

Enhancing Competitiveness through Supply Chain Management Capabilities

- A Structured Framework of how to build Supply Chain Management Capabilities

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It is with the greatest pleasure we submit this thesis that constitutes the concluding element of our years as students in Lund. The thesis represents our achievement during the last semester, which indeed has been intense and challenging. The process of conducting this thesis has been characterized by much frustration and differences in opinion within the group, but it has most importantly been an amusing experience for all of us.

The thesis has been performed within the Paper and Packaging Research Program, which is a result of the cooperation between SCA Packaging and the Institute of Economic Research at Lund University. Even though we have put a lot of effort in this work, it wouldn't have been possible without the assistance of others. Hence, we would like to express our gratitude to all the people who has made this thesis possible. Foremost, we would like to show appreciation to our tutors from Lund University; Thomas Kalling from the Institute of Economic Research and Mats Johnsson from the Department of Packaging Logistics.

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Lund, June 2002

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Abstract

- Title:** Enhancing Competitiveness through Supply Chain Management Capabilities – A structured Framework of how to build Supply Chain Management Capabilities
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- Authors:** Magnus Berndtsson, Jesper Lundén and Thomas Nilsson
- Tutors:** Mats Johnsson, Division of Packaging Logistics
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Peter Schmutzler, SCA Packaging Brussels
- Purpose:** The purpose is to provide a framework of how to build SCM capabilities.
- Method:** In this thesis, a case study has been conducted. The first phase concerns the building of a preliminary theoretical framework. This is done through integration of existing theories, which is a highly deductive process. Theories concerning SCM and capabilities provide the basis for this framework and theory from the fields of Knowledge Management and Industrial Organization are integrated to support the other areas. The framework has been applied to a SCM implementation project at SCA Packaging, with the intention to test the preliminary framework. In the case study, the authors have focused on longitudinal issues, thus recognized the path- and time dependencies of the studied case. The outcome of this inductive phase has been an enhanced framework with explicit advices answering the thesis objective.
- Conclusions:** The main conclusion is that the framework enhances the understanding of building SCM capabilities. Through the application of the framework, the authors have found significant matches between theory and practice. The

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provided model highlights the components that the building of successful SCM depends upon.

Key words:

Supply Chain Management, Capabilities, Resource Based View, Knowledge Management, SCA, SCA Packaging

Abbreviations

I/O	Industrial Organization
KM	Knowledge Management
SC	Supply Chain
SCA	Svenska Cellulosa Aktiebolaget
SCAP	SCA Packaging
SCAP Cn	SCA Packaging Containerboard
SCAP Cr	SCA Packaging Corrugated Board
SCAPD	SCA Packaging Denmark
SCM	Supply Chain Management
SCMC	Supply Chain Management Capabilities
RBV	Resource Based View

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PART I – ABOUT THE THESIS

The first part of this study contains two chapters, Introduction to the Thesis and Methodology. The opening chapter aims to provide the reader with the background, the areas of inquiry and the purpose of the thesis. Also, the delimitations and the disposition are presented in the first chapter. Chapter two discusses the research strategy and the methodological approach of the thesis as well as the consequences of these choices. The concluding part of the chapter addresses the questions of validity and reliability.

1 Introduction to the Thesis

The objective of this opening chapter is to provide the reader with a basic comprehension of the study. The chapter begins with a presentation of the background of this thesis. Thereafter, a brief description of the areas of inquiry will be given, which ends in a specified purpose of the thesis. Further, the delimitation's of the study and a disposition, which outlines the structure of the thesis, is presented.

1.1 Background of the Study

This study is concerned with the question of how to build competitive Supply Chain Management (SCM) capabilities. The study is conducted within the Paper and Packaging research program, a cooperation between SCA Packaging (SCAP) and Lund University. Since SCAP currently has a great focus on SCM, we got assigned with a question of how to build successful SCM. A project that develops a supply chain management organization within the Industry Division of SCA Packaging in Denmark will serve as study object in the thesis.

SCA (Svenska Cellulosa Aktiebolaget) has its origin in a number of Swedish 17th century companies. Since the beginning, SCA has expanded rapidly from a group of sawmills to a multinational corporation. Today, SCA is divided into three business areas, Hygiene Products, Packaging and Forest Products, and the group is represented in more than 40 countries in all the continents.

SCA Packaging, with its head office in Brussels, is one of Europe's leading corrugated board manufacturers. SCAP has a strategic focus on providing the customer with complete solutions and services. The division has adopted the aggressive expansion plan of the SCA group, which has led to a series of acquisitions recent years in various markets. The current Industry Division within SCAP Denmark (SCAPD) is the result of one of these acquisitions, Danisco Pak A/S, in 1999. SCAPD has due to acquisitions a market share of 44%, which is SCAP's largest national market share in Europe.

In the corrugated board market, logistics is important since it raises a significant part of the total cost. This cost is due to the fact that a large part of volumes being transported consists of air. Since this decreases the density of the goods, the logistics cost per unit is high.¹ This characteristic contributes to a fragmented market, where production plants deliver and compete within a limited geographical area. The size of this area is dependent on the revenues and costs of the products. This means, cost

¹ Coyle, Bardi & Langley (1996), p. 62

efficiency and / or high market prices enable a longer transportation of goods before it gets non-profitable.

The structure of the Danish corrugated market has been stable for several decades due to stable customer requirements and insignificant international and domestic competition. There has been a traditional view on strategy, with large-scale production to keep the production cost per unit down. Also, there has been little or no focus on building logistic capabilities.

The European Union and the globalization of markets has lessened the meaning of national borders and increased the international competition amongst firms. German competitors have been exposed to fierce national competition in recent years which has resulted in a “low cost” structure. This has enabled a larger geographical reach, and they have therefore been able to enter the Danish market. This of course constitutes a great threat to the Danish corrugated industry and proposes the question of how the Industry Division of SCAPD should approach the entry of German competition. The German competition implies that the Industry Division within SCAPD must increase their competitiveness. In other words: SCAPD must compete in a new way.

In order to meet the increasing competition and the shift in customer demand, the management in the Industry Division of SCAPD has been forced to look into SCM issues. An internal task force has been engaged in implementing a new organizational structure, with increased emphasis on SCM. The aim is to introduce a SCM department in which a single manager will be given the responsibility for the entire production and logistics process within the Industry Division, from raw materials to delivery of finished goods to customers. The new organization structure should enhance the customer awareness throughout the firm and simultaneously lower total costs due to less sub-optimization within the separate functions. This has not been an over night transformation and it is especially difficult with the ongoing post-acquisition integration.

1.2 SCM and Competitiveness – the Areas of Inquiry

Accordingly, this thesis deals primary with two areas. The first one is SCM and the other is how to enhance the competitiveness of the firm through building capabilities, in this case SCM capabilities. These two areas are described in brief below and more thoroughly in chapters 3 and 4.

1.2.1 Supply Chain Management

SCM is a strategic management tool² that ranges from initial point of supply to ultimate point of consumption. Intra- and inter-organizational relationships are a major part of SCM,³ as are the management of the three bi-directional flows: physical-, information- and financial flow.⁴ The physical flow consists of products and various means of transportation. The main task of the information flow is to administrate the physical flow and it is crucial that the information goes in both directions of the chain. By way of a complete, frequent and up to date information flow, it is possible to maintain a low inventory level throughout the chain.⁵ The third flow, financial flow, consists of credits, invoices, claims and cash. This flow must run smoothly and enable quick, safe and cost efficient financial transactions throughout the chain, otherwise the physical flow will get slowed down.⁶

In 1997 Cooper et al. introduced a conceptual framework for managing the supply chain, which is supposed to embrace all business processes in the organizations across the supply chain.⁷ This conceptual SCM framework is built upon three elements, which are connected to each other: the business processes, the management components and the structure of the supply chain. Behind this conceptual model lie identifiable parts of a value chain. Business processes at an operational level are series of tasks within and between firms that include e.g. lead times, stock levels and other cost drivers. The supply chain structure can be seen as a firm's relations with suppliers, customers and other organizations that affect the company in any way. The management components are the means by which management controls and coordinates the supply chain. This conceptual framework is abstract and hard to put into practise.

1.2.2 Competitiveness

There are many ways to approach the question of how to enhance the competitiveness of the firm. For many years the strategic theories have been developed by analysis of factors external to the firm, and research has been focused on competitive positioning against external actors. This work, called Industrial Organization (I/O)⁸ attempts to explain strategy from an external point of view, it emphasizes the importance of the external industrial forces when deciding on which strategy to use.

² Giunipero & Brand (1996), p. 18

³ Cooper, Lambert & Pagh, (1997), p. 4

⁴ Paulsson, Nilsson & Tryggestad (2000), p. 24

⁵ Lee & Whang (1998), p. 2

⁶ Paulsson, Nilsson & Tryggestad (2000), p. 25

⁷ Cooper, Lambert & Pagh (1997), p. 5

⁸ Porter (1980) & (1985)

As I/O sees the external factors of the industry as their main arena, others try to view strategy from an internal point of view⁹, i.e. how strategy depends on the specific resources within a firm. This Resources Based View (RBV) is based on the work of Barney¹⁰ where he tries to explain competitive advantage from resources and capabilities. The RBV approach is focused on the rents arising from firm-specific resources rather than economic profits from product market positioning. An analysis of a firm's resources can take place at two levels of aggregation, the individual resources and the capabilities, which are the drivers behind the creation, evolution and recombination of resources into new sources of competitive advantage. Capabilities can be seen as the management of resources and is often described as the organizational and strategic routines by which managers alter their resource base.¹¹

1.2.3 Combining the Theoretical Areas

The aim of this thesis is to provide a framework of how to build effective and efficient SCM capabilities, through combining the two starting points, SCM theory and business strategy theory, with emphasis on capabilities. The theoretical fields of SCM and capabilities are both in a state of development. Due to this fact, there exists no consensus regarding definitions among researchers. Hence, there was a need for us to take a stand between the different definitions in order to investigate the cross-section between the theoretical areas. Since capabilities, as defined in this study, are routines by which firms build, integrate and alter resources, and since SCM relies on an effective and efficient usage of resources, it is interesting to investigate how the theory of capabilities can enhance the theory of SCM.

As the cross-section between the theories of capabilities and SCM has not been investigated to full extent, the theoretical and practical discussion above raises many questions: What capabilities do a firm need in order to gain an effective and efficient SCM and how does one build and manage these capabilities? More explicitly, how can a SCM approach contribute to the overall competitiveness of the Industry Division of SCAPD? Also, which SCM capabilities should the firm build in order to develop an efficient SCM organization? And finally, how does the Industry Division build these capabilities in an effective way?

It seems that the theory of capabilities, as defined in RBV, could be an effective means for the Industry Division to improve their supply chain skills and routines. Since capabilities often consist of tacit knowledge they are hard to acquire.¹² As a

⁹ Grant (1998), p. 107

¹⁰ Barney (1991)

¹¹ Eisenhardt & Martin (2000), p. 1107

¹² Eisenhardt & Martin (2000), p. 1111

consequence capabilities must be built in some way. This reasoning raises the main question of this thesis: “How can SCM capabilities be built?”

1.3 Purpose of the Thesis

The purpose is to provide a framework of how to build SCM capabilities.

1.4 Delimitations

A limitation within the theoretical field concerns the term capabilities. When trying to outline how to build capabilities, one often comes across terms like knowledge and competencies. Since a deep understanding of these terms doesn't necessarily help to fulfil the purpose of the thesis they will just be discussed in brief. How to define knowledge and competence is a philosophic question, which so many before us have tried to answer.

1.5 Disposition

The thesis is divided into four parts: I - About the thesis, II - Theory, III - The empirical case and IV - Analysis.

Part I – About the Thesis

The first part consists of the opening chapter Introduction to the thesis and the second chapter Methodology. The methodology chapter provides a discussion concerning the research strategy and methodological approach of the thesis and the consequences of these choices. This chapter further explains the theoretical as well as the empirical sequence of work. Finally, the questions of validity and reliability are discussed.

Part II - Theory

The second part of the thesis includes three chapters of which the first two present the different theoretical foundations. In these chapters, SCM, I/O and RBV, which provide the basis for the theoretical framework, are presented separately. The third and last chapter in this second part presents the authors criticism against the theories and above all the integrated theoretical framework. The framework is the authors' synthesized view of how the theoretical foundations fit together and complement each other when building effective and efficient SCM organizations.

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Part III – Empirics and Analysis

Chapter 6 presents the empirical case from the Industry Division of SCAPD. In subsequent chapter the developed theoretical framework will be applied to the empiric material in order to verify the framework. In this chapter the theoretical framework is also modified according to the findings in the empirical study. This is the chapter that provides the final contribution to the development of theory.

In the final chapter conclusions from this thesis and their validity will be presented. Furthermore, suggestions for future research are presented.

2 Methodology

This chapter provides a discussion concerning the research strategy and methodological approach of the thesis and the consequences of these choices. The chapter further explains the theoretical as well as the empirical sequence of work. Finally, the question of validity is discussed.

2.1 The Authors Basic Assumptions

Even though the authors come from different backgrounds, chemical engineering and business administration, there exists a consensus concerning how to approach a problem. That is the holistic and multidisciplinary approach, applying multiple lenses to the same phenomenon. Thereby we focus not only on the parts of a problem or a system, but also on the connections and relations that may exist between these different parts. Further, through the eyes of the author's, strategy process research is seen as a preferred way to describe and analyze strategies compared to strategy content research.¹³ This means that it is not sufficient to merely identify and suggest desired resources and competitive positions. One must also describe in what way companies obtain and maintain such resources and positions.

According to Bjerke¹⁴, a trinity of paradigms exists within the field of social science. First, the analytical paradigm claims that reality is unaffected by the individual researcher's subjective interpretations. That the sum of the parts explains the entire phenomenon is another belief in the analytic paradigm. The opposite is proposed by the systems theoretical paradigm, i.e. the synergistic effects due to relations among parts are an important factor to consider in research. Finally, the interpretative paradigm assumes the reality to be a social construction not existing in an objective sense.¹⁵

As opposed to the analytical paradigm, the interdisciplinary approach of this thesis acknowledges the effects of relations in a system. Furthermore, the part of building a theoretical framework is certainly not objective but a social construction. This implies that the authors are somewhere between the systems theoretical paradigm and the interpretative paradigm.

