based on information and communication technologies – is mainly over. In a sense, the techno-economic paradigm based on information and communication technologies is entering in its steady phase.

Now, firms mainly have to acquire their money and earnings from their customers (cf. Perez, 2002). This means that the real economy is more important for firms than in the previous phase of economic development. The management innovations of the firms are in the forefront in this phase, as are the new forms of networks and innovation systems, and the new models of enterprises. In these kinds of production and economic phases, many different management, enterprise, network and innovation concepts compete with each other (see Hamel, 2007; cf. Freeman, 1987, 110–117).

That manifold view of enterprises and their management as well as of the renewal of businesses is also present in the literature. The most essential aspects of

industrial firms and innovation and their changing patterns are reviewed below. These aspects and viewpoints form the central starting points for this study and its contents.

First, Gary Hamel (2002) declares that it is time for an industry revolution. According to him, it is not enough to innovate only with respect to one's own industry recipes; one must also be capable of innovating one's past business systems. He calls for enterprise renewal, which is the capacity to reinvent not only processes and systems, but also the purpose and mission of firms (cf. Fransman, 1998; Coyle, 2003). Hamel demands a new kind of strategy process from enterprises. Normally, the traditional strategic planning process limits the scope of discovery to a narrow focus, and thus the firm cannot revolutionise its operation (cf. Ansoff, 1968). There is a need to move away from procedural and reductionist strategy-making towards creative, inventive and visionary strategy-making and management. In his business concept model, Hamel also addresses the boundary of the firm. In this respect, different value networks – such as suppliers, partners, and different kinds of coalitions – are an essential part of the configuration of an enterprise. In his later book, Hamel (2007) highlights management innovation. According to him, management innovation is of the highest importance; next is strategic innovation, then comes product/service innovation, and below that is operational innovation.

Further, Doz and Kosonen (2008) emphasise the strategic agility of a company. Their notes are based on the stories and analysis of large companies. They differentiate between three components of strategic agility: strategic sensitivity, resource fluidity and collective commitment. Their model of strategic sensitivity consists of many dimensions: business management (product lines, industries, market segments and processes), customer relations, active networking and influence (strategic partnership, partners, complementors), and strategic and operational relationships. However, Raynor (2007) sheds light on a strategy paradox, according to which most strategies are built on specific beliefs about the future. According to Raynor, a genuinely flexible strategy has two ingredients: scenarios and real options. With regard to flexible strategy, certain constituent variables have to be taken into account: the economy (GDP growth, capital market, client/consumer activity, government activities, workforce), the environment (energy, pollution, regular policies), technology, policy (factors influencing competition) and customer outlook.

Moreover, John Roberts (2004) has outlined the main features of the modern firm. Firms have changed the scope of their activities, refocusing on their core

businesses and outsourcing many of the activities that they previously regarded as central. Many have also redefined the nature of their relationships with customers and suppliers, often replacing simple arm's length dealings with long-term partnerships. Volberda (1998) has additionally classified different kinds of enterprise flexibility. The main types are strategic (long-term changes in the indirect environment), organisational (medium term, changes in the direct environment) and operational (short term, stable environment). Accordingly, designing new potential for flexibility involves three tiers: active flexibility, design flexibility and development flexibility.

On the other hand, Birchall and Tovstiga (2005) emphasise the meaning of technological innovation for the renewal of enterprises and networks. They argue for Future Proofing for the application of the right technological solutions. The major tools for this are scenarios, technology roadmaps, foresighting, and gap analysis. According to them, networks and clusters help firms to innovate and enhance the efficiency of their operations.

1.3 Focus and aim of the study

In this study, the focus is on business and innovation systems as well as innovative enterprises and networks in an increasingly complex environment, which demands an increase in theoretical knowledge and know-how. With regard to development issues, businesses are facing an extensive and complex environment, which requires deep knowledge and the creation of new solution alternatives. That is why the development of business and innovation systems, enterprises and business networks must rely more heavily on research knowledge.

Knowledge and know-how are needed in three different areas. First, it is necessary to deepen our knowledge of the phenomena and forms of future enterprises and their development mechanisms in order to create new approaches and new kinds of solution alternatives (e.g., Koivisto, 2005; Hyötyläinen, 2005; Baumard, 1999; Tidd et al., 2001; Norman, 2001; Lundvall, 2002; Faulkner,, 2003; Child et al., 2005). Second, knowledge of the theoretical and epistemological foundation of the phenomena of future enterprises is needed in order to understand the methods used for the acquisition and analysis of knowledge, as well as to create new analytical methods for studying the object of the future innovative enterprise (e.g. Hyötyläinen, 2005; Tsoukas, 2005). Third, it is necessary to develop and manage such research-assisted development methods based on case studies, which both make a research approach possible as well as support the

creation of new knowledge and practices, and take steps towards the future innovative enterprise (see Norros, 2004; Sayer, 1992; Archer, 1995; Heckscher et al., 2003; Caldwell, 2006).

These three viewpoints are demanding for any research and development efforts. This study tries to answer the first point by studying business and innovation systems and their future forms, as well as to examine the solutions open for enterprises and networks. The second point will be considered in the connection of the theoretical part of this study by defining new theoretical openings concerning firms, networks and business systems. The third view will be approached by analysing research and development models.

In this study, the major focus is on medium-sized product and production enterprises and networks, as well as their future forms and transformation alternatives (see Hyötyläinen, 2009). In a certain sense, the study also takes into account the development and management of large companies. However, such companies face multiform strategic and operational challenges (see Doz & Kosonen, 2008). They operate globally and are moving more of their sites and workforce abroad. Their development questions concern how to manage distributed businesses, networks and knowledge relationships. Some, medium-sized enterprises will have the same kinds of questions in the future, when they will internationalize any more their businesses and operations.

The aim of this study is to cover the main areas of business and innovation system challenges in the enterprise and network context. The target is to identify future industrial management and innovation challenges. The main industrial development challenges are related to complex business and innovation systems, enterprises and networks.

The main research question is:

- *How to manage business and innovation systems as well as innovative enterprises and networks in a complex business environment? What kinds of theoretical and methodological knowledge are needed to create new innovative business solutions?*

The study also seeks to answer several other research questions. There are three more exact questions:

- What are the factors and elements promoting creative business renewal and what kinds of business and innovation concepts support business renewal processes?

- What kinds of collaborative organisational and management models support innovative activities in business systems and industries? What strategies and forms support the development and growth of SMEs, in particular medium-sized product and production firms?
- How can the same organisation carry out business exploration and exploitation activities at the same time and how is this influenced by a network perspective?

These three research questions set demands for acquiring increased knowledge and know-how, which will be the major effort in this study. The central issues lie in the area of *Production change and organisational innovation.* The major challenges concern *Business networks and networked operations*, which mean the creation of new network concepts and the conceptualisation of new approaches supporting the development and renewal of business and innovation systems. The important facets in enterprise transformation are *Growth and strategy models for businesses*, which challenge firms to build a common theoretical base. This will help firms to overcome the current purely practice-oriented approach. It is also necessary to develop methods. This area requires new innovations that would create new models for the growth issues of businesses. Solution models consist of the analysis of the work that has been accomplished and the development of new approaches. It is important to increase local know-how, an effort that must be carried out in broad collaboration with different firms.

In this study, the area of the *Innovation efforts of businesses* is a central focus. Due to that, there is a need to create a suitable method and to unify and integrate all the different approaches in use in this area. New theoretical advances need to be achieved in order to solve the difficult development problems businesses face in their innovation efforts. The characteristics concerning *business systems and the development of an industrial system* are important parts of the system-wide development of innovative enterprises, as well as of developing systemic connections between innovation systems and new business activities. To this end, theoretical and practical new advances are needed in order to make progress in this area. Creation of the practical-adequacy of knowledge is a key problem (cf. Hyötyläinen, 2005; Pfeffer & Sutton, 2000; Argyris, 2003).

This study brings forward many new theoretical and practical viewpoints. New theoretical views of business and production concepts open new discussion on business and production paradigms, as well as on strategic change patterns. The development and renewal models of business and industries are new ap-

proaches to examine business renewal systems and their dimensions. The treatment of the Finnish business system is a new approach to consider concrete business strategies and models. The patterns of learning and innovation, although mainly revised text, increase the understanding of the dynamics of knowledge and innovative business systems. The forms of innovative collaboration networks are to some extent based on unpublished materials. The treatment increase of how different hyprid network models can progress the renewal of business systems. One of the aims of this study is to increase the practical-adequacy of the results of this study. The analysis of practical frameworks and models, as well as the handling of the case analysis framework and the analysis of the case materials will advance this practical-adequasy of this study.

The analyses and results of this study will serve to open new theoretical views on business and innovation systems, as well as to offer new solutions for practical business world. As such, the study and its theoretical and practical viewpoints and results are suitable for researchers and advanced managers.

1.4 Research approach and method

In this study, the relationship between business systems and innovative activities is viewed from theoretical and practical angles. The development of business systems is seen as an important part of the systemic development of businesses. Furthermore, the changes in production paradigms and business networks influence the advances in innovation systems in the business environment. The analysis of business and innovation systems as well as the strategic change of these systems is based on literature studies and previous research results of the author and colleagues (Hyötyläinen, 1998, 2000, 2005; 2006; 2007a, b; 2009; Hyötyläinen et al., 2002; 2005; 2010 and 2011; Hyötyläinen & Valkokari, 2009; Hyötyläinen & Nuutinen, 2010; Hyötyläinen & Simons, 2007; Simons & Hyötyläinen, 2009).

The author of this study has worked for over twenty five years in the Industrial Management area at VTT. I and some of my colleagues were at the beginning interested in the implementation of technical change in an organisation as well as the realisation of organisational innovations in work environment. Later on, the questions on factory concepts as well as network business models became the subject of interest. The strategy and growth models of business systems became next one of our topics. Recently, innovation management has become

more focused area of study. Business and industrial systems are also interested by some researchers.

This study determines the industrial development trends and forms in the area of business and innovation systems as well as the future innovative enterprise, its organisation and network management. The main focus is on business and innovation systems, and expanding organisations and networks. At the same time, the development processes and methods concerning the formation and implementation of new innovative enterprise and network solutions are outlined and formulated. When enterprises have a fuller understanding of future business management practices as well as the methods of strategic change management, they are better able to renew their businesses and networks.

This study adopts the system view to investigate the different theoretical and practical points based on the different literature sources and research results (cf. Hyötyläinen, 2000). The analysis of study materials is viewed from a systemic perspective. The purpose of the study is to identify new approaches and models for learning and innovation patterns, business and innovation systems and networks as well as for assessing the meaning of business and production concepts in order to promote the innovativeness of businesses and the new forms of innovative enterprises.

Part of the analysis in this study is case analysis. As an example of business systems, the Finnish business system and its development are analysed. Some material concerning medium-sized firms is presented as part of the analysis of the Finnish business system. Furthermore, twelve business cases and their dimensions are described and analysed.

1.5 Structure of the study

The objective of this study is to develop new theoretical and practical approaches and openings for business and innovative systems, innovative enterprises and networks in a complex business environment. The hypothesis is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of business and innovation systems as well as enterprise and network concepts. The premise of this study is that enterprises that have a fuller understanding of future innovative enterprises and networks as well as their strategic change patterns are able to better renew their businesses and networks.

This study consists of two parts. Part I concentrates on the theoretical view on business and innovation systems. Part II concentrates on the practical aspects of

business and its change models. This study consists of an introduction and eleven chapters. Chapters 2–8 belong to Part I and Chapters 9–11 to Part II of this study. Chapter 12 concludes and assesses the study results.

The structure of the study is shown in Figure 1.

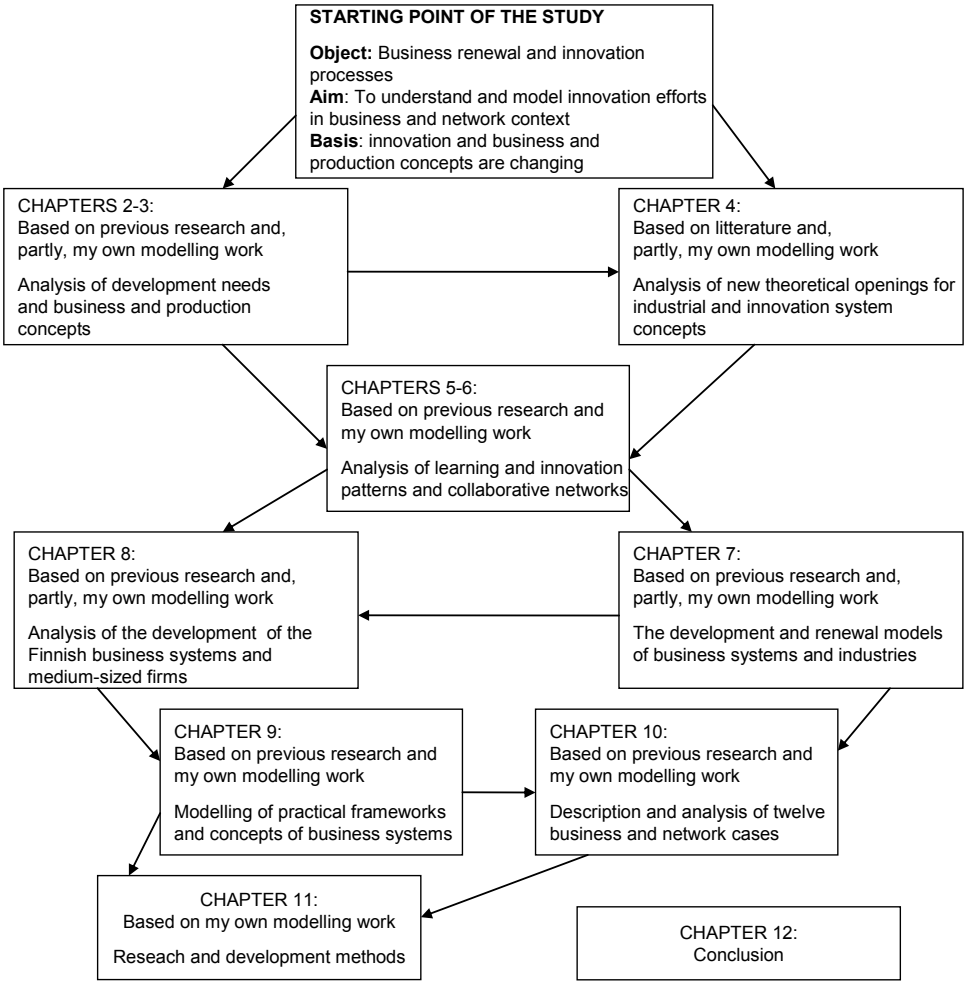


Figure 1. Structure of the study.

Chapter 2 describes industrial management and innovation challenges. A number of major industrial development trends influence the restructuring of production and innovation paradigms as well as the growth and change patterns of enterprises and networks. These industrial trends pose many challenges to industrial management and innovation research. The starting points for industrial management and innovation research are approached through the research tradition of the Industrial Management group at VTT. The concept and model of research-assisted development are analysed. In the same way, the development of the research focus is shown and the major research topics are discussed.

Chapter 3 lays the groundwork for this study. It includes an analysis of the development of business and production concepts. Four business and production concepts are discerned. A new, open innovation-based concept called the co-configuration concept is identified. Its organisational form resembles that of cellular and network organisations.

Chapter 4 is a theoretical analysis of business and innovation systems based on the main questions concerning firms and networks. Four theoretical perspectives and models are analysed: the mass production model, transaction cost approach, competence-based approach and hyper-innovative approach. This is a new approach. The main focus is on this new approach and its analysis. Suitable strategic change models are then analysed. The transformative change model is an interesting new model that aims at radical steps for renewing businesses.

Chapter 5 includes an analysis of learning and innovation patterns. There are different means of creating and utilising knowledge in the organisation. Reflective action and the formulation of hypotheses will facilate the creation of new innovative knowledge and innovation activity. Drafting a development agenda is the key to creating something new in the organisation. However, the actor role is of the utmost importance in the innovation activities and knowledge-creation processes in the organisation.

Chapter 6 includes an analysis of innovative collaborative networks. Four types of networks are explicated. The core firm model and strategic network model are mainly based on the exploitation of existing resources and competences, while the strategic alliance model and open innovation model are geared towards the exploration of new business opportunities. Collaborative networks cannot be thoroughly planned; there are always spontaneous elements in the formation of these networks. The hybrid models of innovative networks depict the five network models with several dimensions. The planning and implementa-

tion issues of the competitive supply model, partner model, strategic network model and open innovation model are analysed and assessed.

Chapter 7 includes an analysis of the development and renewal models of business systems and industries. This chapter creates the models, concluding the major themes of this study. The business systems change model shows the dynamics of business and industry change through several dimensions. The business development model also shows many dimensions of transforming business activities. The model of the change patterns of firms and industries shows the meaning of incremental change and radical change for industrial renewal processes.

Chapter 8 includes an analysis of the Finnish business system. The Finnish business system has shown its dynamism. The development of the Finnish business system is modelled through many dimensions, from the beginning of the 1980s to the present. However, the Finnish business system has a number of complicating features, both now and especially in the future. As part of the Finnish business system, the growth and business models of medium-sized firms are analysed and assessed. Four competitive and growth strategies are analysed: the system supplier strategy, domestic-based strategy, niche strategy and system integrator strategy.

Chapter 9 describes and assesses practical management models. The central section of the chapter concerns the management issues of services and business systems. Different aspects of firms' capabilities and management systems are reviewed. The change process and phases for service business as well as the strategic change model of business systems are analysed and assessed.

Chapter 10 describes and analyses twelve business cases with different dimensions. The analysis is based on a model that has three dimensions: resource exploitation, business renewal, and growth and internationalisation. A summary framework was created for analysing the main features of the cases.

Chapter 11 includes the research and development models. The cyclical development model is a five-step model for developing and renewing business systems.

Finally, Chapter 12 concludes and assesses the study results.

PART I: THEORETICAL VIEW ON BUSINESS AND INNOVATION SYSTEMS

The objective of Part I of the study is to develop new theoretical approaches and openings for analysing business and innovation systems, innovative enterprises and networks as well as production models in a complex business environment. The hypothesis is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of business and innovation concepts as well as the concepts of the enterprise and network (cf. Cohendet & Amin, 2006). The premise of this study is that enterprises that have a fuller understanding of future innovative enterprises and networks as well as their strategic change patterns are able to better and more innovatively renew their businesses and networks.

A paradigmatic change in business systems and production concepts is ongoing (cf. Roberts, 2004; Hamel, 2007). One of the reasons is that enterprises are increasingly operating in a complex and changing environment. Another reason is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of business and innovation concepts as well as the concepts of the firm and the network.

During the past few years, the need to develop and adopt new business systems and industrial models has been of great importance for successful businesses (Hamel, 2007). A central reason for this is that firms are increasingly operating in a complex and changing environment.

Part I consists of seven chapters. In Chapter 2 of this study, we will discuss industrial management and innovation challenges. Industrial development trends raise many challenges to industrial management and innovation research. The starting points for industrial management and innovation research are approached through the research tradition of the Industrial Management area at VTT. The concept and model of research-assisted development are analysed. In the same way, the development of the research focus is shown and the major research topics are discussed.

In Chapter 3 of this study, we will discuss and model business and production concepts. There are great differences between the different concepts.

In Chapter 4 of this study, we will examine new theoretical openings in business and innovation systems. Four theoretical perspectives and models are analysed: the mass production model, transaction cost approach, competence-based

approach and hyper-innovative approach. The latter is a new approach. The main focus is on this new approach and its analysis. Different strategic change patterns are also analysed. The transformative change model aims at radical steps for renewing businesses.

In Chapter 5 of this study, we will review and analyse the patterns of learning and innovation. Learning and innovation models and their formation are studied in this chapter. Knowledge and its formation are mainly based on reflective action and the formulation of hypotheses. Actor roles are of central importance in many knowledge-creating processes in the organisation.

In Chapter 6 of this study, we will devote special attention to the forms of innovative collaboration networks. Four types of networks are explicated. The core firm model and strategic network model are mainly based on the exploitation of existing resources and competences, while the strategic alliance model and open innovation model are geared towards the exploration of new business opportunities. The hybrid models of innovative networks depict five network models and their features. The planning and implementation issues of network models are analysed and assessed.

In Chapter 7 of this study, we will analyse the development and renewal models of business systems and industries. The business systems change model shows the dynamics of business and industry change through different dimensions. The business development model also shows the many dimensions of transforming business activities. The model of the change patterns of firms and industries shows the meaning of incremental change and radical change for industrial renewal processes.

Finally, in Chapter 8 of this study, we will consider the Finnish business system and its development. The treatment of an empirical business systems case will close Part I of this study of business systems and innovation models. The development features of the Finnish business system are modelled through many dimensions, from the beginning of the 1980s to the present, and future features are assessed. As part of the Finnish business system, the growth and business strategies of medium-sized firms are analysed, modelled and assessed.

2. Industrial management and innovation challenges

2.1 Industrial development trends

In the past few years, many lines of business have faced restructuring due to radical changes in business and innovation paradigms, as well as in the growth and change patterns of enterprises and networks. The ongoing formation of the new business and innovation paradigm has created a new trend affecting many dimensions of the economy and businesses (Thore, 1999; Hamel, 2007). That trend has led to the emergence of situations where enterprises form new business concepts and enterprise networks in order to be able to compete globally. For Finnish industry, this trend means new competitors and international operations. Medium-sized product and production firms are also at the forefront of the new challenges due to the internationalisation needs of firms as well as the new competition from the global markets. The changes to businesses also affect the strategic positioning and business operations of the enterprises as well as at level of networks. The changes and development trends may be presented as follows (cf. Miles et al., 1999; Cohendet & Amin, 2006; Foray, 2004):

1. *The nature of business is changing*. Global competition means tighter competition between individual companies and networks. Moreover, customer expectations and customer behaviours as well as rapid technology development affect the products and services that are produced and delivered. The nature of products is transforming: they are turning into solutions that usually cover both physical products and related services. Customers are becoming active partners in the development of new products and services (Prahalad & Ramaswamy, 2004; Hyötyläinen & Nuutinen, 2010). That means that the focus of businesses has to be more customer- and market-oriented.

Furthermore, this means that both the nature of businesses as well as products and services is becoming more complex and are changing continuously (cf. Thore, 1999).

2. *Rapid technology development* requires the efficient management of new kinds of business and technology frameworks and platforms that serve the renewal of businesses and innovation systems. At the same time, the life-cycles of products are often short due to intense product development. As new products and advanced products are launched on the market, the earlier generations become obsolete (Thore, 1999; Birchall & Tovstiga, 2005). One of the major future focuses of technology development is energy- and environment-saving solutions (Ekins, 1999). However, heated rivalry over new technology and design concepts is ongoing in this area (cf. Rosenberg, 1976; Sahal, 1981). At the same time, new technology concepts are closely connected with organisational, management and innovation systems and their new alternatives (cf. Freeman & Perez, 1988; Hamel, 2007).

3. *Business growth and the identification of new businesses* are major challenges for firms and networks (see Penrose, 1959; Roberts, 2004, 243–280). In particular, it is difficult for small and medium-sized firms to achieve growth (Bridge et al., 1998; Hyötyläinen, 2009). However, the growth patterns of firms are hard to achieve because the nature of the path for growth is normally nonlinear and complex (Thore, 1999).

4. At the same time, *the concepts of the firm and network* are under change. The perspectives on strategy and organisation are forming a new synthesis based on approaches that are more process-oriented and holistic than before (Whittington & Melin, 2003).

5. *Learning and innovation models* are changing. Open and interactive learning models are achieving footholds in the literature, as well as in firms and networks (Chesbrough, 2003; Lundvall, 2006). At the same time, a practice-based view of knowing and learning in organisations is being formed (Nicolini et al., 2003; Johnson et al., 2007).

6. *Knowledge and the communication* of meanings have become an important factor both in organisations and at network levels. Knowledge-creating processes and the transfer of tacit and explicit knowledge between the different layers and actors in the organisation as well as at network levels are essential in order to establish shared visions, objectives, interpretations and new prac-

tices (cf. Nonaka & Takeuchi, 1995; Baumard, 1999; Fransman, 1998; Valkokari, 2009).

All the industrial and conceptual development trends summarised above mean changes to business and innovation concepts and strategies, learning and innovation management, and finally the earnings logic and strategic positioning of enterprises and enterprise networks. This development can be summarised as a collaborative business system that includes global players and large companies, as well as local, small and medium-sized enterprises (Simons & Hyötyläinen, 2009; Hyötyläinen, 2009). The main challenge of this development is to create and test business and innovation systems as well as enterprise and collaborative network models. This poses new challenges for industrial management and innovation research.

2.2 Industrial management and innovation research challenges

Business and innovation systems as well as enterprise and network management can be seen as organisation and management innovations of the new business and production paradigm that are closely connected to new information and communication technology tools (Freeman & Perez, 1988; Castells, 1996; Sproull & Kiesler, 1991) as well as to energy-saving and environmentally sustainable technologies (Ekins, 1999). At the same time, a new feature is emerging in the networking scene. Both *strategic* and *open innovation networks* are forming, and they will gradually be applied in practice in enterprises and networks. Nowadays, many companies are seeking new *service concepts*, developing new business models and planning the systems to provide them. In addition, their connections to customers are becoming tighter and grounded on long-term relations. Companies are moving from mere product-selling agencies to service businesses. One example of this development is selling capacity instead of production systems and spare parts (Hyötyläinen et al., 2002; Hyötyläinen & Nuutinen, 2010).

Another new feature is that *co-operation between companies* is taking on new and greater forms. *Partnership* co-operation has emerged as a central mode of thought and operation – it emphasises relationships between two companies (Rackham et al., 1996; Nooteboom, 1999). In partner – or partnership – co-operation, relationships between companies are undergoing significant changes.

The development is ushering in a transition to closer co-operation than ever before. This phenomenon means that companies are becoming increasingly more involved with each other's strategic plans and development strategies. Co-operating companies will pay greater attention to activity processes and associated communication links, implementation of quality assurance systems and their increasing participation in research and development work.

New dimensions of the concepts and systems of networking are forming. The emergence of *strategic enterprise networks* is the subject of more discussion (Jarillo, 1993; Child & Faulkner, 1998; Hines et al., 2000; Hyötyläinen, 2000; Möller at al., 2004). Companies form enterprise networks that possess mutual development programmes and a shared vision of product development. Innovative abilities, operational flexibility and shared values are emphasised in the development of enterprise networks. At this level, co-operation goes beyond partner co-operation. There is a shift from a bilateral partner relationship to *multilateral co-operation* (Jarillo, 1993; Hyötyläinen, 2000; Hyötyläinen et al., 1997 and 1999; Valkokari, 2009). This shift occurs when companies operating within a network develop a strategic system with its own relationship network.

Third, concepts and perspectives on *learning and innovation* have emerged in connection with the discussion of enterprise networks, in particular, strategic networks (Child & Faulkner, 1998; Hyötyläinen, 2000). The emergence of co-operation forms and networks among companies has brought new challenges for the companies and for the management of their learning and innovation processes (see Kanter, 1983; Burgelman & Sayles, 1986; Nonaka & Takeuchi, 1995; Dixon, 1999). The issue is even more problematic when the objective is to create strategic enterprise networks followed by the consequent emergence of innovation and expertise centres that will advance enterprise growth and globalisation (see Child & Faulkner, 1998; Child et al., 2005).

There is a need for *new business and networking concepts*. We need new models for enterprise networks. We live in a 'world of rapid change and complexity', where the differentiation of products is more important than economies of scale, and learning in all of its forms is central (Nooteboom, 1999; Sherman & Schultz, 1998 Hyötyläinen et al., 2002). Companies have to manage many targets simultaneously in order to develop their businesses. The basic target is to increase the efficiency of operations. New targets concern learning and innovation through the enterprise network. Furthermore, the new targets of companies are to create new product concepts and service businesses through networking.

Such targets imply totally new kinds of business concepts and network relations. This is a great challenge for research. New features and concepts in industry are emergent phenomena. Creating new concepts and methods to explain new development mechanisms is a demanding task. There is also a need to develop new kinds of research approaches and methods (cf. Hyötyläinen, 2005). One could say that a conceptual understanding of the formation of new businesses and networks facilitates transformation processes in firms and the application of new business and network concepts.

2.3 Starting points in industrial management and innovation research

2.3.1 Research approach

The Industrial Management research group at VTT has practiced research and development for twenty-five years now. From the beginning, our focus has been on practical development, whose role has only grown over the years. At the same time, we have created and developed methods for practical development activities. The created development method is called a development cycle. When solving business problems, researchers at the VTT Industrial Management group apply a cyclical development procedure. We have developed research and development methods based on a case- and research-assisted approach ever since we started our research and development activities in the mid-1980s (Toikka et al., 1988; Alasoini et al., 1994; Hyötyläinen, 1998, 2000, 2005 and 2007a, Hyötyläinen & Simons, 2007).

When we do more in-depth development work, it is necessary to increase levels of research. The interaction pattern models in co-operation with development projects in practice and theoretical concepts are presented in Figure 2.

Figure 2. Research-assisted development and its conceptual levels (Hyötyläinen, 2005, 45).

We call our research and development model research-assisted development (see Alasoini, 2005a; van Aken, 2004 and 2005; Larsson, 2006). We have a long tradition of research-assisted development. By a research-assisted approach we mean development which, on the one hand, supports the development of businesses and organisations using knowledge based on research data, and also emphasises, on the other hand, the need to create new conceptual knowledge that can be generalised (Alasoini, 1999 and 2005a; cf. Eisenhardt, 1989; Yin, 1994).

The research-assisted model emphasises the close connection and lively interaction between research and practical development work. In this way, the research-assisted development process is associated, on the one hand, with the research world's theoretical concepts, and, on the other hand, is focused on developing practical activities. Thus, the research-assisted model is positioned between the model world and the real world (Hyötyläinen, 2005 and 2007a).

The object of research-assisted development is usually the formation of new action methods in an organisational context. The research context is associated with ongoing functional, productive, technical and strategic changes. This forms the basis for a development project in which the researchers co-operate with the organisation's personnel. The development projects focus on the practice, analysis and solution of development problems (cf. Bruce & Wyman, 1998).

Based on the results from the development projects and the analysis of the collected material, the solutions and the methods can be conceptualised. The new

development concepts and concepts that describe the activities can then be obtained. These concepts will form the basis for new development projects that can be formulated and initiated.

At the same time, according to our approach, we will use the development concepts and the activity concepts to conduct a theoretical discussion by means of the theoretical contextualisation of concept models (cf. Meredith, 1993; Sayer, 1992, 56–65). Through this, an effort is made to make theoretical descriptions and explanations, and to present interpretations. The achieved theoretical knowledge makes it possible to create new development and activity concepts. This can be considered to be the knowledge that will guide operations (cf. Arbnor & Bjerke, 1997; Nooteboom, 2000).

2.3.2 Development of research focus

The research and development work of the Industrial Management group at VTT covers the following *six areas*: technological change; production change and organisational innovations; business networks and networked operations; growth and strategy models for businesses; innovation efforts of businesses; and the development of an industrial system.

The development issues of the area *Technological change* are concerned with the implementation and utilisation of technical systems as well as information systems with methods supporting their development and implementation. Research and development issues involve the interactive mechanisms of technology and organisation and their management (Toikka et al., 1986; Hyötyläinen et al., 1990; Hyötyläinen, 1993, 1994, 1998 and 2005; Kuisma, 2007; see Checkland & Holwell, 1998). Organisational learning processes play a central role both in the definition of technological concepts and their implementation models (Kettunen & Simons, 2001; Norros, 2004; cf. Dittrich & Lindeberg, 2004).

The research questions of the area *Production change and organisational innovations* address the problems of the interactive mechanisms of strategy, organisation and operation methods, the ways to manage this interaction and advance business operations while bringing about production changes (Hyötyläinen et al., 1991; Alasoini et al., 1994; Simons & Hyötyläinen, 1995; Hyötyläinen, 1998 and 2000; see Alasoini, 2004; Hagström & Hedlund, 1998; Beer & Nohria, 2000; Henriksen et al., 2004). This approach is different from the traditional strategy-structure setting (Chandler, 1962). This approach examines the question from a triangular point of view with the operation method and its development in

a central position. These issues include production change, organisational innovations, and the formation of mental and identity models and their changes (Nuutinen, 2006).

Business networks and networked operations is the largest area within VTT Industrial Management. Development issues are involved in network concepts and models, in the development dynamics of networks and in the development and building methods of networks (Kuivanen & Hyötyläinen, 1997; Simons et al, 1998). A major question concerns the issues surrounding network growth and new businesses (Mikkola et al., 2004; Simons & Salkari, 2006). This comes back to the triangle: efficiency – flexibility – innovativeness. It is assumed that the management and building models of networks play a key role in the resolution of this triangle (Hyötyläinen, 2000; Häkkinen, 2008; Valkokari, 2009).

The development issues of the area *Growth and strategy models for businesses* address the strategic innovations and business models of enterprises as well as the development of control models and operations methods (Kuitunen et al., 2003; Koivisto, 2005; Simons & Hyötyläinen, 2009; Hyötyläinen, 2009; see Baden-Fuller & Pitt, 1996; Markides, 1997; McGrath & MacMillan, 2000). Here, the strategic issues of businesses take centre stage. Of further importance is how a strategy is formulated. In this area, strategy is not seen as being set in a top-down process, but within a complex and uncertain process taking place in different interactive relationships playing an essential role (see Mintzberg, 1994; Mintzberg et al., 1998). In this context, there have been attempts to conceptualise service business as a new phenomenon (Hyötyläinen et al., 2002; Kalliokoski et al., 2005; Grönroos et al., 2007; Hyötyläinen & Nuutinen, 2010).

The development issues of the area *Innovation efforts of businesses* concern the nature and implementation of systemic innovations as well as the innovation and development systems of businesses and related management questions (Apilo et al., 2007 and 2008; Kettunen et al., 2008; see Drucker, 1985; von Hippel, 1988a; Tidd et al., 2001). In recent years, research and development efforts in this area have included redefining their field of research. Furthermore, research focuses have also been analysed and defined with greater precision (Apilo, 2010; Hyötyläinen et al, 2011).

A new area consists of *the development of an industrial system.* This area, which is still taking shape, addresses the network of business networks, technology networks and other similar operation forms that are more concrete than industries or clusters (Hyötyläinen et al., 2004; Koivisto et al., 2004; cf. Porter, 1998 and 1990). Development issues concern the meso-level models of an inno-

vation system and the verification of these new operational models. Another issue is the creation of development models suitable for this area. Concept development methods, analytical methods and development methods are among the possible approaches.

2.3.3 Future challenges

Research and development work in the VTT Industrial Management area is facing new challenges. These challenges have to do with the characteristics of development in the business world, but any solution models must also consider the trends at work in the world of research.

In an increasingly complex working environment, the need for change in businesses and their networks is seen in more dimensions than before. Businesses compete globally, which requires them to renew their business concepts and create new functions as well as product and service models.

With regard to research and development, the management of increasingly complex phenomena demands an increase in theoretical know-how. As businesses are facing extensive and complex development issues that require deep knowledge and the creation of new solution alternatives, the development of businesses and business networks must increasingly rely on research know-how.

Such a situation demands a new kind of learning and innovation theory. Such theory is needed for businesses, business networks and research purposes alike (Sparrow, 1998; Simons & Salkari, 2006). It is necessary to create a new learning model for the expanding development cycle and its application. In businesses and business networks, development measures are extensive in scope and take many forms. “Local” learning takes place in connection with individual measures, but it is a challenge to connect it with the broader learning process in the organisation.

3. Development of business and production concepts

In recent years, there have been a growing interesting in new business and production concepts as well as business changes (Tsoukas & Chia, 2002; Roberts, 2004; Hamel, 2007 Doz & Kosonen, 2008). Many lines of businesses have faced restructuring due to radical changes in business and production concepts. This has led to the emergence of situations where enterprises form new business and production models and networks in order to be able to compete globally.

Business and production concepts are undergoing paradigmatic changes. The development of production paradigms has implied changes in many dimensions. Four production paradigms that have partly followed after each other can be discerned. The production paradigms have also been connected to the broad picture of societal changes. At large, it can be considered to have the great shifts in machine-like business and organisational concepts into the information age business concepts and now we stand at the threshold of knowledge age business concepts. Today there is an expectation of continuous innovation as well as new business and organisational forms (Miles et al., 1999; Chesbrough, 2003 and 2006; Cohendet & Amin, 2006).

3.1 Business and production concepts

Originally, the standardisation phase was based on hierarchical and functional forms of organisation and standard products and services, beginning largely in the 1930s. The early phase of customisation began during the period of standardised production back in the middle of twentieth century. In early customisation, enterprises increased their offerings and utilised their resources effectively. Later, customisation developed into mass customisation (Miles et al., 1999; Pine, 1993).

Table 1 presents four different business and production concepts. The first three are process rationalisation and streamlining, core competence development and mass customisation. A new business and production concept is just forming. It can be called co-configuration, which describes innovation and co-creation principles. These business and production concepts describe the development of businesses and production over the time period from the 1980s to the present. Co-configuration will largely be realised in the future.