¹³ Chakravarthy & Doz (1992), p. 6

¹⁴ Bjerke (1981)

¹⁵ Nilsson (1994), p. 8

2.2 Research Strategies

As stated by Yin¹⁶, the case study is one of several ways of doing social science research. The other ways include experiments as well as surveys, histories and the analysis of archival information. The methods differ in many ways, and offer unique advantages depending on the specific conditions of the study. There are mainly three prerequisites that the type of method chosen depends upon; the type of research question, the control an investigator has over actual behavioural events and the focus on contemporary as opposed to historical phenomena. When choosing method for a study, one is making a choice that has a big impact on the way of collecting and analyzing empirical information.

A study can have different purposes, for instance an exploratory or an explanatory approach, where causal inquiries are answered, as well as a descriptive approach. Yin stresses that each research strategy can be used for all three purposes. What distinguish the strategies are not these purposes but the three conditions that set the agenda of the study.

The first and most important condition for differentiating among the posed research strategies is to identify the type of question. In general, “what” questions may either be exploratory, where any of the proposed strategies can be used, or about prevalence in which surveys or archival analysis would be favoured. “Who” and “where” questions are likely to favour surveys or archival analysis since these strategies are advantageous when the research goal is to describe the incidence of a phenomenon. On the contrary, the “how” and “why” questions have an explanatory character and are likely to favour case studies, experiments or histories.¹⁷ Thus, there is a need for a further distinction among these strategies.

The extent of control over behavioural events as well as the degree of focus on contemporary events affects the choice of research strategy¹⁸. Histories are preferred when there is no control and the study is focused on historical events. The investigator must then rely on documents as the main source of evidence. Experiments are done when the investigator can manipulate behaviour in a direct and systematic manner. This can occur in a laboratory setting, in which variables can be isolated and studied separately. It can also be done in a field setting, where social studies can be made.

The case study is preferred in examining contemporary events, when the possibility to control the behaviour is minor. The difference between the case study and the history is the possibility to make direct observations and systematic interviews, two sources

¹⁶ Yin (1994), p. 6

¹⁷ Ibid

¹⁸ Yin (1994), p. 8

of evidence that, according to obvious reasons, are impossible to exploit in the historian research strategy.

2.3 Methodological Considerations of Theory Development

In every scientific project, there is a wish to enhance the apprehension of various phenomena that cross the road of the investigator. To understand these, one must depend on existing theories and develop new theories that abstract concrete facts. Even though there are difficulties catching the social situation by abstract theories, there is a need to approach the conditions in a systematic and theoretic manner. Two possible approaches to the generation of theories exist – through empirical studies or through integration and development of existing theories. By relating to empirical information, theories can also be verified.¹⁹

Generating theory through empirical observations, called the inductive method, has an exploratory character. When applying an inductive method, one starts with observations and draw conclusion from these. The deductive method, improvement of existing theories, does not rely on any empirical studies but are purely theoretical. Verification is the same as testing the relevance of the theory. The different approaches to theory development are visualized in figure 2.1 below.

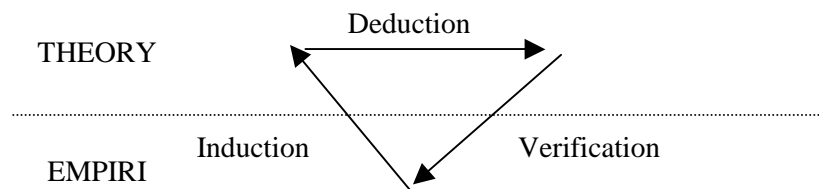


Figure 2.1. A model of theory development by generation and verification (Nilsson, 1994)

The vast majority of the social science studies are composed of both approaches mentioned above and many researchers pose that the most exciting knowledge arises from the friction area between inductive and deductive methods²⁰. Alvesson & Sköldb²¹ claims abduction to be the most adequate description of this iteration between deduction and induction. As abduction requires a thorough understanding of existing theory²², when developing an initial theoretical framework, it helps

¹⁹ Nilsson (1994), p. 3

²⁰ Holme & Solvang (1997), p. 51

²¹ Alvesson & Sköldb²¹ (1994)

²² Yin (1994)

researchers to understand empirical phenomena in the analytical phase. The theory development conducted in this thesis is done through abduction and can be divided into three separate phases, using all of the three approaches stated in figure 2.1 above.

2.3.1 Building the Preliminary Theoretical Framework

Since the purpose of the study is to provide a framework of how to build SCM capabilities, the first phase in the theory development is concerned with building a preliminary theoretical framework. This is done through integration of existing theories, which is a highly deductive process. Mainly, theory of SCM and capabilities provide the basis in this framework. Further, theory from the fields of Knowledge Management and Industrial Organization are integrated to support the other areas. The aim is not to provide a complete overview of these supporting theories, but to strengthen the preliminary theoretical framework. A thorough literature review of the theory fields enables the selection of theories relevant to the study. Synthesizing the theories identified as relevant to the specific area into one framework is our first step in the development of new theory.

2.3.2 Empirical Case Study

The empirical events of this study are of contemporary character and it will not be possible for us as investigators to neither influence nor control the events. Thus, a case study approach is appropriate when studying this particular problem. Furthermore, a case study approach has a relative advantage considering that “how” and “why” questions are the profound base in the process of conducting this study.²³ Clearly, other questions must be addressed and properly answered to obtain a holistic understanding of the complexity of the problem. These questions include e.g. quantitative measures when identifying the physical flow.

The empirical case study generally aims at generating data in relation to the preliminary theoretical framework. The collected data is presented as a narrative (see chapter 6) since it provides a good picture of the problems managers face when developing the SCM organization within the Industry Division of SCAP Denmark. The decision to conduct a single case study was made since the case company, SCAP, provided us with rich empirical data of the project. Furthermore, the single case study can be vindicated since the preliminary theoretical framework is extensive and enables us to view the problem from several angles. The aim of the study is to secure analytic generalization towards existing theory, not statistic generalization.²⁴ Thus, a

²³ Yin (1994), p. 6

²⁴ Yin (1994), p. 31-32

deep understanding of one case provides a better foundation than a number of less investigated cases.

The development of a SCM organization within the Industry Division of SCAP Denmark is an interesting case due to several facts. The project began in prior to our involvement and has recently been completed. This enabled us to conduct longitudinal research²⁵ and thus describe the case as a process not just as a static view (which has been common in articles within the fields of SCM and capabilities). Furthermore, SCAP acts in a mature and homogeneous industry that makes it difficult to obtain (and sustain) a competitive advantage. Thus, the actors within the industry are constantly concerned with reducing costs. Due to fact that logistics raises a significant part of the total cost, SCM can have a great impact on the overall performance of the SCAP. Furthermore, the case includes a classic strategic threat from abroad, that has revealed weaknesses but also a potential for a radical improvement.

2.3.3 Analysis – Refining the Theoretical Framework

The analytical approach of this study is best described as “pattern-matching”.²⁶ That is, the aim of the analysis in this study is to compare an empirically based pattern (see chapter 6) to the preliminary theoretical framework (see chapter 5). The analysis is accordingly done through matching theory with empirical events in order to see where there is a match, where theory can be developed and where theory can not be used. Thus, the refined theoretical framework (see chapter 8) is based on theory as well as on empirical data from the case study.

This course of action implies that the empirical material is approached from the angles specified in the preliminary framework. The study is hence biased of the framework since the aim of the empirical part is to raise data that is relevant to the purpose of the study, i.e. the theoretical framework. The choice to take this course of action was made as the opposite, not using theory in the analysis, would make it difficult to understand empirical patterns.

²⁵ Chakravarthy & Doz (1992), p. 6

²⁶ Yin (1994), p. 106-110

2.3.4 The Process of Developing Theory

The three parts discussed above are all concerned with developing theory. The entire theory development process of this thesis is visualized in figure 2.2 below.

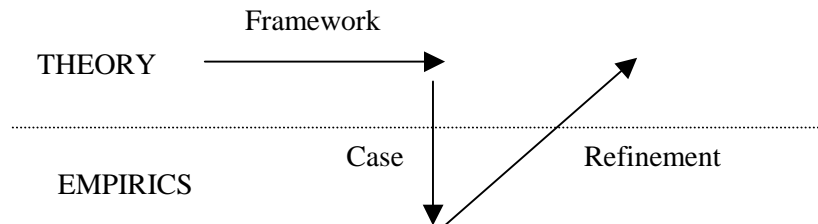


Figure 2.2. The theory development process in this thesis
(Developed by the authors)

2.4 Methodological Approach

This section describes the methodological approach of the study, i.e. the methods and the sources of data that have been used.

2.4.1 Questions

Much of the data for this study has been collected through interviews with SCAP employees and the objective has been to understand and describe the process of developing a SCM organization within the Industry Division of SCAP Denmark. The questions were initially relatively broad and open. The aim of these questions was to get an understanding of the project in a holistic way. Subsequent to these open questions, the interview got more focused on specific parts of the project and issues suggested by the preliminary theoretical framework. The purpose of the latter form of questions has been to put the empirical data in relation to the theoretical framework. Focused questions are included not only to increase our understanding but also to increase reliability since all aspects of the preliminary framework are dealt with. The focused questions have also been used to “double-check” our interpretations of the initially more open questions. The aim of these questions has been to gather empirical data relevant to the preliminary framework. The data should contradict theory, verify theory or extend theory, in order to enhance the validity in the enhanced theoretical framework.

2.4.2 Sources of Information

In this study two methods of data gathering has been used; interviews and archival data. The interview respondents include representatives from a variety of departments within the Industry Division of SCAP Denmark. Also, the head of the SCM project from SCAP headquarters in Brussels has been interviewed. Furthermore, both management and, to some extent, employees has been interviewed. The archival data consist of figures from SCAP databases and documents produced by Lund University and SCAP in Denmark as well as in Brussels, Belgium. The documentation includes slide presentations and reports regarding SCAP in general and more specifically, the Industry Division of SCAP Denmark. In total, more than a hundred pages of archival data have been examined. When possible, two sources of data have been cross-examined.

2.4.3 Analysis and Validity

The proposed framework is the result of abduction, including the development of preliminary theoretical framework, analysis of empirical findings and proposal of theoretical framework based on both theory and empirical data. As mentioned in section 2.3.3, this method is best described as “pattern-matching”.²⁷

Three aspects of validity have been focused on when conducting this study; i.e. integration, relevance and explanatory power.²⁸ According to Bengtsson²⁹ the three terms can be seen as follows: Integration is the extent to which constructs and theory components are inter-related. Relevance is the extent to which the study is practically useful. Explanatory power should be determined in comparison with existing related theories.

The general approach of this study, the abductive approach, needs to be highlighted when discussing how the validity is secured. This approach gives the researcher an opportunity to reveal the limitations of existing theory, and also how theory can be developed through adoption to empirical findings. In chapters 3 to 5, the reader is presented with shortcomings of existing theory, i.e. lack of explanatory power (according to us). Our view of how theory should be developed in order to overcome these shortcomings, is presented in the preliminary theoretical framework (see chapter 5) which is refined in chapter 8. Thus, the proposed framework is based on theory as well as empirical findings. The practical relevance of the framework is discussed in chapter 7, where the framework is applied to the empirical case.

²⁷ Yin (1994), p. 106-110

²⁸ Glaser (1978)

²⁹ Bengtsson (1993)

Integration is thoroughly discussed when developing the preliminary theoretical framework (chapter 5) and also when refining the framework (chapter 7).

2.4.4 Reliability

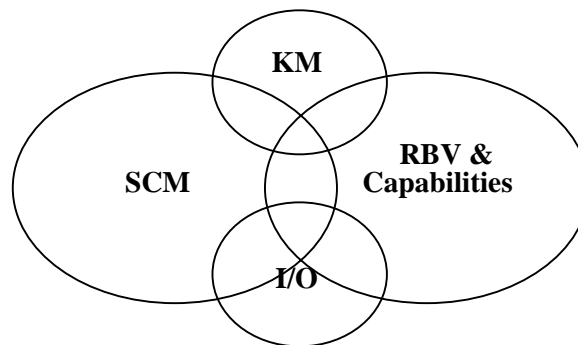
The concept of reliability is a criterion for judging the quality of research design.³⁰ When collecting data, the reliability demonstrates that the operations of the study can be repeated with the same results.³¹ There are two suggested means to secure reliability, the inter-rating and respondent validation. Being a three-researcher study, various findings and interpretations has been scrutinized with intention. Furthermore, we have enjoyed the assistance of e.g. supervisors and fellows in order to discuss interpretations. This has been done with the overall intention to secure inter-rating reliability. The respondent validation has been rigorous, as oral statements have been cross-checked. By intention, we have discussed issues at different organizational levels in order to view problems from different perspectives.

³⁰ Yin (1994) p. 33

³¹ Ibid

PART II - THEORY

This second part of the thesis consists of two major theoretical areas. The leading chapter presents the first area of inquiry, Supply Chain Management (SCM), and highlights important aspects of this theory. The subsequent chapter discusses the development of Business Strategy. Industrial Organization (I/O), Resource Based View (RBV) and Knowledge Management (KM) which is supporting theories are presented in this chapter. The business strategy chapter is concluded with a thorough presentation of capabilities, which is the second area of inquiry. These two chapters situate the theoretical foundation on which the thesis is based. Since the linkages and the relationship between SCM and capabilities is an insufficient investigated area of theoretical inquiry, the cross-section between the theoretical areas will be highlighted and presented to the reader in the closing chapter of this part, i.e. the theoretical analysis.



Through the combination and integration of these theoretical areas, a framework that concerns how to build SCM capabilities is developed. This theoretical framework will serve as the author's analytic perspective when conducting the empirical case study in part three.

3 Supply Chain Management

The area of Supply Chain Management (SCM) will be presented in this chapter. First, the chapter gives an overview of the theoretical and practical development of the term. A framework of SCM is presented and finally, a theory defining different Supply Chains is presented.

3.1 Introduction

Today, the concept of Supply Chain Management has gained acceptance as a tool to increase efficiency among firms. Through the holistic view provided by SCM, many companies have succeeded in reducing lead times, stock levels and costs associated with logistics. In addition to cost reductions, many companies have enjoyed benefits of SCM usage, stemming from e.g. improved customer service and enhanced competitiveness. The concept is the result of an evolution within the logistics area that has been triggered by changes in the environment.

3.2 The Development

Even though the term supply chain management (SCM) did not appear in literature until 1982³², the concept of value chains³³ is nothing new and for a long time, attempts to integrate different parts of the chain have been made. Logistics managers have been using the underlying concepts of SCM, i.e. system analysis, value chain analysis and total cost analysis, for many years and the SCM concept has been evolving through three steps³⁴, briefly described below.

Step 1 – Physical Distribution

In the 1960s and 1970s firms worldwide paid great interest in outbound logistics systems, or physical distribution, to ensure an efficient delivery of finished goods to customers. The tool to accomplish this efficiency was the systematic management of interrelated activities such as transportation, distribution, warehousing and inventory levels. In the effort of seeking to reduce the total cost of physical distribution by

³² Oliver & Webber (1982)

³³ Porter (1985), p. 103

³⁴ Coyle, Bardi & Langley (1996), p. 5-9

managing the trade-offs, the firms gathered these activities under a physical distribution manager.

Step 2 – Integrated Logistics Management

Firms began to appreciate cost saving opportunities in combining outbound logistics with inbound logistics, or material management, in the 1970s and 1980s. The combination of the two systems was described as business logistics and provided a cost saving opportunity by employing a single transportation manager to coordinate the entire system. The process view of the firm was recognized, leading to organizational awareness of the important processes of the firm.

Step 3 – Supply Chain Management

The first theoretical description of SCM, to clarify the difference from more traditional approaches to managing the flow of materials and information, appeared in 1990.³⁵ The first definition of SCM emphasized a decrease in inventory levels within firms as well as across firms.³⁶ The following section presents different views and definitions of the SCM concept.

3.2.1 SCM Definitions

Like many other management terms, SCM is a term with ambiguous definitions since the term constantly evolves. In 1997 Cooper et al made an effort to summarize the different theoretical standpoint of SCM:

“SCM is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers”³⁷

“The network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer”³⁸

³⁵ Ellram & Cooper (1990), p. 1

³⁶ Cooper, Lambert & Pagh (1997), p. 1

³⁷ International Centre for Competitive Excellence (1994)

³⁸ Christopher (1992)

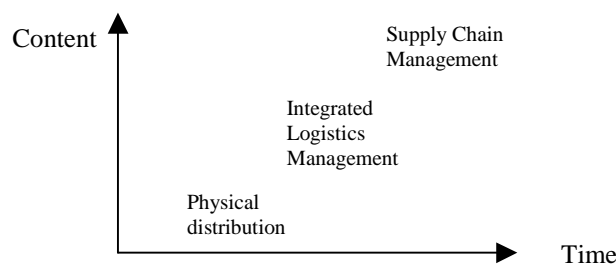
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“In its broadest context SCM is a strategic management tool used to enhance overall customer satisfaction that is intended to improve a firm’s competitiveness and profitability”³⁹

Although there are many definitions of SCM, some commonalities between them seem to exist.⁴⁰ Examples of these commonalities are the involvement of many independent organizations, the management of intra- and inter-organizational relationships, the bi-directional flow of products, finance and information, the span from initial source to final customer and the seeking to provide high customer value. Efficiency and effectiveness are important across the entire supply chain, accordingly the integration and coordination of chain members is a highly essential undertaking.

In a thesis about SCM it should be recognised that there is some doubtfulness about the SCM term, there are still those who just see it as a new name for logistics. To meet this form of criticism one could turn to the practical exploitation, it is a term widely used, and in fact invented, by practitioners all over the world and has proven to generate a great leverage. It has certainly given an important academic as well as practical contribution to the field of logistics, i.e. the holistic view of the company and its business environment.

Through the evolution of the SCM concept, the content has expanded. Today, SCM highlights the importance of multifunctional involvement in order to manage the supply chain. As the early theories concerned a small part of the firm, the SCM concept has had great impact on most departments of a firm. As shown in figure 3.1, evolution has created a concept with a content that covers many aspect of the firm. This holistic approach has made the SCM concept hard to define exactly. The figure below shows the authors’ view of the conceptual contents. By content, we refer to how holistic the concept is.



*Figure 3.1. Evolution of concept
(Developed by the authors)*

³⁹ Giunipero & Brand (1996), p. 19

⁴⁰ Cooper, Lambert & Pagh (1997), p. 4

The above provided definitions are broad and do not offer guidance. Thus it is hard to distinguish the boundaries of the concept, i.e. it is especially hard to define activities that are not Supply Chain Management.

3.2.2 Factors Triggering the SCM Development

Following some strategic changes in the supply chain, in addition to a number of external drivers of change, the term SCM has developed and matured during the 1990's. The, from a firm perspective, external factors include the globalization, which tends to make the supply chains more geographically integrated.⁴¹ One reason for the more integrated chains is the elimination of trade barriers, e.g. within the European Community, which enables firms to compete not only in the domestic market. Another external cause is the technological development with far-reaching impacts within the logistics business area. The possibility of transmitting and sharing information has been improved through technologies like Electronic Data Interchange (EDI) and bar coding. Also, the ability to simulate an entire supply chain flow has been enhanced following the technological development⁴². Finally, the new market, with more price- and time sensitive customers, as well as new channel structures has developed the SCM term to a service-increasing and cost-decreasing tool.

The recognition of speed and time as strategic variables is one of the strategic changes that have occurred in the supply chain area. The emphasis on time compression has now spread to the logistics supply chain activities since logistics play an important role when seeking to decrease order delivery cycles.⁴³ In view of the fact that lead times reduction can reduce customer's storage and inventory cost, thus adding value in the supply chain, time has become a major source of competitive advantage. The SCM tool has evolved into a tool that recognizes time as a key determinant within almost all processes. Besides the cost benefit of a swift supply chain, short overall lead times help companies respond to rapid changes in the competitive environment. Also the enlarged focus on customer satisfaction has had a great impact on the supply chain. When emphasizing the customer, measures as percentage of orders delivered on time is becoming increasingly important.

3.3 Defining Supply Chain Performance

The theoretical concept SCM has a holistic perspective and is preferably a tool for managers. When implemented, several important aspects of operational nature are

⁴¹ Paulsson, Nilsson & Tryggestad (2000), p. 33-34

⁴² Coyle, Bardi & Langley (1996), p. 17

⁴³ Coyle, Bardi & Langley (1996), p. 19

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changed. It is thus important to identify the connection between strategic SCM thinking and performance changes at operational level. Measurements of performance within a company are by tradition associated with individuals and functions. When a company starts to compete through SCM, there is a need for a process-orientated assessment of the measurement systems, e.g. benchmarking.⁴⁴ Before measuring the performance, there is a need to define the operational parameters that are affected by effective SCM.

The question of how to measure performance has no easy answer. Korpela et al. provides a set of parameters that reflect supply chain performance⁴⁵. Depending on the specific situation, some of these parameters are more important than others. Other researchers highlight e.g. speed and quality as important measurement parameters⁴⁶.

Parameter	Description	Key Figures, examples
Lead time	Time consumption between e.g. order and delivery	Days, Hours
Flexibility	The ability to respond quickly to changes in e.g. supply or demand	Lead time new order, product development lead time
Cost Efficiency	The output in relation to input	Logistics cost/unit
Reliability	A measure of confidence between supply chain members	On-Time Delivery
Value Adding	The creation of additional value through an expanded offering	Contribution ratio

Table 3.2. Examples of performance parameters (Korpela, Lehmusvaara, Tuominen, 2001)

For many firms, lead time has become a significant parameter to compete through. A short lead time offers reduced cost of capital along with reduced levels of stock. Flexibility increases with short lead times as the response to customer demands comes quicker. Further more, the relation to the customer evolves as the time distance is reduced. Thus, lead time is in many businesses crucial to the competitiveness of the individual firm.

Flexibility is embedded in the supply chain and is the ability to respond to changes. It can be e.g. the response to an increased demand, or the ability to undertake a late

⁴⁴ Persson & Virum (1996), p.376

⁴⁵ Korpela, Lehmusvaara & Tuominen (2001) p. 154

⁴⁶ Fisher (1997), p.108

order from an important customer. Furthermore, flexibility can be embedded in short lead time processes for e.g. planning and production that allow swift changes of product types and of quantity.

An important parameter of supply chain performance is cost efficiency. Most supply chains must to some extent be efficient, but there is a trade off between cost efficiency and e.g. flexibility. When the cost of distribution is a significant part of the total product value, cost efficiency is more important. Since supply chains are built up by relations between organizations, reliability is an important parameter. A delay in the upstream processes can spread to customers and cause major problems. Therefore, it is important to increase information sharing and the reliability, e.g. through increased on-time delivery. One performance characteristic is the value added in the supply chain. An extended customer solution can generate more value than the cost and thus increase the benefits for all parts. Through adding value, the relations with the customer can be evolved.

3.4 A View of SCM - the Three Flows

The supply chain does not only consist of the physical flow, products from vendor to consumer, but also of the information and financial flows. All three flows exist amongst the supply chain members even though they show dissimilar characteristics.⁴⁷

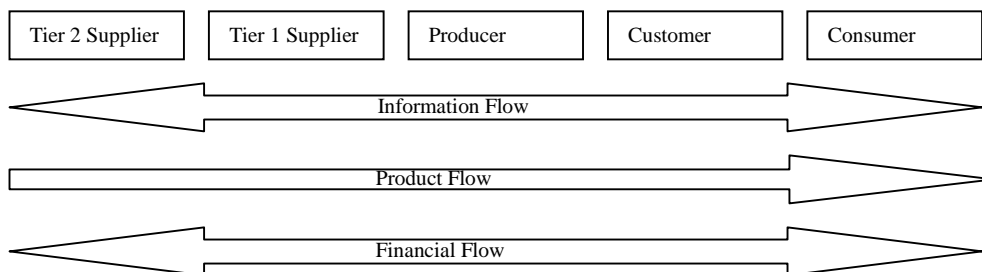


Figure 3.3. The three flows of a supply chain (Coyle, Bardi & Langley, 1996)

Coyle et al⁴⁸ argues that the arrows in figure 3.3 above can illustrate the three flows, ranging from original point of supply to ultimate point of consumption in the supply chain process. The physical flow consists not only of the actual product but also of packaging, pallets, containers and means of transportation. Reversed physical flows

⁴⁷ Paulsson, Nilsson & Tryggestad (2000), p. 24

⁴⁸ Ibid

are becoming increasingly important due to e.g. environmental protection. Therefore it would be appropriate to revise the physical flow in figure 3.3 to go in both directions. The main task of the information flow is to administrate the physical flow and it is crucial that the information goes in both directions of the chain. By way of a complete, frequent and up to date information flow it is possible to maintain a low inventory level throughout the chain, i.e. communication and inventory are economic substitutes.⁴⁹ That's why inventory level is one of the most shared data between supply chain members.⁵⁰ Also, sales information from the retailer enables the supplier to be better prepared for changes in market demand. The third flow, financial flow, consists of credits, invoices, claims and cash. The vendors must get paid in a quick, safe and cost efficient way, otherwise the physical flow will get slowed down.⁵¹ The financial flow is bi-directional, e.g. outbound distributors are paid to perform downstream activities. Hence, the financial flow is of great importance when managing a supply chain.

3.5 A View of SCM – Managing the Flows

A conceptual framework for managing the supply chain, which embraces all business processes in all organizations across the supply chain, was introduced in 1997⁵². The elements of this model will serve as the foundation of this thesis.

3.5.1 Elements in the Framework of SCM

In the proposed framework, the scope of the supply chain is from initial point of supply to the ultimate point of consumption. This conceptual SCM framework is built upon three strongly linked elements: (1) the business processes, (2) the management components and (3) the structure of the supply chain. The elements are illustrated in figure 3.4 below⁵³.

⁴⁹ Lee & Whang (1998), p. 2

⁵⁰ Lee & Whang (1998), p. 3

⁵¹ Paulsson, Nilsson & Tryggestad (2000), p. 25

⁵² Cooper, Lambert & Pagh (1997), p. 5

⁵³ Cooper, Lambert & Pagh (1997), p. 6

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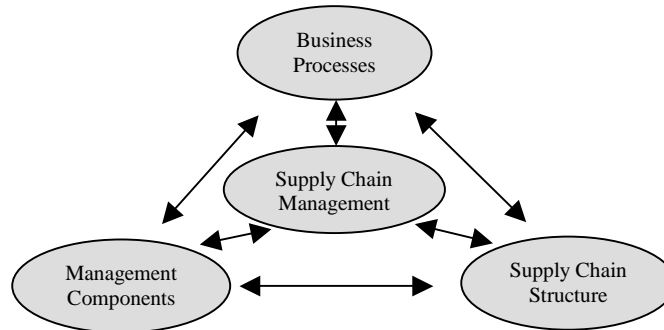


Figure 3.4. Elements in the Framework of SCM (Cooper, Lambert & Pagh, 1998)

Behind the conceptual model lie identifiable parts of a value chain. Business processes at an operational level are series of tasks within and between firms that include e.g. lead times, stock levels and other cost drivers. The supply chain structure can be seen as a firm's relations with suppliers, customers and other organizations that affect the company in any way. The management components are the means by which management control the supply chain. The main contribution of the model is the discussion regarding processes and relations, and the checklist of how to manage the supply chain.

Element 1 – The Business Processes

Process orientation means working in horizontal processes, instead of vertical functions, and taking customers perspectives on business. Hammer⁵⁴ defines processes as “a complete end-to-end set of activities that together create value for a customer”. Striving towards effective process orientation, a company must take a holistic perspective of its business. By taking this holistic approach one is capable of seeing the broad picture and thereby avoiding sub optimization.⁵⁵ This holistic perspective can be exemplified with the production process of a company, which must be optimized in order to maximize the total value. This can be done through e.g. reduction of critical lead times and the abolition of unnecessary production activities. Every supply chain must identify the processes relevant in their own chain and thereafter focus the effort of each process on meeting the customer's requirements.

⁵⁴ Hammer (1996)

⁵⁵ Näslund, Larsson & Holmberg (2000), p. 5

Element 2 – The Management Components

Across all business processes and members of the supply chain there are certain management components that are in common. The management of these common components is of great importance to the outcome, as they determine how the business processes and the supply chain are managed and structured.⁵⁶ The literature, covering both supply chain and business processes, has suggested certain components that must be given management's attention. Cooper et al combined these two theoretical perspectives and proposed ten management components that should be common for the entire supply chain.