Table 1. Business and production concepts (adapted from Hyötyläinen & Nuutinen, 2010; Hyötyläinen, 2007b; Alasoini, 2004; Miles et al., 1999).

Dimension	Process rationalisation and streamlining	Core competence development	Mass customisation	Co-configuration
Driving force	Efficiency and process improvement	Business and core competence building	Flexible responsiveness	Innovation ability and open innovation
Core activity	Production and its models	Business and competence models	Customer solutions	Knowledge-creation and combination
Action processes	Production and supply chain processes	Action and network processes	Product and network Management processes	Value-creation and customer processes
Control model	Detailed rules, direct control	Resource and competence evaluation	Performance management and control	Visions and values as well as knowledge and knowhow assessment
Organisational form	Divisional and process-based forms	Process and network structures	Matrix and horizontal forms	Cellular and network organisations
Customer model	The use of sales information	The use of customer and network information	Expanding customer understanding	Customer as co-partner, interaction model
Development focus	Production and functions	Core business and network	Flexibility and network management	Foresight of customer needs and models
Potential growth model	Incremental product, process organisational innovations	Core activity development, use of networks: new products and services	Market differentiation, expanding use of networks: new products and service business	Extensive knowledge application in value networks: new business and service concepts
Assessment criteria	Productivity, quality	Efficiency, rapid response ability	Ability to use resources	Ability to create and organise knowledge-creating processes

In the rest of this chapter, the features of the different business and production concepts are described and analysed. In the following chapter, the treatment of business and production paradigms will be more theoretical. In addition, strategic change patterns as well as the models of change within firms and networks will be reviewed.

Table 1 presents eight dimensions through which each business and production concept is analysed. The dimensions are: driving force, action processes, control model, organisational form, customer model, development focus and potential growth model as well as assessment criteria. These dimensions are essential features by which business and production concepts and their development can be described.

Firms, also in Finland, tried to move from hierarchical and functional organisational forms to a more *process-oriented approach* in the 1980s and in the early 1990s (Hammer & Chamby, 1993; Simons et al., 1998). At the same time, they concentrated any more into their *core businesses and competences* (cf. Prahalad & Hamel, 1990; Wernefelt, 1997). This meant an increase in network relationships and the advancement of new network forms. At the moment, firms are mainly focusing on the models of *mass customisation* and applying its principles to product and service development and are entering into more customer-oriented business (cf. Pine, 1993; Hyötyläinen & Nuutinen, 2010).

The driving force behind *process rationalisation and streamlining* is efficiency and process improvement (Rummler & Brache, 1990). The core activity is mainly founded on production and its models as well as their development. Action processes concern production and its supplier chains (cf. Porter, 1985). The production and product approach has served as the basis for developing action processes. When constructing supplier chains the main principle is to establish bilateral relationships between two firms. In this case, the core company has the main responsibility for development work. Streamlining also concerns the entire order-to-delivery process including the own production process of an enterprise as well as supply chains (Alasoini, 2004). The action of the model is controlled by detailed rules and direct control methods. The organisational form is based on a divisional and functional structure. To relieve the problems inherent in this kind of structure some process-oriented features have been adopted. In this case, the customer model is based on gathering information about customers, mainly using sales information. Customers are seen as passive actors to which the firm offers ready-parcelled products and services (Hyötyläinen, 2007b). The development focus is mainly on production and the different functions of an organisa-

tion. The growth model of the production concept is mainly founded on incremental changes in products, processes and organisational settings. In this case, the main assessment factors are productivity and quality. The overall aim in streamlining production chains is to shorten delivery times.

The driving force behind *core competence development* is business and core competence building. Due to the globalisation of competition, accelerating cycles of innovation and technological development are driving enterprises to focus on their core competences (Alasoini, 2004). The core activity is directed at the formation of business and competence models. Action processes contain action and network processes. This is leading to a growing need for co-operation between enterprises. When enterprises concentrate on their core competences, they have to acquire other resources from other firms. Thus, networks are established around the firm. The control model in this case is based on the evaluation of resources and competences in the firm as well as at network levels. The typical organisational form resembles process and network structures. The customer model is based on the full use of customer information, drawing also on the information coming from network sources. The development focus is on developing the core business as well as the network and its relationships. The potential growth model in this case is core activity development as well as the use of networks. This enables the development of new products and services for business success. The main criteria for assessing action are efficiency and rapid response ability as well as the use of the competences of networks.

The driving force behind *mass customisation* is flexibility and responsiveness, which mean the customisation of products for different customers and market segments (cf. Pine, 1993). The core activity focuses on the honing of customer solutions. The aim is to produce these solutions efficiently and cost-effectively. Action processes refer to product and network management processes. New processes are needed in order to use and extend enterprises' capabilities. The network model evolved from the late 1970s to the 1990s becoming a network organisation (Miles et al., 1999). At the same time, the network organisation evolved multiform features in which numerous partners co-operated with each other in order to offer increased overall flexibility and therefore more opportunities for customisation (Miles & Snow, 1984; Miles et al., 1999). The control model is mainly based on performance management and control. Normally, the organisation form in this case resembles a matrix organisation in its more horizontal forms. The customer model is aimed at increasing customer understanding, with a greater customer focus orientation (Hyötyläinen, 2007b). Products

and services are tailored according to each customer. However, the goal is to modularise products to enable the easy and effective combination of customer solutions. The development focus is on increasing flexibility as well as on network management development. The potential growth model is built on market differentiation (cf. Porter, 1985) as well as the increasing use of networks. Firms can then develop new products and service businesses. The main criterion for action is the ability to use in-house resources and harness the resources of network partners in full.

Co-configuration is a new business approach to production concepts. The driving force behind this approach is innovation ability and open innovations (Chesbrough, 2003). The core activity is knowledge-creation and combination in organisational and network contexts (Nonaka, 1991; Nonaka & Takeuchi, 1995; Dixon, 1999). Action processes are directed towards value-creation and customer processes (cf. Prahalad & Ramaswamy, 2004; Hyötyläinen & Nuutinen, 2010). The control model in this case is mainly based on the assessment of how visions, values, knowledge and knowhow are advanced in the organisational and network context. The organisation form bears a greater resemblance to cellular and network-type organisation patterns. A cellular organisation is made up of cells, which can be self-managing teams, autonomous business units and other autonomous units. These units can operate alone while interacting with other cells. This structure can produce a more potent and competent business mechanism that generates know-how that in turn produces continuous innovation. Each cell must be able reorganise itself continually in order to make its expected contribution to the overall organisation (Miles et al., 1999; Cohendet & Amin, 2006). In this case, the customer model is based on an interactive model where the customer is seen as a co-partner in developing new products and services. The co-evolution of markets and organisations is the current trend (Miles et al., 1999; Hyötyläinen, 2007b). The development focus is shifting to use foresight methods in determining the future customer needs and acting models. The potential growth model is founded on the extensive use and application of different types of knowledge in value networks. The aim is to create new business and service concepts (cf. Hamel, 2007). Action is evaluated and assessed in terms of how well the enterprise is able to create and organise knowledge-creating processes.

As a new business and production concept, co-configuration poses a great challenge for research. New features and models in industry are emergent phenomena. It is a demanding task to create new concepts and methods for explain-

ing new development mechanisms concerning the co-configuration model. For that, there is also a need to develop new kinds of research models and methods (Henriksen et al., 2004; Tsoukas, 2005). One could say that the conceptual understanding of the formation of new network and business models, as well as of these models themselves, facilitates the transformation processes in firms and the application of new business and network models.

3.2 Summary of business and production concepts

The era of mass standardisation was described on mass production and mass consumption. The organisation of that era resembled the Fordist production model. The basic model was a functional organisation type. The post-war era up to the early 1970s could be described as the golden age of the Fordist model (Alasoini, 2004). Enterprises engaged in process reengineering and streamlined processes, beginning from the 1980s and especially in the 1990s. In many cases enterprises adopted divisional organisation structures in order to be able to separate their businesses and, at same time, be able to take advantage of operating know-how and knowledge over different divisions. Mass customisation began in its present form in the 1980s (Miles et al., 1999; Pine, 1993). The organisational form resembled matrix structures, with network organisations. Innovation and continuous process innovation are currently forming a new paradigm for the business and production concept. Its organisational form will be a network and cellular structure.

Different organisational forms provide different opportunities for different layers to take part in the development efforts of an organisation. These layers can be separated into three: top management, middle management and lower workers. Table 2 presents how the different layers can participate in the development in different organisational forms.

Table 2. Location of managerial know-how in alternative organisational forms (Miles et al., 1999; cf. Porter, 1990, 683–685).

Organisation form	***Operational know-how***	***Investment know-how***	***Adaptation know-how***
Functional	Top, middle, lower	Top	Top
Divisional	Top, middle, lower	Top, middle	Top
Matrix	Top, middle, lower	Top, middle	Top, middle
Network	Top, middle, lower	Top, middle	Top, middle, lower
Cellular	Top, middle, lower	Top, middle, lower	Top, middle, lower

Functional firms primarily utilised greater operating know-how to add economic value, with only top managers providing co-ordination and direction. The divisional form utilised operating knowledge, but also developed and applied knowledge of how to invest money, people and systems in related markets, i.e. so-called diversification know-how (Miles et al., 1999). In the process, divisional firms brought not only top managers, but also an expanding group of divisional middle managers into organisational and business decision processes. Matrix organisations were designed to add value – not only operating and investment know-how, but also their adaptation capabilities. In such organisations, the top managers, division managers and project managers were all involved in business and organisational decisions. The network form allowed value to be added not only within, but also across firms along the value chain. The network organisation's dependence on decision-making teams, both within and across firms, increased involvement in business and organisational decisions in all firms and at all levels. In the same way, the cellular form will revolutionise business and organisational decision-making processes, making them more open, diffuse and uncertain (cf. Regner, 2001; Stacey & Griffin, 2005).

As Miles et al. (1999) state, there are three points to be seen across the entire period of organisational development. First, as each new organisational form was created, it brought with it the expectation that more and more organisation members would self-organise around operational, market and partnering tasks. Second, each new form increased the proportion of members who were expected to make business and organisational decisions. Third, each new organisational form increased member opportunities to experience psychological ownership of particular customers, markets, customised products and services. Through cellular forms, the co-configuration model will open new opportunities for open innovation platforms and frameworks.

4. Need for new theoretical openings in business and innovation systems

4.1 Main theoretical questions on firms and networks

When assessing the new techno-economic paradigm as well as business and production paradigms, there is a need to define the most important dimensions concerning firms and networks.

The first dimension concerns *the boundary of the firm*. Penrose (1959) already emphasised that the boundary is to a certain extent blurred, because the firm also needs other competences than those that it possesses. In the strategy literature, the boundary school considers the question of the boundaries of the firm (Foss, 2001; Slater, 2003). The issue of the boundaries of the firm is a crucial strategic issue, because it goes right to the heart of business and functional strategy.

The second is *the internal organisation of the firm*. This is one of the most heavily discussed hectic topics in the literature. For example, Miles et al. (1999), Loasby (1999), Christiansen (2000), Burke (2002) and Roberts (2004) have touched upon the question. New flexible, distributed and innovative organisational forms are being discussed.

The third is *the formation of the growth and diversification of the firm*. For example, Porter (1985) is known for this strategy. Penrose (1959) reviewed the question of the growth models of firms. Evolutionary and life-cycle models have been discussed, as has the question of how innovation can be managed (Greiner 1972; Burgelman & Sayles 1986; Roberts, 2004, 243–280; see Goold & Luchs, 2003). The difference between exploitation and exploration is one of the mechanisms through which new opportunities for the growth of the firm has been conceptualised (March, 1991).

The fourth is *the role of the management*. Many researchers have considered this issue (Kanter, 1983, Hamel, 2007). Management innovations are being emphasised. New co-operation and communication between the different layers and actors in the organisation are seen as a new feature.

The fifth is *change management*. This theme is very popular in the literature. The great question is the extent to which change can be planned and the extent to which it is an emergent phenomenon when forming new operations models in enterprises and networks (e.g. Mintzberg, 1994; Burke, 2002). Another question is how agency, change and structure interact and what role processes and system changes play in this interaction (e.g. Giddens, 1984; Caldwell, 2006).

We use these dimensions in the following discussion of business and innovation systems and production paradigms and their theoretical aspects.

4.2 Production paradigms and evolution

Production paradigms have been seen as an important contribution to industrial revival, renewal and performance, as well as to the economic growth of enterprises (e.g., Lester, 1998; Miles et al., 1999; Clark, 2000; Cohendet & Amin, 2006). Conceptually, a production paradigm is an overall logic shaping a firm's strategy, structure and management processes into an effective whole. In each historical era, there are always typical paradigmatic arrangements according to which companies operate and produce products and services for customers. The organisational form in each era is closely related to markets and marketing patterns. At the same time, in each era some companies accumulate more know-how than their operating logic allows them utilise, spurring managers to experiment with paradigmatic and organisational arrangements. This evolution process stimulates the search for new production paradigms (Miles et al., 1999; Durand, 2006).

There area a number of typical approaches for distinguishing production paradigms that differ profoundly from each other. Four different models of production paradigms will be analysed and assessed below. First, the mass production model will be outlined and its essential features assessed. After that, three theoretical approaches will be formulated and their relevance for firms and networks will be shown. The transaction cost-based approaches and the competence-based approach have already been defined in the previous literature. The fourth approach can be called a hyper-innovative approach. This is a new approach that is

currently being formed; its roots are in complex theoretical approaches. The hyper-innovative approach and its definition are a special focus of this study.

4.3 Mass production model

The mass production model has described the functions and activities of enterprises as well as societies for several decades. It remains to some extent in use to this day. Standardisation is one of the cornerstones of the model. The different functions are formed to handle their own tasks and duties when organisations have grown and began to compose more vertical layers. Due to that, the co-ordination of the distinct functions of an organisation is one of the essential management duties. In principle, the mass production model is a functional and materialist framework that simultaneously develops and demands mass markets and consumption. The production and its economy were characterised by scale-based volume manufacturing. Manufacturing and marketing aimed to to capture as large a share as possible in existing and new markets.

The mass production model is mainly a closed system based on organisational hierarchy and the firm's own production facilities. The management model used in mass production was top-down in nature, without other organisational employees being involved in decision-making concerning production and organisation development.

Originally, the mass production model was based on the central features of industrial tradition as well as the doctrines of Taylorism and industrial engineering (Taylor, 1913; Rose, 1975, Cole, 1994; Miles et al., 1999). In Table 3, the main characteristics of mass production and industrial engineering are described.

The era of mass production can be described as an era of standardisation and hierarchical organisational forms. The key capability of the paradigm is based on specialisation and segmentation as well as the co-ordination of hierarchical functions. The economic framework was the industrial society, with its mass marketing and consumption patterns.

Table 3. The model of mass production and industrial engineering.

Dimension of the model	**Features of the model**
Economic framework	Industrial society
Economic driver	Standardisation of activities and processes, cost reduction
Business model	Mass marketing, production-oriented operation, standard, low-cost products, scale economy
Strategic aim	Rationalised and automated factory
Factory arrangement	Functional layout system
Control model	Managerial control structure
Organisation type	Hierarchical organisation structure
Job types	Narrowly defined jobs, easy learning curve
Factory and workplace planning practices	Differentiation of the tasks of the planning and execution personnel
Supply chain practices	Arm-length relations

4.4 New production paradigms

Many theories and practical viewpoints have called into question the mass production model and its basic premises. In his famous article, Coase (1937) saw that firms have to co-operate with each other because one firm cannot produce all the products and materials needed for its final products. That created the foundation for transaction cost economics, which were later on conceptualised by Williamson (1975 and 1985). In addition to the transaction cost approach, another new approach can be distinguished. This new approach is based on competence-based premises.

In this publication, a new approach and model will be formulated and explicated. This approach can be called the hyper-innovative framework. It is built on the new premises of strategising and organising, relying on process- and practice-based approaches (Johnson et al., 2007; Nicolini et al., 2003).

Three different perspectives on the firm and network are shown in Table 4. The table are totally based on the formation of the author of this study.

Table 4. Perspectives on the firm and network.

Transaction cost-based approach	Competence-based approach	Hyper-innovative approach
- **The firm as a processor of information** - The firm reacts to external environment signals found - Rational strategic plans for resource allocation and positioning for achieving goals - The firm encompasses interactive contracts: the ground for co-ordination - *Defensive strategy* - Network and market relationships - ***"Adaptation theory"***	- **The firm as processor of knowledge** - The definition of the environment and new action opportunities - by innovation activities - Co-ordination of dispersed learning and knowledge processes - Procedure patterns and rules: the ground for co-ordination - *Evolutionary strategy* - Partner and knowledge relationships - ***"Evolution theory"***	- **The firm as processor of communication** - Complex action environment - Technological breakthroughs - Disintegration: globalisation/ localisation - New business concepts and models - Several business models in parallel - *Experimental strategy,* management limits - Configured networks, ecosystems - ***"Metamorphosis theory"***

The table presents three theoretical models. The models can be characterised in terms of adaptation theory, evolution theory and metamorphosis theory. In the following, these approaches will be explicated further.

4.5 Transaction cost-based approach

The transaction cost-based approach considers the firm as a processor of information. Simon has also advocated the information perspective. For Simon (Simon, 1957; March & Simon, 1958; cf. Shapiro & Varian, 1999), both human beings and their organisations are essentially information processors. The common starting point in transaction cost-based approaches is to see the firm as a response to information-related problems. Several other approaches to the firm also begin with this definition of information. Coase's (1937) approach to the firm is also essentially an approach based on information-related problems (see Fransman, 1998).

According to the transaction cost approach, the behaviour of the firm can be understood as an optimal and rational reaction to the external environment, based on the signals detected by the firm. The focus is on the process allocation

of resources needed to cope with the adaptation process as well as making position decisions concerning the firm in the markets in order to achieve the goals (cf. Porter, 1985). However, Williamson (1975) considers the problem to be bounded rationality and, partly, asymmetrical information, which make it difficult to calculate all the possible alternatives for the firm (cf. March & Simon, 1958).

It can be seen that a strategy based on transaction cost approaches is defensive in nature, because the firm tries rationally to adapt itself to the changing environment by minimising costs. In this sense, the strategy in the approach can be named as adaptation theory (e.g. Cyert & March, 1992). As Achtenhagen et al. (2003) state, the adaptive learning style describes an attitude to change focusing on adaptation in the frameworks of the present organisation. In this sense, the adaptive style corresponds to single-loop learning, as presented by Argyris and Schön (1978).

However, according to Porter (1985), the firm has an opportunity to adopt a defensive strategy or a future-oriented strategy. Each firm has its own opportunities for formulating strategy, which reflects the firm's special circumstances. In principle, the transaction cost approach can be seen to be mainly based on defensive strategy.

The transaction cost approach considers and analyses the relationships between two partners. The model concerns traditional supply activity in the case of relationships between the seller and buyer. The approach analyses the governance of the agreement relationships within different market transactions, based on the exchange of commodities (Williamson, 1975 and 1985). The transaction cost approach considers different situations where there are different alternatives and governance structures. For example, it is appropriate to buy standard materials from the market. It is profitable to carry out routine operations in the hierarchy; that is, in the firm's own organisation. On the other hand, it is argued that customer-specific materials and parts are profitable to acquire from suppliers.

The transaction cost theory also considers the division between the markets and hierarchy. Between them is an area called the network and supply chains (Williamson, 2008). The creation and maintenance of the network involve many transaction costs. These are the costs of the management of common relationships, which grow from negotiations, the planning of activities, the adaptation of partners and control activities (Rao, 2003). Many of these costs are concentrated on the mutual agreements and the acquisition of information for the purpose of transactions. The cost structures vary within different governance structures, but

the costs coming from management and the governance model in question have to be taken into account in all the instances.

In principle, the transaction cost approach differentiates between production costs and transaction costs (Williamson, 1985). Economic decisions on these issues are mainly made on the basis of the correct calculation of costs.

The transaction cost-based approach is by its nature based on the description and assessment of different alternatives of the governance structures of firms and networks. It adopts a closed system and conservative approach wherein there is no possibility for fundamental changes in the existing enterprise and network as well as organisation structures. It is of short-term significance only, while in the longer term it becomes negligible. The approach is to a great extent normative, such that the theory looks at the change in different government structures in the field of the markets, networks and hierarchy according to the different basic alternatives. The approach lacks an explicit time-dependency because it mainly involves the static description of events (Rao, 2003, 14–15).

Two other viewpoints can be mentioned. First, the transaction cost approach highlights that the management of firms and networks is based on economic factors and interpretations. Second, it is important to emphasise management costs within the different governance structures of firms and networks (cf. Häkkinen, 2008). The problem with this approach is that it does not consider the benefits and added value factors, such as learning and innovations, because the transactions theory is only interested in relationship costs and minimising them (Greve, 2003; Lundvall, 2002 and 2006).

According to transaction cost-approaches, the economic framework can be seen to be based on the information society, with its information-driven economy (Miles et al., 1999; see Earl, 1999; Currie, 2000; Marchand et al., 1999).

4.6 Competence-based approach

According to the competence-based approach, the firm is seen as a processor of knowledge, in particular of productive knowledge (Winter, 1993; Cohendet, 2006). According to this approach, the firm is a knowledge generator, but knowledge is provisional and dispersed in the organisation (Hayek, 1945; Loasby, 1999, 87–106). The problem is to use knowledge for decision making in order to find new opportunities for businesses. This approach, unlike the transaction cost-based approach, uses knowledge for seeking new action and business areas, based on learning efforts (cf. Nicolini et al., 2003)

Creating knowledge is a cumulative strategic process that relies on the management of knowledge. The major co-ordination task in the organisation is to handle the dispersed knowledge by learning and innovation processes. Routines and procedures are the basis for acting in the organisation. These rules and procedures form a common basis for learning activities. At the same time, the rules and procedure patterns developed in the organisation function as a means of co-ordinating the different activities of the firm (Nelson & Winter, 1982; Felman, 2000).

The competence-based approach has a long tradition, beginning from capability and resource-based approaches (Penrose, 1959; Richardson, 1972). Some viewpoints on this approach will be considered below.

Generally, a company engages in network development to seek from other companies certain *resources and knowledge* that it does not already have but which are essential for producing and delivering the products to the market. The central idea of networking is that a company recognises its area of expertise and, relying on this speciality, seeks to co-operate with other companies. A company's speciality forms only one part of an advanced product or service, and thus it requires the expertise of other companies as well. Companies form networks because joining resources solely through the markets does not meet the needs of the demanding and rapidly changing markets (see Casson & Cox, 1997; Nooteboom, 1999; Child et al., 2005).

4.6.1 Resource-based view

The research combination approach is based on a *resource-based view of the firm* and the tradition based on that (Ring, 1996; Barney & Arikan, 2001). There are three basic assumptions and generalisations that characterise the approach (Foss, 1997):

- There are systemic differences across firms in the extent to which they control resources that are necessary for implementing strategies.
- These differences are relatively stable.
- Differences in firms' resource endowments cause performance differences.

Much of the resource-based view of the firm is indebted to the seminal work of Penrose (1959). Penrose talks of the notion of "productive opportunity" and productive "services" that the management team of the firm can see and take ad-

vantage of, which may result in the growth of the firm. These possibilities consist mainly of different kinds of resources and their new combinations. Attention is mainly put on the internal process of development of a firm. The relation between the external environment of the firm and its internal processes is seen to be transmitted by means of an "image" in the entrepreneur's mind. Thus, the productive opportunities available to the firm can be analysed within the framework of the relationship between its resources and its own view of its competitive position.

Another strand in the development of the resource-based tradition is evolutionary theory. Nelson and Winter (1982) introduced the focus of a firm's distinctive capabilities. They modelled firms as having, at any given time, certain capabilities and decision rules. These capabilities and rules are modified as a result of conscious problem-solving activity and random events. They based their evolutionary model on the concept of organisational routines, by which they mean all regular and predictable behavioural patterns of firms. The evolutionary perspective connected organisational routines to genes in an organism and tried to explain the survival of a firm in a changing competitive environment in terms of "genetic" variation, selection and retention in organisational routines (see Sanchez & Heene, 1997).

Wernerfelt (1984) introduced a conception of firms as a heterogeneous accumulation of resources and examined firms in terms of their resource endowments. The aim was to try to explain differences in the performance of individual firms by using the concept of distinctive resource endowments. Firms are looked at in terms of their resources rather than in terms of their product. It was assumed that this approach would shed a different light on the strategic options open to firms. Rumelt (1984) has also considered a firm as a bundle of unique resources that defines a firm's competitive position. The task of the management is to adjust and renew these resources and their relationships as time passes and competitive conditions change.

The notion of "core competencies" introduced by Prahalad and Hamel in the 1990s (Prahalad & Hamel, 1990) created a new conceptual vehicle to analyse the structuring of companies around core competences and core products. It is the task of management to identify, cultivate and exploit the core competences that make growth possible. This focus on organisational competencies as a framework for understanding organisational competitive dynamics quickly achieved broad acceptance both in theoretical circles and in practice within strategic management (see Foss, 1997).

The concept of core competences opened the possibility to consider organisational competencies within a firm but at the same time across firms and in the interaction of firms. The question is how firms co-operate and compete. The management of the demand-supply chain is an essential issue. The consideration of whether to make or buy must be started with end products. It is necessary to look upstream to the efficiencies of the supply chain, as well as downstream towards distribution and customers (cf. Porter, 1985).

In principle, the traditional resource-based approach is mainly based on a static view of resources and their combination. Dynamic factors are not so clearly included in theories and in consideration. The traditional resource-based approach clarifies and examines the conditions that must be obtained in order for resources to yield sustained competitive advantage to firms (see Foss, 1997). However, some evolutionary dynamic features are discerned in different theories and practices of the resource-based view.

4.6.2 Competence-based consideration

A growing movement of researchers is considering the practice of strategic management based on the concepts of organisational competence and the competence-based interactions of firms. A firm is characterised as an open system of stock and flows. The firm pursues a set of goals that collectively motivate the collective actions of the firm. Each firm develops a strategic logic. This strategic logic shapes the management processes a firm uses to identify, acquire and use various kinds of resources and competencies (Sanchez & Heene, 1997).

Firms may also form competence alliances through networks that link one firm's competencies or resources to those of other firms in order to use a broader range of competencies, acquire desired competencies more quickly or extend current competencies into new competitive domains.

Through the competence building process, the network can create *dynamic capabilities* for itself and for the companies participating in the network (cf. Sanchez & Heene, 1997; Quelin, 1997; Nooteboom, 2000; Faulkner, 2003). The companies operating within the network develop their expertise and capabilities to ensure their future competitiveness (i.e. the continuous growth of their static efficiency).

It is a question of *organisational learning and innovation*, which the company can use to increase its dynamic capability (cf. Stacey, 1992; Sherman & Schultz, 1998). It also applies to enterprise networks. This can be considered the learning

and innovation process of organisations and their actors (Lowndahl & Haanes, 1997; Hyötyläinen, 2000; Toiviainen, 2003; Valkokari, 2009). As a result of this, learning and "innovations" are created in the network and companies. These can be new products and services, new operations concepts, technological and process changes or new organisational and management practices, and marketing models (cf. Schumpeter, 1934; Bidault et al., 1998).

The competence-based approach belongs by its nature to evolutionary strategy. Part of this approach comprises rules and procedures that promote productivity and the efficiency of operations. Dynamic capabilities make it possible to identify and solve problems, thereby enabling changes in competitive performance. Learning and innovation highlight evolutionary capability, which mean the development of capability itself (Fujimoto, 1998; Nelson & Winter, 1982).

The competence-based approach is best described by evolution theory because the development is understood to happen by evolutionary steps based on the rules and procedures. According to Nelson and Winter (1982), the firm is part of an evolutionary process of economic change. Achtenhagen et al. (2003) refer to evolutionary processes with the term reformative learning style, according to which organisations explicitly try to further develop their current practices and ways of thinking. However, the reformative style is situated on the axis of incremental-radical change, close to the incremental change model.

The economic framework in the competence approaches can be seen to represent the knowledge society, with its knowledge-based economy (Nonaka et. al, 1996; Foray, 2004; Hedstrom & King, 2006).

4.7 Hyper-innovative approach

4.7.1 Complex action environment

In a turbulent environment, the formation of strategy happens under conditions of complexity. Complexity can be characterised as states between order and disorder (Illinitch et al., 1998; Luhmann, 1995). There are several interactions in the strategy process between internal firm resources and external market forces that contribute to strategic complexity. In this kind of environment, planning is often insufficient and leads to rigidity. Tight planning rituals within an organisation restrict its innovative potentials, because options are easily fixed and new options are not noticed (Elfring & Volbedra, 2001).

The strategy process can be seen as an adaptive process where piecemeal strategic decisions are taken based on the feedback from formulation and implementation in an emergent pattern over time. Firms face considerable constraints due to environmental complexities, but at the same time managers and firms have a major opportunity to adapt, manage and modify complexity. The strategy process is an intertwined process involving diverse rationales and strategies simultaneously, rather than individual rationales and strategies as distinct events (Regner, 2001).

In spite of the diverse complexities faced in the strategic process, managers are also capable of bringing innovative products and services onto the market. Managers have room to manoeuvre. They act as active knowledge assimilators and arbitrators. This view highlights strategic learning and knowledge management as decisive mechanisms in the management of strategy and the implementation of actions (Elfring & Volberda, 2001; Regner, 2001).

The hyper-innovative approach is based on the insights of complexity and system theory. According to this theory, ordered patterns can emerge from spontaneous self-organisation. As a complex system, an organisation is characterised by multiple patterns of interaction. Because of this complexity, variances and disturbances can produce unpredictable events and relationships that are the primary source of novel patterns of strategic organisational change (Morgan, 1997, 261–274; Mintzberg, 1994).

According to Stacey (2005a), organisations are not systems but rather the ongoing patterning of interactions between persons in the organisation and network. These patterns of interactions produce further patterns of interactions. Organisations are not thing which cannot be observed outside of the interaction. These kinds of co-operative interaction approaches can be called complex responsive processes of relating.

In the hyper-competitive environment, vision creation and discursive coordination can be seen as key elements of a new form of managing the transformation process (cf. D'Aveni, 1994; Schienstock, 2004). First, a systemic vision can be seen as a general set of ideas on how to transform businesses in order for to them grow, how to modernise business systems effectively and how to restructure production processes in order to increase productivity and innovativeness. A major advantage of a systemic vision is that it makes communication possible among the actors in the enterprise as well as at the network levels; even the actors have different interests and perceptions of the objectives and operations models. The second aspect of co-ordination and transformation manage-

ment is social discourse among different actors in the enterprise and networks. Systemic discourse can be viewed as a platform through which the different actors in the enterprise and networks can create and exchange knowledge (see Nonaka & Takeuchi, 1995; Isaacs, 1999).

Thus, the hyper-innovative approach can be seen as the processor of communication. It can be viewed as an evolving communication system. Such as communication systems that evolve cannot remain in equilibrium. There are several communication systems that inform each other, and they co-evolve while shaping one another. Accordingly, the environment of the organisation cannot be conceptualised as such, but instead has to be considered as another communication system (Leydesdorff, 2001, 79–116). The system/environment relation can be considered as a relation between communication systems. These different communication systems can be seen as systems of self-reference that form the dynamically interacted aggregate system (Luhmann, 1995, 176–209). According to Luhmann, these kinds of communication systems are the systems where the environment is constitutive in system formation. That is, the environment is a necessary condition for the system's identity, because the system disappears without self-reference to environmental systems. At the same time, all the organisational and communicative systems are capable of self-observation when they manage the distinction between the system and environment (Luhmann 1995, 176–209). This self-observation leads from communications to action in the organisation and network. However, the environment is always more complex than the organisational system itself. That is why the organisation tries, by structure and process formation, to manage the inner complexity and to decrease point-to-point correspondence with environmental complexity. Loasby (1999) presents the concepts of framework and closure as means to manage complexity and to make decisions under complex conditions.

4.7.2 Strategising and organising

Nowadays, the distinction between strategy and structure (cf. Chandler, 1962) is replaced by the verb forms, organising and strategising (Whittington & Melin, 2003; cf. Hedberg & Wolff, 2001; Dijksterhuis et al., 2003). That gives less emphasis to the organisational strategies and forms in themselves than to the continuous processes involved in moving towards and along such strategies and organisational forms. This turn in the strategy approach emphasises a single

duality rather than separable building parts. These kinds of approaches put the emphasis on holistic processes.

Organising implies strategising, where strategising means forming new strategic mindsets, activities and action patterns (Achtenhagen et al., 2003; McGrath & MacMillan, 2000). In this sense, the firm can be seen as an image creator. Normally, the development of an organisation is understood in terms of the concepts of path dependency and core rigidities, which delimit the options for further development (Nelson & Winter, 1982; Leonard, 1995). That means that a firm has developed a commitment to the setting of procedures and learning mechanisms with the aim of exploiting particular technological, organisational and management opportunities (see Schienstock, 2004). Because the firm is committed to a specific learning habit and associated competences, the firm may be unable to adopt an emerging model based on a different knowledge and communication paradigm.

However, organisations are in transition. Pettigrew and Massini (2003) cluster it by three indicators: changing structures, changing processes and changing boundaries. The traditional hierarchical structures are under pressure. There are urgent needs for flexibility and innovation in the organisation. Organisations have removed layers, which has been accompanied by increased decentralisation, both on the operational and strategic levels (cf. Mintzberg, 1994). At the same time, communication has increased in the horizontal and vertical directions.

4.7.3 Local and global processes in organisations and networks

For business organisations – global companies in particular – the choice of location in the production, organisation and use of which assets is becoming a more critical competitive advantage. At the same time, these companies form cross-border inter-firm networks and coalitions (Dunning, 2000; Buckley, 2003). Companies have to be both global and local at the same time. Companies have to decide where to establish locations abroad, choosing from a range of local options. There are four types of cost which companies have to take into account: design and development, production, transportation and transaction. Each of these determinants is to some extent specific to a certain product, activity, and country or region. Especially, the character of the market (and in particular the extent to which offering is customised), and the transaction costs of exchanging

goods and services between different political and culture regimes will influence the location decision (cf. Porter, 1990).

The other important factors will be the learning and innovation dimensions of the location choices (Porter & Stern, 2001; Wyckoff & Schaaper, 2006). Due to the increasing role of knowledge, intellectual capital is rarely the property of only one company. A company has to deploy its own knowledge, but it also has to complement this knowledge with other firms by means of collaborative agreements. In this case, companies are in a position in which they have to minimise distance-related transaction costs and to maximise the benefits of dynamic learning and innovation economics. This frequently leads firms to concentrate their activities within a limited special area (Porter, 1990; Dunning, 2000). In the future, the spatial clustering of firms will likely be strongly activity-specific, and firms have to be in close physical proximity to exchange or share tacit knowledge.

Dunning (2000; cf Buckley, 2003) explains how global companies can locate and manage their operations. He differentiates between two organisational forms. The first is called the multi-domestic model or the "standalone" structure. In this case, a company treats its foreign subsidiaries as autonomous units. Each subsidiary supplies its products to local markets, although it can, to some extent, model its operations on those of its parent company. It is also possible that the parent company exports intangible assets (technology, managerial and marketing expertise) and other intermediate products (materials, components and parts) to its affiliates. The second form is called the globally or regionally integrated company. The main feature in this case is that a company adopts a systemic and holistic approach towards its global operations, treating its affiliates as part of a network of interrelated activities. Common goals and objectives are set for the network. The network is more oriented to the rationalised and efficiency-seeking model than its multi-domestic counterpart.

Stacey (2005b) emphasises that people continually interact with a relatively small number of other people when accomplishing tasks in the global environment. He describes it as local interaction. In these local situations people interact with each other on the basis of patterns, themes, habits and routines that they have adopted at a particular time and context. At the same time, when interacting locally, the activity is constrained by global forces. These forces may be the organisation's hierarchical structure, the allocation of resources in the global environment, the authorising and reporting procedures as well as the accepted way of talking and doing things in the organisation's culture.

The other way to understand the relationship between local and global is in terms of systems. People interact locally in a team, project group or the wider context of an organisation. These kinds of interaction patterns form the system. However, such a local system cannot work in isolation but must interact with other systems, which in turn are part of wider systems. There is thus a nested hierarchy of systems in which higher levels act back as enabling constraints on the lower levels which in turn produce the higher levels (Stacey, 2005b). The systems can be considered to be similar in terms of their relation to environment. The system hierarchy is seen to be both open and closed in relation to its environment (Luhmann, 1995).

4.7.4 Creation of new business concepts and models

In complex environments, normal strategic planning is largely an unrealistic effort. By the time detailed strategic plans are approved, they might already be outdated (Leonard, 1995, 111–134). In a complex environment, experimenting and prototyping creates new knowledge and capabilities. These efforts can create the requisite variety in products and processes that opens up new technological options for the enterprise. Experiments yield information that comes from understanding what does and does not work. Therefore, experimentation is an instrumental source of new information and the advancement of knowledge (Thomke, 2006). Second, the act of experimentation initiates a virtuous cycle of innovation that can become a competitive factor for the organisation. Experimenting and prototyping can also be used to incorporate new methodologies and process tools in the organisation. In this way, the organisation can stimulate its organisational learning and critical new business models.