1) Planning and control of operations are keys to moving a supply chain in the desired direction. Multiparty planning has great impact on the success of the entire supply chain. 2) The work structure indicates how the firm performs tasks and activities, which influences the ability to cooperate with other chain participants. 3) Organizational structure is referring to the employment of cross-functional teams within the firm or even cross-organizational teams to integrate the supply chain. 4) Product flow facility structure includes the network for sourcing, manufacturing and distribution across the supply chain. An integrated facility structure requires fewer inventories, and thus fewer storage points. The integration of the structure is of great value to all involved. Value is created since the integration enables moving inventory upstream where unfinished or semi-finished products will be stored, which is less expensive. 5) The information flow facility structure is also a key component to the supply chain. The frequency of information updates and the type of information shared between chain members strongly influences the efficiency of the supply chain. 6) Product structure refers to the product portfolio and the coordination of product development across the chain. Without the coordination of product development the production will be inefficient. A trade off between coordination and giving away corporate competences must be made. 7) The management structure, referring to corporate philosophy and management techniques, has to be integrated across the chain. Since it is difficult to integrate a top-down structure with a bottom-up structure there must be a similar structure across the supply chain. 8) The power and leadership structure across the chain will influence its form and direction. In most chains there are one or two strong leader who steer the direction of the chain. 9) Risks and reward structure across the supply chain will have an effect on the participating parts long-term commitment to the chain. 10) Corporate culture and its comparability across the chain participants is also an important component. This aspect includes how employees are valued and incorporated into the management of the company.

⁵⁶ Cooper, Lambert & Pagh (1997), p. 6

Element 3 – The Structure of the Supply Chain

According to Cooper, Lambert and Pagh, the supply chain structure mainly refers to the different relations a company upholds. Determining how the supply chain needs to be managed depend on a number of factors, e.g. the complexity of the product, the number of available suppliers and availability of raw materials.⁵⁷ The closeness of these relationships will vary at different points in the supply chain. With key suppliers and customers the relationship will probably be more like a partnership. Also, critical components will need closer management and maybe even a backup supplier to prevent from production shut down. Most products consist of many components and managing all of these relationships, as partnerships would take too much of management's time. The firm must choose the appropriate level of partnership for each particular supply chain link. It is costly to uphold close relationships with all supply chain members. Therefore close coordination and integration of all links should not be the ambition.⁵⁸ When deciding which parts of the supply chain, that management should focus its effort on, the factors above must be considered and weighed against the capabilities that the firm possesses and how important they are to the company.⁵⁹

Although the elements in Cooper, Lambert and Pagh's framework simplify the complexity of a supply chain, they highlight the most critical issues in effective and efficient SCM.

3.6 Criticizing the Concept of SCM

Until today the SCM research has focused on operational aspects of the theory, i.e. it has recognized the features of an effective supply chain, without decomposing the factors that the building of an effective supply chain depends upon. The research has tried to answer the question "what" and not the, as important, "how" question. This can be seen as a weakness in the theory, but it can also be an indication that the theory of SCM is still young.

The main contribution of the conceptual SCM model is the recognition of the business processes and relationships concerning a supply chain member. The model is holistic and covers most parts of the firm. As it tries to describe the whole supply chain, it fails to describe the dynamic processes and routines that effective SCM depend upon. The management components element is a check list with important aspects that managers can have in mind. Even though, they fail to explain the recipe for how to gain superior supply chain performance.

⁵⁷ Cooper, Lambert & Pagh (1997), p. 9

⁵⁸ Lambert, Emmelhainz & Gardner (1996), p. 8

⁵⁹ Cooper, Lambert & Pagh (1997), p. 9

Furthermore, no model including the above presented succeeds in explaining the building of SCM. The SCM model recognizes routines that integrates and coordinates business processes within and between companies, but fails to describe the transformational aspects that consider the building of a supply chain.

Our view is further that the SCM concept fails to recognize the important aspect of learning and knowledge. One important aspect of building SCM is the distribution of a supply chain view among members as well as the building of relations. When dealing with these issues, there is a need to understand the way in which knowledge is created and transferred.

3.7 A View of SCM - the Type of Supply Chain

A core matter when building a supply chain is the question of what supply chain is the most appropriate. When developing a supply chain thinking, there is a series of parameters that can be elaborated with. Depending on e.g. products and market, the supply chain should demonstrate certain appropriate features. Supply chains can differ in many characteristics, e.g. flexibility, lead times, value added, reliability and cost efficiency. Thus, different supply chains have unique sets of characteristics. As a rough measure to distinguish the type of supply chain, a theory that connects product and supply chain features is presented. The theoretical frame presented by Fischer⁶⁰ offers simplicity and descriptions of the choice criteria. The theory distinguishes product features with sharp figures, thus making the theory less applicable. The categorization is sharp and visualizes chains with extreme features.

3.7.1 Responsive or Efficient Supply Chain?

The focal point of this part is the description of the dependence between product and supply chain. A supply chain basically performs two types of functions: a physical function and a market mediation function.⁶¹ The physical function handles the physical flow of the supply chain while the purpose of the market mediation function is to ensure that the products reaching the market, matches consumer needs. The cost of the physical function includes cost of production, transportation and inventory. Market mediation costs arise when supply exceeds or is in short of market demand.

The primary difference between an efficient and a responsive supply chain is the embedded flexibility. Thus, it is important to match product requirements with the

⁶⁰ Fisher (1997)

⁶¹ Fisher (1997), p. 107

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supply chain of the products. Table 3.5 below describes the differences between a physically efficient and a market responsive supply chain.

	Physically Efficient	Market Responsive
Primary Purpose	Supply predictable demand efficiently at the lowest possible cost	Respond quickly to unpredictable demand in order to minimize stockouts, forced markdowns, and obsolete inventory
Manufacturing focus	Maintain high average utilization rate	Deploy excess buffer capacity
Inventory Strategy	Generate high returns and minimize inventory throughout the chain	Deploy significant buffer stocks of parts or finished goods
Lead-time focus	Shorten lead time as long as it doesn't increase cost	Invest aggressively in ways to reduce lead time
Approach to choosing suppliers	Select primarily for cost and quality	Select primarily for speed, flexibility and quality
Product-design strategy	Maximize performance and minimize cost	Use modular design in order to postpone product differentiation for as long as possible

Table 3.5. Differences between efficient and responsive supply chains (Fisher, 1997)

The efficient chain focuses mainly on cost reduction as the responsive highlights flexibility. By gaining understanding of the product category and the supply chain structure, a firm can devise the ideal supply chain strategy for their products. According to the reasoning above, the right way to ensure the usage of the right approach is to compare the type of product with the current chain.

3.7.2 Functional or Innovative Product?

Classifying products into either functional or innovative can be of help when trying to minimize the costs associated with the above mentioned functions.⁶² Functional products satisfy basic needs with predictable and stable demand. In addition, functional products have long lifecycles, which often leads to enhanced competition and thus low profit margins. Further, functional products have a low product variety. To increase profit margins many firms introduce innovations in their products. An increased content of innovations may offer competitive advantages that result in

⁶² Fisher (1997), p. 107

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higher profits. But there is a downside to this approach, as the newness makes the demand unpredictable, i.e. there is a linkage between risk and return. Also, the lifecycle of innovative products are often shorter compared to functional products. Table 3.6 below describes differences between functional and innovative products.

	Functional	Innovative
Aspects of demand	Predictable	Unpredictable
Product Life Cycle	Years	Months
Contribution Margin	5-20 %	20-60%
Product Variety	Low	High
Margin of error in forecast	Low	High
Average Stockout rate	1-2%	10-40%
Average of-season markdown of full price	0%	10-25%
Lead time required for MTO	6-12 months	1-14 days

Table 3.6. Difference between functional and innovative products (Fisher, 1997)

The high uncertainty in an innovative product increases the risk for either shortages or excess supplies. The high margin characteristics of innovative products also increase the cost associated with shortage in supply due to leverage. At the same time costs of excess supply is high due to the short lifecycles. Thus, producers of innovative products must focus its efforts on flexibility in the supply chain.⁶³ Market mediation is much easier when selling a functional product since a better match between supply and demand can be achieved. Consequently, producers of functional products are best of, focusing on minimizing physical costs.

The distinction between functional and innovative products is indeed sharp and simplified. Figure 3.7 illustrates the wide span of alternatives in the trade-off between cost efficiency and responsiveness. Our view is that the model alone can not serve as a decision tool when deciding the appropriate supply chain. The criteria for choosing the appropriate supply chain are weak and can not solely be the basis for decision. It must be recognized that changing the supply chain is a difficult issue and that the choice must include more parameters. Further, the model is in many situations not applicable since a company seldom can choose their type of supply chain.

⁶³ Fisher (1997), p. 107

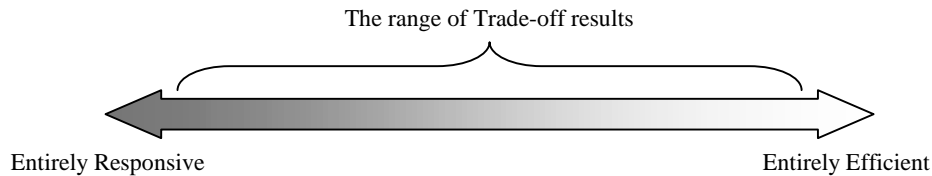


Figure 3.7. The trade-off between Cost efficiency and responsiveness
(Developed by the authors)

The type of supply chain is often an outcome rather than an intended choice due to the overall complexity. Even though, the model contributes with relevant insights for managers regarding relevant aspects of SCM.

3.8 A View of SCM – Measuring the Value

It is of great importance to identify and measure the value created by SCM. Otherwise it is hard to exploit the leverage hidden within the supply chain. The primary concern is to show the management team as well as customers the value of improvements in the supply chain.⁶⁴ An adequate measurement enables management to see the full effects of investments in SCM. Equally important is illustrating the benefits to customers in order to gain price premiums for the additional value created within the supply chain. If the company fails to show this value, profits will decline since the benefits created for customers remain uncompensated. In short, the measuring of value created by SCM has two target audiences, internal management and external customers. Theoretically, there exists not one but many ways to describe the value created by SCM.⁶⁵

3.9 Concluding SCM

The concept is today more than just logistics it covers most relevant aspects of the value chain, and is hard to distinguish from the business of the firm. Furthermore, the width of the concept highlights one important question; is SCM a tool that can become the sole management control system of the firm. Some theorists would indeed answer positive to that question. Our view is that SCM is an interesting mindset that can not be the solely framework for managers. When building SCM, the theory does not provide sufficient guidelines. SCM theories of today are to a high degree concerned with the content of successful SCM. Hence, there are still much to explore within the field of developing SCM.

⁶⁴ Lambert & Burdurglu (2000), p. 1

⁶⁵ Different views of how to measure the value are presented in appendix D

4 Business Strategy

The Business Strategy chapter aims to describe different views of strategy as well as theories concerning the building of knowledge. First, a firm-external view of strategy is presented briefly, and secondly, an internal perspective of business strategy is described. To reveal the concept of building capabilities, a toolbox of learning mechanisms is provided to the reader. This chapter along with the previous Supply Chain Management chapter constitutes the foundation of the Theoretical Framework which is presented subsequent to this chapter.

4.1 Introduction

There are many ways to approach corporate strategy. For many years the strategic theories have been dominated by findings within the industrial environment, and research has been focused on competitive positioning against rivals. This work, mainly achieved during the 1980s, is closely associated with Porter⁶⁶, and attempts to explain strategy from an environmental perspective, that is from the outside of the firm. As the industrial analysts see the strategy-environment interface with competitors as their main arena, others try to view strategy from within the firm⁶⁷, which is how strategy depends on the specific resources of a firm. Hence the later provides an alternative approach to strategic theory. During the 1990s, there has been a scientific focus on resources and capabilities as the basis for strategy and firm profitability. This bundle of ideas has merged into what is known as the Resource Based View⁶⁸ (RBV).

4.2 Industrial Organisation

In the 1980s the strategy work was dominated by the notion of adapting and setting the strategy in coherence with the environment.⁶⁹ The understanding of the environment and the factors which influence it was seen as an important, if not critical, part for the development of a successful business strategy.⁷⁰ The definition of the term environment is very wide and includes all factors that make an impact or in some way influence a company, ranging from governmental to demographic influences. Obviously it is not only a time consuming but also a very costly activity to

⁶⁶ Porter (1980) & (1985)

⁶⁷ Grant (1998), p. 107

⁶⁸ Barney (1991)

⁶⁹ Teece (1997), p. 511

⁷⁰ Grant (1996), p. 54

keep track and monitor all these factors. Hence, it is necessary to make tradeoffs and narrow the selection of factors so that only the most important ones remain.

The pioneer within this field of strategy, the competitive forces approach, is Michael Porter of Harvard Business School. He focuses on what he names the “industry environment”, which is constituted by competitors, suppliers, customers.⁷¹ This doesn’t exclude the remaining factors in the microenvironment. One should through these three factors be able to capture the important influences that affect the company. The industry environment sets the competitive rules, hence outlines the strategic possibilities of the firm and affects managers’ decisions.⁷²

4.2.1 The Five Forces Framework

In this approach, rooted in the structure-conduct-performance paradigm⁷³, the five forces model is the dominant analytical instrument. The model constitutes a framework which determines the industry profitability in relation with five forces; (1) entry barriers, (2) threat of substitution, (3) bargaining power of buyers, (4) bargaining power of suppliers and (5) the rivalry among incumbents.⁷⁴

The term entry barriers is used for such factors that hinder other firms from establishing in an industry, i.e. high capital requirements, economic of scale, absolute cost advantage etc. It is due to entry barriers that a market can enjoy higher rents than the average market profit level. Without entry barriers, other companies would establish in the market and prices would eventually drop due to the increased competition. The availability of substitutes in the market also influences the profit level. The more inelastic market the more potential is it to generate above market price. In an industry, the profitability is also dependent on the bargaining power of buyers, i.e. the buyers’ relative economic power. When measuring the strength in bargaining power there are two factors that should be highlighted; Buyers’ price sensitivity and relative bargaining power.⁷⁵ The factors influencing the bargaining power of suppliers are the same vis-à-vis the bargaining power of buyers. The last factor that influences the profitability in an industry is the rivalry among incumbents. The level of rivalry is dependent upon five factors concentration of competitors, diversity of competitors, product differentiation, cost conditions and excess capacity & exit barriers.

⁷¹ Grant (1996), p. 54

⁷² Teece (1997), p. 511

⁷³ Teece (1997), p. 510

⁷⁴ Ibid

⁷⁵ Grant (1996), p. 68

The five forces model sets up a framework that show managers which structural characteristics that influence an industry's profitability. The managers should use this as a tool to understand the competitive forces and further to position the company in a way that increases firm competitiveness.⁷⁶ The principal theory behind this form of strategic thinking is that the industry environment sets limits and determines the strategic action.

4.3 The Resource Based View

As the theory of Industrial Organization explains business strategy from an external perspective, RBV and adjacent theories explain competitiveness as stemming from internal resources. The pioneering work within this area was made by Barney⁷⁷, with Penrose⁷⁸ and Ricardo⁷⁹ as intellectual roots. The emphasis of the resource based strategy is the connection between resources and firm profitability, and this theory has been further developed to address the issue of how to create resources critical to firm profitability.⁸⁰ This dynamic approach that will be further explored in the capabilities section crosses the scientific fields of resources as well as Knowledge Management. Thus, RBV has its starting point in an intra-firm perspective, and tries to explain competitive advantage from resources and capabilities.