No single business model can create value indefinitely. A business model describes a systemic combination of value and cost drivers. A business model can become outdated because competitors undermine it by imitating it or introducing new and better offerings. Changes in customer demands require the development of new products and services.

The renewing of business models in an enterprise can be called strategy innovation, which constitutes a fundamental innovation in the enterprise's business model (Williamson, 2003; cf. Markides, 1997; Hamel, 2007). Strategy innovation constitutes changes in three dimensions of a business model:

- who the enterprise serves (a change to its customer base)
- what the enterprise offers to its customers (a change to the offering)
- how the enterprise provides value to its customers (a change to the activity chain and the value and/or costs associated with each activity).

New directions for the enterprise can also arise through the formation of strategic options. These options for the future may take various forms. The option may take the following forms (Williamson, 2003):

1) an idea for a new opportunity that has been conceptualised but not tested
2) an experiment or pilot that has been conducted to test a new business model or market proposition
3) a venture where the pilot has been launched as a standalone business, but not yet scaled up.

By creating strategic options for the future, the enterprise may outperform its competitors who have not engaged in the same kinds of development efforts. The development of new strategic options requires knowledge of new potential markets as well as the capabilities to set new targets and achieve them. Two sets of processes are needed to fundamentally expand the enterprise's strategy innovations. First, the enterprise has to set processes to expand its capability set. Second, the enterprise has to implement processes through which it can expand its knowledge of new markets and market behaviours.

The renewal of an enterprise through strategic innovations can be looked at as the management of the strategy innovation pipeline (Williamson, 2003). Figure 3 describes the strategy innovation pipeline and its mechanism.

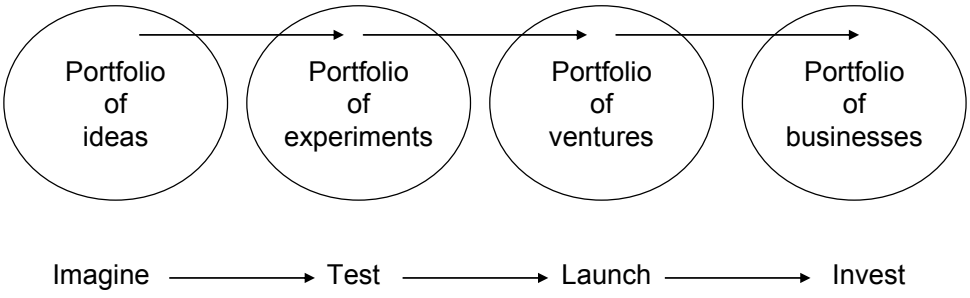


Figure 3. The strategy innovation pipeline (Williamson, 2003).

Managing a portfolio of options involves actively creating and managing a pipeline of options in different stages of development. The cost of development efforts increases when moving forward in the pipeline. In the idea phase, it is already important to articulate a viable business model around the idea. In the experiment stage, the objective is to test the viability of the option and to assess its preconditions. The venture phase seeks to refine and prove the scaling of the option and to evaluate its business profitability. In the full business phase, the aim is to invest in the new business model and its implementation in the organisation and markets.

When strategic innovation creates options for the future, minimising the costs of creating and maintaining strategic options becomes a critical task for the management. The cost can be reduced by careful design of experiments, test marketing and prototyping. Sharing the costs with interested customers or suppliers can reduce the risks involved in the new strategic innovations and business concepts.

4.8 Concluding remarks on new production paradigms

The transaction cost-based approach is based on defensive strategy because it only takes cost reductions into account. It considers contracts between two parties, the buyers and vendors. The approach assumes that there are network relations between the markets and the hierarchies of the organisation. The firm is seen to encompass interactive contracts that form the basis for the co-ordination of activities. In this approach, the firm is considered through information processing.

The competence-based approach is more dynamic than the transaction cost approach. This approach can be characterised as an evolutionary strategy because it seeks to identify new action opportunities and innovation actions. The approach is based on procedures and rules that are the basis for co-ordinating activities. The approach is inclined to consider partner relations through the knowledge perspective. In the same way, the firm is seen to be a processor of knowledge.

The hyper-innovative approach is based on a complex view of the business world. The approach is aimed at the transformation of the firm. The approach can be characterised in terms of metamorphosis theory. On the other hand, the transaction cost-based approach is founded on adaptation theory with its piecemeal developments. The competence-based approach is by its nature based on the principles of evolution theory. The hyper-innovative approach considers the line between globalisation and localisation by looking at the activities of the personnel in the local context, under the constraints of global business. This approach considers the firm as a processor of communication. The approach examines the formation of new business models and their mechanisms. Experimental strategy is a fundamental aspect of this approach. Manifold network relations characterise hyper-innovative approach. It can be argued that networks are part of the wider ecosystem of business units and other actors as well as institutional actors (Iansiti & Levien, 2004a).

4.9 Strategic change patterns

Traditionally, the analyses of strategic thinking and strategy-formation processes focus on individual companies. A strategy is formulated by an individual company for its own needs. Normally, the company's business strategy sees other companies as present and future competitors or entities supplying production inputs (see Porter, 1980 and 1985). This kind of thinking leans on microeconomics, in which the central ideas are competition and the competitive position of a firm. The approach is not well suited to the conceptualisation and management of the strategies of enterprise networks. However, views about companies' strategic processes and the significance of defining a strategy have varied across time (Mintzberg et al., 1998).

In principle, there are some strategic change patterns that can be discerned within the strategy and management literature. Elfring and Volbera (2001) have differentiated two opposite strategic change approaches, presented in Table 5.

Table 5. Strategic change assumptions (adapted from Elfring & Volbera (2001, 5; cf. Mintzberg 1994, 1–4).

Planned change (prescription)	**Evolutionary development** (description)
Perfect rationality	Bounded rationality
Planning	Spontaneous
Top-down	Bottom-up
Analytical	Stepwise planning

Planned change is based on a normative approach. It is by its nature a prescriptive way to see strategy. Prescriptive ideas have increasingly gained influence in the strategy area. Evolutionary development in turn is based on description. It tries to describe the actual strategy formation in enterprises, based on empirical research.

4.9.1 Strategic change models

Planned change presented in Table 5 corresponds to the planned change model in Table 6. Correspondingly, evolutionary development describes the evolutionary development model in Table 6 (cf. Hyötyläinen & Nuutinen, 2010; see Mintzberg, 1994, 5–23). In the following, we will review each of the three strategic change models presented in Table 6. Finally, each model will be evaluated and compared to each other.

In Table 6 the strategic change models are considered through six dimensions: the background thinking of a model, strategic starting points, strategy determination, planning method, main actors in the planning process and the approach to managing market information.

The strategic change models differ fundamentally from each other. In addition, the management plays a different role in the strategy process in each of the three different models (cf. Ericson et al., 2001).

Table 6. Different strategic change models.

	Planned change model	**Evolutionary development model**	**Transformative change model**
Background thinking model	***Rational approach***	***Unbounded rationality approach***	***Inductive and practical approach***
Strategical starting points	Environmental changes, positioning, strategic planning	Reacting to environment changes, strategic problems, cultural collisions	Visionary and innovative hold, systems theoretical consideration
Strategy determination	Strategical alternatives, strategy, implementation as own task	Strategy formation by practice, tight interaction in the organisation	New perspectives, complexity and many rationales
Planning method	Formal, "linear" planning process, formal methods	Stepwise planning, problem-oriented approach	Manifold planning, experimenting and testing
Main actors	Top managers, different functions´ key persons	The interested parties, different organisational persons	Key organisational groups, management groups
Management of market information	Markets: competitors, customer actions	Customer understanding, markets development	Customer value-creation, knowledge management

Background thinking in *the planned change model* is based on a rational approach or perfect rationality. The model is based on disciplines that emphasise rationality, planning, design and control (e.g. Ansoff, 1965; Andrews, 1971). The model is more oriented towards the content and context of strategy, with its interest being mainly in the outcome of strategy (cf. Elfring & Volbera, 2001).

The strategic starting points for the model are that the environmental changes can be forecasted and that the new development directions in the environment can be analysed. Based on this, it is possible to rationally plan the development actions whereby one can form a suitable environment for the enterprise. After that, the structure of the enterprise can be adapted to the new strategy (cf. Chandler, 1962).

Strategy determination is an important factor for strategy formation. According to the planned change model, there are strategic alternatives and positions that can be seen as the outcomes of strategy. The central focus of the positioning of strategy thoughts is the industrial-economic basis advocated by Porter (1980 and 1985). Competition and a competitive position are analysed mostly on the

basis of economic concepts. Enterprises in a certain industry can choose one of three generic strategies. These are cost-leadership, differentiation or focus.

In the planned change model, the environment is seen as a relative constant. The challenge for strategy formation is to influence the environment or to adapt the organisation to it. The assumption is that the environment of an enterprise can be analysed and the position of the enterprise in it can be shown (cf. Elfring & Volberda, 2001). Another assumption is that the enterprise has the time to plan and realise the potential of a certain strategy.

The problem in the model is the implementation of the strategy. The major efforts are put on the formulation of strategy while the implementation is mainly left on the shoulders of middle management (cf. Mintzberg, 1994, 25–29). The implementation will influence the strategy itself, because their normal action patterns and objectives have an impact on the content of strategy, and it is difficult to achieve radical strategy changes. Moreover, the annual planning rituals within an organisation can restrict its innovative potential, because options are often fixed and new options are not noticed (see Elfring & Volberda, 2001).

The planning methods are based on formal methods. The planned change model is perhaps the most general model that the management experiences to be useful for carrying out strategic changes because it provides many arsenal of formal tools. The planning and design school is for example known for SWOT, the method of the Strength Weaknesses Opportunities Threats model (Elfring & Volbedra, 2001; Pettigrew & Whipp, 1991, 11–17). In this model the strengths and weaknesses of an enterprise are differentiated and then the opportunities and threats in the market are evaluated.

The main actors in the planned change model are top management and different functions' key persons. The assumption is that top management design an explicit "grand strategy" for the entire enterprise. The assumption is that a correct strategy can be planned by means of systematic forecasting, planning and control.

The management of market information is based on the analysis of competitors, competitive forces and customer actions (cf. Porter, 1980 and 1985). The rivals are competing firms, potential competitors, suppliers of substitute products, suppliers of inputs and buyers in industry. Changes in any area can have dramatic outcomes for an enterprise and its position with respect to its rivals in the industry.

In principle, the rational planned change model can be described by a machine-like and bureaucratic analogy (cf. Morgan 1997, 13–31). The model is

mainly based on achieving the goals set in the planning process for an enterprise. This means that innovation is difficult to achieve. Furthermore, the different objectives of different specialised functions inhibit communication and co-ordination in the organisation.

The evolutionary development model has supported by many sources (e.g. Nelson & Winter, 1982; Pettigrew & Whipp, 1991; Greve, 2003). The model is built on the unbounded rationality approach, which has been influenced by many concepts (e.g. March & Simon, 1958; Cyert & March, 1992; Quinn, 1980).

The strategic starting points are the reactions to environmental changes. In this approach, the environmental changes and the factors within the organisation jointly influence the development needs of the organisation and its reaction to environmental features. The approach is based on solving strategic problems. According to this approach, development follows a gradual path. The aim is to make changes and modifications in the prevailing action and action principles (cf. Argyris & Schön, 1978). In this effort, one can collide with different cultural factors, which can have impacts on the formation of strategic solutions.

While the planned change model is more oriented to the content and context of strategy, the evolutionary development model is oriented to the process and context in strategy making (cf. Elfring & Volberda, 2001; Johnson et al., 2007, 15–26). It is by its nature a dynamic model. Strategy is not so much planned, but rather emerges incrementally (Mintzberg, 1994). Quinn (1980) states that incrementalism is logical because of the iterative character of the strategic management processes, due to which there is a need to adjust strategy continuously.

As Burke (2002) states, most organisational changes – about 95 per cent – are based on the evolutionary development path. McGahan (2004) in turn argues that evolutionary changes account for about 75 per cent of all the organisational changes in different industrial sectors. This further increases the significance of the evolutionary model because 10–20 per cent of firms primarily change only through the normal adjustment of action and operation (Pettigrew & Massini, 2001).

Strategy determination in the evolutionary development model is a manifold process that happens in the practice of the organisation. According to Mintzberg (1994, 23–29), the intended strategy cannot be realised in full. A great part of the intended strategy is always left unrealised. However, a great deal of emergent strategy is created through tight interaction in the organisation. This strategy was not expressly intended.

In the evolutionary development model, planning relies on a problem-oriented approach. The evolutionary change model is founded on the strategy process, progressing step by step. Strategy is to a great extent formed during action and the use of new opportunities opening up during this action. Strategy is based on the interaction of the visions made by management and the bottom-up actions taken in operations (cf. Cyert & March, 1992; Hutchel & Molet, 1986). It is acknowledged that middle management can act as an intermediary in this dialogue. The middle management often has a good grasp of the visions of top management and, at the same time, a solid awareness of the action patterns of operative persons (Nonaka & Takeuchi, 1995).

The main actors in the evolutionary development model are the interested parties in the different parts of the organisation. As such, strategic visions and action development are interlinked (see Mintzberg 1994, 23–29). Strategic solutions are then relatively easy to implement because the interested parties have been involved in forming strategy and its implementation forms.

In the evolutionary development model the top management creates visions and goals and has a considerable role in the definition of strategy. The top management seeks new opportunities and business openings. However, the personnel of the organisation have a broad role to play in the strategic process of the organisation.

The management of market information in the evolutionary development model is based on customer understanding and foresight of market development (cf. Prahalad & Ramaswamy, 2004). Customer demands can be understood because the different parties in the strategic process discuss these demands with each other, when the visions and objectives can be founded on a good knowledge of both customer understanding and the perceiving of the development directions of markets.

The evolutionary development model is based on a flat hierarchy and informal procedures. The model can be named the entrepreneur form (Pettigrew & Massini, 2001). That model can also be characterised in terms of an organism and open systems analogy (Morgan, 1997, 33–50).

The transformative change model is aimed at large and radical changes. It is based on an inductive and practical approach relying on experience and insights about both action development directions and environment change forces (Mintzberg, 1994, 324–333; Nicolini et al., 2003; Johnson et al., 2007). Mintzberg (1994, 325–329) states that the analytical approach to problem solving often produces a precise answer, but its distribution of errors is normally

quite wide. In contrast, intuition is less frequently precise but is normally more consistently close to the right answers and knowledge. Through experimenting and testing it is possible to make sure that the developed strategic and organisational solutions are working in practice.

The strategic starting points for the transformative change model are founded on a visionary and innovative approach. In the model one tries to achieve an innovative hold and innovative strategic and organisational solutions (cf. Elfring & Volberda, 2001, 3–15). The model is based on systems theoretical analysis and vision leadership. The basis is the notion that the environment is not a stable factor. The firm is capable of renewing its organisation and bringing innovative products and service onto the market. When a firm renews itself, it can break free from the restrictions of its existing market (cf. Schumpeter, 1934).

In the transformative change model, strategy determination is founded on new perspectives. At the same time, the analysis takes a holistic approach in which it is possible to analyse and perceive the different parts of systems and their dynamics (Stacey & Griffin, 2005). Thereby it aims to change the position of the enterprise in the market and to strategically relign the enterprise. However, at the same time, it is acknowledged that decisions concerning the direction of the enterprise are made in a complex environment in which there are simultaneously many rationales for and notions of the desirable and desired development paths (Regner, 2001). Due to that, there is a need to have sufficiently wide and deep discussions about the future images and directions.

The planning method of the transformative change model is founded on manifold planning, which is, at the same time, supported by experimenting and testing (cf. Leonard, 1995). Experimenting is often based on trial and error methods that yield opportunities for new strategic and organisational openings but also pose the risk of mistakes due to the uncertain complex environment (Cohendet & Amin, 2006). The planning method of the model has to be adapted to the sought-for strategic changes. In general it is appropriate to build the planning efforts so that the planned visions and concepts will be reviewed and specified at different levels in the organisation and its network.

The main actors in the transformative change model are different planning and change groups. It is often appropriate to organise the planning of new radical solutions such that the change team consists of the key organisational persons. The role of the change team is to outline the direction of change and to create the implementation plan and its steps (Hyötyläinen & Nuutinen, 2010). Further planning and implementation groups in the enterprise and its network will be

organised to concretise the solutions and their principles. The top management has to be involved in the large and radical change process because without the support of the management it is difficult to make progress in the implementation process.

The transformative model is based on divided management (Hamel, 2007). Authority in strategy formation is distributed between different groups and communities in the organisation according to the planning and implementation tasks. The role of the management is to master insecurity and new situations. The management support the planning and implementation groups and participate in the strategy determination process. The management and the planning groups have to be in contact with numerous network partners because many strategic and radical solutions cannot be realised without partners (Hamel, 2002).

The management of market information in the transformative change model means a new approach to customers and knowledge management. The transformation change model is aimed at new strategic openings. This can mean a new relation to competition and customers (Prahalad & Ramaswamy, 2004). The attention shifts from action processes to the learning processes and knowledge management. Knowledge-creation processes are becoming more important for enterprises (Nonaka & Takeuchi, 1995; Nicolini et al., 2003). The ability to organise knowledge-creation processes becomes the important criteria for the activity of the organisation and network (Boyer, 2004; Norman, 2001; Hyötyläinen, 2007b). In this case, the key action processes concern value creation systems and the value processes of the customers.

4.9.2 Conclusion of the strategic change models

Different strategic change models have different possibilities and limitations.

The planned change model is based on rational planning and analytic decision making. In this case, the problem is that tight planning is restricted to finding new possibilities and opportunities. The risk is that one often remains a prisoner of one's own organisation and its functional parts. In any case, planning takes time and a great deal of effort from the management and organisation. In the changing environment, it is a risk that the conditions will change before the strategy is implemented (Mintzberg, 1994). Furthermore, the planned and intended strategy is not realised as such. A great part of strategy is emergent in nature, resulting from experiments and the testing of new market steps. The actual strategy can be determined after it has been formed and realised in practice.

The evolutionary development model is founded on unbounded rationality assumptions. The evolutionary development model connects the visions and the operative action to each other. That helps in forming emerging strategies and, at the same time, in implementing the strategy in the organisation. The model also makes it possible to maintain broader contact area with the customers and markets than in the planned change model. However, the model has a number of problems. The principles of the model are procedures and different organisational rules (Nelson & Winter, 1982). There is a risk that the organisation will remain path-dependent and will have difficulties in reaching new development paths and breaking free from core rigidities (Leonard, 1995). In this way, the organisation can generate new momentum for continuous developing and learning.

The transformative change model concerns a fundamental strategy change in the organisation. It involves the future business concepts and their manner of implementation. The aim of the manifold strategy process is to set new perspectives for the enterprise and thereby achieve the strategic change of the position and action of the enterprise. However, the transformative change model is risky because it changes the foundation of the strategic thinking patterns in the organisation as well as its relations to network partners (Hamel, 1996 and 2002). That is why radical changes so rarely occur in enterprises. Another difficulty for the implementation of radical changes is that there is, at the same time, the need to change the firm´s approach to customer processes and to the forming of the whole value system in customer relations.

5. Patterns of learning and innovation

With regard to the renewal of business systems and networks, there is a need for firms and networks to expand their innovation horizons (Hamel, 2002; Doz & Kosonen, 2008). That demands new kinds of openings in learning and innovation processes. Both learning and innovation processes are about creating something new and changing the established ways of thinking and acting. Learning and innovating are both social activities and always take place in certain business contexts (Loasby, 1999). Innovation requires learning about how to make things better or how to transform business and production systems as well as marketing patterns. Learning is a social activity that renders the innovation process uncertain, cumulative and collective (Lazonick, 2005).

It is generally understood that open and thematic business networks are a central prerequisite for the emergence of new innovative solutions and operational models based on such solutions (Chesbrough, 2003; Powell & Grodal, 2005). Learning processes taking place within business networks cannot be easily explained using traditional management models. The situation becomes more complex when the concept of management is extended to include learning and innovation in networks (Vesalainen & Strömmer, 1999; Kogut, 2000; Toiviainen, 2003). In this context, it involves the system-level development and management logic of an open and expanding network learning forum and the complex system it forms (see Stacey, 2001; Stacey & Griffin, 2005).

5.1 Learning and innovation models

Strategic enterprise networks have been existed for over a decade. In such networks, learning and innovation have emerged as key issues, together with the generation of new businesses (Jarillo, 1993; Hyötyläinen, 2000; Toiviainen, 2003; Möller et al., 2004). Another topic has been learning in a network system

(Kogut, 2000). Learning networks have become a broader concept. This model is also known as the networking model (Hyötyläinen et al,. 2005, 44–51; Hyötyläinen, 2006). It involves creating new kinds of development forums and initiating collaborative relationships. Its emphasis lies on the learning and innovation objectives of the participating enterprises, enterprise networks and people, as well as on the creation and adoption of new solution models.

The natural form of collaboration in the networking model is thematic teamwork. The topics to be discussed arise from the common needs of the participating groups and people. Interest networks form a firm foundation, motivating participants to contribute to the promotion of collective actions and measures (Henriksen et al., 2004). In the model, innovation and innovativeness depend on the collaboration and interaction of the participating groups and experts. At its best, a networking model can lead to the creation of new network-like webs among the participating groups and experts (Hyötyläinen et al., 2005; Doz & Kosonen, 2008).

Learning and innovative network models describe informal networks rather than traditional supply chains or strategic enterprise networks. The questions of how open or closed business networks are and how static the network relationships are assumed to be remain unresolved. Möller and his colleagues suggest that one should differentiate between different learning networks in terms of how radical or incremental their innovation goals are (Möller et al., 2005; Möller & Svahn, 2006). The models, however, address innovativeness and emphasise innovative solutions (see Powell & Grodal, 2005). In any case, both the learning and innovation network models place requirements on management models in order to understand and handle evolving learning processes taking place on many different levels in firms. These processes also take place in certain contexts and are, by nature, dynamic phenomena.

5.2 Knowledge and innovative business systems

5.2.1 Knowledge and know-how of innovation processes

Nonaka's knowledge development model (Nonaka, 1991; Nonaka & Takeuchi, 1995; Nonaka, 2004), which examines the prerequisites for new knowledge creation, can be used as a foundation for management and innovation models supporting them. Basically, this involves the management of knowledge processes and know-how. Nonaka divides knowledge into tacit and explicit

knowledge (cf. Polanyi, 1983). Tacit knowledge is considered to be subjective knowledge that is based on experience and is to a large extent contextual, which makes it difficult to communicate. Explicit knowledge is general and shared knowledge, which generally can be documented. The emphasis lies on the development processes of knowledge and the interactive relationships between individuals and groups. It can be pointed out, however, that even explicit knowledge is not always general in the sense that all organisations and actors would know it. There is also an information and knowledge asymmetry (Loasby 1999, 1–18). Furthermore, the processors of information are characterised by unbounded rationality, which affects actors' chances of always finding the right or optimal solutions (March & Simon, 1958).

These assumptions and models are important for the operation and development of business networks capable of learning and innovation. There are limitations to learning and innovation networks and their development, impacting on the ensuing solutions and development dynamics of networks. Thus new participants in a business network or those operating in the different branches of the same network are unlikely to form the same picture of the innovation and its development agenda. Each entity and even each individual have their own background and tacit knowledge, the consolidation and collective development of which make for difficult processes in learning and innovation. Nonaka and Takeuchi (1995) also point this out. They emphasise interaction and collective processing of information. The model of Nonaka and Takeuchi is not without its critics. Engeström (1999), among others, points out that the model phases do not seem to include any concept analysis or interpretation, which would be important factors in organisational learning. This aspect is also addressed by the communities of practice approach, which emphasises the social and communal aspects of new knowledge creation (Lave & Wenger, 1991; Cohendet & Amin, 2006).

5.2.2 Reflective action and utilisation of information

Interpretation and reflective action can take place on several levels in firms and networks (see Choo, 1998; Lester & Piore, 2004). The first level is formed by *individual* reflective processes. Argyris's (1992) double-loop feedback model is an example of the assessment of individual action and the changes made in operational principles based on it. The model is based on empirical learning, but according to the model, concepts and generalisations are formed when an individual thinks or reflects on his experiences. In principle, Argyris (1990) also

attempts to extend his model to include the organisational level. On the second level, we have the learning and reflecting taking place on a *business community* level. An example is the model of Lave and Wenger (1991), which emphasises the contextual nature of learning and the understanding of learning as participation in communal practice (see Brown & Duguid, 1991). The third level can be seen in the *hypothetical and expansive learning* of a business community. Engeström's (1999) expansive model and the analysis of its structural components serve as an example of this level.

One advanced form of interpretation of the individual level is reflection, as presented by Schön (1983), by which he means a reflective practitioner and his role in the development of expert activities. According to Schön, reflection on an action and the problems connected with it makes it possible to learn from the action and to create more advanced action models. On the second level, we have the business community model of Henriksen et al. (2004), which emphasises conceptualisation and communication in a business environment. It is based on the definition of communicative action as a cognitive and purposeful action. Henriksen et al. propose that one important expression of communal interaction is dialogue and its conduct (see Isaacs, 1999). Dialogue is seen as a way to create new realities and change business processes in which language and communication play a crucial role. A dialogue linked with communicative action is by nature always situation-specific, with the interacting people forming concepts while processing shared meanings (Henriksen et al., 2004, 152–161). Henriksen et al. point out that reflection also plays an important role in the conceptualisation of new business concepts and processes and when defining problems and the necessary actions.

Central dimensions of business networks are, on the one hand, the ability of a business community to create and interpret knowledge and, on the other hand, the need to transfer knowledge among business parties within the business community. This takes us closer to the questions surrounding the utilisation of community knowledge and exchange mechanisms for information and knowledge (Dixon, 1999 and 2000). Dixon (1999) first presents a four-stage organisational learning cycle that emphasises the creation of collective knowledge. The four stages are generation, integration, interpretation and action. The widespread generation of knowledge includes both the gathering of external information and the development of internal information. Here the construction of common concepts in a firm is important. Internal development means analysing success and failure, and changing action in a self-correcting direction. The

second stage involves the integration of new information into the business community context. Here the actors should have the opportunity to access information that is important to them.

For the next stage, Dixon proposes collective interpretation of information, which comes close to what Henriksen et al. (2004) present as communicative action and dialogue between actors (see Doz & Kosonen, 2008). The idea is that the individual creation and presentation of knowledge is not sufficient for collective learning – the reason being that people process information differently and interpret it within their own frame of reference. For this reason, close interaction within the business community is a key to collective interpretation and opens a possibility for shared learning experiences. Collective learning does not guarantee that absolute answers will be found, but at least it helps identify central development problems. Dixon's last stage has to do with the authorisation and responsibility to act according to the interpreted information.

Secondly, Dixon (2000) emphasises the transfer of knowledge in a business community. This could be seen as the central dimension of business networks and the learning processes taking place in them. According to Dixon, a community should develop systems and ways to facilitate borderless sharing of knowledge by its members. As is well known, this is neither easy nor self-evident. The difficulty of transferring knowledge or information within a business community is well-known ("sticky information"). Knowledge and information are by nature local and context-specific, and the transfer of information between actors and localities is a cumbersome process (von Hippel, 1998b; Szulanski, 2003). Möller and Svahn (2006) have started to examine this issue in the business network context and suggest useful guidelines for balancing between self-organised learning networks and more co-ordinated theme groups.

The viewpoints presented above have a direct connection to the formation and development of learning and innovation models. It is best to reject oversimplified learning and innovation models indicating that business networks and the collaboration taking place in them would easily lead to a common or unambiguous understanding of the function and contents of a learning and innovation network.

5.2.3 Formulation of hypotheses and creation of new knowledge

Learning and innovation in firms always has a future dimension. Learning and innovation do not only mean the processing and transferring of knowledge in a

business community, but also the formulation of "hypotheses" or assumptions about the future as well as the constructs guiding action (Engeström, 1987, 321–337 and 1999; Friedman, 2001). That requires reflection on thought and action models.

We believe that information and knowledge are not sufficient to promote learning and innovation in business communities. It is also a matter of interpretation (cf. Daft & Weick, 1984; Weick, 1995; Weick, 2003). We know that with the same information and knowledge we can come to quite different conclusions and measures (March & Simon, 1958). The only way to study issues in learning and innovation is define new hypotheses and to create common learning and innovation forums and to process the interpretations constructed in them interactively. Here communicative action and dialogue processes take a key position (Isaacs, 1999; Henriksen et al., 2004). They assign interpretations and meanings to issues and information, which helps to pose new questions in the business community and to create new knowledge (Weick, 1995; Lester & Piore, 2004).

This, however, leads to an interesting dilemma, which we will encounter in learning and innovation communities and their interactive events. We may ask which came first, action or interpretation (Vygotsky, 1978). The question is justified on the individual level, but it becomes even more problematic with business communities, such as learning and innovation forums. Without an action, we cannot interpret it. Otherwise interpretation relates to the orientation of different parties or individuals and their way to operate in different situations (Norros, 2004). This forms a substantial limitation to the results that can be achieved in learning and innovation networks. People's "fixed" thought and action models change most easily when faced with new and unexpected situations in which they need to form new concepts and corresponding actions, for example when interacting with others inside and outside of the firm (Engeström, 1999; Norros, 2004; Doz & Kosonen, 2008).

Business and innovation networks can serve as forums in which different business entities and people with their individual orientation and operation models are exposed to the other parties of the network and have to revise their own interpretations as well. Collective action and forums can facilitate communicative action and thereby the formation of shared interpretations. However, we still have to address the questions of starting the learning and innovation processes and the meaning of the roles of actors for the development of the learning network. These questions will be addressed next.

5.3 Formation of learning and innovation models

5.3.1 Formation of a development agenda

According to Alasoini (2005b), the focus of a learning and innovation network can be loosely defined at first. There is some truth to that. However, for the purpose of operation and communication, as well as learning, the innovation network will need a development agenda, which describes the focus, contents and goals of its operation and around which the learning and innovation network can be built (cf. Hyötyläinen, 2006; Cohendent & Amin, 2006; Doz & Kosonen, 2008).

It has been strongly suggested that the implementation of organisational changes and the creation of anything new require actors who will promote change and engage others (Caldwell, 2006). It is hard to imagine that learning and innovation networks would emerge entirely spontaneously, although there might be some examples of this happening. Möller et al., (2005) suggest that the next position and relationships that an organisation has to build influence its possibilities for agenda development. With growing experience and new network connections, a development path model can be drawn up.

5.3.2 Actor models and roles

The changes and new forms rising from the development of the learning and innovation network and the supporting learning forums prompt the question of actor models and the roles of the various actors in these models (Friedman, 2001). With increasing and more specific information and knowledge the possibilities for action and its reliability generally increase (Sneck 2002; Doz & Kosonen, 2008). This also lays the foundation for the formulation and development of actor models.

The big question, however, is whether a learning and innovation network can be a "subject". It is generally assumed that change and development have an agent of change (Heckscher et al., 2003; Caldwell, 2006). The agent may operate outside the organisation, but always in close collaboration with the organisation and the actors. Some believe that there is no significant difference, either in principle or in practice, between an external agent and the actors within the organisation (Henriksen et al., 2004, 145–161). It is a question of joint action and interactive communication and dialogue processes through which reality is con-

ceptualised and new realities are created. This action and conceptualisation are seen as a continuous chain of several cycles in firms.

These concepts reveal a complex fabric where actors in a learning and innovation network and in a firm create new realities or, at least, analyse and conceptualise target systems and processes taking place in them. Here we have already moderated the requirement of having a central agent. These are actors who, working together and interactively, define and conceptualise the business system and its boundaries (Stacey & Griffin, 2005).

It may be that for the description and conceptualisation of a complex business system such as a learning and innovation network, the best approach would be to use decentralised agents. In that case, there would be no one single logic and intention in any system entity, but the "intelligence" would be in the system. These complex systems are best described and analysed by the complexity theory, which is also applied to the study of dynamics in an organisation or a business community. According to complexity theory, a business system operates in the middle ground between chaos and order. This may also be seen as a continuing interaction between structure and processes (Giddens, 1984; Caldwell 2006, 22–27 and 92–121). Recent research suggests, however, that it is useful to distinguish business systems according to their relative openness versus closeness: this influences the means by which the systems are and can be co-ordinated (Luhmann, 1995; Möller & Svahn, 2006).

5.4 Concluding remarks

A business system of complex relationships may be characterised as an interaction model (Lundvall, 2006). The business system operates in a dynamic environment – in a world that is at the same time known and uncertain (Stacey, 2001). A business system of complex relationships is self-organising, which means agents interact with each other according to their own local organisational principles. This kind of innovative system is evolving, but development takes place through the interactive processes of complex relationships and with system-wide programmes or plans (Stacey & Griffin, 2005, 6–10).

A system of complex relationships is an appropriate description of the management of a learning and innovation network and its evolution, based on open learning principles. Action is based on complex interactive processes, which support communicative interpretation between different entities whose action is based on different local models. By nature, such open and evolving business

networks also promote innovation. Specifically, such a network can be said to form a social network that supports general innovativeness and the creation of completely new openings. At the same time, the operation of the business system is based on local operational principles, which can promote the creation of separate, focused innovations (Tidd et al., 2001, 202–217; Luhmann, 1995; Stacey, 2005b; Senge, 1990). The system of complex relationships can, therefore, be understood as a decentralised agent network that, while being its own system, includes several separate environments built around different agents.

6. Forms of innovative collaboration networks

6.1 Network challenges of enterprises

Enterprises have three central challenges with regard to enterprise networks. First, enterprises have to be aware of the characteristics, action demands and management needs of the network types in which they are involved and are operating. This is what the different forms of networks require from enterprises (Dyer & Singh, 1998; Hyötyläinen & Valkokari, 2009; Hyötyläinen et al., 2011). Second, enterprises have to know what new forms of networking are available to them (Dyer et al., 2001; Child et al., 2005). Third, enterprises have to consider which types of networks will help them to renew their businesses and to create new business opportunities (Cohendet & Amin, 2006).

Enterprises have, in principle, four models of networking. The first model is traditional supply chain management, in which there is a relationship between the vendor and the buyer. The model is mainly based on the transaction cost approach (Williamson, 1975 and 1985). Porter (1980 and 1985) has extended the model to value chain management. Value chain thinking has a strong position in defining the competitive strategy of an enterprise. The enterprise is part of the value chain in which it has to seek its own position as well as its critical success factors (Kogut, 1985). The value chain comprises all the links and supply chains that influence the formation of the total costs within product and service groups. One has to assess the cost and price information so that the enterprise is able to make decisions on its position in the value chain. Enterprises have to increasingly take into account the international and global value chains and the competitive differences and competitive conditions in different countries, although this poses some management difficulties (Porter, 1990, Levy, 1997). However, the main point in the supply chain model is to use the present resources of networks and

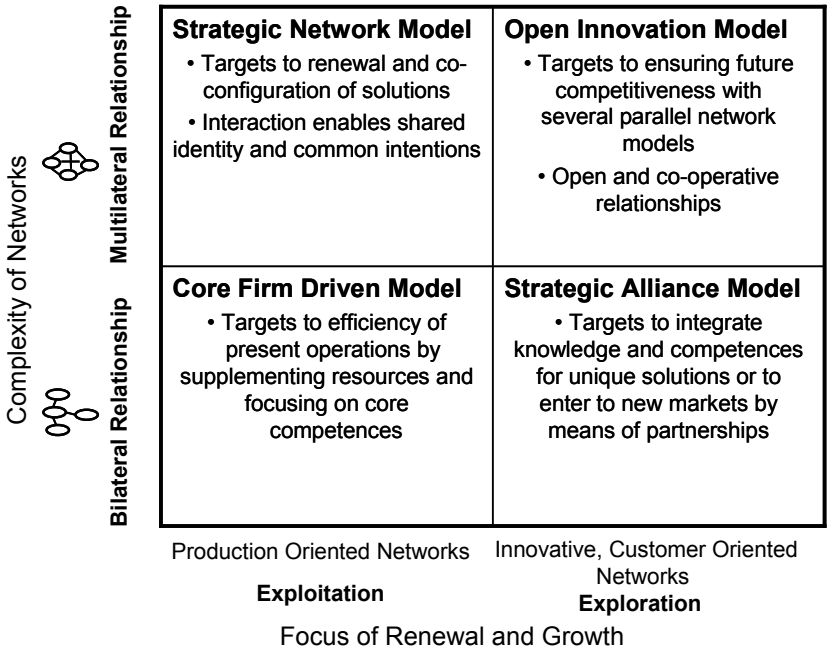
therefore the model is characterised by the exploitation dimension (cf. March, 1991).