The theory is built on two assumptions, first, companies can be conceptualized as bundles of resources, where the resources are heterogeneously distributed across firms and second, these differences tend to persist over time.⁸¹ An analysis of a firm's resources can take place at two levels of aggregation, the individual resources and the capabilities that develop, combine and wind up resources in order to improve competitive advantage.⁸² Resources can be classified as tangible, intangible and human⁸³. The former are the easiest to identify and evaluate, and consists typically of financial and physical resources. The intangible resources remain largely invisible on a company's balance sheet, and include resources as technology, reputation and culture. The human resources finally lie in the human capital of the firm and their skills.

⁷⁶ Teece (1997), p. 512

⁷⁷ Barney (1989)

⁷⁸ Penrose (1959)

⁷⁹ Ricardo (1817)

⁸⁰ Eisenhardt & Martin (2000), p. 1

⁸¹ Barney (1996), p. 3

⁸² Barney (1996), p. 18

⁸³ Grant (1998), p. 111

4.4 Causalities Between Theories

The different theories presented can be seen as reinforcing perspectives. They assess the firm and the market from various angles, hence providing alternative views of how to characterize problems. The market can be described through the five forces as they describe the competition and the industry attractiveness.

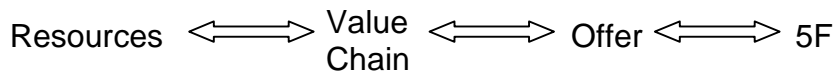


Figure 4.1 Causalities between theories
(Developed by the authors)

The offered service or product is made through a series of procedures and activities that can be conceptualized through the value chain⁸⁴. The value chain model by Porter explains the firm through a holistic approach. The different activities deploy resources, e.g. as input material or production equipment. The firm can be conceptualized as a bundle of resources that co-operate through the value chain when making an offer that is affected by competitive forces.

4.5 Competitive Advantage – a Comparison

The Resource Based View and the theories of Industrial Organization have different views of the origin of competitive advantage. The RBV approach focuses on the rents arising from firm-specific resources, rather than economic profits from product market positioning. RBV researchers tend to conceptualize organizations as a bundle of resources. With the individual resource as the unit of analysis, they assess value, rarity, imitability and the degree of efficiency in order to measure the competitive advantage stemming from the resource.⁸⁵

Supporters of I/O view competitive advantage as stemming from the location within an attractive industry. According to Porter⁸⁶, competitive advantage stem from either a low cost strategy or a differentiation strategy. With this approach, the profit is not considered when assessing the competitiveness. Instead, the price or the cost is the

⁸⁴ Porter (1991), p. 103

⁸⁵ Barney (1996), p. 4

⁸⁶ Grant (1998), p. 190

base of a competitive advantage. Porter stresses that a competitive advantage can not be acquired through other means than the generic strategies.

When Barney developed RBV it was done as a reaction to the theory of I/O, and for a long time, they have been regarded as opposite perspectives that can not be combined. A very small number of these theories recognize the possibility that the perspectives reinforce each other into a more holistic view. We consider the two approaches to Business Strategy as different tools for different situations, which could help to create a holistic view of a company's situation in an industry, if used with caution. In other words our view is that competitive advantages stem from the successful utilization of both I/O and RBV.

4.6 Capabilities

The concept of capabilities has gained acceptance as a part of the resource based view. By many, capabilities are considered to be vague and hard to understand. Further, the content of the concept is not properly defined, e.g. some authors use capabilities to describe different phenomena. To enhance the understanding of the concept, different views are presented below along with a definition.

4.6.1 Defining Capabilities

Capabilities can be seen as the management of resources and is often described as the organizational and strategic routines by which managers alter their resource base.⁸⁷ Thus, they are the drivers behind the creation, evolution and recombination of resources into new sources of competitive advantage. Eisenhardt & Martin provide the following definition of capabilities:

*“The firm’s processes that use resources -specifically the processes to integrate, reconfigure, gain and release resources- to match and even create market change. Capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die”.*⁸⁸

The vast area of literature within capabilities and resources provide different views of the phenomena. There is hardly any consensus of the terminology to be used when describing capabilities. Depending on the author, words like competence, core capabilities, organizational capabilities, coordinating resources and capabilities are

⁸⁷ Eisenhardt & Martin (2000), p. 1107

⁸⁸ Ibid

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used to describe the phenomenon. In table 4.3, different views are presented along with the author's contribution to the phenomena.

Authors	Keyword	Contribution to phenomena
Prahalad & Hamel (1990)	Core competence	Identifies core competences to distinguish those capabilities fundamental to a firm's performance and strategy.
Teece et al (1990)	Capability is a firms ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments.	Recognizes processes, positions and paths as fundaments of capabilities
Stalk et al (1992)	Capabilities	Identifies principles for capabilities based competition
Sanchez & Heene (1997)	Competence is an ability to sustain the coordinated deployment of assets in a way that helps a firm achieve its goals.	Incorporates Knowledge Management as a means to gain capabilities
McGrath et al (1995)	Level of competence is defined as the ability to reliably and consistently meet or exceed its objectives	Identifying rents as arising from the deftness and comprehension that build competence
Winterscheid (1994)	Refers to Teece et al	The perception of existing competence affects the development of new competence.
Eisenhardt et al (2000)	Refers to Teece et al.	Capabilities have significant commonalities across firms. They recognize differences due to the market dynamism
Collis	Capabilities: The socially complex routines that determine the efficiency with which firms physically transform inputs into outputs.	The sustainability of capabilities is questioned. Proposes future research to focus on building relevant capabilities.

*Table 4.2. Various views of capabilities
(Developed by the authors)*

Our view is that the provided definitions are complex and hard to understand. Most definitions identify routines as a significant part of the capability. Our view is that the definitions above do not distinguish capabilities that build resources from the

capabilities that integrate and coordinate resources. We therefore propose the following definition:

“A capability is the ability to build, integrate, coordinate and alter resources in order to enhance competitiveness”

Our definition describes both the ability to build resources and the ability to integrate and coordinate resources.

4.6.2 The Features of Capabilities

The majority of scientists agree upon the notion of capabilities as a complex system of routines and processes. Eisenhardt & Martin state that capabilities consist of identifiable and specific routines. Some capabilities integrate resources, such as product development routines where varied skills are combined in order to create competitive products with large revenues. Similarly, strategic decision making is a capability where managers integrate resources that shape the strategic direction of the firm. Other capabilities reconfigure the resource base of the firm by the use of different routines. This includes resource allocation routines and patching, which is the changing of routines and resources in order to match the changing market environment. Further, there are capabilities that are related to the gain and release of resources. These include routines for knowledge creation where managers and others build new thinking within a firm. It also includes routines for alliance and acquisitions, where resources are brought into the firm from external resources.

Capabilities are often described as unique and idiosyncratic processes that have emerged from path-dependent histories⁸⁹. Thus the processes depend on the path and on the current position. Although there are many differences between capabilities, they show commonalities in the key features. This arises from what is known as “best practice”, that is the fact that there are more and less effective ways in dealing with different management issues. Therefore, many successful competitive firms show similar capabilities within e.g. product development⁹⁰.

Researchers⁹¹ have found similarities in successful acquisition processes, as well as in knowledge creation processes. These commonalities imply that there are many ways to develop effective capabilities, although the processes are path-dependent. This equifinality suggests that managers can reach similar capabilities from different starting points, through different paths. The commonalities further imply that effective capabilities can differ in details as long as the commonalities are present.

⁸⁹ Teece, Pisano & Shuen (1997), p. 518

⁹⁰ Eisenhardt & Martin (2000), p. 1106

⁹¹ Larrson & Finkelstein (1999)

Thus, they can be imitated, which further implies that capabilities can not be a source of a sustainable competitive advantage.⁹² This suggests that they are homogenous and therefore more substitutable than was previously known. When discussing equifinality in e.g. supply chains, one must consider that firms have different positions and thus different relations. Practically, the concept of equifinality is hard to apply since capabilities often are embedded in the relations within the supply chain. The bundle of relations held by a supply chain member is unique and can not be acquired by a competitor. Therefore, equifinality is to a small degree applicable when discussing capabilities within SCM.

4.6.3 The Evolution of Capabilities

The essence of capabilities is embodied in different organizational routines and processes, shaped by specific positions and paths⁹³. These routines are more or less tacit, and can be described as patterns of practice or as “the way we do things here”. The position can be described as current assets and resources, and the path is referred to as strategic alternatives available and the attendant path dependencies. Teece et al. provide the most comprehensive explanation of capabilities, as they explore the evolution of capabilities through a framework consisting of processes, positions and paths.

Processes

The organizational processes consist of three different roles; the integration/coordination of resources, the reconfiguration and the learning role.⁹⁴ The integrative and coordinative role of processes deals with the effectiveness of the internal coordination as well as external integration with e.g. customers. The growing interest in SCM and relationships with other companies evidences the importance of external integration and coordination. Researchers⁹⁵ have shown that coordination and integration of processes have a great impact on cost, lead-time and quality in relationships with other companies. Hence, to recognize the integrative processes is critical to the understanding of capabilities.

The learning role enables firms to improve the operational efficiency, but also to identify opportunities. This process involves individual as well as organizational learning. It includes the transformation of tacit knowledge to explicit knowledge and

⁹² Eisenhardt & Martin (2000), p. 1107

⁹³ Teece, Pisano & Shuen (1997), p. 518

⁹⁴ Ibid

⁹⁵ Clark & Fujimoto (1991)

vice versa. The learning processes reside in new patterns of activity, or routines that are the foundation of capabilities.

The process of reconfiguration deals with the change of a firm's asset structure. These processes are thus linked to capabilities that deal with building new resources. The ability to transform assets in a value-adding direction depends on the ability to scan the environment and make the necessary adjustments in a cost-efficient manner. Thus, this capability is itself a learning organizational skill.

Positions

Due to the heterogeneity and persistence of resources, capabilities indeed depend on the asset structure⁹⁶. In many industries, the technological assets can provide competitive advantage, either through the ownership or through the utilization of these assets. Reputational and financial assets also have a great affect on how capabilities evolve. The latter sets limits to what the company can do in a short perspective, and the previous affects the creditability of the company. Structural assets are the structure of the organization and the linkages internally and externally. Both the position of a company within a network and the internal organization influences the evolution of capabilities.

Paths

The processes that embody a firm's capabilities are a function of the current position and the travelled path. The path ahead is further dependent on the current position and processes.⁹⁷ These dependencies must be considered when analyzing a firm's capabilities. Thus, what a firm can do is rather constrained by its position and paths. This proposal suggests that capabilities are unique and hard to acquire. This is contradictory to the idea of equifinality proposed by Eisenhardt & Martin.

4.6.4 Capabilities and Market Dynamism

Eisenhardt & Martin suggests that the pattern of capabilities vary with the market dynamism⁹⁸. In less dynamic markets, the capabilities are complex, detailed and stable routines. The changes within these markets are predictable and follow linear paths. The capabilities rely heavily on existing knowledge and routines are analytical

⁹⁶ Teece, Pisano & Shuen (1997), p. 521-522

⁹⁷ Teece, Pisano & Shuen (1997), p. 522

⁹⁸ Eisenhardt & Martin (2000), p. 1106

and linear. In less dynamic markets, the causal ambiguity of the capabilities arises from their complexity and from the fact that they are hard to identify.⁹⁹ In dynamic markets, the changes are rapid and unpredictable. The capabilities do not rely on the accumulated mass of knowledge, but rather on situation-specific knowledge and simple rules that helps the managers to handle the rapidly changing environment. These simple routines help to set priorities, and to stick to the business model. Due to the rapid environmental changes, the capabilities are rather iterative than linear. In dynamic markets, capabilities are causally ambiguous because they are simple.¹⁰⁰

One important implication of the dependence between capabilities and the market dynamism is the sustainability. In less or moderately dynamic markets, the capabilities resemble routines with complex and analytical processes. When managers gain experience, the processes improve and the sustainability increases. In high velocity markets, the capabilities are simple and less structured. In these markets, managers must have an optimal amount of structure, too much makes the firm static and too less makes it unstable. Hence the capabilities become difficult to sustain in high velocity markets.

4.7 Criticizing the concept of capabilities

The capabilities approach is often described as tautological and uneasy to apply practically, i.e. by identifying competitive firms and then attributing the performance to whatever possessed unique resource, the capabilities approach indeed becomes tautological. This is the main criticism proposed by Priem & Butler¹⁰¹. Further they state that resources and capabilities are hard to measure and therefore to use. The resource base that provides competitive advantage is often path dependent; hence it is beyond reach for the management to manipulate. The critics further describe capabilities as “routines to learn routines” and non-operational, see table 4.3. By defining capabilities as a means to alter the resource base, which is in accordance with the authors definition, their value becomes independent of the overall performance and the tautology can be avoided.¹⁰² In other words when a capability is a tool to initiate value from a resource the capability itself doesn't create value and therefore the above problem is solved.

The accumulated mass of research within capabilities has focused on definitions and the success of companies that possess a capability. The means by which a capability can be acquired have not been explored fully, thus making the concept of capabilities as a strategic tool unreachable for managers. Further the practical use of capabilities

⁹⁹ Eisenhardt & Martin (2000), p. 1114

¹⁰⁰ Ibid

¹⁰¹ Priem & Butler (2001), p. 22

¹⁰² Eisenhardt & Martin (2000), p. 1106

becomes difficult to demonstrate because it is hard to measure the exact effects of using a certain capability. Researchers exploring capabilities have answered questions that no one has asked. Further, they have ignored the connection between the internal and external perspectives of strategy. The level of abstraction within the concept of capabilities is a complex area. When scientists describe capabilities, it tends to be a complex set of routines that are hard to find. This can be explained by the embryonic nature of the term and the wide majority hasn't yet embraced it. Yet it is not possible to ignore the fundamental contribution to the holistic understanding of a company success.

Researchers provide different words to describe the phenomenon that deals with managing resources in a value adding direction. The authors recognize the criticism stated by Kalling and Styhre that the arena of capability studies has converged into a battle of words without a stable empirical foundation.¹⁰³ Thus, many concepts have been proposed to describe similar phenomena. The scientific field of RBV has evolved into different schools, although their main distinctions are of linguistic nature. Therefore, concepts like competence, organizational capabilities, coordinating resources, core capabilities and dynamic capabilities are used to describe the phenomenon. This textual approach to RBV science has improved the number of words and lessened the deeper insights of how to gain competitive advantage through building capabilities.