The second is the partner model, in which network partners engage in close co-operation and build tight relationships. The basis for the model is resource-based theory, which brought a business perspective to the network area. The enterprise acting in the network faces management challenges (Pfeffer & Salancik, 1978; Dyer, 2000). The resource-based approach also addresses co-ordination and management issues in networks. Richardson (1972) stated that the enterprise acting in a network has competences, know-how, experience and skills that it has to be able to manage through functions and processes. These competences and expertises complement each other. The relationships have to be long enough and based on trust, so the enterprises can ensure good production planning and network activities management.

The partner network relationships can form the strategic networks in which enterprises collaborate on a multilateral basis (Jarillo, 1993; Hyötyläinen, 2000; Möller et al., 2004; Möller et al., 2005; Möller & Rajala, 2007). The enterprises in the network develop joint strategies and business concepts. The strategic network model is by its nature normally a multilateral network where several enterprises co-operate and collaborate with each other. The target is the renewal of businesses in a network context. Such networks can also involve collaboration at several levels of network participants. The enterprises in the network can set common goals and objectives for businesses with the target of finding new solutions together. They co-operate with customers. Thus it is possible to create a shared identity and common intentions in this model (Valkokari, 2009). However, the main emphasis in both the partner model and the strategic network model is to exploit strategic assets to a great extent.

Table 7 presents the framework for four network types.

Table 7. The framework of network models.



There are two other network models besides the three models mentioned above (cf. Hyötyläinen et al., 2011). One is the strategic alliance model. The strategic alliance model is based on integrating different competences (Quélin, 1997). In fact, *the partner model is very close to the strategic alliance model*. The aim is to achieve new markets and customer groups (Gulati, 1998; Child & Faulkner, 1998; Faulkner, 2003). A partnership could be composed of companies that have different technologies. By combining these technological bases it is possible to acquire new customers (Hyötyläinen et al., 2005). Normally, this model is not easy or fast to build, and takes time to progress. It is possible that some network partners are also competitors, which makes it difficult for them to discuss further measures and agree on common targets. It is possible that only some partners may actually form partner relationships with each other. However, the main dimension in the strategic alliance model is to explore new business opportunities between the partners in the network.

The other is the open innovation model, which is currently only under discussion (Chesbrough, 2003, 2006 and 2010). It is an even more theoretical model. That said, some companies are already trying to apply the principles of open

innovation. The target is to ensure the future competitiveness of network partners. Normally, there are many parallel loosely coupled networks. In this case, an emerging network aims to create new knowledge concerning new products, services and technologies as well as new market opportunities. It is possible that only some network partners can join together and start new businesses. In this case, it is normal that new business opportunities are formed step by step when network partners can agree on business areas. In the previous chapter we discussed and analysed the learning and innovation model and its characteristics when we described some important features of open and thematic networks.

6.2 Strategic issues in collaborative enterprise networks

In the development of inter-firm collaboration, the extension of the boundaries of the firm is seen as an efficient way to manage uncertainties, acquire appropriate resources, receive new knowledge, create learning processes through the network and to promote the development and growth of the firms (Nooteboom, 1999; Toiviainen, 2003, Child et al., 2005). An essential concept in the development of collaborative networks is trust, which can be seen to link the formal part represented by contracts and governance structures with informal processes. Establishing trust in the network context is a learning process (Koenig & van Wijk, 2001; Valkokari, 2009).

Trust is a characteristic that has a double meaning, by which it is possible to understand the dynamics of collaborative activities between firms in multilateral networks. On the one hand, trust is normally the initial condition for establishing co-operation and contracts. On the other hand, one can emphasise the role of trust as a learning process and delineate its further evolution in the interaction between partners. The point is that trust cannot be traced back solely to shared norms and values, nor can it be derived exclusively from strategy and management efforts (Powell, 1996; Sabel, 1993). The development of trust is a learning process that occurs during interaction. Trust is enhanced through informal and personal networks. Thus, trust is produced among social actors in the network when they create and hold shared beliefs and models and hence build up mutual expectations. Therefore, co-operation between firms cannot be fully planned (cf. Vicari & Troilo, 1998; Valkokari, 2009). Instead it develops in the interaction between partners, and is framed by contractual and formal mechanisms.

The main issue in collaborative networks is the dividing line between the concepts of co-ordination and collaboration (Koenig & van Wijk, 2001). Co-

ordination can be seen as a form of co-operation in which activity can be planned and programmed over time, leading to formal organisational and managerial arrangements and high efficiency. An essential point is that processes between organisations can be integrated without any discussion of the alteration of each firm's objectives. The decision to continue or end co-operation is based on the balance between the resources committed and the achieved returns.

Instead, collaboration is characterised by the mutual commitment of resources and capabilities in an open-ended process. In this case, neither situations nor all arrangements are formally planned, but instead are defined by their shared objectives. Collaborating firms need to trust each other in order to start up creative processes and mutual adjustment is required for efficient operation. Thus, it can be stated that collaboration leads to a co-operation pattern that influences objectives. Collaboration can become an organisation in its own right, identified and defined by its objectives (Koenig & van Wijk 2001; Hyötyläinen, 2000; Valkokari et al., 2006; cf. Häkkinen, 2008).

6.2.1 Development of strategy of collaborative networks

The development of collaborative network strategies and management can be examined through two strategy models. The incremental approach can be taken as a basic approach (cf. Quinn, 1980). Management by vision complements the network strategy process (cf. Fransman; 1998). These models can be used as the bases for creating a model of the strategic management of collaborative networks (Hyötyläinen, 2000).

The incremental approach offers a realistic starting point for the development of an enterprise network strategy. Enterprises' network co-operation has gradually developed from the traditional subcontractor culture towards partner co-operation (see Kuivanen & Hyötyläinen, 1997; Hyötyläinen, 2000; Valkokari, 2009). At the same time, the co-operating companies have had to change their strategies to better reflect the demands of the changed circumstances and to consider new opportunities brought about by the tightening of co-operation.

Strategic issues have gradually arisen as a natural part of co-operation. Co-operation has covered a continuously growing set of factors closely related to strategic issues. Even in the initial stages, companies discuss quality issues and delivery methods as well as co-operation in their development. Gradually, issues about information transfer, product design and product development have arisen

and been included, which has further increased the need for more strategic co-operation.

This development can be characterised as the interaction of companies' strategies and the historical development of the new network's co-operation (cf. Mintzberg, 1994). Companies participating in co-operation have many parallel strategies; they proceed as if they were using several divergent operational paths at the same time (cf. Regner, 2001). It is a question of which forms of activity become general and of when the companies can strategically shift over to uniform operational lines. The new mode of activity can become the basis for a mutual strategy among organisations when it transforms into a mutual resource and is taken into general use in the network (Valkokari, 2009).

When evaluating the possibilities of the incremental approach from the perspective of managing the enterprise network, we need to pay attention to two issues. First, the companies may have to proceed in small steps without any policy outline. Second, new emerging possibilities might have to be utilised. The most decisive aspect is what general view and plan forms the basis of solutions. At best, progress and management are based on analyses of elaborate links of influence and the examination of the essential connections of activity and its systemic modelling. The main issue, however, is what kind of overall view strategic management should be based on.

This process is not necessarily entirely consciously managed. The task of the companies' management is to notice and seize new modes of operation that are developing in the network and to direct their development when necessary (cf. Koenig & van Wijk, 2001).

Management by vision offers an excellent method for this. In the changing business environment, the significance of visions and scenarios is highlighted (Mintzberg, 1994; Fransman, 1998). The vision process serves the network's activity and the decision-making that is taking place, i.e. the decisions that are used in the continuous construction of future policy. Decision-making is not the “slavish” implementation of a plan but rather is a “context-bound” and “creative” activity (cf. March & Simon, 1958; Cyert & March, 1992). Decision-making will have to react to new emerging opportunities and likewise to implement actions to fight off emerging threats. In such a situation, strategy processes that are based on creating visions and their results can function as efficient means for estimating the significance of different actions from the perspective of long-term objectives.

When network activity develops into a collaborative network, the network's co-operative mode of activity then changes into multilateral co-operation (Kuivanen & Hyötyläinen, 1997; Child et al., 2005). The enterprise group commits to the development of mutual activity and to the systematic modes of operation. Business processes are designed in co-operation, which strengthens value chains and clarifies the division of labour in the network.

The basis for a collaborative network is a shared vision of network activity, products, product development and production as well as customers (Valkokari, 2009). In this way, a new activity culture is created in the network. Central to the development of the network is the utilisation of development potentials. Multilateral co-operation brings about new perspectives, which enhance the innovative abilities of the network.

The network's operation principles and development visions can be combined into a common network strategy. The network strategy crystallises the network's common development direction and its model. The strategy forms the basis for network development activity and for the development of new forms of co-operation.

6.2.2 Strategic options in the creation of new businesses through networks

Learning and innovation processes are an essential feature of collaborative networks. Learning and innovation are related to the building and development process of enterprise networks in two ways. First, developing an eterprise network into a collaborative requires learning and innovation by the network and the network's enterprises. Second, a collaborative network can generate a learning environment in which the enterprise network and the network's enterprises create new organisational, activity and product innovations, and new businesses (cf. Inkpen, 1996; Stacey, 2001; Stacey & Griffin, 2005).

The learning processes and innovations required by the building and development processes of networks require that different actors in the network be in close interaction. Establishing direct personal connections is a mandatory requirement for building functional networks and an essential part of the network-like activity mode (cf. Nohria & Eccles, 1996; Hutt et al., 2000). The formation of new co-operation forms and modes evolves as a social process in which different actors and functions of the organisation influence the change processes,

both together with and separately from concrete measures (cf. Burgoyne, 1994; Cyert & March, 1992; Räsänen, 1986; Sitkin, 1996).

The basic premise for overcoming the different views and different thinking and activity models of the network's different companies and actors is that a mutual state of will and trust is created in the network by means of discussion, planning, mutual meetings and compromises (cf. Dixon, 1999). In this way, the common concepts of development targets and solutions can gradually be formed. This is how models and methods for the new activity mode can be generated. The models and methods developed are turned into operative activity modes and tools as well as conceptual models in companies and networks. Creating new processes, connections and activity modes facilitates the thinking and activity processes of individuals participating in the implementation of the change, which supports the desired new activity mode in the change and development processes. This enables the creation of structures and models of activity in the network that support organisational learning and knowledge creation (cf. Nonaka & Takeuchi, 1995, 83–90; Leonard, 1995). Through learning and innovation the collaborative network opens new opportunities and strategic options.

6.3 Collaborative networks and business models

In recent years, managerial and economics literature has paid much attentation to co-operative activity between firms (Biggart & Hamilton, 1992; Jarillo, 1988 and 1993; Casson & Cox, 1997; Nooteboom, 1999 and 2004). There have been a number of reasons for co-operative and collaborative activity being cited in the literature. It is recognised that in order to fully understand collaborative forms and linked business models, one has to consider the need for interplay between multiple levels of analysis. This involves different factors that have impacts on the business, corporate and network levels. Collaborative networks and their formation concern complex and interlocking clusters of firms, groups and networks (Faulkner, 2003; Valkokari, 2009).

The firm can be considered as a bundle of capabilities, which are appropriate knowledge, experience, skills and resources. The role of complementary capabilities in collaboration has been recognised as a major stimulus to collaborative activity.

Identifying and profiling collaborative possibilities helps to create the conditions for the evolution of networks. Furthermore, the networks themselves provide an environment in which collaborative activities may extend down back to

the corporate and business levels of each company, and further stimulate the development of new collaborative forms and agreements within the network. Business, corporate and network levels are likely to interact in mutually supportive ways, with the deepening of collaboration at one level helping to stimulate co-operative activities at other levels (Kay 1997; Child et al., 2005).

6.3.1 A need for formalisation

Collaboration is considered to be intensive co-operation aiming at flexibility and creativity. However, there is a need to arrange a single locus of control. Otherwise there is a risk that the partners in co-operation cannot achieve the expected result and fulfil their obligations. In principle the learning process stimulated in a relationship of trust makes it possible to achieve an environment where mutual competencies can be combined in a creative fashion. However, practice and efficiency soon lead to the need to at some level formalise experiments so that their results can be systematically fully harnessed.

It has been observed that formalisation provides a variety of advantages and safeguards (Koenig & van Wijk 2001; Häkkinen, 2008). First, it ensures reproducibility in time and place, which makes it possible to engage in the wider exploitation of collaborative practices. Second, it leads to control, which promotes the achievement of relative performance, as well as incremental improvements that can be tested and implemented. Third, formalisation advances the legitimatisation of an existing mode of collaboration. The stakes can get very high in collaboration without formalisation. Failure in a collaborative relationship can be extremely damaging, if there is no formal control to monitor the exchange of competence and resource assets.

Companies tend to form collaborative networks that possess mutual development programmes and a shared vision of product development. Through the learning and innovation processes, the network can create dynamic capabilities for itself and for those companies participating in the network (Lamming, 1993; Nooteboom, 1999; Bidault et al,. 1998; Valkokari, 2009).

6.3.2 Spontaneous network formation

Enterprise networks do not, however, develop merely as a result of strategic and systematic planning. Networks also emerge from a chaos of spontaneous challenges and conflicts as a result of real-time learning (cf. Stacey, 1992 and 1995;

Mintzberg, 1994). The key issue is to identify the real questions, problems and possibilities. The challenge is to find an appropriate and creative inclination or objective for the network (cf. Tushman & O'Reilly, 1997; Cohendet & Amin, 2006). Here the network's co-operation organisation creates the framework for co-operation. Different groups of people and individuals, and their intuition and skill at recognising metaphors and analogies in complex environments must be relied upon both in the network and in development. Learning occurs efficiently in the development groups in the network. The groups' learning processes are directed by, for example, the views of different parties, conflicts and inter-group power relationships and hierarchies (cf. Cole, 1989; Stacey, 1992; Vicari & Troilo, 1998; Simons & Hyötyläinen, 1998). As a result of this kind of activity, certain questions or problems arise as strategic issues in the network and network enterprises (cf. Nonaka, 1991; Valkokari, 2009).

People's "tacit" (silent) knowledge has been seen as a central factor in the creation of organisational knowledge (see Polanyi, 1983; Nonaka, 1991; Choo, 1998). Organisational knowledge also includes the know-how connected with activity and cognitive models, which contain thinking models, beliefs and opinions about desired visions of the future. The only way for organisational learning and creation of new knowledge to occur is to bring the different views into contact, which is when we can achieve shared views of the present, its development needs and visions of the future (see Nonaka & Takeuchi, 1995; Nohria & Eccles, 1996; Valkokari, 2009). Gradually these will be formalised into explicit models and shared concepts. Formal models and methods can be extended in the network to different actors who can adopt and internalise them as their own tools and bases for new "tacit" structures.

6.4 Virtual organisations as a basis for collaborative networks

Companies tend to form collaborative networks that possess mutual development programmes and a shared vision of product development, production and delivery activities as well as marketing measures. Through the learning and innovation processes, the network can create dynamic capabilities for itself and for those companies participating in the network (Nooteboom, 1999; Bidault et al., 1998; Lamming, 1993). At the same time, a new virtual company model has emerged (Davidow & Malone, 1992; Hedberg et al., 1997; Hyötyläinen, 2000; Hyötyläinen et al., 2005). A virtual company is an enterprise group that is creat-

ed for a certain task and broken up after performing its task. The idea is that companies seek the corporate partners that are the most suitable for a given task.

By combining the features and models of the strategic network and the virtual organisation into the same framework, we can develop structures that are flexible and yet capable of learning. Figure 4 illustrates this model of operation.

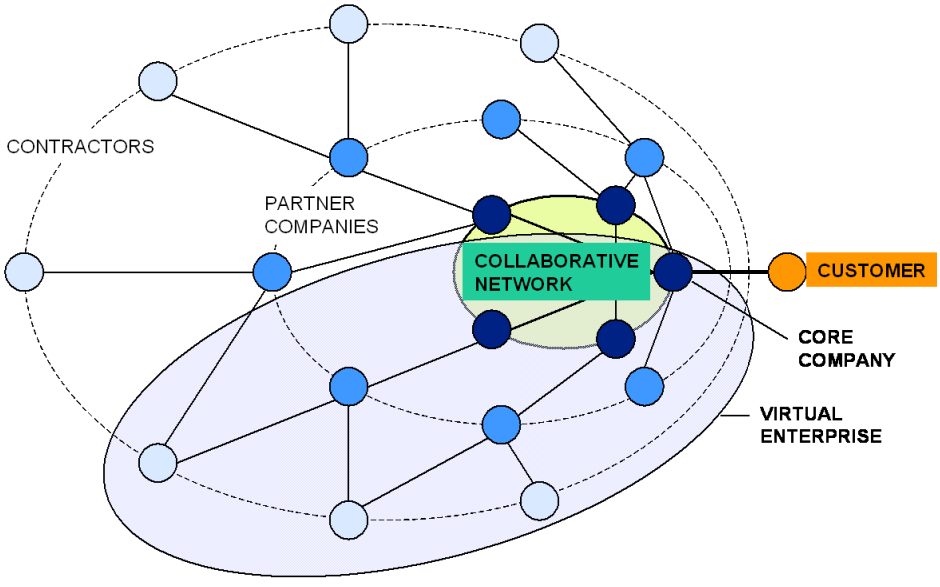


Figure 4. Model of collaborative relationships (see Hyötyläinen 2000, 67; Hyötyläinen et al., 2002).

The model includes three types of companies. The core of the network consists of the collaborative network. The companies in this network operate in multilateral co-operation. A collaborative network usually has one distinct core company that has a central role in the creation and development of the network as well as in its maintenance. At another level, there are the partner companies. Bilateral relationships between companies are emphasised in partner co-operation. The relationships between collaborative network companies, as well as the relationships of partner companies, are characterised by close and long-lasting co-operative relationships. At the third level, there are delivery contract companies, whose expertise and investment are needed for performing the tasks.

Enterprise networks form "virtual companies" within them. A virtual company is formed to perform concrete tasks. The tasks can include, for example, customer projects, delivery projects of certain products or product development projects. A virtual company is a subset of companies that is closely attached to the enterprise network. Companies essential for performing the task are selected from amongst the network companies. If necessary, delivery contract companies are included. These companies deliver the required special expertise and certain types of local services.

Virtual companies operate for a fixed period. When the task has been carried out, the virtual company is dissolved. However, the activity mode of a collaborative enterprise network differs from the traditional model of a virtual company. A collaborative network is a permanent network with its own shared objectives and organisational practices (Hyötyläinen, et al., 2005). A collaborative network can be a learning environment in which companies included in the network learn from each other and across the boundaries of virtual companies as well. The experiences and lessons remain within the companies of the collaborative network, but are also used by the co-operation partners to create new ideas, product models and methods for future operations (cf. Nooteboom, 1999; Powell & Grodal, 2005).

6.5 Hybrid models of innovative networks

Hybrid models of networks involve matrices formed by both the enterprises' business models and the network forms. They also show how the new combination of the future networks and their management model will develop.

Certain thinking patterns are forming in the business and network area that emphasise the dependence of the co-operation forms of enterprises and networks on the operational environment and its network requirements. The networks and network forms are assessed according to context-bound views and criteria when it is important for the enterprise to acknowledge the management challenges of the networks involved and to assess their opportunities to develop businesses (cf. Clark, 2000; Gulati, 1998; Gerdin & Greve, 2004).

Furthermore, over and above their effectiveness, businesses and their networks are assessed on the basis of how they increase the enterprises' know-how and innovation ability and create requirements for business concept innovations as well as make it possible to adapt national and international operating models. For the development of the national innovation system and business system, it is

extremely important which kinds of business models different networks offer for national success (Porter, 1990 and 1998; Alasoini, 2004; Ali-Yrkkö, 2007; Valkokari, 2009; Apilo, 2010).

Table 8 describes the hybrid models of networks. They are represented by ten dimensions concerning the matrices of five network models and business models.

Supply and value chains represent nearly vertical chains. Customers are considered to be part of these chains. These chains are founded on production functions and development work, which is seen as a part of the rationalisation of supply chains. The definition of value chains also serves the creation of the competitive strategies of enterprises as well as the planning of the division of supply chains. The innovation horizon concerns the integration of supply chains and the formation of new business strategies. The changes are incremental in nature. Internationalisation means the distribution of supply chains to different countries and the utilisation of different competitive conditions. The national environment is at its best based on the bounded supply chains and the clusters formed by value chains, which can offer possibilities for national innovation models (cf. Porter, 1990 and 1998; Porter & Stern, 2001). It is possible that these models will form strong innovative system suppliers that are tightly bound with the operation of core companies (Vesalainen, 2002; Hyötyläinen et al., 2005).

In general, *partner relationships* concern strategic nets in which there are vertical and horizontal relationships between actors, depending on the network type in question (Hyötyläinen, 2000, Möller et al., 2004). In the strategic networks, firms combine resources and competences and create common strategies for the network. Customers are also seen as partners that are a tight part of the strategic network. The innovation horizon covers creative changes that can lead to business innovations. The formation of new steps in this model can be described by experimental progress (cf. Möller & Rajala, 2007; Hyötyläinen & Valkokari, 2009). Internationally this process can form partner relationships, which also requires the internationalisation of partner firms. It is possible that it can nationally form the functional strategic networks that advance the creation of the new business concepts and operation model in enterprises.

Table 8. Hybrid network models.

	Supply relationships	**Value chains**	**Partner relationships**	**Strategic networks**	**Industrial business systems**
Starting point	Supply relationships Vertical chains	Competitive strategies Division in value chain	Strategic relationships Vertical and horizontal nets	Business models and multi networks	Business systems
Structure	Networks between hierarchy and markets Vertical vendor structures	Value chain as links and multi-level supply chains	Networks as strategic bundles of complementary resources	Networks and alliances based on needs: co-operative competition	Competition structures cut across industries
Operating model	Contracts and minimising transaction costs	Value chain as process: main and backup activities	Connection of resources and building of dynamic competences	Defining the action model of the firm and its boundaries	Innovative dynamics of industrial systems
Actor strategies	Principal: make/buy decisions	Firm and its management: defining value chains and the position of own firm	Firm and net: matching strategies between firm and net	Firm and network: knowledge processes and their organisation	Actor models and their strategies in business systems
Boundary of firm	Purchase strategy Principal co-ordinates supply chain	Firm as part of value chain	Firm as part of net and strategic co-operation	Firms engages in tight collaboration in networks	Interaction between organisations in business systems
Customer interface	Principal: product orientation to customers: demands	Customers as part of value chain	Customers as strategic partners	Value systems and customer value processes	Customer as part of industrial systems
Innovation horizon	Incremental changes Supply chain integration	Changes and new business strategies	Creative changes and business innovations	Creative and radical changes and business concept innovations	Open innovation systems and structural changes
International dimension	International supply purchases	International value chains Competitive conditions	International partner relations	International value networks	International and regional business systems
National environment	Specialised suppliers and bounded supply chains	National structures and operating models	Functional strategic networks	National business concept frameworks	National architectures and integration models
National models	Supply relations networks	Clusters and innovation models	New business concepts and operation models	New kinds of business concepts and operation structures	National business systems and industrial structures

Strategic networks as well as industrial business systems are tightly linked to the discussion on the formation of new business models, hinging on the need-based view of networks and alliances. Knowledge-creating processes are an essential part of the operation of enterprises and their networks, which require wide interaction between organisations. Customers are seen as part of the value system and as an integral part of industrial systems (Grönroos, 2005). The innovation horizon builds on open innovation systems that advance business innovations and structural changes. In this case, the progress into new business solutions and structures happens step by step, based on parallel advance (cf. Hyötyläinen & Valkokari, 2009). Strategic networks and industrial systems can also form through the actions of international actors that promote the internationalisation of enterprises. Strategic networks and industrial systems can serve as a special strength for developing national platforms. These platforms and networks advance the creation of new business concepts and the renewal of industrial structures (Iansiti & Levien, 2004a, b; Hyötyläinen et al., 2005; Apilo, 2010). This activity can open new possibilities for service businesses (Hyötyläinen & Nuutinen, 2010) as well as for system integrators that can assume a key role in the work division on the international scale in the future. At the same time, they can form new competitive forums for the national basis (Pavitt, 2002). Furthermore, the development of industrial systems can influence national business systems and industrial structures (Alasoini, 2004; Porter, 1990).

6.6 Concluding remarks: planning and implementation issues of collaborative network forms

It is assumed that the building and development methods of network co-operation are dependent on the desired level of co-operation. Here four different models for building co-operation can be distinguished: the competitive supply model, the partner model, the strategic network model and the open innovation model for collaborative business (see Hyötyläinen et al., 1999; Hyötyläinen, 2000; Hyötyläinen et al., 2011). These "ideal models" of enterprise network planning and implementation methods are presented in Table 9 (see Alasoini et al., 1994; Hyötyläinen, 1998 and 2005; Simons & Hyötyläinen, 1998). These models can be seen as a reference framework.

The competitive supply model resembles the traditional "techno-centric" approach in which the planning and implementation of solutions occurs as dictated by the principal in a "top-down" direction. The role of the subcontractor is to

conform to the principal's wishes and solutions without participating in the planning of the co-operation forms and solutions (cf. Hyötyläinen 1998, 26–29).

The partner model resembles the "user-centred" approach, which is based on the socio-technical tradition (cf. van Ejnatten, 1993). In the partner model, the parties work closely together to plan and implement new co-operation solutions. The partners create close and long-lasting relationships with each other on the basis of reciprocal trust (cf. Hyötyläinen 1998, 30–33).

The strategic network model represents "lean production" approaches in which companies co-operatively create the network's business processes, new businesses and the division of labour that is based on those business processes and practices. The model applies to multilateral networks and collaborative businesses (cf. Hyötyläinen, 1998, 38–43; Hyötyläinen & Valkokari, 2009).

The open innovation model resembles the "use-oriented" design and planning approaches, in which the planning and implementation are carried out in an integrated way between companies and their innovation systems (cf. Hyötyläinen, 2005; Dittrich & Lindeberg, 2004).

The four "ideal models" presented in Table 9 have been compared in terms of several different dimensions, from the premises and objectives of the model to the methods employed in its planning and implementation. The following discussion will explore the differences between the models.

Table 9. The "ideal models" of enterprise networks planning and implementation methods (see Simons & Hyötyläinen 1998, 135; Hyötyläinen 2000, 93–94; Hyötyläinen, 2005, 78–98).

	Competitive supply model	**Partner model**	**Strategic network model**	**Open innovation model**
Starting points	Competition- and economy-oriented approach	Product- and activity-oriented approach	Vision- and activity-oriented approach	Innovation and communication approach
Objectives	Cost objectives	Operational objectives	Business development objectives	Knowledge-creation objectives
Object of planning and development	Purchases and logistic processes	Information processing and product development processes	Business processes and new businesses	Value creation systems and customer processes
Organisation of planning	Principal alone	Principal, co-operation with partners	Group of companies in co-operation	Business systems actors
Planning process	Analyses on principal's own activity and formulating development objectives	Analyses on principal's activity and co-operation agreements	Analyses on present situation, development objectives and programmes	Analyses on new perspectives of business systems, new business systems
Planning results	Ordering practices	Co-operation and quality practices	Network strategy and co-operation practices	Knowledge creation and combination practices
Method of implementation	Straightforward implementation of plan	Systematic implementation method	Systematic and phased way or progressing	Manifold planning and testing
Implementation model	Setting objectives for subcontractors	Co-operation in activity development	Network-like co-operation, shared work groups	Open co-operation between actors of new business systems, the formation of closed business groups
Participants in implementation	Principal's production management and purchasers	Company management, production management and companies' purchasers	Company management, production management, representatives from different functions and production cells	Work groups, network relations

The *starting points and objectives* for the competitive supply model are founded on a competition- and economy-oriented approach. The objectives of the competition model are based on the principal's drive to eliminate costs and seek a cost advantage by soliciting competitive bids from subcontractors. Gaining a cost advantage is the central objective of this model. The partner model has a prod-

uct- and activity-oriented approach, which means that operational objectives such as quality and product design issues are emphasised in co-operation. The premise of the strategic network model is the vision- and activity-oriented approach, which emphasises the development objectives of the collaborative network as well as business development objectives. The open innovation model has an innovation and communication approach, which is based on inductive approaches. The objectives for the model concern knowledge creation objectives.

The *object of planning and development* in the competitive supply model comprises direct purchasing and logistic processes. In the partner model, however, information processing and product development processes become central. Information exchange assumes a significant role when co-operation deepens. The object in the strategic network model includes business processes and new businesses, extending the examination to shared issues concerning the division of labour. The object of the open innovation model comprises value creation systems and customer processes. The model is directed to customers as part of business systems.

Planning is *organised* in the competitive supply model so that the principal alone is responsible for planning solutions. In the partner model, planning is mainly co-operative, although the principal naturally has the determining position. In the strategic network model, co-operation occurs as multilateral activity, and all the companies in the network participate in it. Planning in the open innovation model is organised so that different actors of business systems influence the solutions formed.

The planning process evolves in the competitive supply model such that the principal first analyses its own activity and then uses this analysis to set objectives for its subcontractors. As a *result*, ordering practices are created. In the partner model, the principal analyses its own activity and co-operation practices. Co-operation and quality practices are agreed upon with the partners. In the strategic network model, the present situation and development objectives are analysed first. In development work, the views of different parties are considered and a common development plan is designed based upon these views. The result is co-operative procedures and a network strategy. The open innovation model is based on the analysis of the new perspectives of business systems, resulting in the formation of new business systems. The results are knowledge creation and combination practices.

Regarding *the method of implementation*, differences exist between the models. Implementation in the competitive supply model proceeds in a straightforward manner, with the principal issuing instructions to the subcontractors. The principal's purchase department and production management in particular take part in this implementation. In the partner model, implementation is systematically carried out in co-operation. Companies' management, purchasers and production management participate in the implementation. In the strategic network model, implementation is carried out systematically in various phases. The implementation is based on network-like co-operation and mutual work groups. Personnel from all levels of the companies, from corporate management to representatives from different functions to teams and production cells, participate in the implementation (see Simons & Hyötyläinen, 1998). The open innovation model is based on manifold planning and testing practices. The point is that planning is part of implementation, because planning is seen to continue in the implementation phase. It is open co-operation between the actors of new business systems, although part of the business systems can form a more closed business group. In this model, different work groups that are connected to each other through network relationships are responsible for implementation.

7. Development and renewal models of business systems and industries

7.1 1 Business renewal models

In the previous chapters, as Part I of this study, the business and production concepts, the business and innovation systems, the learning and innovation patterns and the forms of innovative collaboration networks were under consideration and theoretical analysis. In the following, the focus is on the analysis of the development and renewal of business systems and industries. This chapter shows how many dimensions have really to be changed in the connection of business systems and industries for their renewal. The next chapter applies business system and renewal analysis on the Finnish business system and its development as well as the growth and business strategies of medium-sized firms. That analysis closes Part I of this study.

The renewal of businesses leads to innovations and changes in products, services, processes, marketing or business relations (cf. Schumpeter, 1934; Penrose, 1959). Renewal requires business concept innovations, which involve not only changes in processes and production systems but also the renovation of whole business systems (Hamel, 2002 and 2007). The new industrial forms have to be connected with new significant changes and their features occurring in industries and technologies (Birchall & Tovstiga, 2005). Business concept innovations are increasingly dependent on relations between different businesses and their mutual constellations. Business system innovations are highly valued in producing business benefits with relatively small direct investment costs. However, the renewal of businesses is not easy, because it entails changes in and accumulation of social capital and competences. Furthermore, renewal processes often require new technological solutions. The role of technology is to reduce the constraints

on business activity and open new opportunities for business system innovations and the transformation of value systems (Norman, 2001).

However, Hamel (2002, 5–18) states that there is a long tradition of incremental and continuous development in industrial activity. The tradition started from Taylor's doctrines and continues in the model of continuous development. Process improvement and ERP systems also belong to the same tradition. According to Hamel, the approaches concerning organisational learning and knowledge are almost in line with the principle of continuous development.

Creating new business concepts is often necessary in order to adopt holistic and radical perspectives. There is a need for new products and services that profoundly change the expectations and action patterns of customers (Hyötyläinen, 2007b; Hyötyläinen & Nuutinen, 2010; Chesbrough, 2011). That can succeed only by changing the whole value creation system such that customers become an essential part of business and its management. In any case, it is certain that in all alternatives firms have to increase their innovativeness and development ability in order to be able to renew themselves and to develop their earning and business models (Tidd et al., 2001; Prahalad & Rasmaswamy, 2004).

With regard to the renewal of business, the aim is not to position the business in relation to competitors, but to go beyond competition and create new competition arenas. This involves the renovation of all the components of its business concept (Hamel, 2002). The main components are the core strategy and strategic resources of the firm, as well as the configuration of these two components inside and outside the firm. The great question concerns the boundaries of the firm. The firm is open in three directions. The first factor is the customer interface, which involves customer benefits and the co-operation dynamics with customers. Another open interface comprises the company boundaries between the firm and its value networks (e.g. suppliers, partners, coalitions). The third direction is the business ecosystem at large (Iansiti & Levien, 2004a, b). The ability to renovate business concepts is aground for innovation systems and their development in firms.

7.1.1 Business system changes

The innovation horizon presents the degree to which the changes sought by firms and their networks are radical and creative. There is a great difference between whether one is satisfied with incremental steps or tries to achieve and implement new business models. The implementation of radical change requires

setting up a development agenda. That is why business networks will need a development agenda for advancing communication and learning between network partners. The agenda describes the focus, contents and goals of business operations around which the learning network can be built (cf. Cohendent & Amin, 2006; Hyötyläinen, 2006). Radical change differs from traditional business development projects. Radical ideas change normal industrial rules, change the expectations of customers, impact dramatically on the structure of pricing and costs or influence changes in the competitive position of an industry (Figure 5). In the figure, there are two axes, one of which describes the radicalism of changes and the other the broadness of the changes. The innovation horizon covers the spectrum from incremental changes to radical changes. The area between them can be called the creative model.

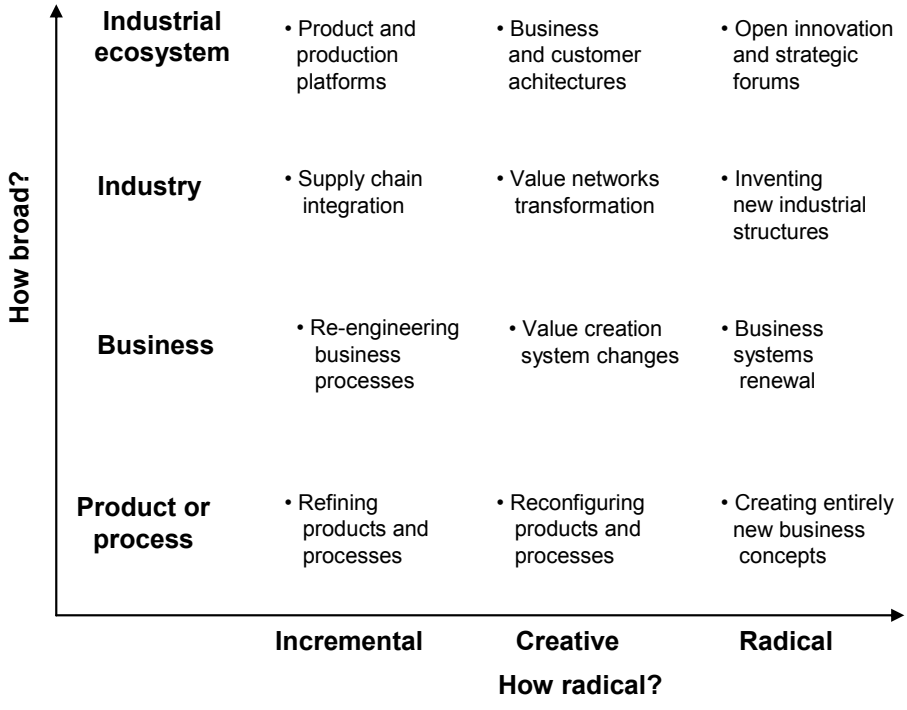


Figure 5. Business systems change model (applied according to Hamel, 2002, 64; Iansiti & Levien, 2004a, b).

Incremental changes presented by a *stepwise model* that is based on continuous development. The model is based on the present core functions and competence

of firms and networks (cf. McGahan, 2004). Firms and networks try to strengthen their operational effectiveness in particular by applying the stepwise model. The *creative model* describes the significant innovation that threatens the core activities of a firm. The resources and competence of firms are in danger of becoming obsolete. For this reason, firms and their networks must commit to development projects that enable them to renovate resources and competence. Firms and networks have to develop their activities in order to be able to create new openings into markets.

Radical change occurs when new approaches threaten the core activities and resources and competence of firms and networks (McGahan, 2004). Usually, the reasons for such changes are great technological breakthroughs, market changes or different regulatory amendments. These kinds of changes can mean structural changes in the line of business in question. This requires firms and networks to create strategic alternatives and their adaptation. Radical innovations usually emerge for firms in new acting environments, which are not easy to perceive (Möller et al., 2004). Firms and networks are in a situation where there are opportunities to create new acting patterns. Normally, the strong firms in the industry in question can be identified, but they are also in a position that forces them to realign their recources and core activities. The partners and networks of firms can identify new business opportunities in the radical phase.

7.1.2 Dimensions and levels of change models

The field of development for firms has become more complex than before. Companies have to develop activities and new action patterns at many levels. Figure 6 presents different facets of business development.

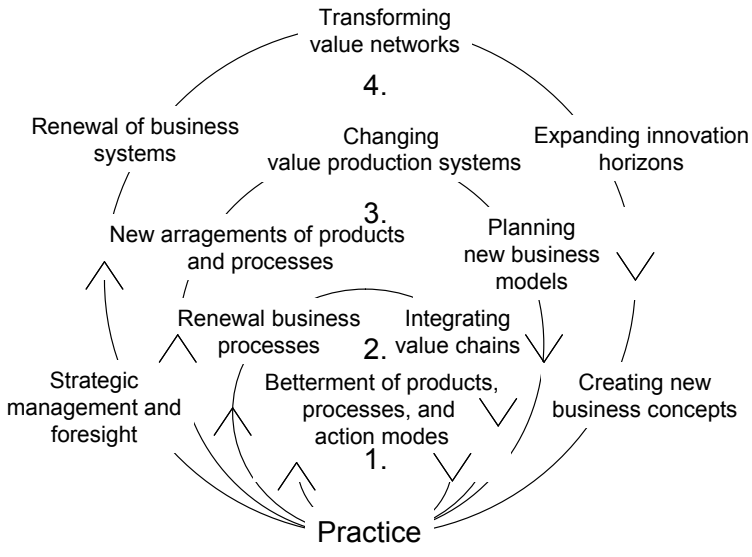


Figure 6. Business development model.

The figure shows four different levels and cycles. On the first level, we have the immediate planning and development of *operation methods,* which include products, processes and action modes and their incremental betterment. The second level focuses on the development of *business processes* and the integration of value chains, and their models. On the third level, the objective of development is *new arrangements* of products and processes, as well as the changing of value production systems and the planning of new business models. On the fourth level, development concerns *the renewal of whole business systems* and the transformation of value networks. An essential feature is the expansion of innovation horizons covering creative and radical innovations. The aim is to create new business concepts that can guarantee a competitive advantage for firms (cf. Hamel, 2002; Birchall & Tovstiga, 2005; Möller & Rajala, 2007). A fifth circle is taking shape: the dimension of this circle is an *industrial system.* Here lie the formation of new industrial structures, new innovation systems and industries, business groups and regional development. In this context, we can talk about the changing nature of *business ecosystems* (Iansiti & Levien, 2004a; McGahan, 2004; Doz & Kosonen, 2008).

On the third and fourth levels, business development is concerned with large and complex objects. The rules of the lower levels are no longer valid (Hyötyläinen & Simons, 2007). Solutions planned in the immediate development

of operation methods can be easily tested and provide feedback, sometimes even before the next meeting of the development team. The traditional cycle has been based on close interaction between planning and practice.

The expansion of objectives lengthens the planning process. Complex system models, such as business concepts and value networks, need to be planned and developed without the benefit of feedback from the practical world. At the same time, the abstract nature of research and development becomes more apparent. For a long time, business development exists only in the conceptual models of the participants and in the models and documents they create together. The evaluation of planning is based, to a great extent, on logical reasoning and the assessment of plans and perceptions (Weick, 1995 and 2003). The cycle of learning revolves around plans and previous experiences, not direct practical experiences. Many things happen while a plan progresses towards practical implementation, which means that learning may be based only partially on the direct comparison of realisation with the plans made earlier.

The construction of business systems and business models adds the dimension of time to the process, which has a significant influence on the nature of planning and learning. Planning for the future involves wild cards that cannot be revealed through experience (Möller & Svahn, 2006; Doz & Kosonen, 2008; Sneck, 2002). In such cases, one can only "trust" the solutions that were chosen. Collaboration is often seen as a way to create trust. The discussion of alternative development paths also adds to the knowledge about chosen solutions and the understanding of the development mechanisms at work.

7.2 Models of change within firms and industries

Expanding worldwide competition, fragmented markets and emerging technologies force enterprises to renew themselves continuously. However, enterprises have to balance between exploitation and exploration modes (March, 1991). In the same way, industries have to either evolve or transform themselves. Table 10 shows the model of change within firms and industries.

Table 10. Change patterns of firms and industries.

	Incremental Change	Radical Change
Firm Level	**Adaptation** Focus: **Incremental change within organisations** Mechanisms: Strategic choice Resource dependency	**Metamorphosis** Focus: **Framebreaking change within organisations** Mechanisms: Altered competitive structures Strategic reorientation Transcending management understanding
Industry Level	**Evolution** Focus: *Incremental change within established industries* Mechanisms: Natural selection Competitive forces	**Revolution** Focus: *Emergence, transformation, and the restructuring of industries* Mechanisms: Quantum change Environmental uncertainty

At the firm level, two change patterns can be discerned. One is based on incremental change and the other on radical change. In the same way, at the industry level there are two ways to change. The incremental way corresponds to evolution and the radical way to revolution.

Normally, firms follow an adaptation strategy. Firms copy the existing strategies and organisational forms of their competitors (Hamel, 2002). The incremental change model is based more on the linear strategy model. In principle, when employing a strategy based on transaction cost approaches, a firm tries rationally to adapt itself to the changing environment. In this sense, the strategy in the approach can be described as adaptation theory. Achtenhagen et al. (2003) see that the adaptive learning style describes an attitude to change focusing on adaptation in the framework of the present organisation. In this sense, the adaptive style corresponds to single-loop learning, as presented by Argyris and Schön (1978).

It is normally assumed that managers make choices to focus the positioning of an enterprise and to change its entry on the markets (Baden-Fuller & Pitt, 1996). However, resources and core competences can, at the same time, become core rigidities (Leonard, 1995). Then the enterprise might have a limited capacity to

change. The enterprise can become the prisoner of its deeply ingrained routines and other assets, which form earlier distinctive competences.

At the industry level incremental change is seen from the evolution perspective (Nelson & Winter, 1982). This involves incremental changes within the established industries. Natural selection of firms occurs in the market. Competitive factors influence the position of firms in the competitive environment (Porter, 1980 and 1985). The industry change in this case is similar to the evolutionary change model that describes strategic change patterns.

Only some firms are able to renew their management and organisation as well as their marketing strategy (Hamel, 2002). Radical change at the firm level means creating new business concepts, renewing business systems and adopting new technologies. It also means new management innovations and organisational innovation. Normally, it involves a frame-breaking change within organisations (Hamel, 2007). That results in altered competitive structures and the strategic reorientation of an enterprise. In this case, we can speak about the metamorphosis happening in the enterprise. This radical change is so great that the management has difficulties in grasping it and coping with its management issues.

Figure 7 presents the development of the radical steps at the firm level.

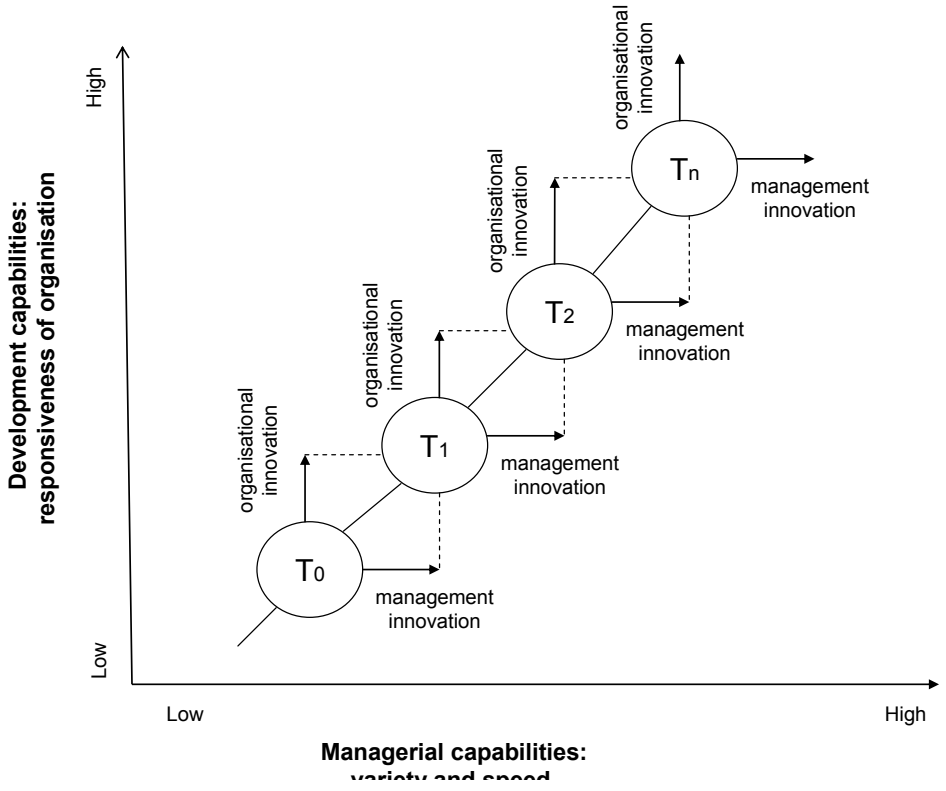


Figure 7. The development trajectory of successful firms (adapted from Volberda, 2003).

The figure has two axes. Managerial capabilities describe how fast a firm is able to renovate its management and how it can increase its managerial variety in order to rapidly respond to new challenges. The vertical axis describes development capabilities. It is a question of how fast the organisation can respond to competition changes and how innovative the organisation of the firm is. The organisation has to improve its responsiveness in order to increase exploration capabilities in the organisation.

When the firm takes further radical steps, it has to renew its management and organisational concepts at the same time. The firm has to be able to make innovations in management and organisation. Through these innovations the firm will proceed to higher levels along the radical diagonal trajectory (Volberda, 2003; Hamel, 2007). This means that the firm can adjust to competitive changes faster and more holistically.

This kind of radical pattern is close to the hyper-innovative approach and its strategic metamorphosis change model. This model is an answer to competition in a hypercompetitive environment (Volberda, 2003).

Radical change at industry level means to invent a new industrial structure and to develop open and strategic networks and forums. As Hamel (2002) states that strategy has to lead to strategy revolution, which means creating new industries and breaking the existing rules of the industry. This implies that strategic flexibility, rather than fixed strategies, is the source of success in an industry (Volberda, 2003). At the industry level, radical change means revolution in industries – the emergence, transformation and restructuring of industries. This is a quantum change in network and alliance structures as well as in customer relationships. It is a time of environmental uncertainty when new business structures are emerging (cf. Hamel, 2007; McGahan, 2004).

There are two-way relationships between radical change at the firm level and at the industry level. If a firm succeeds in transforming its businesses, it has the right relationship with change at the industry level. In this case, some firms create new competitive factors that also alter the competition in the markets at industry level. That also has revolutionary implications at the industry level (Hamel, 2002). Furthermore, the formation of new network and innovations structures at the industry level helps firms to radically change their businesses and business systems as well as their management and organisation at the firm level, because they can utilise the new network and innovation forms in their renewal processes (Cohendet & Amin, 2006; Chesbrough, 2011; Hyötyläinen, 2006; Hyötyläinen et al., 2011). This also helps firms to reorient their business models and strategies. Through these measures firms can better manage environmental uncertainty in a complex environment.

8. Finnish business system and its development

8.1 Dynamism of the Finnish business system

The Finnish business system has dramatically changed since the early 1980s. The scope of large firms became diversified and multidivisional and they increased their international presence when they became international corporations, a process that began in the 1980s. Since then, these firms have gone through several waves of mergers and acquisitions. However, due to their small number, large firms constitute an exception among the whole population of firms in Finland. There are about 250 firms employing more than 1500 persons. The number of medium-sized firms is about 2600 (50–500 persons) and the number of small firms (below 50 persons) is about 230.000. Most of the small firms are so-called micro firms employing one to ten persons (Simons et al., 2007; Laukkanen, 2007).

Diversification of large firms continued to the mid-1980s. Then a clear change of strategy happened. After that, the firms started to rationalise their business portfolios, and step by step developed more specialised and international product-based divisions (Lilja & Tainio, 1996; cf. Prahalad & Doz, 2003). This tendency to adopt a core competence strategy has also received a great deal of attention in the management literature (Hamel & Prahalad, 1990; Doz, 1997).

In the 1980s, a kind of endpoint for the growth of large firms began to emerge based on diversification into many fields of business. Then firms carried out many mergers and concentrated on their core business. That meant that firms were unravelling the structures they had created in the 1960s and 1970s. The firms and industrial structures were changing. This continued further in the 1990s, when manifold and diversified electronics and ICT-related industries

emerged. Nokia Corporation played a leading role in this transformation of Finnish business systems (Ali-Yrkkö & Hermans, 2002).

When discussing industrial structure and business systems in Finland, one has to take into account more traditional and less R&D-intensive industries that still constitute a major sector in the country. The renewal of the traditional industries, such as the Finnish wood products industry, is very important for employment and export (Palmberg, 2004). Understanding the conditions and processes that support their renewal faciliates innovation network formation for business growth and enlarging international operations.

Medium-sized firms are in a key position in Finnish industry. In many sectors they employ more than half of the workforce. As large companies outsource activities, medium-sized firms play a growing role both in the domestic market and in exports. A central challenge for these firms is to be competitive when entering and expanding in foreign markets and integrating into global value networks (Simons & Hyötyläinen, 2009; Hyötyläinen et al., 2011).

However, large international companies act as change agents in many areas. They create new acting patterns for other firms and for the whole economy. However, as these companies move their sites abroad and operate globally, new dynamics are needed in the domestic industrial system. New driving engines for industry are needed. Here, medium-sized firms (50–500 employees) producing their own products or services are potential actors in the future dynamic business landscape (Simons & Hyötyläinen, 2009; Hyötyläinen, 2009). They have the knowledge and infrastructure for creating businesses from products and services. Although they too are under pressure to increase their export activities and to increase their international operations, medium-sized firms are more bound to their home country than large companies.

8.1.1 Development of Finnish business system

Starting in the early 1980s, Finnish business system experienced a transformation from a typical co-ordinated market economy towards a more liberal market economy. However, Finland is one of the most co-operative countries in the world (Skurnik, 2005). At the same time, Finland is moving from an *investment-driven* economy to a knowledge-driven economy. From the end of WWII to the late 1980s, the Finnish business system had an investment-driven model. There was largely the ability and willingness to invest in new technologies, which were mainly imported and upgraded technologies (cf. Hyötyläinen, 1998; Kuisma,

2007). Products were differentiated for different markets and market segments. The Finnish business system moved step by step towards a *knowledge-driven* economy from the early 1990s on. This economy has been characterised by domestic knowledge generation. Companies have made their own indigenous innovations based on their own R&D as well as the creation of new technologies. At the same time, companies and firms are seeking completely new markets for their products and new products and services (Dahlman et al., 2006). In the future the Finnish economy and business systems will become more *innovation-driven* systems, where the focus will move more and more towards new path development activities and the utilisation of new opportunities opening up in networks and different markets and among customers through new products and services, competing within international and global environments (cf. Schienstock, 2004; Alasoini, 2004; Hyötyläinen & Nuutinen, 2010).

The Finnish business systems and their development are presented in Table 11.

Table 11. Finnish business systems and their development (Skurnik, 2005; Alasoini, 2004; Vartia & Ylä-Anttila, 2003).

	Time periods			
Central functional demands	*To 1980s*	*1990s*	*Early 2000s*	*Forward on 2010s*
Business system type	*Based on co-operation and collaboration*		*Compartmentalised action patterns*	
Ownership control and its development/the role of the state	Weak and remote The strong and active role of the state State-owned businesses	Became more strong and active State innovation and regulation measures	The role of markets is emphasised The role of the state decreases: innovation policy measures	Large global companies globally influence their institutional settings Bipolar development EU and state: business policy measures and regulation rules
Company type	*Co-operative hierarchies*		*Isolated hierarchies and networks*	
Strategic goals	Cost orientation Effectiveness	Quality strategy	Flexibility strategy	Knowledge and innovation frameworks Renewal and experimental strategy
Structure	Hierarchical systems Functional organisational structures	Matrix organisational forms Horizontal development groups	Process-oriented organisational forms Customer-centred units	Network forms Project-based customer teams
Management	Plan, Decide, Command	Direct, Provide resources for organisation and teams	Create visions and objectives Coach and support groups in problem-solving	Stimulate strategy work and participate in strategy definition process Role is to detect new development forms
Control principles	Detailed rules Direct control	Quality systems Standard operation rules	Outcome-based control	Visions and values Development of knowledge and know-how
Resources and organisation model	Resource mastering Rational and control-based organisation models Narrow job specifications Routine working habits	Definition and development of procedures Business and network organisational model Quality control integrated into basic tasks Problem-solving ability Group working	Competence management and development Process organisation models Multi-skilled and professional jobs and teamwork	Communication management Distributed organisational models Creative and innovative needs Continuous development needs Need for comprehensive commitment

In the table, there are eight dimensions through which the development features of the Finnish business systems are conceptualised: business system type, ownership control and its development, company type, the strategic goals of companies, structure, management, control principles, and resources and organisational model.

Up to the late 1990s, the Finnish business system type was based largely on co-operation and collaboration between the state, the employer and employee organisations. Business organisations were also based on relatively co-operative forms. But changes were coming. These changes were initiated by changes in the international product and capital markets and institutional environment, speeded up by the financial market deregulation in the mid-1980s, and the severe recession in the first years of the 1990s (Skurnik, 2005). The great growth of the ICT industry accelerated the transformation of the Finnish business system and its "creative destruction" (cf. Schumpeter, 1934; Ali-Yrkkö & Hermans, 2002).

From the early 2000s, the Finnish system type is more based on the changed structures and strategies of business systems. The Finnish business system has moved from collaborative forms towards a compartmentalised economy. At the same time, companies, which were earlier co-operative hierarchies, are increasingly changing over to isolated hierarchies and network forms.

Until the 1980s, the Finnish state played a strong role due to its active participation in industrial policy. Furthermore, the state owned many companies in many sectors of the economy (Vartia & Ylä-Anttila, 2003). At that time, ownership control was weak and remote. The management of companies was in a key position. Ownership control of companies became stronger and more proactive in the 1990s. At the same time, the state placed a greater emphasis on innovation and regulation measures by which it could influence the transformation of the Finnish business system.

In the early 2000s the role of markets became more important and their role was emphasised in the management of companies and their financing structures. At the same time, the role of the state changed and decreased. The Finnish business system and economy were moving towards a more liberal constellation. The state emphasised innovation policy measures and some industrial policy actions.

A great transformation is ongoing in the Finnish business system in the 2010s and on. The roots of this transformation go back to the 1990s, and partly the 1980s, when the globalisation of companies intensified and broadened in scope (Lilja & Tainio, 1996; Vartia & Ylä-Anttila, 2003). Large global companies are

in a position to influence their institutional and industrial settings and conditions. They can move their sites to places where the markets and other conditions are favourable for businesses. Global companies have distributed their factories and businesses. It can be said that the Finnish global companies have evolved from their earlier business model, based on the traditional Finnish export industry. The Finnish export industry is now international in scope both in terms of business and ownership (Skurnik, 2005).

However, a bipolar Finnish business model is emerging. Small and medium-sized firms in different sectors as well as other home market-oriented firms and co-operatives are and will be in an important role in the Finnish business system and its development in the future (see Simons & Hyötyläinen, 2009; Skurnik, 2005).

Until the 1990s, co-operative hierarchies were the dominant company type in the Finnish business system. Traditionally the strategic goals of companies mainly focused on costs and achieving effectiveness in their operations (Alasoini, 2004). The structure of companies consisted of hierarchical systems and functional organisational structures. As in this model, the management's role is to plan, decide and command an organisation, based on detailed rules and direct control. The main aim is to manage resources and the organisation based on rational planning and control principles. In this case, working practices were characterised by narrow jobs specifications and routine work.

Companies sought to employ a quality strategy in their operations in the 1990s, and partly in the 1980s. The structure of companies bore a greater resemblance to matrix type forms, including horizontal groups (Alasoini, 2004). The role of management was to direct activity and also to provide resources for the organisation and teams. Quality systems and standard operation rules were important in controlling business operations. The definition and development of procedures are an essential part of business organisation (cf. Nelson & Winter, 1982). The main aim is to manage business and network organisational models. The essential task of workers is to control quality in their jobs. This requires problem-solving ability and teamwork in the organisation.

A clear change happened in the Finnish business system in the early 2000s. Strategic goals were refocused on flexibility strategies (Alasoini, 2004). The structure of companies changed into more process-oriented forms, a shift that already began in the 1990s (Simons et al., 1998). At the same time, the structure was divided into customer-centred units aimed at promoting service business activities (Hyötyläinen et al., 2002; Hyötyläinen, 2007b; Hyötyläinen &

Nuutinen, 2010). The role of management was to create visions and set objectives for the organisation. Another role of management was to coach and support groups in problem-solving activities and to make sure that these activities serve the set strategic objectives. The control principles are mainly based on outcome-based control. The organisational units and customer-centred units are assessed according to their outcomes and achievements. The resource and organisational model is in this case chiefly based on enhancing competence management and development. More process organisation models are adopted. Multi-skilled and professional jobs are formed and teamwork is favoured (cf. Pettigrew & Massini, 2003).

The Finnish business system is step by step moving towards knowledge and innovation frameworks and models (see Dahlman et al., 2006; Hyötyläinen et al., 2011). This strategy aims to renew businesses. Due to the complex business environment, an experimental approach is needed to renew business strategy and its different dimensions. The structure of companies resembles network forms and is founded on project-based customer teams. The task of management is to stimulate strategy work and participate in the definition of strategy and strategic lines. It is essential to be able to detect new development forms and their meaning for the company. Visions and values become more important factors in the assessment and control of business operations. It is essential to assess how the organisation and its different parts can develop new knowledge and know-how (cf. Grant, 2003; Tsoukas, 2005). The management of communications will become an ever more important factor in future enterprises and networks. Companies are characterised by distributed organisational models. That corresponds to the compartmentalised action patterns that describe the business system type as well as economic activity in general. Knowledge and innovation models demand a creative and innovative attitude and activity from the personnel in the organisation. There is also a need for continuous development. To this end, full commitment from the personnel is required.

8.1.2 Growth challenges of Finnish business system

The Finnish business growth models have been successful for many decades. The foremost growth engine of the economy has been export-based industries, mainly capital-intensive industries such as the pulp and paper industry, chemical industry, metal industry, and food industry as well as the textile and clothing industry (Vartia & Ylä-Anttila, 2003).

Large firms have dominated these industries. As recently as in the year 2002, the 30 greatest industrial firms employed 170,000 persons in Finland, over 35 per cent of the whole industrial workforce. In total, foreign workforce included, they employed nearly 400,000 persons (Vartia & Ylä-Anttila, 2003, 90–91).

Productive growth is one of the main features of the paradigmatic change process of industries and enterprises. An enterprise has to be able to increase its productivity in order to be competitive in the markets in which it operates and competes (Ylä-Anttila, 2006).

Great hopes have been set on the adoption of new ICT and internet technologies in economies for advancing productivity growth. The impact of ICT on productivity can be compared to USA figures. ICT investment and fixed capital have had the greatest effect on the productivity growth of industries in the USA. During the last part of the 1990s, over 50 per cent (it is 1.4 per cent) of total productivity growth in industries came from the use of ICT. Totally, nearly half of labour productivity in the whole 1990s was generated by the growth of ICT use (Koski, 2005).

In Finland, the impact of ICT on productivity impact has been only 0,6 per cent of the total productivity growth of industry. However, the main input has come from the production of ICT. Only one third of the total productivity growth comes from the adoption of ICT investments in industry and trade. However, it can be stated that it is the use of ICT – not necessarily production – that is decisive for long-term economic growth (Koski, 2005; Ylä-Anttila, 2006). One of the major reasons for this is the lack of adequate changes in organisational and business models required to harness the full potential of ICT investments. In most cases, organisational and structural changes are more expensive than the original ICT investments. In fact, ICT investment is by its nature first and foremost an organisational change and transformation process (Hyötyläinen, 1998).

Moreover, the growth pattern of labour productivity is uneven in different parts of the economy. In Finland, the labour productivity of ICT production has increased by leaps and bounds since the beginning of the 1990s. Most of our global firms have also increased their labour productivity. However, these firms are moving more and more of their activities abroad. They compete in global markets and locate themselves close to expanding market areas. The firms are of great importance for the whole economy and its functioning, for example due to the high share of income generated by the export trade. They also have a great impact on the functioning of their suppliers and partners.

However, the firms in the high productivity sector of the economy employ about 335,000 persons. Most firms, however, operate in sectors of low productivity. These kinds of firms employ 1,150,000 persons (Sneck et al., 2007). Furthermore, the share of employment accounted for by low productivity areas is growing. In recent years, the greatest share of employment growth has happened in service sectors in which a significant part has had low productivity growth.

It is important to pursue structural change in business systems and in innovation models. Large international companies act as change agents in many areas. They create new acting patterns for other firms and for the whole economy. However, there is a need to create new dynamics in the industrial economy. New driving engines for industry must be developed. In particular, medium-sized enterprises (50–500 employees) are potential actors for the future business landscape and its dynamic features. In Finland, there are about 2600 medium-sized firms in total. Most of them will grow and develop. However, about 5–6 per cent of them can actually grow (by at least 10 per cent a year) (Lehtoranta, 2006; Simons, et al., 2007). These firms employ about 340,000 persons in Finland. These firms have been able to increase their personnel by over 10,000 persons in the years 2000–2004. Furthermore, the medium-sized of firms has grown from 7 to 11 million euros in the same period. However, these firms are often too small to take decisive steps to grow and go international. There is a great risk for these kinds of firms to get into a rut and avoid the challenges they would face in international activities.

Many small firms are under great pressure and often act as suppliers for larger firms. In Finland, there are about 230,000 small firms, which employ a total of about 580,000 persons. The majority of these firms, 93 per cent, are micro firms employing less than ten workers (Laukkanen, 2006, 34; Simons & Hyötyläinen, 2009). These firms have increased their personnel by about by 8.8000 persons during the years 2000–2004. Only 3 per cent of these firms will grow at least 10 per cent a year. The great structural question is how small firms can be drawn into the networks by larger companies and how they can get into a growth pattern.

8.1.3 Concluding remarks on the Finnish business system

The Finnish business system has changed because management has adopted new management concepts as the business environment has changed. The Fordist model was phased out in the 1970s. The Finnish business system has been under transformation since the 1980s (Skurnik, 2005; Alasoini, 2004). The transfor-

mation process will also continue in the future (Dahlman et al., 2006; Ylä-Anttila, 2006). Finland has pursued a knowledge- and R&D-oriented strategy since the early 1990s. The success of the Finnish business system and economy during the past 10 to 15 years is attributable in large part to developments in the ICT sector. However, Alasoini (2004) argues that there is a lack of empirical material on the introduction of flexible production models in Finland. One should be cautious about how widely to diffuse flexible models into the Finnish business system. New flexible and network models can be connected to the adoption of mass customisation principles in the Finnish production systems, beginning largely in the early 2000s (Hyötyläinen & Nuutinen, 2010).

8.2 Growth and business strategies of medium-sized firms

One of the objectives of this study is to focus on the development of medium-sized firms and their role and activities as part of the Finnish industrial business system. In the following, the growth and business strategies of medium-sized firms will be examined and analysed. Furthermore, the aim is to create concepts and models for the renewal paths of medium-sized firms. The objective is to model business concepts that enable firms master several business models within the same organisation. Another objective is to assess and define the role of specialisation when choosing different business models. A further aim is to assess different environment trends by means of strategic foresight and thereby to support the success of medium-sized firms and their business systems.

8.2.1 The development of medium-sized enterprises

The role of medium-sized firms is growing in the economic scene. The role of medium-sized firms is important in other countries as well. It is widely acknowledged that small and medium-sized enterprises are of critical importance to many economies (Enterprise & Industry Magazine, 2009). In the European Union, firms with 250 or fewer employees provided 67 per cent of employment in 2003, when the financial sector is excluded (Eurostat, 2007). Respectively, firms with less than 500 employees provided 51 per cent of all employment in the USA in 2004 (US Census Bureau, 2004) and 64 per cent of all Canadian private sector employment in 2005 (Industry Canada, 2006). This implies that the

growth models of small and especially medium-sized enterprises are a hot topic for both enterprises and all economies.

The role of medium-sized product and production firms is important in several industrial sectors in Finland (Palmberg, 2004). For example, in the machine and metal product industry, medium-sized product and production firms are of utmost importance for the technology industry and the Finnish economy. The sum of the turnover of medium-sized firms in the machine and metal product industry was about 18 billion euro in 2005, while the total turnover in that industry in Finland was about 32 billion euro. This means that the turnover of medium-sized firms is larger than the turnover of big companies in Finland. In total, there are about central 500 firms (altogether over 1000 firms, including also smaller firms) important medium-sized product and production firms in the technology industry, and their average size is about 200 persons (Federation of Technology Industry, 2009).

The implicit assumption is that all companies want to grow and create more jobs. That would be possible if all the favourable factors progress the growth of a firm (Liukko et al., 2006). Despite the extensive interest in research on the growth of medium-sized enterprises, little attention has been devoted to investigating how meaningful these growth assumptions and measures are to the business firms itselves. However, the medium-sized firms face many development tensions on their growth path:

The great challenges of these firms are how they can create new business concepts and growth patterns, exploit their own and network competences, increase exports and become internationalised.

It is normally assumed that these firms employ about 50-500 employees (see Simons et al., 2007; Simons & Hyötyläinen, 2009). It could be assumed that these kinds of firms would permanently grow by over 10 per cent per year, within a so-called growing pipe (which means a 10 per cent turnover increase every three to four years) (Raisch & von Krogh, 2007). However, this is not the case. These firms have difficulties in maintaining their growth pattern (Bridge et al., 1998; European Communities, 2004; Ali-Yrkkö et al., 2007). In Finland, there are a total of 2600 firms in this medium-sized group. This group is highly important because it accounts for about 30 per cent of all private sector employment in Finland (small and medium-sized firms together provided about 70 per cent of all private sector employment in Finland in 2004). However, only 5–8

per cent of these medium-sized firms are seeing growth of more than 10 per cent per year. Why is this the case?

One major reason for that is the social change process and the difficulty of managing that process. Growth is not an abstract phenomenon; rather, it is carried out by management, middle management and other actors in an organisation, for growth efforts demand concrete actions. Another reason is that growth often demands the identification and analysis of sometimes quite complex business concepts as well as new growth solutions. It is essential to be able to analyse the present situation of the firm. However, it is of utmost importance for the firm and its management to be able to anticipate future growth patterns and paths (Hyötyläinen & Valkokari, 2009). To this end, the firm must have enough competence and courage to grasp new opening opportunities and engage in radical decision making under uncertain conditions connected to the changes in industrial business systems.

8.2.2 Industrial sector as a development platform

The industrial sector is an environment that influences the prerequisites and growth efforts of medium-sized firms. The industrial sector provides a firm with a good comparison basis for assessing its own performance level. By comparing its own performance values to the respective indicators in the industrial sector, the firm can deduce the level of its own activity in relation to other firms and competitors acting in the same industrial sector. Thus, the industrial sector forms a development platform for the firm and its innovation activities. A firm can greatly influence the success of its business by understanding and taking into account the development platform and its main features (cf. Simons & Hyötyläinen, 2009).

Productivity view

It is of utmost importance for a medium-sized firm to analyse the general development trends in the industrial sector and their effect on the firm's growth and development. One has to be able to form suitable growth and innovation strategies for different situations. However, a medium-sized firm has to be able to define its own industry precisely enough in order to achieve a significant position within its branch and to thrive in the international market.

The growth of medium-sized firms must be considered in relation to industry or market growth. Normally, it is considerably easier for a firm to grow in a growth industry. Growth should also be compared to the performance of competitors. Furthermore, each firm's own history sets some limits to growth (Storbacka, 2006). Medium-sized firms are in a particularly awkward position because they have limited resources to develop their operations and future activities.

Figure 8 presents three growth patterns of firms compared to the productivity development of the line of business in question.

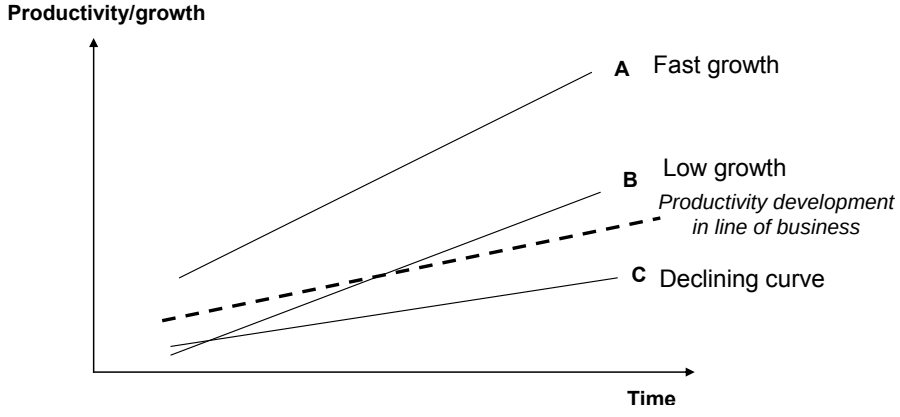


Figure 8. Industry productivity and different firms' growth paths.

Normally, the productivity curve in an industry heads upward due to both firms' own productivity measures and structural changes in the industry (cf. Maliranta, 2005). Firms can be in different positions. In Case C, a firm is on a declining curve because it remains below its industry productivity line. Such firms are normally regressive, and they have great problems in developing their operation in a sustainable way. In Case B, a firm grows, but only slowly, because it crosses the productivity line of industry only gradually. In Case A, a firm is able to increase its productivity at a clearly faster pace than the industry average. These kinds of firms are normally fast-growing enterprises.

The most essential consideration is how a firm is able to grow consistently and in the long term (Storbacka, 2006). In this respect, the growth paths of medium-sized firms are dependent on industrial structure and other enterprises' measures. Medium-sized firms struggle in the terrain between local and global dimensions.

They normally have a strong presence in domestic industry. At the same time, they have to go international. The most striking development features are:

- focusing on core competence
- exploitation of enterprise networks and strengthening own network status
- connecting services to business
- starting exports and international operations.

There is a need to increase the share of international operations of SMEs and medium-sized firms at large. The normal way of accomplishing this is to step up exports, which is also seen as a way to increase the turnover and competitiveness of enterprises. In any case, the share of exports accounted for by European SMEs is not so high. Only about 18 per cent of these firms undertake direct exports. The most common form of internationalisation is to enter into foreign supply relationships, which 30 per cent of all SMEs have done. It is not common for SMEs to establish subsidiaries or branches abroad; only three per cent of SMEs have done so. However, medium-sized enterprises behave differently. About half of these enterprises are exporters (European Communities, 2004). It is probable that co-operative approaches like networks and alliances involving SMEs will intensify in the future as a form of internationalisation (Hyötyläinen & Valkokari, 2009; Hyötyläinen et al., 2011).

Life-cycle of businesses

The life-cycle of products and services in the industrial sector in question is also an important factor that influences the growth and development opportunities of medium-sized firms (cf. Greiner, 1972; Porter, 1985 and 1990). The development features of the life-cycles of products in industry have a direct impact on the demand and competitive position of the enterprise in the markets. Life-cycles are an essential aspect of the principles of the industry.

To compete in an industry, the enterprise has to renew its own business and to start new businesses. Figure 9 shows the strategic renewal paths.

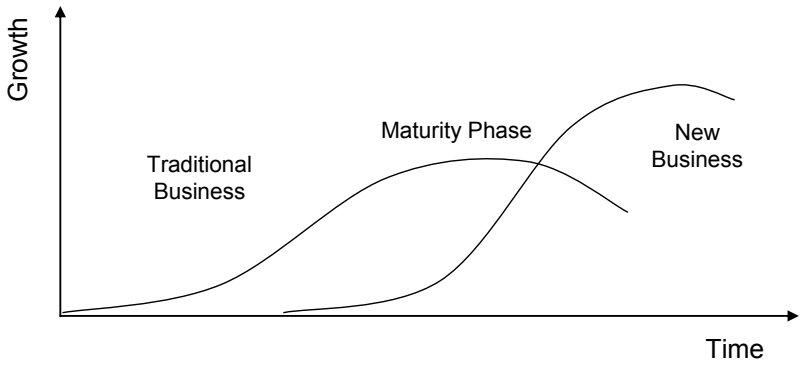


Figure 9. Strategic renewal of business.

The enterprise has to develop innovations, technological innovations or new products and services. Management, organisational and marketing innovations are often quite important for the success and growth of the enterprise (cf. Schumpeter, 1934; Hamel, 2007).

The enterprise can develop and grow at different speeds in its industry. Normally, the enterprise develops step by step through betterment innovations (Figure 10).