4.8 Building Capabilities

The resource-based view states that a competitive advantage arises from a bundle of efficient and effective resources. The capability approach stresses more tacit values of a firm, e.g. culture, organizational experience and effective routines, as the origin of rents.¹⁰⁴ Because of the non-tradability of soft assets, this implies that capabilities generally can not be acquired. Therefore, capabilities must be built. Some authors attempt to describe how to build capabilities. According to Stalk et al¹⁰⁵, companies create capabilities by making strategic investment in a support structure that links and transcends traditional functions. Furthermore, they state that the first challenge in building capabilities is to perceive a firm's business in terms of strategic capabilities. Stalk et al. further suggests four steps by which a company can transform itself into a capabilities based competitor.¹⁰⁶

¹⁰³ Kalling & Styhre (1999)

¹⁰⁴ Teece, Pisano & Shuen (1997)

¹⁰⁵ Stalk, Evans & Schulman (1992)

¹⁰⁶ Stalk, Evans & Schulman (1992), p. 64-65

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Four steps towards capability based competition
<ul style="list-style-type: none">▪ Shift the framework to achieve aggressive goals▪ Organize around the chosen capability and make sure employees have the necessary skills and resources to achieve it▪ Make progress visible and bring measurements and reward it into alignment▪ Do not delegate the leadership of the transformation

Table 4.3 Four steps towards capability based competition (Stalk, Evans & Schulman, 1992)

Even though this four-step model seems simple, it catches the essence of building capabilities. It deals with managing organizational resources and set shared goals that increase the competitiveness.

As previously mentioned development of capabilities follow unique paths with causal ambiguity. Hence, the capabilities often develop during a period of time without a clear purpose and without being identified.¹⁰⁷ Therefore, many companies find themselves possessing unique and valuable capabilities where the path is unclear. One challenge is to identify the lack of a specific capability and further to gain it by a systematic building approach. Within the scientific field of capabilities, there is a lack of theories that explains how to gain competitive advantage through building capabilities. Collis¹⁰⁸ states the impossibility to gain sustainable competitive advantages through a structured capability approach. Even though, it is important to reveal the mechanisms that guide the evolution of capabilities. To extract these mechanisms, Knowledge Management (KM) is presented in the next section.

4.9 Knowledge Management

The question of what knowledge is has intrigued some of the world's greatest thinkers. Yet, there is no clear consensus regarding the definition of this subject.¹⁰⁹ Even though, one can state that knowledge is relevant to firms, and that the right utilization of knowledge can create value. Sanchez et al.¹¹⁰ states that knowledge is fundamental to the ability to sustain the coordination of assets and capabilities in a way that promises to help a firm achieve its goals. The concepts of this approach are linked tightly with the capability approach. In general, they both tend to seek competitive advantages from an inside perspective of the firm. According to

¹⁰⁷ Eisenhardt & Martin (2000), p. 1114

¹⁰⁸ Collis (1994)

¹⁰⁹ Grant (1996), p. 110

¹¹⁰ Sanchez & Heene (1997)

Sanchez¹¹¹, knowledge is the set of beliefs held by an individual about causal relationships among phenomena. When a group have a shared set of beliefs about causality, that set of beliefs constitutes organizational knowledge.

Knowledge Management is, as previously stated, closely linked together with the capabilities theory. Knowledge Management is, as in the case with capability theory, in an early state of development. The scientific field of Knowledge Management approaches competitive advantages as arising from competences. From this perspective it tries to explain how competence is built within an organization. However the boundaries of this field are blurry and it can be seen as a way to build resources. We see the overlapping and the immaturity of the theories as an opportunity for develop each theory even further.

4.9.1 Mechanisms in Building Capabilities

There are many factors that successful building of capabilities depends upon. In general, these mechanisms deal with individual and organizational learning. Within the academic field of capabilities, there is an array of mechanisms that are used to describe the building of capabilities. These mechanisms describe various phenomena, such as individual learning, organizational learning and management processes that spread capabilities within an organization. The following section contains various mechanisms that are frequently used within RBV and KM literature. Since the different mechanisms have not been gathered and discussed thoroughly, a screening process has been conducted by the authors of this thesis. This section, including table 4.4, contains a synthesis of different mechanisms.

¹¹¹ Sanchez & Heene (1996), p. 9

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Mechanisms	Relevance for building capabilities
Codifiability	The formalization of experience into processes and routines
Practice	Learning by doing
Comprehension	The holistic understanding of causalities
Teachability	How easily a capability can be taught
Coordination	A management process that coordinate internal and external processes
Cooperation	A way of coordinating and integrating businesses
Mistakes	A trigger that can give a sense of urgency
Transferability	A skill to transfer a capability within an organization
Replication	Transferring and redeployment of a capability
Imitation	Replication performed by a competitor
Recombination	This is a means to combine knowledge in a new manner
Integration	The level of coordination between processes and activities
Reconfiguration	The change of assets in order to enhance competitiveness
Aggregation	The additively of new knowledge to existing knowledge

Table 4.4 Mechanisms in building capabilities
(Developed by the authors)

To enhance the understanding of the mechanisms, we suggest a classification of the mechanisms. We view learning mechanisms as one important category. These mechanisms are either inductive or deductive. Another category concerns the transfer of knowledge. When an individual has been taught e.g. a routine, the knowledge must spread into other parts of the organization. Finally, some mechanisms concern the application of knowledge. In addition to the obvious need of learning and transferring knowledge, it must be applied in order to create value.

4.9.2 Learning mechanisms

Inductive Mechanisms

Empirical research¹¹² has proved that repeated practice is an important learning mechanism for the development of capabilities. The practice often leads to explicit as well as tacit knowledge within the company. It helps people to understand processes and further to develop more efficient routines. Eisenhardt & Martin¹¹³ claim that

¹¹² Zollo & Singh (1998)

¹¹³ Eisenhardt & Martin (2000), p. 1114

mistakes can contribute to the evolution of capabilities. Success often fails to engage managers in learning from their experience, but major losses often raise a defense against learning. Thus, small failures often give managers motivation to learn, and cause individuals to pay attention to the problems that should be solved. These mechanisms are highly inductive since the both deal with “learning by doing”.

When conceptualizing the firm with a Knowledge Management approach, it is often seen as an institution for integrating knowledge. Thus, firms exist because they can create conditions under which multiple individuals can integrate their specialist knowledge. The market is unable to undertake this coordinating role because of the immobility of tacit knowledge¹¹⁴.

There is a discrepancy between different author’s interpretations of the role of an individual within an organization. Grant stresses that knowledge creation is an individual activity, as others view the organization as the entity that creates, stores and deploys knowledge.¹¹⁵ A framework proposed by Sanchez attempts to visualize the knowledge processes within an organization.¹¹⁶ The model identifies the emergence and integration of knowledge as dependent on learning cycles.

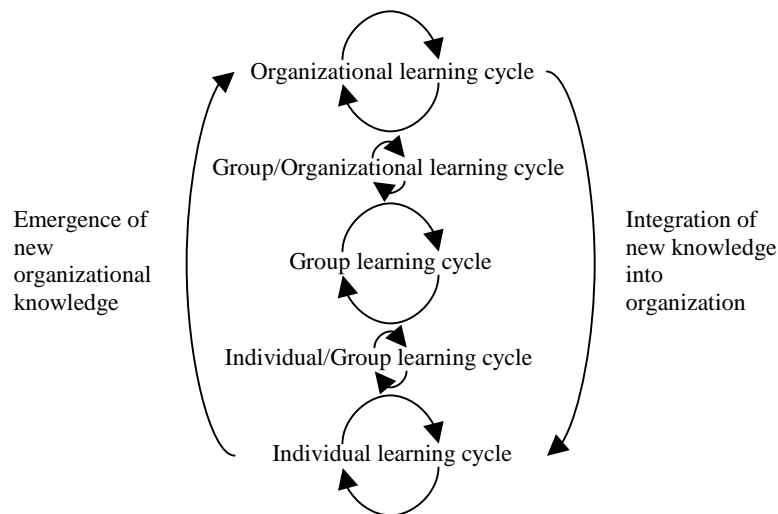


Figure 4.5 The five learning cycles (Sanchez, 2001)

Figure 4.5 above shows five learning cycles. The individual learning cycle consists of her knowledge and her interpretive frameworks. The smaller cycles represent modes of interactions between individual-group and between group-organization. By sharing the individual’s knowledge with this cycle, the knowledge can get embedded within

¹¹⁴ Grant (1996)

¹¹⁵ Grant (1996), p. 112

¹¹⁶ Sanchez (2001)

the group. The group learning cycle represents the routines and capabilities that are made of know-how and know-why processes.

The learning cycle model contributes with the identification of learning processes as important for creating and transferring knowledge. It touches on the aspect of creating and embedding knowledge as routines, which is a fundamental part of the capability concept.

Deductive Mechanisms

In addition to the inductive mechanism, some deductive mechanisms have been identified through the literature screening. Knowledge is not solely created through practice and mistakes, since analytic thinking can be a source of knowledge. Comprehension of causalities is an important deductive approach when building capabilities. When creating knowledge through an analytic process, one must have a holistic view of these causalities. It can be seen as a prerequisite for most learning, since one must understand the context in which knowledge is added.

4.9.3 Knowledge Transforming Mechanisms

The transferability deals with the speed of transfer of a capability. Firms compete through creation, replication and transfer of their own knowledge, but also through their ability to imitate competitors. Thus, the speed of transfer is a critical factor in order to gain a competitive advantage. According to Grant¹¹⁷, the transferability depends on whether the knowledge is explicit or tacit. Explicit knowledge is revealed through communication, and tacit knowledge through application. Further, the capacity for aggregation affects the building of capabilities. The knowledge absorption depends on the organizational or individual ability to add new knowledge to existing knowledge. The aggregation of knowledge is enhanced when it can be expressed in a common language¹¹⁸.

The coordinative mechanism deals with internal as well as external coordination. The growing literature on strategic alliances and supply chain partnerships implies the importance of coordinating activities and processes between companies in the network. The relevance of coordinating processes is evidenced through the fact that companies are seen as more than the sum of their parts. The cooperative mechanism affects the building of capabilities. By cooperating with other firms, a company can enhance the transfer of useful knowledge.

¹¹⁷ Grant (1996), p. 434

¹¹⁸ Grant (1996), p. 116

According to Zander & Kogut¹¹⁹, the degree of codification along with how easily a capability is taught has a significant influence on the speed of transfer. If a capability is teachable, it is easily communicated and thus easy to replicate or to imitate (See figure 4.6).

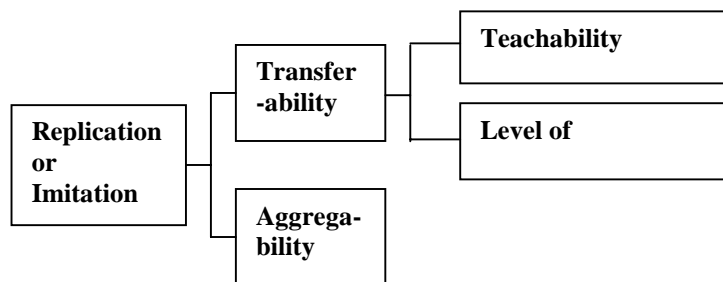


Figure 4.6. Connections between transformational mechanisms
(Developed by the authors)

The development of capabilities depends on the codification of experiences that is the transformation of experience into formal procedures and technology. Good codification skills make the experience easier to apply and improve the building of routines that help the company to deal with various situations. Thus, formalization mechanisms play a key role in the building of capabilities. If the capabilities are highly codified, thus not tacit, the possibility for competitors to imitate the processes increases.

To spread capabilities within an organization, one must cope with replication. This involves the transferring and redeployment of a capability from one area to another. Since the routines that build up the capabilities are quite complex, it is normally difficult to replicate capabilities.¹²⁰ Often, capabilities are built up by a set of routines, which impedes the ability to transfer capabilities. Further, organizational routines are often quite tacit. The phenomenon replication thus determines how the capability can be replicated within the organization, but also how readily the capability can be imitated by competitors. In competitive markets, the ease of imitation determines sustainability of a competitive advantage. Barney proposes the VRIO-approach as a means to measure the sustainability of a competitive advantage.¹²¹ In general, if a firm's resources are tacit, the harder it is to replicate it by the firm itself or by the competitors.

¹¹⁹ Zander & Kogut (1995), p. 76

¹²⁰ Szulanski (1996)

¹²¹ Barney (1996), p. 4

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Integration is a complex mechanism in which many capabilities are embedded.¹²² It deals with most mechanisms described and is a comprehensive phenomenon. The capability concept presented by Eisenhardt & Martin stresses integration as a key managerial process. Learning, individual as well as organizational, depends on a vast number of factors. The pace of experience also affects the evolution of capabilities. If experiences come too often, managers can get overwhelmed. This can lead to an inability to transform the experience into a meaningful learning, since the organization needs time to consolidate the learning. If the pace of experience is infrequent, the organization tends to forget previous experiences, which impedes the accumulation of knowledge. The pace of experience is thus a path dependent property.

¹²² Teece, Pisano & Shuen (1997), p. 518

5 Theoretical Framework

This chapter aims to take the first step towards the fulfilment of the purpose of this study, the development of a framework of how to build Supply Chain Management capabilities. This is done through the integration of previously presented Supply Chain Management and Business Strategy theories into a conceptual model. The outcome of this chapter is a preliminary theoretical framework which is based upon the conceptual model.

5.1 Linking SCM and Capabilities

Our view is that effective SCM is dependent on successful coordination of three flows, the physical, the financial and the information flow. According to the definition of capabilities that we proposed in the previous chapter, the SCM concept can be seen as a capability itself. In order to enhance the understanding of SCM capabilities, we propose the following definition:

“A Supply Chain Management Capability is the ability to build, integrate, coordinate and alter the physical, financial and information flows in order to enhance the value created in a supply chain”

The structured approach to managing supply chains proposed by Cooper et al include three basic elements; (1) Business processes, (2) Supply chain structure and (3) Management components. This model manifest the framework through which the SCM capabilities act. The purpose of SCM, and thus SCM capabilities, is to increase supply chain performance.

When assessing SCM capabilities of a firm, one should connect the framework of SCM with relevant characteristics of the capabilities approach. Therefore, the structural SCM approach is developed through the integration of capabilities and KM theories in the following chapter. As shown in figure 5.1, we view the path-dependent routines¹²³ as a main characteristic of capabilities.