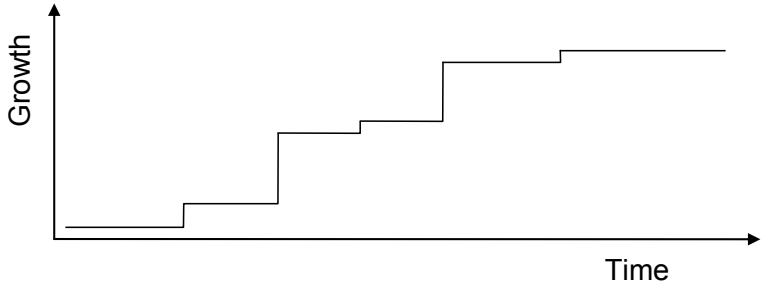


Figure 10. Innovation path of a medium-sized firm.

Firms develop radical innovation at intervals. They represent clear steps up in performance, and can be based on new business concepts, new products and services, market innovations, delivery innovations, process or organisational innovations. It is characteristic of these radical steps that they enable the enterprise to create competitive advantage. At best such a step involves a profound change that influences competitive conditions and lay the foundation for the future business models of the industry (Hamel, 2002 and 2007).

An enterprise has to be able to achieve a balance between its present business and its incremental development, and the creation of new businesses and radical innovations, which has a great bearing on the success and profitable growth of the enterprise. It is a question between exploitation and exploration, as March has stated (March, 1991).

The changing nature of lines of business

The enterprise has to become aware of the changes and development features of the industry in question in order to be able to evade the unnecessary risks and costs that arise when the direction of the industry is not taken into account. When the firm plans to grow, it is important for it to take note of the present and future conditions of the industry. Medium-sized firms are seldom able to change the development direction of the industry, as they often have to concentrate on relatively narrow business areas (Simons & Hyötyläinen, 2009).

The pace of change has increased in many industries. However, McGahan (2004) states that real profound changes take time – often a decade or longer – and progress gradually. These are long trajectories that change the whole structure and action pattern of the industry.

According to McGahan (2004) every industry follows a trajectory. There are four development models: the incremental change model, creative model, value model and radical change model. These are presented in Table 12.

Table 12. The types of an industry (adapted from McGahan, 2004).

Resources Change	Core Competence Change: Yes	Core Competence Change: No
Yes	Radical change	Creative change
No	Value change	Incremental change

The table presents two dimensions that describe the change in core competences and the change in resources. The core competence change dimension refers to the core competences of the firm and the threat that they will become outdated. This often involves the relationships with customers and suppliers. In such cases the whole value system has to be changed (Hyötyläinen, 2007b).

Incremental change is the most common type of industry evolution. It is based on incremental innovations, through which firms try to enhance operational effectiveness. The means to achieve this are process improvement, the implementation of information systems, the development of actions, product improvements and the enlargement of the markets. On this trajectory, both core activities and core assets are stable. Firms build on their established capabilities and resources over time instead of abandoning their old ways of doing things in favour of new approaches. On incremental evolutionary paths, innovation is typically founded on the feedback from buyers and suppliers.

Creative change in industry evolution involves major innovation but not a threat to core activities, which means that the industry relationships with buyers and suppliers remain relatively stable. However, core assets are threatened by obsolescence. The reason for change comes from competitors or new entrants. This requires a firm to be engaged in development projects whereby the firm renews its resources and competences without specific market knowledge. The firm has to develop its action patterns in order to be able to launch new openings to the markets. Network partners can help to speed up the renewal of the firm.

Value change concerns the changes in performance level when the core competences of the firm are under threat. These changes concern the changes in customers' respect. It is normal for customers to evaluate and demand services. Firms have to develop their value systems when they have to develop new actions for serving customers (cf. Hyötyläinen, 2007b). Value changes typically concern massive changes in the structure of the information available to the buyer and to suppliers. During value change, performance depends on reconfiguring activities to create value in unprecedented ways. For that reason, value change is difficult to manage. The firm has to preserve its old capital and at the same time develop entirely new sets of relationships.

Radical change occurs when a new approach threatens both the core activities and core assets within an industry. It is normally motivated by a massive technological or regulatory breakthrough. The change occurs because buyer preferences shift dramatically, supplier capabilities become outdated, and old scale economies become fixed commitments that lock firms into outdated ways of

doing business. As a result, the relationships between stable companies, their buyers and their suppliers are restructured. Navigating radical change successfully depends on developing a strategy that is directed towards the transformation of the industrial structure. It is a fact that the leaders in an emerging industry are rarely the leaders prior to a radical change.

The prevalence of each trajectory was assessed in US industries in the 1980s and 1990s. A total of over 700 industries were assessed. The results are as follows (McGahan, 2004, 35):

- incremental change 43 per cent
- value change 32 per cent
- radical change 19 per cent
- creative change 6 per cent.

Thus, most industries follow an incremental change model. The value change model is also common. About one fifth of industries can be described as belonging to the radical change area. The industries representing the creative change model are the rarest type. Sometimes different models can appear in parallel. But as McGahan (2004) states, a certain industry in general follows some of these four change types.

8.2.3 Dynamic business concept

A dynamic business model offers new opportunities for medium-sized firms to grow in a focused way (Simons & Hyötyläinen, 2009). The firm can intentionally create and open new business areas around different markets and customer segments. Figure 11 presents two business model concepts.

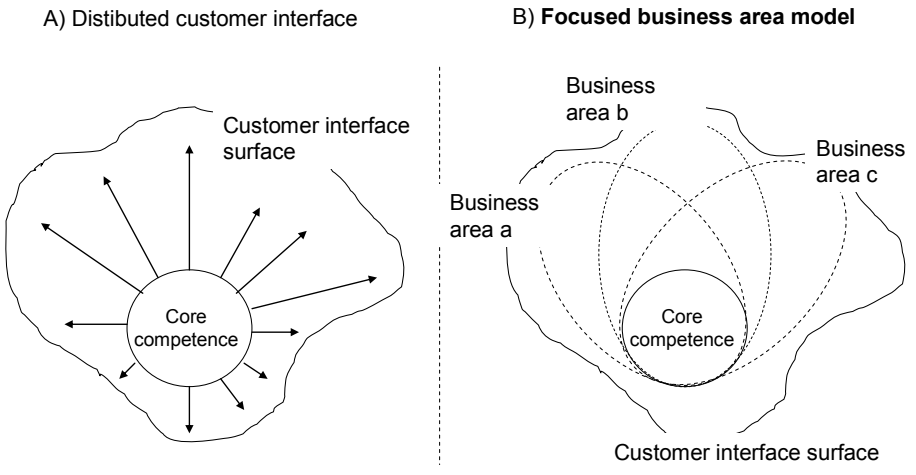


Figure 11. Two business model concepts.

Normally, smaller firms are characterised by blurred organisational borders because they have external contacts with many customers. The firm is scattered in many directions, according to the demands of each customer (Figure 11A). Hence, the organisational models of smaller firms tend to be fuzzy and loosely coupled. This kind of business model results in adaptation and rapidity. However, there are some problems in the model (Iandoli & Raffa, 2005). The model is characterised by lack of formalisation, weak co-ordination and strong overlapping between different persons and managerial staff behaviours. These kinds of firms have difficulties in focusing on any proper direction and creating the functioning organisational forms that would guarantee efficiency and growth.

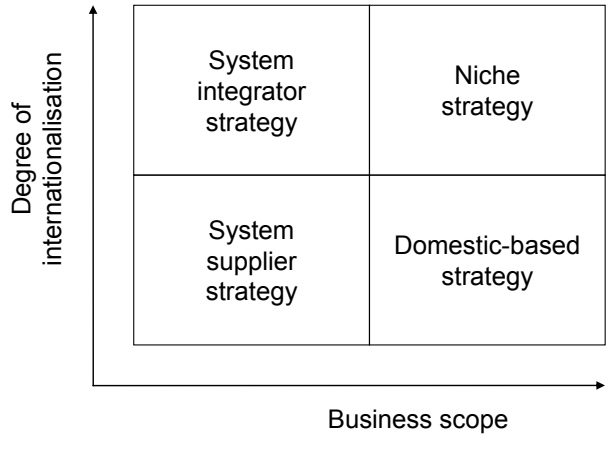
This kind of model behaviour is also often typical of medium-sized firms. Another option is to form a dynamic business model-based approach, which demands a clearly defined strategic core competence. A dynamic business model supports the organisational development of medium-sized firms. The firm can establish different focused business areas around its core competence, each of which has its own organisational structure (Figure 11B) (Morris et al., 2005). Furthermore, they may have their own management levels. Clear organisational structures promote a greater focus on the action mode and, hence, increase efficiency. However, dynamic growth firms do not restrict themselves only to formal structures. They experiment with new business opportunities for future

growth. They make use of synergies between different business areas, and engage in new experiments to create new business concepts that can later become their own new business areas.

8.2.4 Competitive and growth strategies of medium-sized firms

Ensuring certain growth is important for medium-sized firms, because it drives the firms' long-term success and improvement in performance. Through growth the firm can reach new markets, engage in development activity and renew its business, which is of critical importance in a changing market environment (Raisch & von Krogh, 2007). In that respect, however, medium-sized firms act in different markets and customer segments. Firms form heterogeneous group consisting of different kinds of firms. Each group has its own way to develop and grow. However, we can discern four typical competitive strategies within medium-sized firms (Simons & Hyötyläinen, 2009). Table 13 presents these strategies.

Table 13. Four competitive strategies of medium-sized firms.



There are several development strategies that are common to all four strategies: service business, networking and internationalisation (Hyötyläinen & Valkokari, 2009). However, each strategy has its typical features. Next, these characteristics will be considered.

System supplier strategy

The system supplier strategy is one of the cornerstone strategies for successful medium-sized firms that serve major core business companies with large systems and services. These firms normally have a production-oriented approach, although they often have some development abilities (Hyötyläinen et al., 1999; Hyötyläinen & Valkokari, 2009; Hyötyläinen et al., 2011). Partnership is an important model for system suppliers. That means tight co-operation between the system supplier and the customer company. The co-operation often includes product development and design. The role of the system supplier is to ensure that a product is easy to manufacture. However, this means that many medium-sized suppliers have to acquire special planning competence (cf. Dyer, 2000).

Furthermore, many major customers demand that their system suppliers have to become international and maybe set up operational units close to their foreign factories. But there are many economic and cultural hindrances to this, making it hard to go abroad so easily. It often takes years to open a new operation in distant markets. The only way to proceed in this effort is to apply the step by step model. In many cases, the system supplier has to build co-operation relationships together with local partners abroad (Hyötyläinen & Valkokari, 2009).

Niche strategy

A niche strategy is an innovative business strategy and is one of three strategies presented by Michael Porter (1980). It is based on focus and differentiation. Niche firms have innovative products that they normally sell in many countries, and they often operate internationally, even globally. Firms stress customer orientation. Partnership means that a firm actively participates in the product development process of its customers. The firm solves the problems of customers. In a way, a partnership is a customisation process for a niche firm. Furthermore, partnership requires a great level of trust between the niche firm and a customer. That trust is of high importance for the niche firm because it acts in specialised markets.

One new growth direction for niche firms is service business. However, service business is not easy for them. They are renowned for high technology and quality products. It is hard to change one's orientation to service business (Hyötyläinen, 2007b; Hyötyläinen & Nuutinen, 2010). Normally, services cover spare parts and some implementation activities, and perhaps maintenance and

repair actions as well. The development of service business on a broader scale usually takes several years. This is because new service innovations are systematic by nature (Salkari et al., 2007). Due to that, it is not enough for a niche firm to only change its business models. The business models of both the niche firm and its customers have to be changed. Furthermore, this has to be done in co-operation with customers and their management, as well as with functions at different levels.

Domestic-based strategy

A domestic-based strategy concerns medium-sized firms that are powerful actors in domestic markets. Their products are at the forefront of the market in terms of their technology and design, and their product brands have good reputations. Furthermore, these firms make large outlays on production and quality in order to produce high-quality products and achieve cost-effective manufacture (Boter & Holmquist, 1998; Hyötyläinen et al., 2011). These firms are often leaders in their domestic markets.

One of the development strategies for domestic-based firms is to become a total supplier (Simons & Hyötyläinen, 2009). A total supplier seeks to serve customers with a wide range of products and services. The goal is to get the customer to consolidate his purchases to the total supplier by providing him with all the services that he needs. To this end, the total supplier must be able to manage new kinds of systems. This requires concept thinking from the firm and its different functions. Furthermore, the firm must make investments in product development and network building. The firm also has to include components of other suppliers, whether domestic or foreign suppliers, into its offering.

Service business is also an attractive alternative for domestic-based firms. Normally, it is tightly coupled with product solutions and supports sales activities. At its largest scale, it is installation and maintenance service. However, launching a full service business concept involves difficulties, because domestic-based firms are normally production- and product-oriented enterprises. Domestic-based firms need to change their mindset in order to be able to move into the service business with greater volumes (Simons & Hyötyläinen, 2009; Hyötyläinen & Nuutinen, 2010). Furthermore, domestic-based firms export part of their products. However, exports most often go only to close-by countries and familiar cultures. The firm may also establish new local production units in new market areas in order to gain the trust of local customers and contribute to the

growth of the firm. One possibility is to venture into so-called low-cost countries. Normally, domestic-based firms do not go so far. They tend to venture into certain Middle European countries, Baltic countries or Russia.

System integrator strategy

System integrator is a new role of medium-sized firms. In one sense, it can be seen as a new step in the development of system suppliers. A system integrator can take a new role in new value networks. The role demands the development and adaptation of service functions as part of normal activity. Pavitt (2002) has highlighted the system integrator role as a prime factor that can form successful factors for industrial countries.

The expanding role of system integrators can be connected to larger changes in value networks in industry. Figure 12 presents this configuration change.

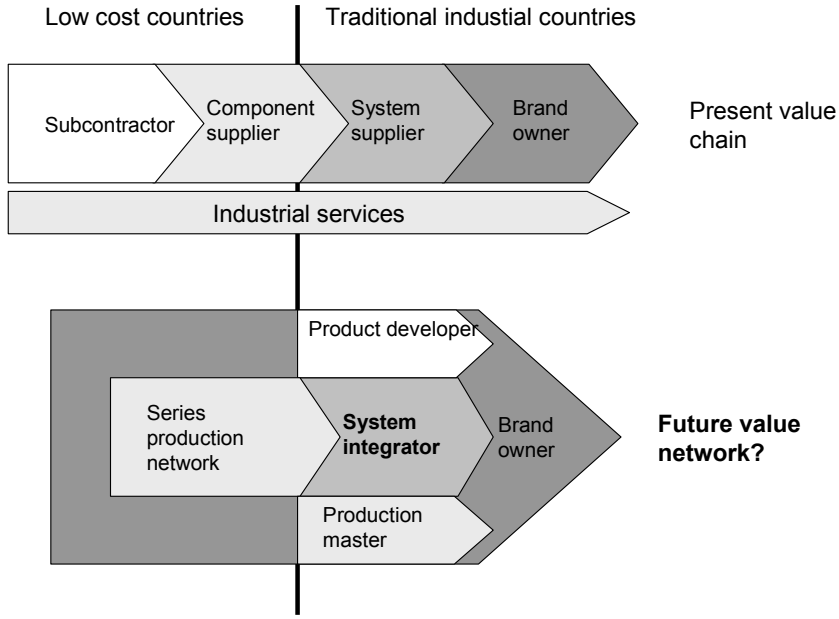


Figure 12. Radical change in the value chain (adapted according to Kulmala et al., 2007).

The principles of value chains have been based on the premises presented by Michael Porter (1980). According to these premises, it is important for a firm to indentify its place in the value chain and to choose its business strategy accord-

ingly. In the global economy, the different parts of the value chain can be acquired from different countries, based on so-called relative advantage. However, that model is also criticised from different corners. Norman & Ramirez (1994; Hamel, 2002) see that the value chain represents by its nature the model of an assembly line. They emphasise the need to renew the value system so that service and customers are the starting point for all development activity in both enterprises and value systems.

System integrators can evolve into service organisations that take on more of the tasks that were previously carried out by different specialised firms. The system integrator can integrate product developers and production firms as well as different planning organisations in order to serve global brand owner companies with enlarged service offerings (Kowalkowski et al., 2009). In this way, system integrators can develop into an essential part of industrial systems in industrial countries, as Pavitt (2002) presented. At the same time, the system integrator takes part in creating and testing new service and production concepts. These new production concepts can also be transferred to new business environments. The system integrator can be involved in this transfer process, and it can thereby support brand owners in solving their production concept problems in different parts of the world.

However, there are three great questions concerning the system integrator strategy. First, is it possible for system suppliers to develop into this new role? This is hard for system supplier firms to accomplish because they are nowadays mainly production-oriented enterprises. A good question to ask is which kinds of firms are able to assume the role of system integrator? Second, what are the future service concepts of system integrators? Third, which kinds of management and action models are needed to master the different tasks of the system integrators?

8.2.5 Future steps

Normally, it is assumed that all medium-sized firms want to grow because of their relatively great size. Because they have about 50–500 employees, it can be assumed that they have enough resources for development and growth. However this is not the case. Finnish results indicate that about half of all the medium-sized firms want to achieve substantial growth. Some firms want to grow if the conditions are favourable. And some firms are not interested in growth at all (Liukko et al., 2006; Simons & Hyötyläinen, 2009; Hyötyläinen, 2009). The

major reason for this is the need to change business concepts and management models in order to grow into the next size class (cf. Greiner, 1972).

Different kinds of medium-sized firms have their own typical competitive and growth strategy. Four strategy groups were discerned: the supply group, niche group, domestic-based group and system integrator strategy. Each group has several development directions into which firms in the group can develop and grow. However, medium-sized firms have many problems to solve before they can fully use all the potentials open to them. In particular, system integrator is one of the new promising roles for medium-sized firms. The prerequisite is, however, that the firm in question is able to grow into this new role.

In order to adapt new business and management concepts, medium-sized firms have to make full use of networking possibilities (Hyötyläinen & Valkokari, 2009; Hyötyläinen et al., 2011). A partnership is a form of co-operation between two firms. Normally, a core company has the decisive role in this relationship. In the same way, two companies can form an alliance together in order to get into new markets by combining innovatively different competences. Strategic networks form a multilateral approach that supports the renewal of the businesses of firms as well as efforts to reach new markets and customers (Hyötyläinen, 2000). The open innovation model has arisen as a new networking pattern (Chesbrough, 2003, 2006 and 2010). The model offers a new kind of environment for firms within which they can innovate new business concepts and market strategies for the future.

PART II: PRACTICAL VIEW ON BUSINESS AND ITS CHANGE MODELS

The practical subject of this study is business and its change models. The topic of this part of the study is the management of service business and its business systems. Change processes and their models are also under consideration. Case descriptions are presented and analyses made. Finally, research and development methods are explicated and modelled.

The second part of the study has three chapters.

In Chapter 9, we will emphasise practical management models. The central focus is on the issues of services and management systems. Different aspects of firms' capabilities and action process systems are reviewed. The change process and phases of service business as well as business systems are analysed and modelled.

In Chapter 10, we will describe and analyse twelve business cases. The analysis is based on a model with three dimensions: resource exploitation, business renewal, and growth and internationalisation.

In Chapter 11, we will explicate research and development methods that are suitable for developing business and management systems. These methods are based on a cyclical development model comprising five steps.

9. Practical management models

9.1 Framework for management of services and business systems

Nowadays many firms are renewing their business concepts and moving towards service activities. Service business is considered to be a growing area that enables firms to increase turnover and gain new markets and customer groups (Prahalad & Ramaswamy, 2004). It has been argued that the value deployment in service activity is greater than the value deployment of physical products (e.g. Koudal, 2006; Grönroos, 2008). Furthermore, revenues from service businesses are more stable than revenues from sales of manufactured goods only. Normally, service businesses have long-term contracts in which the cash flow from services is less volatile than the sale of manufactured goods, which follows the economic cycle or seasonal variations (Kim et al., 2010). Due to that, it is attractive to add services to products, thereby enabling the firm to achieve competitive differentiation in the market.

However, venturing into the service business requires changing the whole value and management system. Service activities concern the value creation of the firm and its customers as well as mutual value systems. The need to change value systems has long been emphasised in the literature (e.g. Norman & Ramirez, 1994; Hamel, 2002).

The creation of a service system framework requires a firm to develop a more integrated and holistic view of its services and its own business systems (Daim et al., 2010; Kowalkowski et al., 2009). The system elements in service business are the service user, the buyer of the service and the service providers. Normally, most services are jointly provided by multiple organisations that all contribute to the total value of the service. It is usual for the service users to participate in the value creation process by contributing a combination of production factors that

are external to the service provider. These can be, for example, service users' knowledge and information on their business and activity context.

When a firm moves towards the service economy, the meaning of value and the process of value creation shift from a product- and firm-centric view to customer value and experience (Prahalad & Ramaswamy, 2004). Figure 13 presents the model for the value system and business systems that produce value for customers.

The basic elements in creating and delivering value for customers are the value system, business system and capability system (cf. Chen et al., 2010). The value proposition describes value for the customer. The producers of value are the business models and management systems through which value for customers is created, produced and delivered.

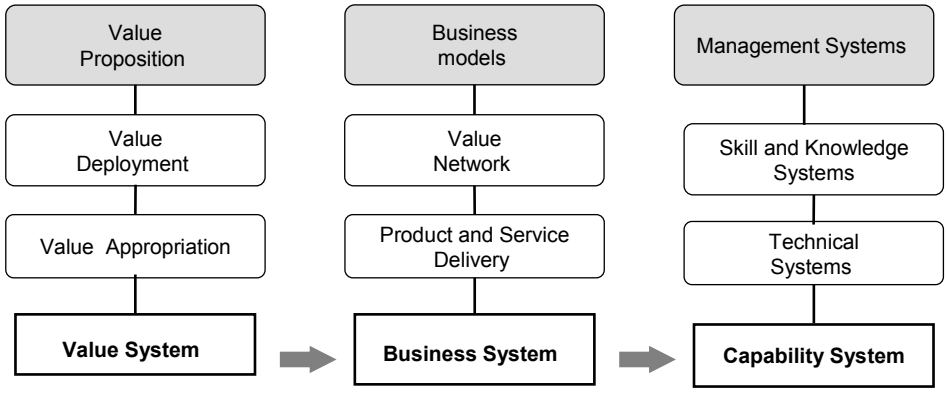


Figure 13. Customer value system and business systems (adapted from Lee et al., 2010).

The main components and phases in value creation and delivery are the value proposition, value deployment, value appropriation, service design, service development and service delivery (Lee et al., 2010). In the following, the different elements presented in the figure will be reviewed and analysed.

The value system is a central part of the system through which value is created, deployed and captured. Understanding the value system and its meaning to the firm's business systems and capability systems is an essential factor in formulating the firm's business concept and strategy (Lee et al., 2010).

The value proposition explains how value is created for the customer. Levitt (1983) was the first to express that only customers can assess the value of products and services. A paradigm shift is ongoing where great emphasis is laid on

customer value. In the case of products going directly to consumer markets, the dominant logic of marketing has shifted from the producer to the customer or the consumer (Vargo & Lusch, 2006). The construction of a value proposition requires the specification of the focal customer value or benefits. To succeed in this, there is a need to define the product and service offerings as well as to choose the market segment in which the firm wants to compete.

Value deployment concerns how value is expanded. To fully deploy value for customers, the firm needs to establish *the value network* to expand its value creation and delivering activities (see Hamel, 2002). The firm must be able to acquire resources from the value networks and use the knowledge and capabilities aquired from the network to serve customers. Customers also have to see co-partners in value creation (Prahalad & Ramaswamy, 2004). Therefore, the major challenge for the firm creating and delivering services is to foster a co-creation experience with customers and, at the same time, to build strong relationships with network partners.

Value appropriation refers to how value is captured. A central question in business strategy is how much value a firm can expect to capture (Lee et al., 2010). The firm that creates value normally has to share part of it with its network partners. One of the central questions is how the firm can ensure the competitiveness of its service offerings in the long term. A firm can take steps – by means of knowledge, physical or legal factors – to protect its value-creating activities against replication by competitors.

Product and service delivery is the final step in fulfilling value for customers. Firms compete to a great extent for market share on the basis of service response and delivery. The goal is to enhance customer value through the service delivery process and thereby sustain revenue and growth (Lee et al., 2010).

9.2 Business system components

The value system requires good *business systems* through which value can be created and delivered. Business systems consist of business models, the value network, and the product and service delivery system.

The business model defines the firm's service and earnings model for a particular market area. Normally, the firm can have different business models for different products and services aimed at different markets or market segments. The business model is the means for strategic renewal and development, by which it is possible to describe the central factors from the point of view of the firm's

business and competitiveness and their interaction. These factors are divided into factors concerning the firm's internal resources and outward factors. The outward factors represent how the firm creates value for its customers and how it stands out from its competitors in the markets. The internal factors define the competences and resources the firm harnesses to achieve permanent competitiveness (Simons & Hyötyläinen, 2009).

The literature presents a number of different business models. Table 14 describes three types of business models.

Table 14. Business model factors.

Business Model	**Outward Factors**	**Internal Factors**
Position Strategy Model Baden-Fuller & Pitt, 1996	Firm's position in the markets Business areas Business segments Products and services and their distribution systems Business behaviour	Internal resources Competences Incentive systems Management and internal entrepreneurship Creative strategy process Ability to implement strategy
Mutual Strategy Model Vos, 2002	Market demand Business choices Business areas Value creation for customers Competitiveness and its changes	Competences Internal functions Operative activity The formation of strategy practices
Business Concept Model Hamel, 2002	Utilisation of opportunities opened by changes in the business environment Business concept innovations Business strategy Customer interface: customer attainment and support Innovative products and services Information services Pricing	Strategic competences Strategic resources Core processes Innovation system Innovation ability Value network Suppliers Partners Coalitions

The table includes three business models that represent typical cases.

The position strategy is a traditional approach. Porter (1980 and 1985) has already advocated this strategy. The main question is how the firm has to position itself in the markets. The selection of business areas and business segments is an important factor in the positioning strategy. Determining products and services and their distribution systems represents an essential task in the strategy. A number of internal factors are also taken into account in the positioning strategy, such as internal resources and competences as well as management systems.

The mutual strategy model is a new approach. It describes the mutual relationships between the firm and its environment. They are considered to be a single system in which both parts depend on each other. Luhmann (1995) has developed social systems of this kind. The firm has to acknowledge market demands and make choices concerning markets, customers and value creation systems. Competitiveness and its change form the solid bases for determining the development efforts. Competences and internal functions are important for decision making on co-operation partners. An essential feature of the model is the formation of strategy practices, based on manifold phases and interactive patterns.

The business concept model describes the renewal of businesses (Hamel, 2002). The approach emphasises business concept innovation as well as innovating products and services. It is aimed at changing customer expectations with innovative products and services (Salkari et al., 2007). The model is based on examining and utilising the new opportunities opening up for the firm. A central goal in the approach is to develop radical innovations that will enable the firm to achieve a competitive advantage. The goal of business concept innovation is to introduce more strategic variety into an industry. This enables the firm to prosper and bypass its competitors. Internal factors, such as strategic resources, core competences and innovation abilities, are important for the success of the firm. However, the firm has to co-operate with other firms, such as with suppliers, partners and different kinds of coalitions (Hyötyläinen & Valkokari, 2009; Hyötyläinen et al., 2011).

9.3 Value network dimensions

Value networks are an essential means of producing and delivering products and services to customers. The use of value networks can be an integral part of the business models of the firm. At the same time, value networks can be an important means of increasing the renewal and growth of the firm. The network can form a basis for a place where firms can learn and create new growth opportunities (Möller et al., 2004; Simons & Hyötyläinen, 2009). Table 15 presents three different views of networks and their types.

Table 15. The dimensions and structures of value networks.

Renewal view	Competence view	Value chain/network sructure view
Current value chain nets ▪ Focus on exploitation	Utilisation of existing know-how	Vertical production and supplier networks
Business and value renewal nets ▪ Focus mainly on exploitation	Combination of existing competences	Vertical and more horizontal development networks
Emerging business nets ▪ Focus on exploration	Creation of new knowledge	Innovation networks aiming at new products and technologies

Current value chain nets hinge on co-operation in which the current competences are utilised in a network. Normally, the network type is a vertical production and supplier network. Growth can come from customers or the strategic goals set by the principal in the network. It is based on the current businesses as well as the production and delivery of the current products and services. The notion of markets is clear and easy to determine. The main focus in this model is on the exploitation of current assets. Firms can grow relatively slowly in this network model.

Business and value renewal nets seek to creatively combine existing competences with a view to renewing the network and creating new businesses. New strategic customers and new business relationships are also a goal. The forms of networks are based on vertical relationships, and increasingly also on horizontal development networks. However, the model focuses mainly on the exploitation of existing competences. In any case, this network model offers the firm opportunities for relatively fast growth.

Emerging business nets are networks within which innovation and the creation of new knowledge are the starting point (Chesbrough, 2003; Valkokari, 2009; Hyötyläinen et al., 2011). The goal is to create new products and services that will be produced and then delivered to customers. The creation of new combinations is an important objective. It is possible that these networks can originate new innovation and development networks crossing the borders of different

branches. These networks aim at the creation of new technologies, products and service openings. In principle, the focus is on exploration, based on finding new things (cf. March, 1991). This network environment offers firms opportunities for very fast growth through an innovative growth model (Simons & Hyötyläinen, 2009, 132–136).

Through networking, firms can achieve new kinds of business and product opportunities, but at the same time they become more dependent on each other. Firms no longer compete only as individual units but as competitive arrangements, and this has changed the competition between networks, as already noted by Manuel Castells (1996). Independent firms also have to be able to act in network relationships even when the tight relationships increase business risks. Due to that, some firms can co-operate while also competing with each other. Firms participating in networks set their sights on victories and benefits. A winning arrangement can lead to successful and genuine co-operation between the partners in the network. However, it is not always possible to define all the benefits in advance. Furthermore, benefits might materialise later for some network members than for others, as Vesalainen (2002) has shown.

9.4 Firm's capabilities and management systems

The resource-based view traces superior competitive performance to the distinctive resources of the firm. Furthermore, there is an essential view of how the firm can compete in the market, according to which the structural forces approach states that a competitive position in the market is derived from excellent performance in selected segments of the total market. Furthermore, managerial and organisational processes – that is, the way things are done in the firm – are in a key position. Figure 14 depicts this situation.

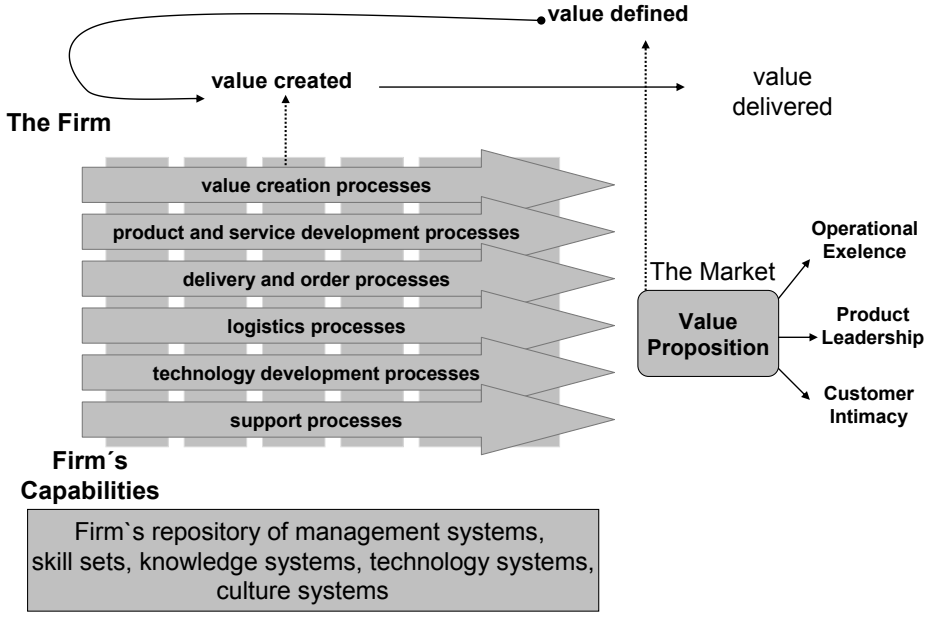


Figure 14. A firm's processes and capabilities and its delivery of value (adapted from Birchall & Tovstiga, 2005, 45).

The competitive advantage of the firm is directly related to its ability to create value for customers, such as by delivering better value to customers than its competitors. Value is defined and ultimately delivered in the market for customers.

The firm's *value proposition* is an articulation of its strategic intent concerning how it intends to deliver value to the market. The value proposition provides a powerful basis for competitive differentiation. Treacy and Wiersema (1995) suggest three possible value disciplines that form the basis of the corresponding value proposition for the firm's customers. The first one focuses on *operational excellence*, providing the firm with the possibility to compete with an effective cost-price ratio. It is based on the exploitation dimension (cf. March, 1991). The second value discipline focuses on *product leadership*. The value proposition in this case is based on the firm's ability to establish a leadership position in delivering innovative products and services to the customers in the market. This can be seen as an exploration function in the firm. The third is *customer intimacy*, whereby the firm cultivates relationships with specific customers, satisfying unique needs that often only the firm can fulfil by virtue of its close relationship with its customers.

Treacy and Wiersema (1995) argue that firms invariably focus on one of the value disciplines. According to this, the firm's choice of value discipline defines what a firm does and therefore what it is. However, in real business environments, firms often must deliver a combination of value disciplines in order to compete effectively in the market (Birchall & Tovstiga, 2005, 42–44). The firm has to balance between exploitation and exploration, as noted by March (1991). That means upholding operational excellence and product leadership at the same time. Furthermore, customer intimacy will be one of the cornerstones in service business, which is playing an increasingly important role for firms (Hyötyläinen, 2007b; Hyötyläinen & Nuutinen, 2010; Chesbrough, 2011).

The firm has *business processes* through which it provides value for customers. The processes that are capable of generating the greatest contribution are core processes. In particular, these processes include value creation processes, product and service development processes, and delivery and order processes. Logistics processes facilitate the functioning of the core processes. All these processes have to be closely aligned with the firm's overall strategy. The firm's core capabilities are especially relevant to the firm's core processes and their functioning. The firm's *capabilities* are integrated with its repository of knowledge. They are rooted in the firm's stock of strategically relevant knowledge, skills, management systems and technology systems. All these aspects are integrated into the firm's culture system when they are unique to the firm and are hard to copy by its competitors (Birchall & Tovstiga, 2005, 42–47; Nuutinen, 2006).

Some processes play more of a supporting and supplemental role. These kinds of processes are technology development processes and support processes, and partly logistics processes. These processes are essential for the firm's competitive advantage, but can readily be imitated by competitors.

9.5 Dual nature of service business

Service business involves providing services for customers and their processes (Grönroos, 2005; Hyötyläinen, 2007b). However, the dual nature of the service business is that it depends on both sides of businesses, that is, the service provider and the customer to which service is offered. Both sides have their own strategy for service business. Table 16 presents four types of customer-provider relationship.

Table 16. Supplier-customer relationships (adapted from Sivula et al., 2001; Kowalkowski et al., 2009).

Duration of customer relationship	Transaction	Cooperation
Long-term	LOYAL RELATIONSHIP	CUSTOMER PARTNERSHIP
Short-term	MARKET EXCHANGE RELATIONSHIP	SOLUTION RELATIONSHIP

Interaction intensity of customer relationship

The table identifies four types with the dimensions of interaction intensity of customer relationship and of duration of customer relationship. These four types are: market exchange relationship, solution relationship, loyal relationships and customer partnership.

A short-term relationship describes a market exchange relationship and solution relationship. A *market exchange relationship* is in principle a "faceless" relationship. In this case, there is no interactive or long-term co-operation between the provider and the customer/client. The customer has an exact problem that he wants to solve with relatively standard products and services. This model represents a traditional production- and product-centric approach, in which both the customer and provider have the same view of the action (Hyötyläinen, 2007b). It is a traditional trade in which the parties restrict their co-operation to a one-time delivery. The supplier delivers relatively standard products and services that are adapted to the specifications articulated by the customer.

A solution relationship is common in service business. It is characterised by a close relationship with the customer/client. In principle, the relationship is short-term, but it can recur in a different context. Normally, the goal is to solve a customer's problem. However, both the identification of a customer's/client's problem and service delivery may require considerable interaction with the customer, which leads to long-term, intense interaction. In this case, the supplier is by its nature a system supplier and as such is able to offer total solutions to the customer's problems. The supplier acts chiefly at the level of the customer's operations and processes (Hyötyläinen & Nuutinen, 2010). In this model, the custom-

er does not know the solution to its problem. The supplier then has a task-oriented action pattern. Thus, a supplier cannot use only its earlier knowledge about a customer to solve the customer's problem, but must use other knowledge and experience of related customers, industries and problems (Sivula et al., 2001, 84).