¹²³ The definition of capabilities as processes, positions and paths are changed to routines, positions and paths. This is done to avoid confusion regarding the processes within the supply chain.

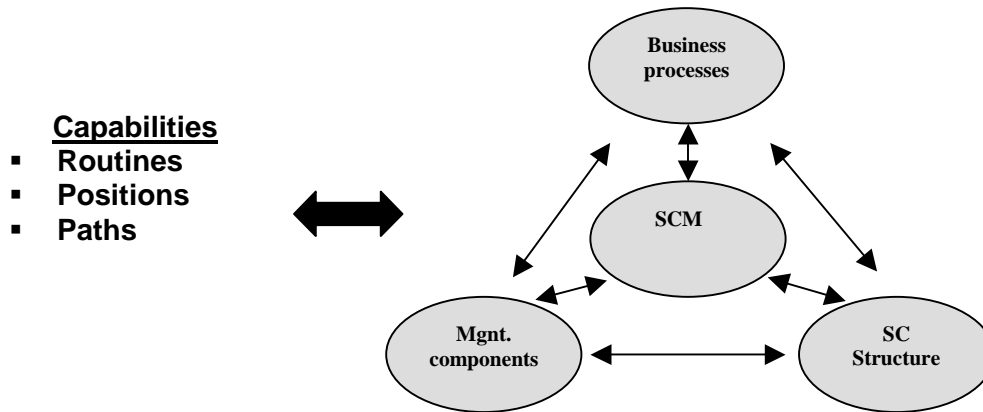


Figure 5.1. Comparison between SCM and capabilities

5.2 Conceptual Model - Integration of the Theoretical Aspects

Our view is that the SCM framework can be seen hierarchically as a means to distinguish different SCM capabilities. The capabilities have different features at different organizational levels, and by making a distinction, the way in which a capability can be acquired is better understood. We therefore propose the classification of supply chain capabilities into:

- **Management Capabilities.** Routines embedded in the managerial work structure
- **Supply Chain Structure Capabilities.** Routines embedded in relations and in structures for developing relations
- **Business Process Capabilities.** Routines related to operational activities

The capabilities in the business process level are often embedded as explicit routines, which describe the way to perform a process. Still, they are hard to recognize due to their complexity. Management capabilities deal with integration of the business processes. These capabilities are therefore less explicit and thus harder to recognize by a competitor. They resemble the concept of “the way we do things here” and are often hard to change. The structural capabilities are embedded in relations and partnerships, and span the organizational boundaries. The capabilities are presented in figure 5.2.

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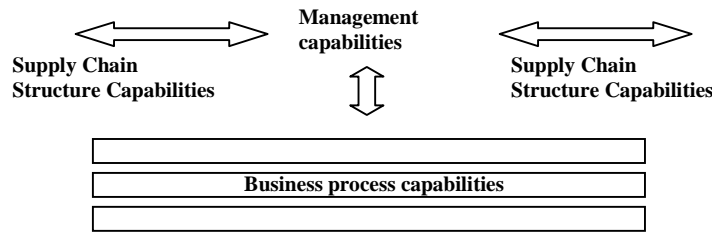


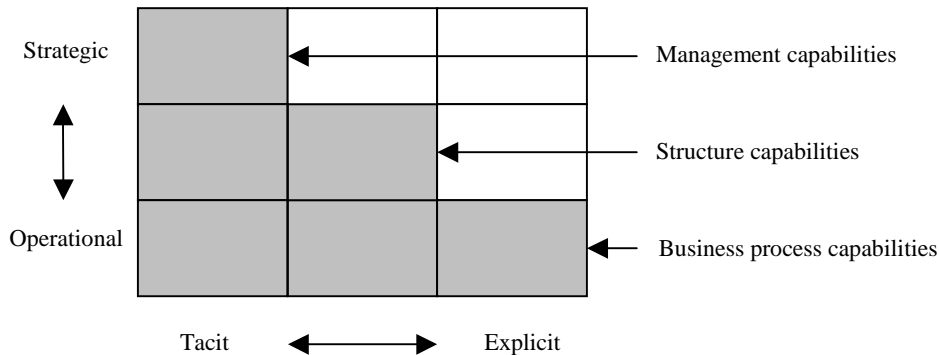
Figure 5.2. A basic conceptual model
(Developed by the authors)

One important aspect of the figure above is the top-down chain of command, when implementing SCM. Managers have a holistic view of the supply chain that is a prerequisite for successful implementation.

5.2.1 Defining the Hierarchy among Capabilities

It is difficult to make a clear cut distinction between the different contexts in which capabilities are utilized, e.g. the management capabilities are an important part of the business processes. On the other hand business process is not an essential part in developing management components. According to us, the degree of codification varies between the different forms of capabilities. Capabilities at Business Process level are embedded in work structures and thus more easily identified. Structural capabilities depend upon relations and are often very hard to change. Consequently, a hierarchy between capabilities can be discerned.

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*Figure 5.3. The proposed hierarchy among capabilities
(Developed by the authors)*

The management capabilities are based on tacit routines at strategic level. They are hard to reveal due to their complexity. The structural and business process capabilities are complex routines embedded in e.g. activities or relations. Their character range from tacit to explicit, some activities can show a high level of codification as some are complex and hard to understand. Structure capabilities are above Business process capabilities in the proposed hierarchy since it is important to know in what context the business processes capabilities should be developed. In other words, the processes must be defined prior to the optimization. Otherwise, there is a risk that the entire supply chain is sub optimized due to the optimization of the parts.

5.2.2 Management Capabilities

The proposed management capabilities have one main characteristic, comprehension. We define comprehension as the level of understanding of causalities in a complex system. We identify comprehension as a main determinant when building and evolving these capabilities. It is critical to understand the supply chain and the causalities in order to manage it. When understanding the phenomena, it can be implemented through codification of tacit processes and routines. Further, coordination or integration of processes demands understanding of the causalities that link them together.

Example: A management capability is the routines and processes at managerial level that can empower an organization. One example of a management capability is an effective management organization that enables a swift decision making process. Further, a management capability can be exemplified by decision structures that enable rapid response to market changes.

The management components as described in the SCM model contain processes that

are coordinative and integrative. At the same time, it fails to recognize re-
configurative processes as important for SCM. These components are essential since
they determine how the business processes, and thus the supply chain, are managed
and structured. The SCM framework lists a number of components that describes the
content of an effective supply chain. However, this content-based approach does not
explore the means to achieve good scores or how to build the supply chain
management structure. The planning and control of a supply chain is a skill that is
built up by a coordinative capability. To coordinate a supply chain, one must
understand causalities and learn to spread this knowledge within the supply chain.
The level of comprehension is therefore crucial to the planning and controlling
ability. The work structure is indeed dependent upon processes, as it evolves through
innovations and other changes. E.g. the corporate culture is a phenomenon that should
be seen as a product of routines, positions and paths. It is coordinative since it sets
informal rules regarding how individuals within an organization should behave. We
propose that capabilities are embedded in the management components as routines
and processes, which set the agenda for managers' ability to cope with the supply
chain.

5.2.3 Supply Chain Structure Capabilities

The supply chain structure refers to relations and partnerships with members of the
supply chain. Firms often participate in more than one chain and the characteristics of
relations differ. A relation is a phenomenon that develops over time along a path. This
feature makes the connection between capabilities and supply chain structure feasible.
Thus, relations evolve through routines that depend upon position and paths.

Example: A structural capability is the routines and structures in relations with other firms.
An example of a structural capability is the effective usage of an information technology
system, allowing increased sharing of information and a more effective supply chain. Note
that an IT system itself can not be a structural capability, only an effective tool to enhance
the "power" of the structural capability.

Since firms participate in more than one supply chain, it is costly to maintain equal
relationships with all supply chain members. A SCM capability must therefore
include processes for developing and reconfiguring relations, but also ways to

distinguish supply chain members of strategic importance. Important relations can e.g. be integrated through a partnership. Most important, all relations can not be offered the same level of commitment.

5.2.4 Business Process Capabilities

The business processes are the set of coordinated tasks that are performed by firms within a supply chain. The previously described management components are an underlying premise of the coordination and structure of the business processes. As the management components deals with coordination and integration between business processes, there is indeed managerial activities within the processes in order to coordinate and transform the process. The coordination can be seen as a result of the capabilities connected to the components, but one might ask whether capabilities are embedded in the more operational business processes.

As capabilities are characterized as routines dependent upon positions and paths, these processes can be seen as organizational routines that in a way are more complex and harder to identify than the business processes recognized in the SCM model. Since capabilities often evolve without intent, in a path-dependent manner, there is reason to believe that capabilities can evolve at a business process level without reaching the attention of managers. Further, it is reasonable that capabilities are embedded in the business processes as a result of managerial attempts to integrate these business processes. There must be a managerial objective to embed routines and processes within the business processes. The presence of routines at this level will simplify the business processes and help move the strategic decisions to management level. In the absence of routines, employees will often make wrong decisions due to lack of a holistic perspective. Our view is that, embedded capabilities will enforce the correct decision-making and thus, increase the performance.

Example: The business process level consists of the operational aspects of a company. The structural and managerial capabilities are important, but the business process capabilities are the means which creates tangible value. A business process capability can be a Supply Chain process that enables e.g. short lead times and responsiveness to customer demands. A business process capability can also be a production planning process that enables an optimal utilization of production resources with a pull approach.

The SCM framework proposed by Cooper et al recognizes seven business processes that are related to the financial, informational and physical flow.¹²⁴ With this

¹²⁴ See appendix A

approach, the SCM framework stresses the importance of processes as opposed to traditional functions. When the market is moderately dynamic, capabilities resemble the concept of routines. They are detailed and stable with relatively predictable outcome. One conclusion is that the individual business process can constitute a capability. These capabilities are more operational than the management component capabilities, as they primarily are related to solve a series of tasks in an efficient manner.

5.3 Adding Perspectives

The basic conceptual model entails the identification and classification of SCM capabilities. The model doesn't describe the process of developing capabilities nor does it relate to its strategic context. In other word it doesn't describe how capabilities should be related to each other or for what purpose they should be developed. It is therefore necessary to complement/integrate the KM perspective and the I/O perspective into the model.

5.4 The Knowledge Management Perspective

As stated above the building of SCM capabilities involves the identification and management of routines. The capabilities which are identified must be embedded within the organization. In this thesis, we approach this through the addition of a KM perspective. For this purpose, a series of mechanisms concerning learning have been classified.

5.4.1 Management Capabilities

Through assessing the concept of capabilities with a KM frame, a clear resemblance appears. Capabilities literature discusses the concept with vague terms as a set of processes, e.g. integration, learning and reconfiguration. Our view is that the management capabilities include transforming and learning mechanisms as instruments to achieve the strategic goals. The capabilities at management level are tacit and embedded in the minds of individuals, in decisions structures and managerial work structures. The incubator of most knowledge is the mind of individuals, and the challenge of a firm must be to spread this valuable knowledge within the organization. If knowledge is created at operational level, there is a managerial objective to identify, comprehend and to embed the knowledge as codified routines. Even though the knowledge is created at strategic level, e.g. as a vision of future goals, there is a need to implement these thoughts within the organization through

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codification. Thus, the below described process include the creation of knowledge, the transfer within the organization and the change of knowledge attributes.

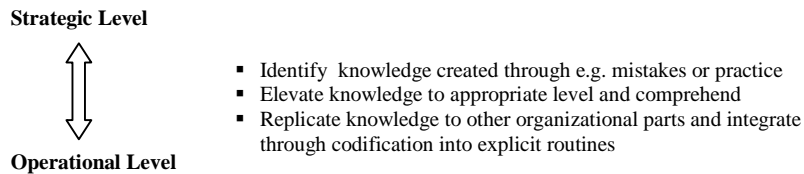


Figure 5.4 Management Capabilities
(Developed by the authors)

Furthermore, management capabilities can act through deductive mechanisms. Many decisions arise from analytical processes within the minds of managers. To enable this process, comprehension of causalities is crucial. The managerial decision to e.g. implement a supply chain organization is not made as a result of mistakes. Thus, many mechanisms are deductive and are the result of analytic thinking rather than “learning by doing”.

5.4.2 Supply Chain Structure Capabilities

With a supply chain perspective, it is critical to comprehend the entire supply chain. To assure supply as well as demand, managers must integrate across organizational boundaries and embed certain routines within important partners. Since relations with partners include routines and complex patterns of interaction, the relation itself can be seen as a capability. We identify the structural capabilities as the ability to develop, maintain and differentiate a bundle of relations, but also to extract knowledge from these. Since the structural capabilities deals with the scope and depth of relations, they can be described through the mechanisms of e.g. cooperation, imitation and integration. One advantage of relations is the ability to learn from each other, but also to gain knowledge stemming from the interaction. Furthermore, imitation of e.g. certain routines is a possibility that arises from relations.

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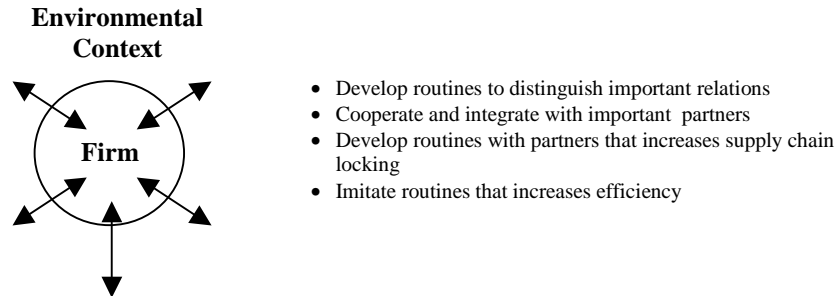


Figure 5.5. Structural capabilities
(Developed by the authors)

Thus, the structural capability contains creative as well as transfer- and change mechanisms. They are difficult to change since they involve external supply chain members that might be hard to affect.

5.4.3 Business Process Capabilities

At the business process level, capabilities resemble the concept of embedded routines that deals with operational activities. Through “learning by doing”, knowledge is created at this level about operational as well as strategic matters. Often, this knowledge is not shared with the rest of the organization. By transferring and codifying this knowledge, it can be shared with other employees.

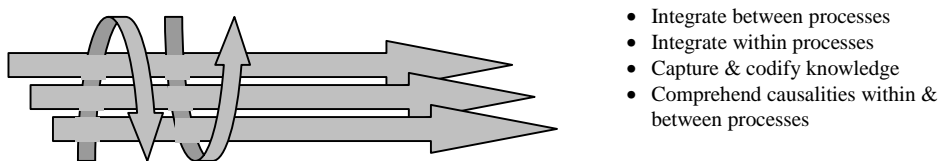


Figure 5.6. Business process capabilities
(Developed by the authors)

The aim of these capabilities must therefore be to capture the knowledge and transfer this to other organizational areas, e.g. through a best practice arrangement. Capabilities at operational level are often unknown to managers and must therefore be recognized through the managerial comprehension. To understand the underlying

routines of the capability and to make it visible for employees must also be a core concern of the business process capabilities.