A *loyal relationship* indicates a long-term relationship in which the customer takes a transactional approach to the supplier. Due to that, this model is relatively problematic. The customer may need a particular service regularly, but prefers to maintain an arm's length relationship with the supplier. Normally, the customer is fully aware of existing solutions for fulfilling a need, preferring to use a pre-existing product and service. In this case, the supplier has a product and service that it can deliver to the customer and is able to a limited extent customise the service because it has repeat engagements with the customer. Through these engagements, the supplier may advance the customer's business (cf. Hyötyläinen & Nuutinen, 2010).

A customer partnership is a long-term relationship between the supplier and the customer. It is aimed at achieving a competitive advantage for both firms by developing and using new knowledge with the partner. This enables the use of both firms' tacit knowledge in the co-operative relationship (cf. Nonaka & Takeuchi, 1995). In this case, neither the customer nor the supplier has an existing solution for the problem. They thus agree to work together to find the solution. The goal is to enlarge both parties' business activities. In the best cases, a customer partnership can take the form of a formal joint venture with the customer (Sivula et al., 2001). Other network partners can then be involved in the partner relationship in order to develop additional products and services for the customer, as well as offer them to wider customer groups.

When firms forge a partnership, the firms have to revise their thinking patterns. That also means changing the business concept of both firms. The inside and outward organisation will be characterised by interactive and open communication as well as knowledge-creating processes (McRath & MacMillan, 2000; Chesbrough, 2003). Organisationally, this is a challenging situation, for there is no direct shortcut to such organisational models. For this reason, the firm has to build its own business concept and, on the basis of this concept, the management system. However, the firm may have to act according to several different logics at the same time, because different operations can advance at a different pace towards service- and customer-centric operations models (cf. Pettigrew & Massini, 2001; Hyötyläinen & Nuutinen, 2010).

9.6 Change process and phases for service business

The management of the tansformation process of service business requires wide organisational and functional changes as well as the creation of new kinds of interactive relationships both inside the firm and within the customer and co-operation network. However, it is not easy to implement profound changes in organisations (Burke, 2002). It could take several years, and if one attempts to carry out a large change covering the entire business.

Firms have to proceed step by step into service business. Five different phases through which firms may advance can be discerned: (1) awakening to the opportunities of service business, (2) the modelling of a new operations model, (3) the testing and customer assessment of the new operations model, (4) the establishment of the new operations model, and (5) the changing of the established operations model into profitable service business.

Table 17 presents these different phases and processes of service business.

Table 17. Service business phases and processes (adopted from Hyötyläinen & Nuutinen, 2010, 60–64).

	Awakening	**Modelling**	**Testing**	**Establishing**	**Profitable business**
Starting point for progress	Competitive require-ments Customer needs	Modelling needs	A question of implementing models into practice	Definition of establishment	Definition of business potentials
Action planning and control mode	Several outlooks	Different notions of services	Testing plan, customer interface	Establishment plan and time-table	Business models and service concepts
Action planning means	Own starting points	Clarifying goals	Evaluation criteria	Customer model	Setting profita-bility goals
Organisa-tion challenge to be solved	Organisa-tiotional challenges	Organisational participation	Large participation	Organisation and management models	Definition of organisational responsibilities
Procedures supporting progress	Study work and decision making	Modelling work, customer evaluation	Evaluation of results, follow-up measures	Evaluation of operations model, new development measures	Reporting results and starting development activity

At the start, it is necessary for the firm to *awaken into service business* and its opportunities. The may be spurred to do so by the general tendency of firms to pursue growth in service business (Hyötyläinen, 2007b). However, this general trend is not enough to start the process of the firm's transformation into a service business. It is necessary for there to be a compelling reason to begin an analysis and transformation process. One has to acknowledge at the outset that the service business will cover the whole organisation and its operations model, with their personal and organisational interaction patterns. At the employee level, this involves changes in their interaction and a new relation to the customer-centric operations model.

Awakening into service business and studying service business opportunities requires decision making in several quarters in an organisation. The visions and objectives set by management also direct the development and give it wider meaning as an organisational challenge. The key persons in the organisation have to be involved in outlining service opportunities.

The next important phase is the *modelling* of service business. The service business itself is a relatively broad and multifaceted phenomenon (Hyötyläinen, 2007b). It can refer to everything from maintenance activity to availability guarantees or taking end-to-end responsibility for the customer's processes (Grönroos, 2005; Kalliokoski et al., 2005). Without exact goals in mind, there is no reason to go into service business. In general, there are many parallel service business problems in an organisation that require attention or in which one can interfere. However, manifold problems as such are not enough to start organisational change, because these problems are often practical in nature (cf. Burke, 2002). With regard to setting the objectives for service business, analysis and comprehensive consideration are necessary in order to identify actual and real problems, and the testable hypotheses connected to them (cf. Sayer, 1992; Weick, 2003). These hypotheses can be tested in the change process and against them one can assess the scope and success of the service business change (cf. Martin, 2000; Henriksen et al., 2004).

Establishing models and plans in practice is often the greatest effort phase, for it is easy to set visions and objectives, but introducing them into the new operations model requires wide organisational resources. Implementing the new operations model is often a long process (Burke, 2002; Hyötyläinen & Nuutinen, 2010). The greater use one makes of the wide expertise in the organisation, the easier it is to implement the new operations model of the service business. When one can evaluate common progress on a regular basis, it is easier to carry out the

plan. It is vital for the new operations model to be tested with the customer interface. Only customers' attitudes determine the success of service business activities or bring to the fore the new needs for further service planning.

Once the new operation model of the service business is functional, getting it up and running as a *profitable business* is a different matter entirely (Hyötyläinen, 2007b). This can take a relatively long time. The service business has to be integrated into organisational action, becoming part of the future business concept and business implementation model. The service business can become profitable when action processes are created together with customers so that the action can be intensified while new action patterns are being created (cf. March, 1991). These action processes and their functioning have to be ensured at the operative level. The joint procedures and process actions make it possible for both parties to engage in reliable and value-increasing activity.

However, the formation of a service business is not always a direct and phase-to-phase process (cf. Burke, 2002; Martin, 2000). Here are five interconnected factors:

- The change of the firm's business concept and operations models requires strategic solutions in the firm.
- The organisation must have an understandable and credible reason for the change.
- Within a firm, there are typically divergent opinions and objectives concerning the development of service business.
- While progressing towards service business, one gains experiences that impact on the set goals. The goals can change based on these experience and the problems met.
- The target phases and the formation process can have unexpected consequences that can force the direction of the change process.

9.7 Strategic change model of business systems

In Section 9.2 of this chapter we considered the components of business systems from the perspective of value systems. In the previous section we examined the change process and phases for service business as well as the management of this change process. In this section we will concentrate on the question of the strategic change of business systems as well as the management of this strategic change. This analysis will conclude this chapter concerning the practical frame-

works and concepts. In the next chapter we will describe and analyse several cases.

Changing business systems is a complicated process. There are three different levels in an organisation: the strategic, systemic and operative levels. This kind of organisational structure forms the structure of the communities of practice and partly the epistemic structure, in which the formation of knowledge is in an important role (Wenger et al., 2002; Cohendet & Amin, 2006).

Figure 15 presents the change model of business systems.

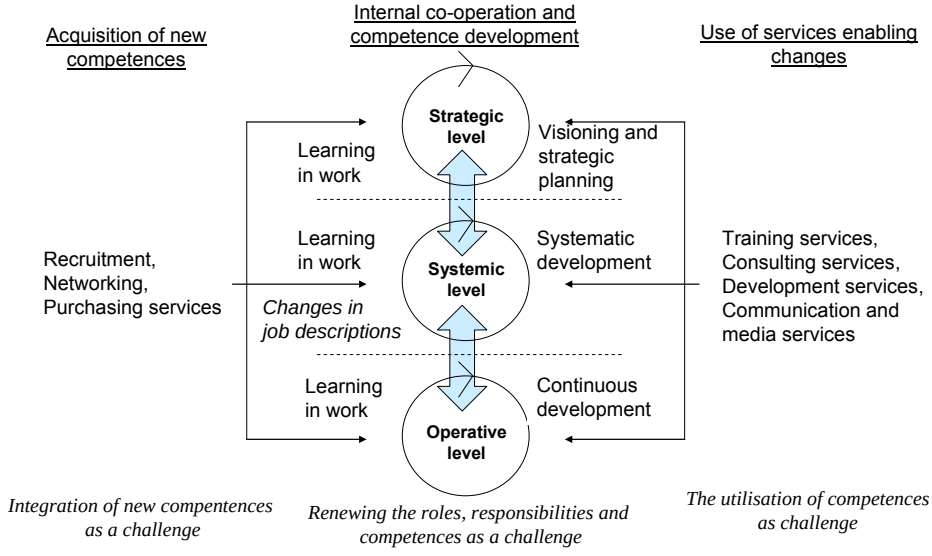


Figure 15. Business systems change model (adapted from Simons & Hyötyläinen, 2009, 271).

Changing a business system requires co-operation between the different levels in an organisation. These levels correspond to the organisation structure of the firm. The strategic level represents the firm's upper management, the systemic level middle management, and the operative level the employees in the organisation. They also have different roles in changing the business systems (cf. Hagström & Hedlund, 1998).

Normally, the *upper management* follows what happens inside the firm and in its environment. This corresponds to the two factors of the business model, presented in Table 15. The upper management makes plans for how the firm should operate in the future. The plans take the form of visions and firm strategies as

well as development targets for the future actions of the firm. However, it is hard to plan all changes beforehand, because many changes are formed in the context of the markets and competition. In this sense, the change of business activity is based partly on planning and partly on emergent strategies (Mintzberg, 1994). In a complex environment, firms have to continuously seek new ways to be competitive in the market and reach new customer groups.

The *middle management* attempts to reach the goals and objectives set by the upper management by means of systematic development activity. These development measures serve the changing of the business systems of the firm. They can concern the firm's products and services, production structures, organisation, operations models and marketing measures (cf. Shumpeter, 1934; Simons & Hyötyläinen, 2009). In principle, these form a basis for the infrastructure of the firm. The infrastructure investment is planned for the long term. However, the problem is that although a firm's strategy is relatively easy to change, the infrastructure of the firm is not so easily replaced (cf. Mintzberg, 1994). This forms a tension between the strategic change and the infrastructural change in the firm, which may slow the renewal of the business systems of the firm.

The systems and infrastructures of the firm also experience pressure "from below". The *employees* of the firm face many problems in their work at the operative level. They work in a context-based environment, and meet the operative adaptation needs of the business systems of the firm. Their measures for adaptation lean chiefly on continuous development activity. Since both the customers' needs and the availability of the firm's own resources can vary, the situations in the firm can change often. For that reason, the firm has to rely on its employees' expertise and skills to facilitate the adaptation and renewal of the business systems of the firm (cf. Hyötyläinen, 2000, 62–64).

The development of new competences is required to develop and change the business systems of the firm. The change process is always an organisational learning process (cf. Nonaka & Takeuchi, 1995). Individuals learn in organisations, but at the same time the entire organisation gains shared expertise. Learning happens both through development measures and learning at work. The shared views on the needs to change the business systems will emerge through conversation and co-operation between different levels in the organisation (cf. Dixon, 1999; Valkokari, 2009).

A great challenge is how it is possible to change job descriptions as well as to renew the roles, responsibilities and competences in the firm, which will facilate the requirement for the change processes in the organisation. One possibility is

to emphasise the role of middle management. Middle management can operate between two levels. On the one hand, they understand the visions, objectives and development targets expressed by upper management. On the other hand, they also have a clear image of the organisation's everyday operations and development problems. Thus, middle management can serve as intermediaries when processes are transformed (cf. Nonaka & Takeuchi, 1995).

The firm also has to acquire new competences from outside the firm. This can happen by networking, hiring new employees or purchasing other services from the markets. However, it is a challenge for the firm to be able to integrate these knowledge sources so that they serve its change processes.

The firm also needs to acquire services that help it to change its business systems. There are many services that the firm may need, such as training, consulting and development services, which can function as a change agent in the change process of the firm (Heckscher et al., 2003). The problem is how well the firm is able to use such services. Nowadays, internet- and web-based communication and media services are important facilators for firms and their renewal processes.

10. Cases and analysis

10.1 Analysis framework

Changing business systems requires changes in different dimensions. However, the firm has to be competitive in order to be able to renew its activities. This is the dilemma described by March (1991). In this chapter, a number of cases are described and analysed. The framework for case analysis is presented in Figure 16.

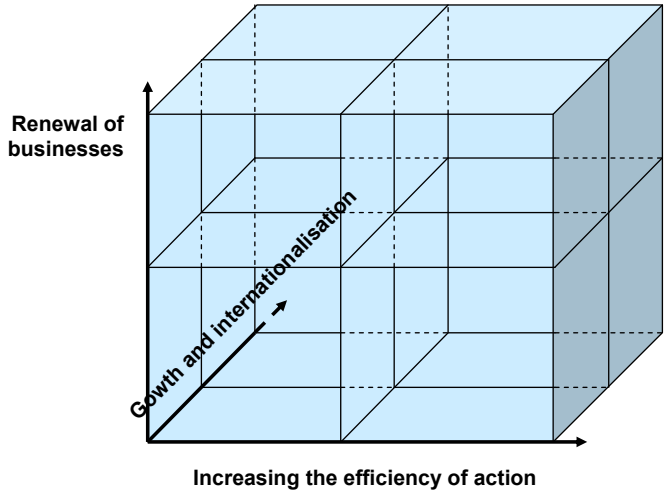


Figure 16. Business development framework.

There are three dimensions in the figure. The first two are: increasing the efficiency of action, and renewal of businesses. According to March (1991), these two dimensions involve, on the one hand, the exploitation of the existing resources and competences as effectively as possible, and, on the other hand, the exploration of new opportunities to renew businesses and to create new busi-

nesses. The third dimension in the figure is growth and internationalisation. Internationalisation is necessary for most firms to enable them to grow, and also increases their potential to renew their businesses and management systems (Boter & Holmquist, 1998; Simons & Hyötyläinen, 2009; Hyötyläinen, 2009). Business renewal may be based on service business, networking or organisational and management innovations, or marketing innovations (Schumpeter, 1934; Prahalad & Ramaswamy, 2004; Storbacka, 2006; Hyötyläinen, 2000; Williamson, 2003).

For the purpose of analysing the cases, growth and internationalisation are separated into two. Furthermore, it is necessary to add the networks dimension to the analysis. When describing and analysing the cases, we can ask what the features and forms of the cases will be and how the dimensions will manifest themselves. How can the cases be classified?

10.2 Cases

In the following, twelve cases will be described. Cases A, G and H are mainly based on the publication (Valkokari et al., 2009). Cases D, I, K and L are mainly based on the published article (Hyötyläinen et al., 2010). Case F is based on different sources. Cases C and E are mainly based on the book (Simons & Hyötyläinen, 2009). Case J is based on an interview with the case company, with some earlier knowledge about the company. Case B is partly based on the publication (Hyötyläinen, 2000), and also draws on other sources.

10.2.1 Case A

Company A is the leading supplier of mineral processing systems in the world. It offers systems for the mining industry and earth-moving industry, and it has one of the largest *service packages* in its business area. The company is part of a large Finnish corporation. The company employs about 9000 persons. The company has its own production in Finland and about 40 units around the world. Furthermore, it has sales, service units, agents and resale offices in over 100 countries.

The company has developed a *new machine model* that has become a success for its business. The company has made many efforts to *develop production*. A mass customisation concept was adopted in the first years of the 2000s. The company changed the *products and product structures* of its volume production

when it moved to the mass customisation model in its production. However, the product and systems are modularised and adapted to different customer segments and demands. To further develop the production concept a new production line concept was implemented in 2005. It influenced the control and logistics of production. At the same time, the company also established electronic connections to its major suppliers.

The company reorganised its *material acquisition organisation*: strategic and operative purchasing. After that, the company started a development effort to develop its *supplier network*. The aim was to include all of the major suppliers in the dynamic environment in which the company operates. The company classified its suppliers as shown in Figure 17.

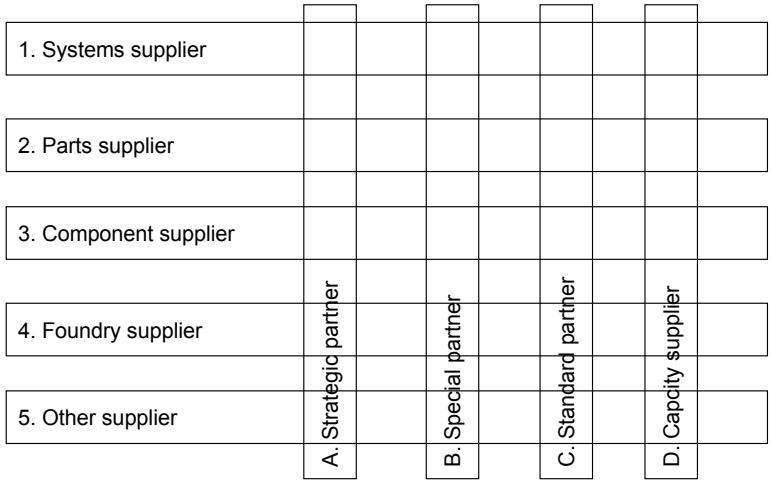


Figure 17. Supplier network structure.

The company started a *development project to create new action models for its supplier network.* The company developed supply chains, material flows, logistics and material management. The company plans long-term contracts with its strategic partners and considers future opportunities. The partners that are not strategically important belong to other groups. The co-operation with capacity suppliers is market-oriented, and requires much control from the company. Furthermore, the company considered how some of its partners could specialise in product development and the development of new production concepts as well as take part in prototype production.

10.2.2 Case B

Company B is global fibre material company that is experiencing changes in its international businesses and operation. The company has manufacturing places in fourteen countries. Furthermore, it has sales offices in 25 countries. The company employs about 6000 persons. It does business in four different business areas. It also has a *service organisation.* It *develops products* and customises them for different customers and customer groups.

The company has thinned its supplier networks. It has increased the share of its operations handled by systems suppliers. It has developed its entire *supplier system*. Its systems suppliers take part in product and production development efforts. At the same time, the company demands its systems suppliers to start up international operations.

The company has boosted the *effectiveness* of its supply chain. The delivery time of supply has to be shortened constantly by developing production control, material handling and logistics. Delivery time is also a critical factor for businesses that are serving different customer processes and their changing needs. The reliability of supply is of utmost importance for the company's businesses. In the same way, suppliers have to be able to adapt to the fluctuations in sales volume. The factors that affect the price of supplies are under consideration. Some programmes are started, and responsibility for the development efforts is agreed upon.

10.2.3 Case C

Case C involves a systems supplier that started its business at the beginning of the 1990s and is one of the first players in its operating area. It has *grown* ever since and is now the largest company in its field in Finland. The firm is still family owned. The firm has grown relatively fast by building new operational factories close to its key customers. Only one factory has been acquired. The firm's turnover has continuously grown by over ten per cent in the last years – one year it rose by almost 30 per cent. It can be stated that the firm has *explored* new openings for its business all the time. Recently, the firm has made two business arrangements. It bought a part of the business activities of another company. In addition, it bought another firm that has a European factory and which exports its products to 30 countries. Through all these actions, the firm has grown and now has about 300 persons on its payroll.

The central competence of the firm is to offer *services* to its customers in the machine and metal industry as well as in the electric and electronics industry. The firm utilises new technology to effectively serve customers. From the beginning, the strategic plan of the firm has been to act close to customers. This operations model has led it to establish several factories around Finland. Nowadays, the firm has about ten units, most of which offer core services to customers. The firm serves its customers in three different ways. First, its basic service provides quality service to customers, based on project and one-time deliveries. Second, its series manufacturing service is a customised service for those customers that can forecast their own demand. Third, the firm provides quick services to serve needs that a customer has not been able to forecast and determine.

By opening several new units around Finland, the firm has created *a loosely coupled network* composed of many independent units, with differing operations models. In this model, each unit was *networked with partners,* based on local needs. The units have thus purchased materials and parts independently, even from the same network sources, without knowledge of the other units' operations. That made the enlargement and development of the firm's activity risky and difficult.

To *exploit* its resources and competences more effectively, the firm started a development project. Through this project, the business model was changed to harmonise the operations models between units, develop the whole organisation and create a technology strategy for the firm as a whole. At the same time, a new enterprise resource system was implemented for the whole firm. Furthermore, some tasks, such as the acquisition of great volume materials, were centralised in the firm.

Ever since it was established, the strength of the firm has been that its units have handled matters relatively independently through *entrepreneurial management*. When the firm was growing constantly, it was from an economic and functional perspective reasonable to centralise part of its activities. However, when the organisation is harmonised and some activities are centralised, there is a need to preserve the strong features of entrepreneurship.

10.2.4 Case D

Case company D is a SME offering industrial services, metal products and subcontracting to global product companies in the technology industry. The compa-

ny employs about 200 persons. It also has activities in the Baltic countries. The company has an effective ERP system.

During the last ten years its customers have been outsourcing their production and the case company has taken larger responsibilities. In order to cater to an even broader area of customer needs and offer *life-cycle services*, the case company has built relationships with partners that have complementary resources. The target was the *exploitation* of partners' complementary resources and their integration into business solutions. The partner companies are a small engineering company, an electrical installation company and a maintenance service company. The companies have prior experience of co-operation, but they started this collaboration with a joint strategy process. Within this process the companies co-created the joint business concept and defined the roles, the responsibilities and the sharing of the risks and the benefits of the collaboration. However, the case company wanted to ensure the commitment of partners, and therefore strengthened interdependence with cross-ownership between the case company and partners. The co-creation was founded on *bilateral partnerships* between case company and partners and the case company's strong governance and co-ordination of joint processes.

The company has activities in the Baltic countries. Furthermore, the company co-operates with another company in order to be able to offer international manufacturing services for its customers.

10.2.5 Case E

Case E is a hoist company. The company is a niche firm that is a market leader in its home markets. The firm has three business areas and correspondingly three business models. Its core business is founded on its own technological solution. The firm has used this solution to develop about ten standard products, with many options. The firm has its own R&D function. The firm continuously develops *new products*. In addition, it develops materials for products. In other words, the firm continuously *explores* new technology solutions. In its own production, the firm concentrates on assembly, purchasing other parts through its *network partners*. However, it manufactures the key component, which is technologically important for the firm's products. The firm has its own painting shop, which is essential for tailoring high-quality niche products to the *wishes of the customer*. At the same time, the firm has developed its own production by

exploiting resources fully and by raising the productivity of its production, for example through the management and control of production facilities.

The firm has *grown* fast, concentrating on its central customers. The firm has formed a *resale network* for its home country. At the same time, the firm has *exported* its products to the Nordic countries through its resale networks.

The firm has decided to *invest in export activities* to maintain its growth momentum. The firm experimented with venturing into the US market, but this effort was not a success. Next, the firm decided to go into the European market. The firm found a *European partner*. The firm's selected products complete the partner's products within certain high-priced special segments. The firm had to adapt its products to meet the requirements of European certificates before marketing activities were possible. The European partner is responsible for the sale, distribution and maintenance of the products. The firm provides *maintenance training* to the European partner.

Next, the firm decided to move into the *service business*. The firm manufactures spare parts for the products, but other firms attend to the maintenance of the products. The firm developed its service business and service concepts. The firm created its own *maintenance organisation* in Finland and in the Nordic countries, with its own business area and management. The firm marketed and launched the new concept. The firm built its *service network* together with the partners. The firm manages the partner network as part of its service concept.

10.2.6 Case F

Case F is a wood product company that has in recent years moved into the service business. Its wood products are still an essential part of its services. The company has four assembly factories of its own. In addition, the company owns several component factories that produce different components for the assembly factories. The company has grown fast, more than doubling its turnover in the 2000s. It employs about 350 persons.

All the factories have supply chains and partners. Many part assemblies and materials are acquired from outside the company. Production is honed to be as efficient as possible. Thus, production sets great demands on the supply chain and its development. Network co-operation focuses on *exploitation*. The manufacturing costs of products are only a small part of the total price when products are sold to clients and customers. Furthermore, the firm's service functions install all products for all its clients and customers. Service functions have devel-

oped new kinds of *services* for clients and customers. They co-operate with new partners, and develop new service packages together with their new partners. This activity has increased the complexity of networks, thereby transforming *the relationships from bilateral to multilateral*. The company is strategically moving into a new direction in the service business. However, the production side will continue to operate in an exploitation mode in the future.

The company has developed new special *products and service applications* together with its partners. Through new products, the company has gained a new position in the market, both in the end client market and in the customer market. In this sense, it can be stated that the company has *explored* new openings to be competitive. A few years ago, the company renewed its strategy. Since then, it has *grown* steadily, more than doubling its turnover. It has gained a leading position in the Finnish market. At the same time, all the parts of the company have entered the service business. To grow fast, the company has *gone international* by venturing into two foreign countries, founding its own selling and service organisation in each country. It has a very large organisation in one foreign country.

10.2.7 Case G

Case G is a mechanical wood processing company that manufactures components and parts for furniture companies and resale networks. Its main markets are Finland, the other Nordic countries, and mainly in one continental European country. The company employs about 110 persons.

The company's process consists of a sawmill and two wood processing factories. The company has reorganised its operations with a view to making *production more efficient* and carrying out more cost-conscious volume production.

The company has strategically decided to concentrate on massive wood processing manufacturing on the one hand, and processed materials and components on the other hand.

The company has its own *partner network* that provides services for the company. It consists of production, maintenance and logistics firms.

The company is seeking new competitive factors. It is developing its *services* and enlarging its product mix. The company has *network partners* that further process its materials into customer-specific components and products. At the same time, the company is deepening its *co-operation pattern with customers*, seeking to forge closer relationships. This also means *renewing products and*

product innovations. Thus, the company is able to move into new business areas. As part of this renewal process, new sources for acquiring wood material from abroad are studied.

10.2.8 Case H

Company H makes electric and electronic components and products. The company has grown fast and also wants to grow in the future. The company has subsidiaries in thirteen countries and factories in Finland and four factories abroad. In addition, it has *a network of resale distributors* on all the continents. The company employs about 500 persons.

The company manufactures components and products, but it also *plans and designs customer-specific solutions* for demanding environments. It assembles modular components and products for different customer groups. The company has actively sought *new markets* for its components and products.

The company has developed its *processes,* increased its productivity and upgraded the quality of components and products.

The company has reorganised its activities. It has developed the *working practices* of the executive group. In addition, it has started Key Account Management practices to better manage key customers. Its aim is to develop customer-centric activities. The company wants to *network with its customers*. At the same time, the company wants to create *new business opportunities* and solutions. The company is entering *the service business* and creating value for its customers. At first, the company is piloting new service concepts with several customers. At the same time, the company intends to *renew its organisational practices* and the competences of its key persons in order to make headway in the service business.

10.2.9 Case I

Case company I is a technical trading company operating in Finland. Its offerings include machine and equipment deliveries, installation, implementation, training, maintenance and replacement part services. The company imports machines and materials. The company employs 185 persons. The company has grown; for example, its turnover increased by 25% in the late 1990s. The company has a subsidiary in the Baltic countries.

The major customer segments of the company are the metal industry and building industry. In Case I, a new service concept was developed jointly in a

network of separate companies, e.g. its partner offering material handling systems and customers in the metal industry customer segment. The new concept seeks to improve both the *exploitation of present competences* and *exploration of new business opportunities*. The aim was that the company sells the total solution and manages the customer relationships in the chosen customer segment. The partner company provides support in technical matters and documentation. Therefore the network consists of *bilateral relationships* and the co-creation has characteristics of both co-ordination and collaboration. The co-creation of the new business concept was based on complementary resources and interdependence between actors. Thus the companies have each defined their roles, motives and goals for the co-creation to find opportunities for a win-win situation.

10.2.10 Case J

Case J is a planning office. Its main activity focuses on project-based operations and partly on work-based pricing. The firm has *grown* very fast during the past ten years. The firm has also bought several small planning offices. Nowadays, the firm has about 300 employees.

The firm operates in many areas. The main area is the metal and engineering industry. The firm is building long-term relationships with its customers. The firm wants to take on a greater part of the customers' processes. The firm wants to move away from mere project-based competition to become a *partner to its customers*. The firm experiments with this kind of activity with some of its customers. In this way, the firm is moving towards the *service business*. The firm has renewed its strategy. The firm aims to be part of a *customer network*. The firm is also ready to take end-to-end responsibility for the other partners in the customer network in order to serve its customers. Based on that, it can be stated that the firm is *exploring* new openings. The firm has started a development project aimed at coming up with a new operations model and honing the competences of the planning staff.

The firm has also boosted the efficiency of its planning processes by *exploiting* better planning potentials. The firm has provided the planners with state-of-the-art hardware and sofware. The firm has also offered training to the planners. At the same time, the firm has built its *partner network*, from which the firm purchases special planning services.

The firm has strategically decided to *internationalise* its operations. Many global customers have also preferred that the planning office they use in Finland

would establish offices close to their sites abroad. The firm is considering what kinds of new persons and competences are needed for international operations. This also involves building career plans for the existing planners to enable them to participate in internal services. The firm is currently considering that it requires *international partners* for its international operations.

10.2.11 Case K

Case company K is a small company offering software products and services, e.g. consulting related to software products. IT services for both industry and public sector generate more than half of its turnover. Its software products are partly based on open-source software and its employees participate in certain open-source communities. Thus the company has actual business partnerships with core companies in these communities. These core companies offer commercial products based on OSS and the case company also utilises these solutions. In order to *explore new business opportunities,* the CEO and owner of the company has to lead the employees to participate in certain discussion forums. From these connections and interaction with potential customers, the company has found opportunities to offer its services to new customers, who have been looking for knowledge related to the utilisation of new IT tools. Although the company operates continuously in different open communities and social networks with *multiplex relationships*, its CEO has a clear vision about knowledge sharing and protection in the business network. That is why the case company also has several models for co-creation within business networks, varying from co-operation with larger companies to collaboration in communities.

10.2.12 Case L

Case L involves a group of six companies offering marketing services in the areas of marketing, advertising, business consultancy, printing, media planning and market research. The case companies are part of a larger group. The group is an important actor in the Nordic countries. It employs about 450 persons.

The companies form a network with *multiplex relationships* with each other. The companies in the group have shared large customers, although the companies also serve customers independent of the network. Therefore the group's management plans to take responsibility for the co-ordination work and to offer a full *service package* to customers. According to their view their customers

would benefit in many ways from a more co-ordinated approach to selling marketing and advertising services. The business focus was on the *exploitation* of existing knowledge and competences at network level. The group has already described the networked service concept on some level. The description includes, for example, common aims, processes, some tools and documentation procedures. The further development work and co-creation between the group members aims to develop a common understanding of the service concept of the network, and a unified way of managing the network. Thus co-creation existed on several levels and because of that it can be considered to be collaborative process.

10.3 Main features of the cases

The summary framework and main features of the cases are presented in Table 18. The cases are assessed below.

Table 18. Summary framework of cases.

	Increasing efficiency	**Business renewal**	**Networks**	**Growth**	**Internationalisation**
Case A – mineral handling company	Mass customisation, flow production, electronic connection to suppliers	New machine and its variants, new product structure, renewing its business model, service packages, partner development	Classified business networks and partners	Fast growth, workforce about 9000	Global company
Case B – fibre company	Production control, material handling, logistics, supply procedures	Service packages, new products, development of supply system	Networks and partners	Slow growth, workforce about 6 000	Global company
Case C – systems supplier	Process and technology refinements, centralisation of activities, new ERP	Customer-based enlargement, services	Ten factories around Finland, network partners	Fast growth, over 10%/year, bought part of one firm and a 100% holding in another firm, about 300 persons	The acquired firm has a factory in Europe, exports products to 30 countries

Case D – subcontracting firm	Resources of own and partners joint development	Product offerings Life-cycle services	Partners and bilateral partnerships, cross owner- ships, with one partner in international manufacturing services	Growth, about 200 persons	Operations in Baltic countries
Case E – hoist firm	Assembly and painting shop, development activities	New products and options, new technology solutions, moving service business, own maintenance organisation	*Network partners* for parts *Resale network* in home and Nordic countries *European partner,* maintenance training for partner	Fast growth, about 200 persons	Exports to Nordic countries, investing export activities, European market
Case F – wood product company	Four factories and component factories, production is streamlined	Entering the service business, installation services, developing new services together with partners	Material and partner networks Service networks and partners	Fast growth, more than doubling turnover in the 2000s, 350 persons	Organised selling and service organisation in two foreign countries
Case G – mechanical wood processing company	Optimisation of timber saw and wood processing activities	New products, product innovations, customer relations, services	Network partners, partners processing further timber products	Slow growth, 110 persons	Exports to the Nordic countries and to one European country
Case H – electronic component company	Processes, productivity, quality, work practice	New products, new markets, new businesses, services, organisational changes	Resale network, customer networks	Fast growth, seeks growth in the future, about 500 persons	Five factories, subsidiary firms in 13 countries
Case I – technical trading company	Development of present competences	Products, Life-cycle services, exploring new business opportunities	Partners, bilateral relationships, co-operative partners	Some growth, operations in Finland, about 185 persons	Subsidiary firm in the Baltic countries

Case J – planning office	Planning process, modern tools, training	Now: activity project and work-based pricing *New strategy*: customer partner, moving to service business	Partner network, offering special planning services Responsible for part of the *customer network* Need for international partners	Fast growth for over ten years, buying small offices, 300 persons	Strategic aim: internationalising activities, need for new competences and roles
Case K – software company	Software development tools	Software products and services, consulting services, exploring new business opportunities	Open-source communities, core partnership	Small firm	
Case L – marketing and media company	Exploitation of existing knowledge and competences	Service concept, large service packages	Partner network, multiplex relationships	Finnish base, about 450 persons	Group is an important actor in the Nordic countries

The cases are analysed in the table through the three dimensions presented in Figure 16, describing the analysis framework. The dimensions are: increasing efficiency (increasing the efficiency of action) and business renewal (renewal of businesses). The dimension of growth and internationalisation is subdivided into two: growth and internationalisation. In addition, the networks dimension is added to the table, because networks are essential part of the offering in all the cases.

Global companies continue to grow even larger and more global. Companies operating globally are seeking growth by carrying out acquisitions or by signing different types of co-operation agreements. The major challenges of these companies are the ability to centralise their core businesses and strengthen their international position. They have to be able to manage global businesses. They have to decide what role to take in value chains and which partners to choose (cf. Porter, 1980 and 1985). At the same time, learning and innovation as well as the creation of new businesses in distributed business networks are becoming important factors for global companies. The success of these companies depends on their technological competences and customer-oriented approaches (Dunning, 2000; Doz & Kosonen, 2008).

Global companies are in a position to influence economic and business practices in their own areas (Skurnik, 2005). They are important export actors. At the same time, they use networks and partners for supply, development and business purposes. Global companies and their objectives for network building and utilisation have a direct influence on the business potential of supply firms. The situation is not without ambiguity. At the strategic level there is an ongoing emphasis on networks and co-operation. In practice, the companies have divergent views on the network partners and different objectives concerning them (Hyötyläinen, 2000; Valkokari, 2009). The companies set new requirements for their network partners in order to be able to internationalise their operations together with their customer companies.

Companies A and B are global businesses, manufacturing products in many locations and doing business around the world. The companies are two of the world's leading companies in their fields. They have the same kind of profile with regard to network development. However, they have different approaches to doing business. Company A focuses on its core business area, while Company B has four major business areas (cf. Prahalad & Doz, 2003). The two companies have increased the efficiency of their operations by developing production control, material handling, logistics and supply procedures. They apply the principles of mass customisation in production to be able to produce customer applications in an effective way (cf. Pine, 1993).

Both of the companies engage in product development and create new products and their variants. They renew their businesses. Service business and service packages are a means of doing new business and renewing business models. The companies have developed their supplying system and partner networks.

The companies have classified their networks and partners according to the meaning of the partners and suppliers to the business. Systems suppliers are involved in the development of products and production concepts. The companies are making greater use of supplying activities, as they concentrate on their own core businesses. In some cases, the production of certain products is outsourced in full to a supplier (Hernesniemi, 2007).

Subcontracting firms live under great pressure. They act as suppliers for larger, often global firms (Hyötyläinen et al., 2005). Subcontractors are normally small and, possibly, medium-sized firms. They have three opportunities to evolve and survive in the changing business environment. First, they can specialise in a certain high technology and its applications. Second, firms can grow and in this way take more responsibilities from larger customers and their business-

es. Third, firms can grow and develop their operations by networking and partnering with other firms. In addition, these firms have pressures to internationalise some of their activities due to the demands of their global customers (Hernesniemi, 2007).

Cases C and D are subcontracting firms. Case C is clearly a systems supplier company. Case C has its own factory network, with ten units. Case C has made process and technology refinements. It has centralised some of the activities that were earlier handled by each unit itself. Furthermore, it has installed a new ERP system. The company has grown fast, driven by customer-based enlargement. Services play a key role.

Case C has grown in Finland. Its factories have been located close to major customers. The case company has many partners that produce parts and components for the systems supplier.

The problem of Case C was that it only had activities in Finland. The other problem was that it was too small to internationalise its operations (cf. Hernesniemi, 2007). Now, the firm has bought part of the operations of another firm. In the same way, it acquired a 100% holding in another firm that also has one factory in Europe. This firm exports products to 30 countries. By means of these acquisitions, Case C is able to internationalise its businesses, providing better service to its global customers. Case C can offer manufacturing network services in many locations.

Case D is closely co-operating with its network partners. It has developed its own resources, and has jointly developed the resources and competences of its partners. Through its network partners, the firm is able to enlarge its product offerings. Likewise, it has entered the service business, offering life-cycle services to its customers.

The firm has many partners with which it co-operates on a bilateral basis. Due to the importance of partners to the success of the firm, certain cross-ownership arrangements were made between the firms. Case D also co-operates with the new firm. Together with this firm, Case D can offer manufacturing services to its international customers.

Medium-sized firms that have their own products are of importance for both other types of firms and the whole economy. They have remarkable production potential and opportunities to engage in the development of production and products. They co-operate with other firms and use network partners. In this sense, they are network weavers (Simons & Hyötyläinen, 2009). Thus, medium-

sized firms form an important intermediate population in the whole business field.

Normally, these firms grow and increase their workforce in Finland. At the same time, they are exporting their products. These firms are relatively important from the perspective of exports, because many of them export about 10 to 50 per cent of their production. Some of the firms have gone international and founded activities abroad, and the ranks of such firms will grow in the future (cf. Boter & Holmquist, 1998; European Communities, 2004).

It can be stated that the firms that have their own products are exporting their products. *Cases E and F* are such firms. In the same way, Cases G and H can be seen to belong to the product-based group. They are basically component companies. However, they also offer larger components or even their own products. All these firms belong to the group of medium-sized firms. They have production and marketing competences. There are also differences between these firms. The firms are entering the service business. Case E relies on resale network partners, through which it sells and exports its products. Furthermore, the firm has built its European exports with a European partner company, which is responsible for sales and maintenance activities. Company F has handled these activities in another way. It has created its own sales and service organisation in Finland and in two foreign countries. In this way, the company has internationalised its activities by founding its own organisation abroad. Later, Firm E also created a service management organisation in Finland and in the Nordic countries.

Both of the companies have advanced high-quality products. They develop new products and services all the time, providing better service to their customers/clients in order to stand apart from their competitors. At the same time, Cases E and F have increased the efficiency of their production facilities.

Both of the companies have network relationships and partners that they harness to boost the efficiency of their production and pursue new business and service opportunities. At the same time, the firms have grown at a fast rate. That is necessary to enable the firms to export their products and to internationalise.

In principle, *companies G and H* have features similar to those of pure product companies. It is highly important for them to develop their production activities, such as processes, productivity, quality, work practices and present competences. They are developing products and exploring new businesses and markets. Services are becoming a new area for them. They have wide network relations. However, there are differences between the companies in this area. Partners are

of high importance for Case G. Its one partner network processes further wood material components for Case G and its customers. In this way, the company is able to customise its products for different customers and customer groups. Company H has a large resale network. At the same time, it has created customer network relationships.

In principle, *Cases I and J* represent one kind of alliance model. They have many network relationships. They are seeking new business opportunities. They have networks and partners that help them in their basic business.

The cases hone their production by planning their process, using modern tools, competence development and training.

The cases have co-operative partners. The cases are moving towards the service business. Case I needs partners for its life-cycle services and the creation of new businesses. Case J is moving toward the service business. Its aim is to take responsibility for the customer network on a large scale. In this case, the firm is involved in developing its customers' networks. At the same time, Case J has decided to internationalise some of its operations. In this effort, it needs international partners. Likewise, Case I has a subsidiary in the Baltic countries. It needs local partners for its business there.

Cases K and L represents a more open network model. Case K is a software company that develops software products and services as well as seeks new business opportunities. It participates in open-source communities. It forms partnerships with partners from open communities. Case L is a large group of marketing and media firms. The firms in the group co-operate with each other. However, it forms an open platform in which some firms can form tighter relations with their partners in order to pursue definite business targets.

Cases K and J have also developed their production processes by developing software tools and exploiting their existing knowledge and competences.

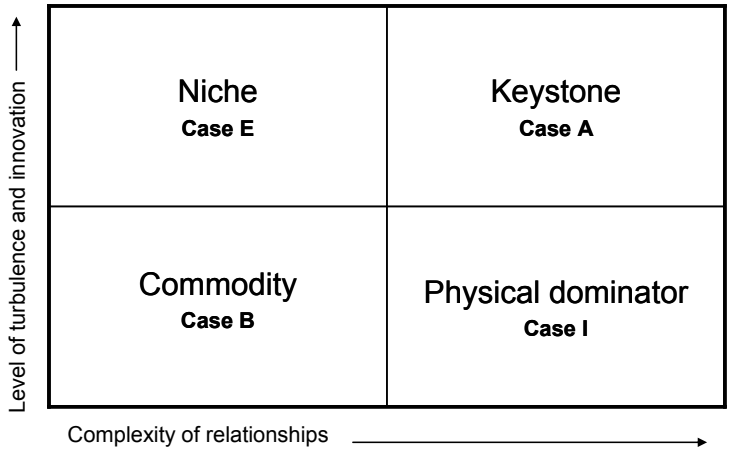
10.4 Conclusion of the cases

Iansiti and Levien (2004a) have defined four business strategies. In this case, the dimensions are the level of turbulence and innovation, and the complexity of network relationships. Four strategies concerning business systems are defined: niche, keystone, physical dominator and commodity. Firms act and adapt to changes in business systems according to these strategies. These firms have different relationships to networks in their action, growth and development. According to Iansiti and Levien (2004a), a keystone strategy is most efficient when

the firm acts in a turbulent business environment and when it acts in the core of networks.

Table 19 presents these four strategies for business systems. One typical case is shown to represent each strategy.

Table 19. Company strategies in business systems.



Companies A and B form, by their nature, their own group among the twelve cases handled. They are global companies with many factories and sales networks, but they have different business strategies. Case A has an almoust keystone strategy. Case A is the world's leading producer in its field. It develops its products continuously. It has continuously developed its production concepts. It has made great efforts to develop and structure its network and business partners. It has also involved its partners in product development and prototype productions.

Case B acts in a more stable environment than Case A. The company has large networks and many partners, but it does not act as the creator of networks, unlike Case A. (cf Iansiti & Levien, 2004a). Company B acts in four major business areas. Although it has developed its network systems, it mainly sets efficiency targets for its partners.

Case E is a niche firm. It is characteristic of these kinds of firms that they have a narrow market segment, international markets and high technological competence (Iansiti & Levien, 2004a).

The physical dominator strategy is based on the use of wide network relationships. These kinds of firms act in a relatively traditional business area. Business networks are utilised for business purposed (Iansiti & Levien, 2004a). Case I is a technical trading company that utilises its network relationships for two purposes. First, it is important for the company to have good and wide relationships with its customers, because it sells imported machines and materials to its customers. Second, it is important for the firm to have wide product and service packages to offer to its customers. For that, it needs its own partner network that enables it to further develop its offerings.

Another view of the cases is our approach to different network forms. They are: the core firm-driven model, strategic network model, strategic alliance model, and open innovation model. A total of ten cases are located within these dimensions. Table 20 shows the results.

Table 20. Renewal and co-creation models in case networks.

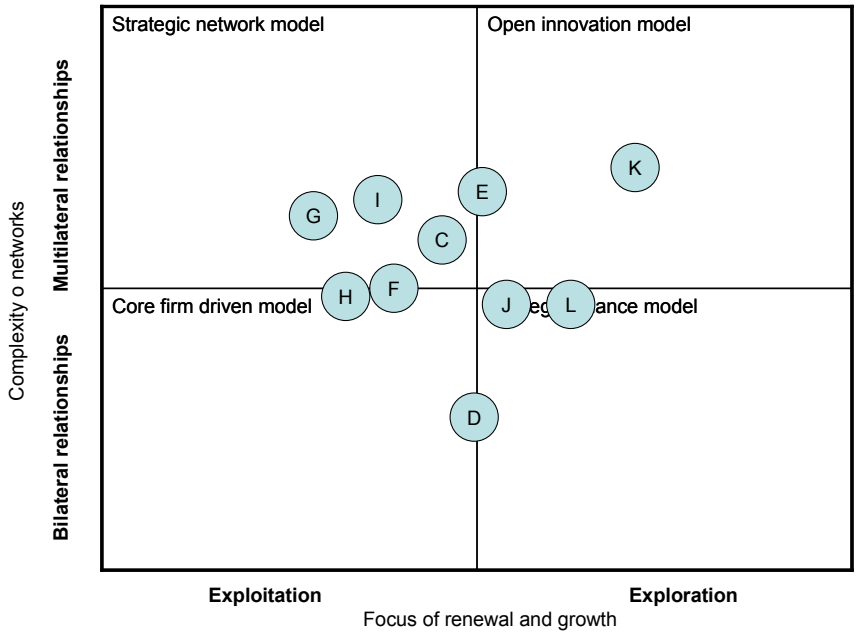


Table 20 includes several groups of firms. One group represents the *core firm-driven model*. These cases are D, F and H. Firm D is a subcontracting firm. It co-operates with its partners on a bilateral basis. To assure effective deliveries, the firm has made cross-ownership arrangements with some of its partners. In addi-

tion, together with one partner it is able to offer services to international customers. Case F is a wood product company. The company has network partners that serve production purposes. A new feature is that the company is co-operating with its service partners in the development of new services. Case H is an electronic component company. It has mainly developed its own processes and organisational practices. Now it is shifting into service activities by building its customer networks.

The other group represents the *strategic network model*. Firms C, I and G belong to this group. Case C is a systems supplier that has its own network of ten factories. It has a partner network to serve the firm's enlarged service functions. The firm has bought part of another firm's activities. In addition, it has bought another firm in its entirety, enabling it to export products and serve its global customers. Case I is a technical trading company that is renewing its products and moving into service activities. It has large partner relationships, but also acts on a co-operative basis with its partner network. Case G is a mechanical wood processing company. It has partners that serve it operations. It also has partner networks that further process the products and materials of the company.

The third group represents the *strategic alliance model*. Cases J and L more clearly belong to this group. Case J is a planning office that is renewing its action patterns and network relationships. It is creating new kinds of alliance systems. It is now exploring a new model in which it takes wider responsibility for its customer networks. At the same time, it is internationalising its operations. To this end, it needs international partners. Case L is a marketing and media company that consists of a group of firms. The firms co-operate with each other. The firm forms different coalitions for different purposes.

One firm belongs to the group of the *open innovation model*. Case K is a small software company. It operates in accordance with the principles of open-source communities. In practice, it forms development projects together with some partners in the communities. Case E also mainly has an open innovation model. Case E is a lifter firm that represents a niche firm. It has large networks. It belongs partly to the open network and partly to the strategic network model. It has a European partner and its network.

Some of the firms are currently repositioning their action models. In the future, they will locate themselves anew within the dimensions in Table 20. For example, Case J or the planning office can move towards more open innovation models. Also, Case E can reposition itself, adopting more clearly open innovation practices.

11. Research and development methods

11.1 Development approach

The construction of research and development methods is an essential part of the renewal processes of business systems in firms as well as the formulation process of a new research approach (Burnes, 2004; Caldwell, 2006; Apilo, 2010; Hyötyläinen, 2005). The three cornerstones of our research and development method are the development cycle, teamwork and modelling. In the business-focused development work of VTT Industrial Management, development has been primarily based on three central pillars with the aim of promoting the change of business systems as well as solving business and operation problems. The first part of our method is *cyclical development*, which is a tool for analysing development processes and keeping them in circulation (see Hyötyläinen, 1998 and 2000). The second part is *development teamwork* (see Simons & Hyötyläinen, 1998). Development teamwork is the most characteristic feature of our development work. In teamwork together with the researchers and the business personnel of the firm we can solve development problems, outline solutions and implement them in practice. In this work, researchers often play an important role. The third central feature is *the creation and use of models and methods* in development work. On the one hand, models and methods are used to analyse development targets, and on the other hand, they are used as tools in the development process, facilitating and identifying development tasks as well as measuring development results. However, these models and methods are always refined for the firm in question.

11.2 Cyclical development

When developing businesses and solving business problems, a cyclical development procedure can be applied. Figure 18 shows a typical development cycle applied in our business projects.

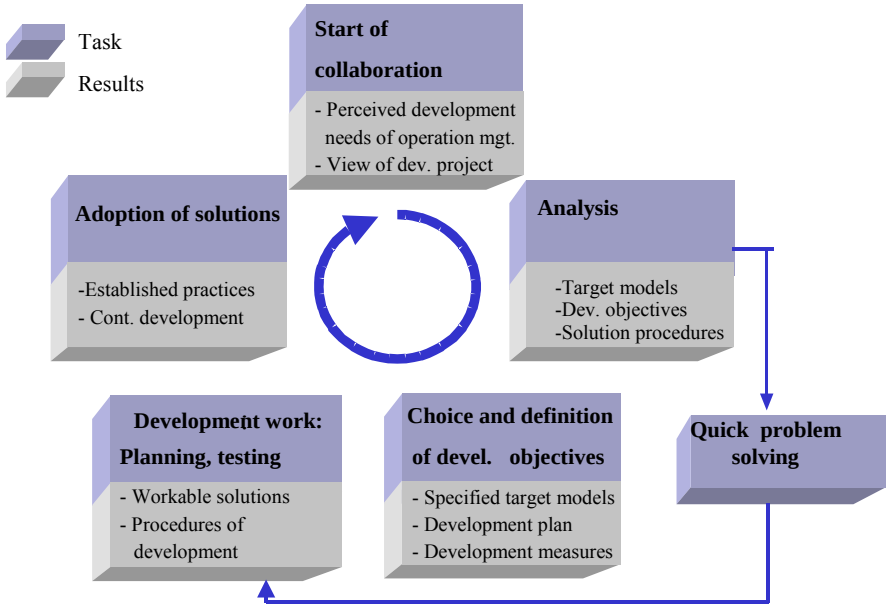


Figure 18. Example of a development cycle (Hyötyläinen & Simons, 2007).

The figure shows the five main stages of business-specific analysis and development: 1) start of collaboration, 2) analysis, 3) choice and definition of development targets, 4) planning and testing of development, i.e. of solutions and their implementation, and 5) adoption of solutions and practices that have been proven to be workable. Each stage of the development process has been assigned certain tasks, actors, i.e. an organisation, and development results. The development process also addresses the need for quick problem solving, which is specified in the discussion of the stages. Naturally, the progress of development is not linear from one stage to the next; instead, it is sometimes necessary to return to review the start position or to plan new solutions and methods when those already developed prove unworkable.

11.3 Development teamwork

Joint projects with customers will be based on network co-operation and teamworking. This means that the different functions and the personnel involved will participate jointly into the decision-making in the formation of change solutions (Hyötyläinen, 2005). Wide participation is the prerequisite for both sufficient expertice, as well as commitment. In discussion and co-operation among the various parties in a company is it possible to consider various aspects and activity dimensions. Network co-operation is the starting point and foundation of new innovative solutions (Nonaka, 1991).

11.4 Creation and use of models and methods

Successful development work in companies requires the use of systematic methods and tools (Alasoini, 1994; Hyötyläinen, 1998). By systematic methods we mean the organisation of the development work and co-operation forms through which we support the joint handling of even difficult development measures. By systematic tools, we mean models that can be used to describe complicated entities and planning of objectives together with the personnel. One can talk about "theory models", which are customised to correspond to the target organisation´s special characteristics and needs (Hyötyläinen, 2005). There are different activity and structure models, as well as process diagrams, tables and other tools.

12. Conclusions

In the conclusion chapter of this study, we will summarise the study and evaluate the study results. The basic problem addressed in this study is how to manage business systems as well as innovative enterprises and networks in a complex business environment. We discerned three research questions, all of which are theoretical. The second and third questions were also approached by case analysis. First, the summary of the study and its results will be presented. Second, the study results will be evaluated according to the background of the three research questions. In this connection, we will discuss the business, production and innovation concepts that were created during the study, as well as their extension to innovation and network models. Further, these different models are extended to practical frameworks and models. Here we also summarise the case analysis results. Third, we will evaluate the study results and their status in the research tradition in question. Finally, we discuss the need for further research and development steps.

12.1 Summary of the study

In this study, the focus is on business and innovation systems as well as innovative enterprises and networks in an increasingly complex environment, which demands an increase in theoretical knowledge and know-how. With regard to development issues, businesses are facing an extensive and complex environment. It was recognised that this environment requires deep knowledge and the creation of new solution alternatives.

In this study the main argument is that a paradigmatic change is ongoing in business and innovation systems (Roberts, 2004; Cohendet & Amin, 2006; Hommen & Edquist, 2008). One of the reasons behind this is that enterprises are increasingly acting in a complex and changing environment. The other reason is

that a new innovation paradigm is emerging – one which will question the early theoretical and practical premises of management and organisational concepts as well as the concepts of the enterprise and the network. In this study the new concept of cellular-networked enterprises was explicated based on an analysis of business systems and innovative networked approaches. In addition to the theoretical emphasis of this study, the practical aspects of the business and change models were reviewed and assessed.

This study covered the main areas of business and innovation systems in the enterprise and network context. The study developed new theoretical and practical approaches and openings for analysing innovative enterprises and networks in a complex business environment.

Business and production concepts were analysed and modelled. Four concepts were discerned and explicated: process rationalisation and streamlining, core competence development, mass customisation and co-configuration. These concepts were analysed through different dimensions. The dimensions are: driving force, action processes, control model, organisational form, customer model, development focus and potential growth model. The different concepts differed greatly from each other. It was concluded that the principles of mass customisation comprise a major form of organising businesses nowadays. The co-configuration concept is based on open innovation and knowledge principles and customer value processes. This is a new concept that is just forming.

The theoretical view on business and innovation systems and their paradigms was reviewed and analysed. In this study, the different theoretical approaches to the firm and network were reviewed and explicated. Four theoretical perspectives and models were analysed. The first three are: the mass production model, transaction cost approach and competence-based approach. The fourth, the hyper-innovation approach, is a new approach to firms and networks that is argued and supported based on the premises of complexity theories and new theories on strategising and organising.

Correspondingly, different strategic change models were analysed. Three change models were distinguished: the planned change model, evolutionary change model and transformative change model. The transformative change model is an interesting new model that aims at radical steps for renewing businesses.

Learning and innovation patterns were analysed and assessed. There are different means of creating and utilising knowledge in the organisation. Reflective action and the formulation of hypotheses advance the creation of new innovative

knowledge and innovation activity. Drafting a development agenda is the key to creating something new in the organisation. However, the actor role is of the greatest importance in the innovation activities and knowledge-creation processes of the organisation.

Innovative collaboration networks and their development were analysed and modelled. Four types of networks were explicated. The core firm model and strategic network model are mainly based on the exploitation of existing resources and competences, while the strategic alliance model and open innovation model are geared towards the exploration of new business opportunities. Collaborative networks cannot be thoroughly planned; there are always spontaneous elements in the formation of these networks. Furthermore, the planning and implementation issues of the competitive supply model, partner model, strategic network model and open innovation model were analysed and assessed.

The development and renewal models of business systems and industries were analysed and assessed. The business systems change model shows the business and industry change dynamics through different dimensions. The business development model shows the many dimensions of transforming business activities. The model of the change patterns of firms and industries shows the meaning of incremental change and radical change for industrial renewing processes.

The Finnish business system and its development were analysed and modelled (cf. Skurnik, 2005). The Finnish business system has shown its dynamism. The development of the Finnish business system was modelled through many dimensions, from the beginning of the 1980s to the present. However, the Finnish business system has a number of complicating features, both now and especially in the future. As part of the Finnish business system, the growth and business models of medium-sized firms were analysed and modelled. Four competitive and growth strategies were analysed and modelled: the systems supplier strategy, domestic-based strategy, niche strategy and systems integrator strategy.

Practical management models were reviewed and assessed. The central focus concerned the management issues of industrial services and business systems. Different aspects of firms' capabilities and management systems were reviewed. The change process and phases for service business as well as for business systems were analysed and modelled.

Twelve business cases were described and analysed. The analysis was based on a model with three dimensions: resource exploitation, business renewal, and growth and internationalisation. The networks dimension was added.

Research approaches and methods were analysed and modelled. The cyclical development model is a five-step model for developing and renewing business systems.

12.2 Research questions and results

In this study, the focus is on business and innovation systems, learning and innovation patterns, innovative enterprises and business networks. In this study, the basic question concerns the management issues of business systems as well as innovative enterprises and networks in a complex business environment. This basic question is divided into three research questions. In the following each question is considered through the study results.

However, the main research question has a further focus:

What kinds of theoretical and methodological knowledge are needed to create innovative new business solutions?

In this study, the background for the theoretical and methodological openings forms the analysis of industrial management and innovation challenges. The starting points of this study, the research approach and the development of research focuses in the Industrial Management group at VTT were considered and assessed.

The analysis of the development of business and production concepts reveals great differences between different business and production concepts. Many enterprises have applied process rationalisation and streamlining as well as core competence development (cf. Rummler & Brache, 1990; Prahalad & Hamel, 1990; Alasoini, 2004). Mass customisation is also applied widely in firms (Pine, 1993; Miles et al., 1999; Hyötyläinen, 2007b). By means of product modularisation firms are able to offer customer-specific solutions. As part of that, services are formed and offered to customers. At the same time, firms form and utilise several networks and partner relationships to serve production purposes, but these are also needed for new service innovations and service delivery. Especially, the co-configuration concept is a new business approach to production concepts. The driving forces behind this approach are innovation ability and open innovation (Chesbrough, 2003). The concept is directed to value-creation and customer processes. Customers are seen as co-partners in the creation of new services (Grönroos, 2005; Hyötyläinen, 2007b). In the same way, firms are deeply involved in network activities, through which new business and service con-

cepts are created. The organisational form of this approach resembles that of cellular-network enterprises, where the organisation is distributed into self-organising units that are networked to each other.

Business and innovation systems were reviewed through theoretical consideration and analysis. The focus was on production paradigms and their evolution. Four different paradigms were analysed. The first three were the mass production model, transaction cost-based approach and competence-based approach. The fourth was the hyper-innovative approach, which is a new approach.

The mass production model relies on standardisation and large scale production. It is based on Taylorism and industrial engineering. The transaction cost approach can be seen as an adaptation theory. The competence-based approach is built on a knowledge processor basis. It mainly represents evolution theory. The hyper-innovative approach looks at the firm as the processor of communication. It can be seen to represent metamorphosis theory. The hyper-innovative approach in particular was analysed more closely.

12.2.1 Factors and elements in creative business renewal

The first research question is answered through the theoretical analysis approaches and models developed and assessed in this study. The first research question in this study is:

What are the factors and elements promoting creative business renewal and what kinds of business and innovation concepts support business renewal processes?

Of the business and production concepts, the *co-configuration business approach* is one of the factors promoting creative business renewal. The main elements of the approach promoting business renewal are the driving force (innovation ability and open innovation), core activity (knowledge-creating and combination), customer model (customer as co-partner, interaction model) and organisational form (cellular and network organisations).

Of the theoretical business and innovation systems, the *hyper-innovative approach* in particular promotes creative business renewal. In a hyper-competitive environment, vision creation and discursive co-ordination can be seen as key elements in the transformation process of business renewal. Systemic discourse forms serve as a platform through which the different actors in the enterprise and

networks can create and exchange knowledge (Nonaka & Takeuchi, 1995, Isaacs, 1999).

Another important element for business renewal in the hyper-innovative approach is the creation of new business concepts and models. The strategy innovation pipeline depicts how the portfolio of ideas evolves further to the portfolio of experiments, then to the portfolio of ventures and lastly to the portfolio of businesses (Williamson, 2003). Moving forward in the pipeline, the costs and the amount invested increase.

Of the strategic change patterns, the *transformative change model* is particularly effective in advancing the renewal of businesses. The key elements in the model are the strategic starting points (visionary and innovative hold, systems theoretical consideration), planning method (manifold planning, experimenting and testing) and main actors (key organisational groups, management group). However, the transformative change model is risky because it changes the foundation of the strategic thinking patterns in the organisation (Hamel, 2002).

Of the learning and innovation patterns, *reflective action and the formulation of hypotheses* are the critical factors promoting the renewal of businesses. The main elements are innovation processes, the formation development agenda and actor models.

12.2.2 Innovative activities in business systems and industries

The second research question is more oriented towards frameworks and models, which are developed in this study. The second research question is:

What kinds of collaborative organisational and management models support innovative activities in business systems and industries? What strategies and forms support the development and growth of SMEs, in particular medium-sized product and production firms?

The forms of innovative collaboration networks support innovative activities. There are four models of networking. The core firm-driven model and strategic network model are more production-oriented networks, while the strategic alliance model and open innovation model are more innovative, customer-oriented networks. Especially, the *strategic alliance model and open innovation model* support innovative activities in business systems and industries.

Of the hybrid network models, the *value chain and partner relationships models* partly support new innovative business systems and industrial structures.

Especially, the innovation horizon yields new businesses. The value chain model influences firm changes and new business strategies. The partnership model yields creative firm changes and business innovations. The national environment and models support the formation of new industrial structures. The value chain model influences national structures and operating models. It can form clusters and innovation models. The partner relationships model can form functional strategic networks and new business concepts and operation models.

In particular, the *strategic networks and industrial business systems models* lead to new business systems and industrial changes. This is described by the innovation horizon dimension. The models mean creative radical changes as well as open innovation systems and structural changes. Correspondingly, the national environment and models support the emergence of new kinds of business concepts and operation structures as well as national business systems and industrial structures.

The development and renewal models of business systems and industries present how business systems and industries can be changed and renewed (Hamel, 2002; Iansiti & Levien, 2004a). The *business systems change model* shows that changes can reach from the product or process level to the business level and further to the industry, and lastly to the whole industrial ecosystem level. Three change patterns were discerned in these levels: incremental change, creative change and radical change. The creative and radical change models support largely innovative activities in business systems and at the industrial level. The *business development model* shows through four different levels and cycles how innovative activities vary in businesses and networks. The two outer levels and cycles imply profound innovative changes in business systems and networks. The *change patterns of firms and industries* show how changes happen. Incremental change means adaptation at firm level and evolution at industry level. Radical change in turn means an innovative approach. It describes metamorphosis change at firm level and revolution as well as the restructuring of industries.

The Finnish business system has changed since the early 1980s. However, the growth models of the Finnish business system have been successful for many decades. The primary growth engine of the economy has been export-based industry. However, medium-sized firms are playing a growing role in the economic scene, because large global companies are moving their sites and workforce abroad. However, the medium-sized firms face many development tensions on their growth path:

The great challenges of these firms are how they can create new business concepts and growth patterns, exploit their own and network competences, and increase exports and become internationalised.

In fact, the question is how exploitation and exploration occur simultaneously in the same organisation. This was answered by the third research question. The *strategic renewal of business* shows how firms can create new businesses by means of the life-cycle model. The *innovation path* of the medium-sized firm shows innovative jumps and their role in the growth of medium-sized firms. *The types of an industry model* describes four patterns. Value change, creative change and radical change in particular mean innovative change models. Four competitive strategies of medium-sized firms show how firms can innovatively grow: the system supplier strategy, domestic-based strategy, system integrator strategy and niche strategy.

12.2.3 Exploitation and exploration activities in business organisations

The third research question is based on the theoretical views developed and assessed in this study, and partly on the case analysis results. The third research question is:

How can the same organisation carry out business exploration and exploitation activities at the same time and how is this influenced by a network perspective?

The *framework of network models* showed how some network forms promote exploitation while others promote exploration. In particular, the strategic alliance model and open innovation model advance exploration. The strategic network model also advances renewal and co-configuration of solutions. Further, the *hybrid network models* showed how different model types can be directed to achieving efficiency while creating new businesses and industrial structures.

The business systems change model showed that incremental, creative and radical change models simultaneously refine businesses and renew businesses and industrial structures.

The *change patterns of firms and industries* also showed the difference between the incremental betterment of existing resources and competences and the radical change of business and industries. The *development trajectory of successful firms* shows how firms have to progress in the dimensions of management innovation and organisational innovation at the same time.

The treatment of the *growth and business strategies of medium-sized firms* also effectively showed the dichotomy between new business creation and exploitation resources and competences.

The *practical framework and models* concern the service business in particular. The service business has a dual nature. It can be solely a means to sell more products or it can be a means to engage in new businesses and renew business practices. For example, the *dimensions and structures of value networks* show that current value chain nets focus on exploitation, and business and value renewal nets likewise focus mainly on exploitation, while emerging business nets focus on exploration (Möller et al., 2004). The *dual nature of service business model* also shows the dual meaning of customer relationships for new business opportunities. Furthermore, the *service business phases and processes model* and the *strategic change model of business systems* show that it is a question of considering new business opportunities at the strategic level and refining operations at the operative level.

Twelve cases were described and analysed through the analysis of the *business development framework*, which has two dimensions: increasing the efficiency of action and renewal of businesses. The third dimension is growth and internationalisation. For the *comparison of the cases*, the following dimensions were chosen: Increasing efficiency, Business renewal, Networks, Growth, and Internationalisation.

The results show that all the cases engage in efforts to increase the *efficiency of existing resources and competences*. The typical efficiency efforts are flow production, production control, process and technology refinements, logistics and supply procedures, and exploitation of existing knowledge and quality practices. At the same time, they engage in many efforts to *renew businesses*. They are: service business, product offerings, new products, new technology solutions, organisational changes, new strategies, and exploring new business and market opportunities. The clear conclusion is that all the cases use *networks* and partners not only to intensify their production chains, but also to renew their businesses. In almost all the cases, networks and partners have an important role in the growth and internationalisation of firms.

12.3 Evaluation of the study results

Studies of the management of business and innovation systems, innovative enterprises and networks have been the subject of extensive interest (see, e.g.,

Burgelman & Sayles, 1986; Child & Faulkner, 1998; Blackler et al., 2003; Boyer, 2004; Birchall & Tovstiga, 2005; Chesbrough, 2010; Alasoini, 2004 and 2005a, b; Apilo, 2010). Strategic and organisational change approaches and methods have also been discussed (Mintzberg, 1994; Burke, 2002; Aken, 2004 and 2005; Caldwell; 2006; Durand, 2006).

However, few research efforts and studies have examined new business and innovation systems and their paradigms. This study constructed a new business and production paradigm called co-configuration and defined its dimensions (see, e.g., Miles et al., 1999; Chesbrough, 2006, Hamel, 2007; Hyötyläinen & Nuutinen, 2010). In the more theoretical analysis, the hyper-innovative approach was created and constructed in this study. It is a new concept, with its own determination dimensions.

Different aspects of innovations and innovative approaches have been under lively discussion (see, e.g., Nonaka, 1991; Chesbrough, 2003; Lester & Piore, 2004, von Hippel, 1998a and 2005). However, the innovation paradigm has not been defined. At the moment innovation issues consist of a collection of innovation and knowledge perspectives.

In this study, the hypothesis is that the innovation paradigm is just forming. The assumption is that there is an ongoing paradigmatic change in the economic scene (cf. Perez, 2002, Ekins, 1999; Hamel, 2007). It will have a profound effect on business and innovation systems as well as production concepts. The concept of firm and network is also changing. We addressed these problems in this study. These approaches and concepts were analysed and assessed. Furthermore, their meaning for the development and renewal of business systems, networks and industries was reviewed, modelled and assessed in this study.

Through the analysis and development of business and innovation systems, as well as modelling enterprise and network concepts, this study has enhanced further business and innovation research by formulating new frameworks and concepts. By means of the analysis of various research approaches on business and innovation systems, we show the possibilities of new approaches. We conceptualised the cellular-networked enterprise. We connected the hyper-innovative approach to communication patterns as well as the interaction patterns between the local dimension and the global dimension.

Finally, there is a reason to note that, in this study, the three aspects and factors could be connected to each other. **The first** is the creation and development of paradigmatic concepts. These comprise the co-configuration, cellular-networked enterprise, hyper-innovative approach, transformative change model,

reflective action and the hypotheses formulation, the forms of collaborative networks, and the planning and implementation models of collaborative networks. **Another part** is the conceptualisation of the development and renewal models of business systems and industries. The objective was to examine the business systems changes and their dimensions. The Finnish business system and its development were analysed and evaluated. As part of that, the growth and strategy models of medium-sized firms were analysed and assessed. **The third** consists of the practical business and change models. Service business and business systems were analysed and assessed, and change phases and processes were modelled and assessed. Twelve cases were described and analysed, and conclusions were drawn from the results. The analysis of the cases was based on an analysis framework in which the main dimensions increase the efficiency of action and renewal of businesses. The third dimension is growth and internationalisation. A more extensive framework was applied to the analysis of the cases. Based on these three points, this study lays the groundwork for further research efforts, as well as for practical studies based on the analysis model of the cases.

12.4 Further research and future innovative development steps

The study delineates the need for further research and presents future innovative development steps for practice-oriented operations. The first issue is the need for deeper and more extensive theoretical analysis of business and innovation systems. In particular, there is a need for thorough analysis of the hyper-innovative approach and the evaluation of its significance in the change of innovation paradigm. The second need is the deeper study of strategic change models (Mintzberg, 1994; Ericson et al., 2001). The further analysis of the evolutionary change model and the transformative change model as well as the comparison and evaluation of both the models are particularly interesting issues. Practical cases will bring new points for evaluation. The third issue is the model of the cellular-networked enterprise. There is a need for the deeper analysis of the model and for the evaluation of the concept in the different environments of business and innovation systems. The fourth issue is the further analysis of business systems and industries, because the renewal of industrial structures and practices is of high importance for the growth models and strategies of internationalised firms. Finally, further research on and development of the practical

management models are needed. By means of the models, one can direct the practical development activity of enterprises and networks.

The major innovative development steps refer to four points. First, the patterns of different kinds of learning and innovation forums have to be developed and tested. The developed forums offer new platforms that enable enterprises and networks to create and develop new businesses and innovative practices (cf. Alasoini, 1999 and 2005a,b; Hyötyläinen, 2006). Second, the co-configuration model has to be developed further, and the firms participating in enterprise forums can apply it as an innovative model. Third, innovative network models offer reference points for enterprises and networks. In the same way, the development and renewal models of business systems and industries can serve enterprises and networks when they evaluate their own development and renewal measures. Finally, the case analysis and the summary framework developed in this study can be extended to the analysis of other cases as well.

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Series title, number and report code of publication

VTT Publications 762
VTT-PUBS-762

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Title

Cellular-networked industrial enterprises in innovation paradigm

Abstract

The main argument of this study is that a paradigmatic change is ongoing in business and innovation systems. One of the reasons for this change is that companies are increasingly operating in a complex and changing environment. Another reason is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of management and organisational concepts as well as the concepts of the enterprise and the network. This study explicates a new concept of cellular-networked enterprises on the basis of an analysis of business systems and innovative networked approaches. In addition to the theoretical emphasis of this study, the practical aspects of the business and change models are reviewed and assessed.

In this study, the different theoretical approaches to business and innovation systems as well as to the enterprise and network will be reviewed and new approaches and models will be explicated. A new approach to business and innovation systems – called the hyper-innovation approach – will also be argued and supported, based on the premises of complexity theories and the new theories on strategising and organising. Strategic change patterns will also be considered and modelled. Three strategic change models are distinguished: the planned change model, evolutionary change model and transformative change model.

The Finnish business system and twelve business cases are described, analysed and modelled. This study focuses on the development of medium-sized firms and their role and activities as part of the Finnish industrial business system. Practical topic of this study is the management of service business and its business systems. Change processes and their models are also under consideration. Case descriptions are presented and analyses made. Finally, research and development methods are explicated and modelled.

ISBN
978-951-38-7734-7 (soft back ed.)
978-951-38-7735-4 (URL: http://www.vtt.fi/publications/index.jsp)

Series title and ISSN	Project number
VTT Publications 1235-0621 (soft back ed.) 1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)	125087

Date	Language	Pages
May 2011	English	216 p.

Name of project	Commissioned by
Fine	VTT

Keywords	Publisher
Business and innovation systems, firms, networks, industrial systems, Finnish business systems, medium-sized firms, theoretical and practical frameworks and models, research and development methods	VTT Technical Research Centre of Finland P.O. Box 1000, FI-02044 VTT, Finland Phone internat. +358 20 722 4520 Fax +358 20 722 4374

This study covers the main areas of business and innovation systems in the enterprise and network context. The objective is to develop new theoretical and practical approaches and openings for analysing innovative enterprises and networks in a complex business environment. The premise of this study is that enterprises that have a fuller understanding of future innovative enterprises and networks as well as their strategic change patterns will be better able to renew their businesses and networks.

The main finding of the study is that a paradigmatic change is ongoing in business and innovation systems as well as in production concepts. One of the reasons for this change is that enterprises are increasingly operating in a complex and changing environment. Another reason is that a new innovation paradigm is emerging that will question the early theoretical and practical premises of business and innovation concepts as well as the concepts of the firm and the network. This study explicates a new concept of cellular-networked enterprises based on the analysis of business systems and production concepts as well as on innovation and networked approaches.

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