The character of these capabilities may be quite operational. It can be e.g. an efficient set of routines within production planning or an effectively organized sales force. It can also be the modes of interaction between some departments leading to an efficiently utilized production capacity.

5.5 The Industrial Organization Perspective

When connecting RBV with I/O, capabilities can be seen as the dynamic processes that enable the achievement of the static goals postulated by the five forces. Thus, the static perspective provided by I/O influences the position that capability routines depend upon. By this we propose that the position is dependent on the current internal resource- and capabilities foundation as well as the external context.

Our view is that a five forces analysis can be fruitful when assessing the strategic context of either a firm or a supply chain. The bargaining power of suppliers and buyers affects the value sharing between supply chain members, but does not improve the overall value of the chain. If the buyer's price sensitivity is low, the seller can get a higher share of the value. This suggests that these customers should be linked tight. This linkage can be manifested through a value-adding solution. A value adding approach might increase switching costs for the buyer.

The threat of substitution deals with the market dynamics. In some cases, the firm can get in an obsolete position through the substitution of a product. This case can be avoided through technology lock in, but also through a rigid market pull product development. Further, an integrated supply chain that benefits the members could make substitution threats obsolete through supply chain lock in. By this we propose that relations have developed through path-dependent processes, which involves various investments that contribute to an overall stability of the supply chain structure.

The entry barrier of a market depends on e.g. capital requirements and the absolute cost advantages. The access to distribution channels as well as the existing relations within the markets set the possibility to enter a market. When the distribution costs constitute a high share of the total product value, SCM becomes an important issue. Further, a differentiated SCM solution may provide an obstacle for entries.

The force called rivalry between established competitors' deals with the competition between actors at the same level within different supply chains. The diversity of competitors decrease the competitive level since the offered solutions have less

similarities. Thus, an integrated supply chain makes the offered product more of a solution and less of a commodity. The rivalry between competitors indeed depends on the capacity and cost structure. When the balance between demand and supply is poor, different costs arise. Due to leverage, profitability tends to vary more than the sales. An effective SCM can cope with market fluctuations and stabilize the capacity-demand interrelation. The five forces framework explains how SCM capabilities can improve competitiveness of a firm, further it is a means to explore the strategic context that a firm is facing. The forces affect the supply chain and it should be a managerial objective to increase the supply chain competitiveness by adapting to the industrial environment.

5.6 The conceptual model

The theoretical framework below describes the authors view on a supply chain capabilities organization, which continuously improves processes in order to evolve the SCM. One main feature of the conceptual model is the hierarchy among capabilities. There is a top-down structure in the conceptual model due to the need of supply chain comprehension. The “choice” of building and developing supply chain capabilities is made by managers and is further imposed on the organization.

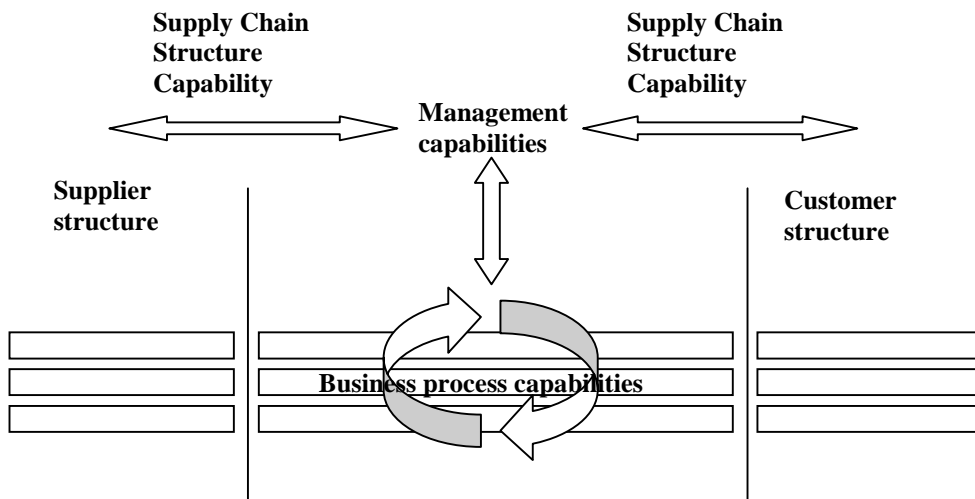


Figure 5.8. The SCM Capabilities Organization

The conceptual model recognizes several KM mechanisms as important for building SCM capabilities. Behind these lies a more or less tacit process such as codification of knowledge into routines and directives. Furthermore, the model stresses processes

as important for building capabilities. Hence, it recognizes that SCM capabilities are built along the axis of time.

5.7 The SCMC Quadrangle

The conceptual model, presented previously in this chapter, highlights the integration of capabilities and SCM. The theoretical focus of the model makes it difficult to apply in “real life”. To enable a more practical use, and increase the relevance of this study, we have put the conceptual model in context through a systematic framework, the SCMC-Quadrangle. The framework must not be seen as a snapshot of a SCM project. Contradictory, the theoretical framework is structured as a process, in a longitudinal way. This means that it considers the process of how to build SCM capabilities as dependent on previously developed capabilities and resources.

Since the conceptual model was created to increase the comprehension of SCM capabilities, it constitutes the foundation of the framework. The aim of the SCMC-quadrangle is to act as a tool for managers when developing and /or modifying SCM with regards to the three flows within the chain. This means that the ultimate goal with the SCMC-quadrangle is to optimize the three flows with regards to the entire supply chain.

The preliminary theoretical framework will subsequently be enhanced according to the findings in our empirical case study at the Industry Division in order to increase the practical relevance of the framework. The basics of the preliminary theoretical framework are visualized in figure 5.9 below.

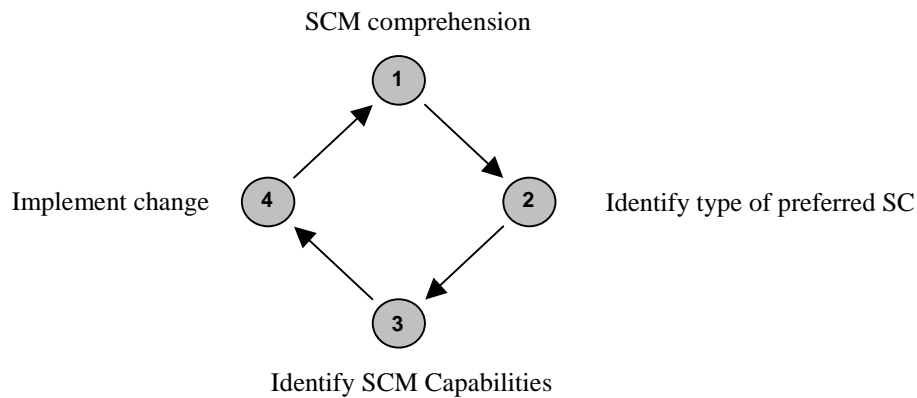


Figure 5. 9 The basic elements of the SCMC - quadrangle

As shown in the figure, the framework of how to build SCM capabilities consists of four major steps. The four steps follow a structured sequence, which all together constitute the preferred way to build SCM capabilities. It is important to understand that it is the total sum of SCM capabilities within the organization that travels through the steps of the SCMC-quadrangle. The conceptual model should be considered in all four steps even though different parts are emphasized throughout the process. Another important thing that must be understood is that the SCMC-quadrangle merely treats the question of how to build SCM capabilities. It doesn't provide a tool for how the supply chain should be structured.

5.7.1 Step 1 – SCM Comprehension

Since management comprehension of SCM has been identified as a capability that is highly significant to the outcome of a SCM implementation, this constitutes the first step of the theoretical framework. In other words it is important to understand the effects that the three flows within SCM have on the competitiveness of the firm. Furthermore, the support of management must be stressed since SCM demands that the entire firm works aligned with the strategy, a disturbance in one area can affect the entire SC function. Thus, the first step stresses the capability that is defined as upper in the hierarchy, i.e. Management Capabilities.

Identification of the current supply chain is another important part of this first step. A firm must know its current situation in order to understand how to modify the supply chain. This can be done through qualitative as well as quantitative measures. Questions that should be answered are: “What are the costs associated with warehousing?”, “What level of service do we provide?” “What does the cost structure in the production look like?” etc. Business process mapping is an effective tool to answer these questions since it reveals all the activities within the firm. Thus, all value adding activities are identified.

5.7.2 Step 2 - Identify Type of Preferred Supply Chain

In order to respond to changes in the environment, the company must modify its current supply chain. First, the firm must identify the appropriate type of supply chain. This step sets the prerequisites for much of the subsequent work when restructuring the supply chain. The preferred supply chain should be shaped with regards to certain parameters such as products, cost structure and market demand since these factors determine how flexible, quick and cost efficient the supply chain must be.

An effective way to identify the preferred supply chain is to conduct a cost-benefit analysis of the trade-off between flexibility and cost-efficiency. This means that in order to be flexible and responsive, a firm must have a high capacity, which increases the cost of production. This analysis provides a good picture of the alternatives through the mixture of quantifiable and qualitative questions.

According to Fishers theory regarding responsive versus efficient supply chains, which was presented in chapter three, the attributes of the product is an important parameter to consider when deciding on how to structure the supply chain.

The cost of warehousing, i.e. cost of capital, depreciation, insurance, cost of warehouse control etc, is another parameter that must have a high impact on the decision.

The output of step two should be a description of the preferred structure of the supply chain. This description is an important input to the subsequent part of the SCM capability building process.

5.7.3 Step 3 - Identify SCM Capabilities

Subsequent to the identification and description of the preferred structure of the supply chain, the capabilities that are needed should be identified. This should be done according to the proposed hierarchy of the conceptual model presented in chapter 5. According to us, there is logic in a usage of a schematic way of identifying the different capabilities since some are needed to understand and identify others. The hierarchy implies that the following sequence of work is the most appropriate.

Management capabilities

Since the prerequisites of the preferred supply chain are already set, the first capabilities to identify consider the strategic context of the supply chain, i.e. management capabilities. The understanding of the management capabilities that are needed makes it easier to identify more operational activities, in other words it is essential to develop capabilities that provide comprehension of causalities among activities within the business processes.

Structure capabilities

The second group that should be identified is structure capabilities, since these enable a fit between the parties within the supply chain. That is, the structure capabilities determine the effectiveness of the firm's SCM. As the structure defines how firms interact these capabilities shape the operational business processes that are dependent on the overall structure. Hence, these capabilities must be identified and developed prior to business process capabilities.

Business process capabilities

The last group of capabilities considers the operational aspect of the supply chain. These capabilities influence the efficiency of the business processes throughout the supply chain. This means that they to a high degree are focused upon optimization of processes and activities. It is in this area that the results of SCM are revealed since it is easier to measure improvements in this area. Although the business process capabilities are at the bottom of the proposed hierarchy, they are just as important as the other two groups of capabilities.

The output of the third step should be a complete list over the capabilities which are needed in order to develop a successful SCM structure.

5.7.4 Step 4 – Implementation

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The implementation phase, despite its name, doesn't include the practical part of operating the supply chain. Instead it consists of the codification of capabilities into the organization. It is in this phase of the framework that the area of knowledge management plays its most significant role. The main effort in this step is to spread the SCM capabilities in the entire organization, i.e. how should management distribute new capabilities in the organization and how should they utilize existing knowledge within the organization. The practical part in step four consists of a series of questions such as: "How will existing capabilities be distributed in the organization?", "How must the implementation process be presented to gain acceptance in the organization?" In table 5.10 we propose a guideline of things to consider when implementing supply chain capabilities.

<i>GUIDELINE</i>
<ul style="list-style-type: none">▪ Involve management team early▪ Recognize path dependencies and understand the complexity of changing embedded routines▪ Set up a vision of what to accomplish with SCM▪ Give middle managers holistic view of supply chain and embedded interrelations in order to avoid functional silos▪ Implement SCM thinking within the entire organization▪ Connect strategy concerning logistics to operational measures in order to avoid strategic decision making by operational employees▪ Codification by written rules and directives is important but not sufficient

Table 5.10. Guideline for what to consider when implementing SCM capabilities

It is critical to highlight that the process doesn't end with the implementation phase. Having done everything right in the SCMC-quadrangle the firm should continue to develop capabilities in line with the process structure of the framework. The process is intended to be iterative, and the continuous improvement of the processes should be a never ending story.

PART III – EMPIRICS AND ANALYSIS

The third part of this study contains three chapters; Empirics, Analysis and Conclusions & Implications. The aim of the leading chapter is to present the empirical case study from the Industry Division of SCAP Denmark. In the Analysis chapter the preliminary theoretical framework, the SCMC-quadrangle, is compared with the case study, and similarities and differences are described and analyzed. Furthermore, this chapter aims to improve the theoretical framework according to the findings from the comparison with the empirical case study. In the last chapter of this thesis, Conclusions & Implications, we discuss the theoretical contribution and the validity of this study. Also, suggestions of further research are presented.

6 Empirics

This chapter aims to describe the empirical case study from the Industry Division of SCAP Denmark. First, the European packaging market is presented briefly in order to provide an overall understanding of the market situation. This is followed by a description of the SCA Packaging business area and the Danish Industry Division. Furthermore, the effects of the changing corrugated market are described, with emphasis on the problems facing the management within the Industry Division. Concluding, the Supply Chain Management project within the Industry Division is presented more thoroughly.

6.1 The European Packaging Market

The total European packaging market is worth about SEK 950 billion. The market is divided into two areas; primary packaging and transport packaging. The transport packaging segment, where SCAP mainly is active, is worth about SEK 200 billion. In this segment, corrugated board packaging has a market share of 62 percent, and is worth approximately SEK 120 billion.¹²⁵ The corrugated industry within Europe consists of more than 500 companies and the net sales are forecasted to grow with about three to four percent during the next five years.¹²⁶ In other regions such as China, the market is expected to grow with the general economic growth in the region. E-commerce is also expected to increase the demand for packaging solutions.¹²⁷

6.2 SCA Packaging

Since 1990, SCAP has been a strategic business unit within SCA, together with Hygiene Products and Forest Products.¹²⁸ With its head office in Brussels, Belgium, SCAP has adopted the SCA group's aggressive expansion strategy, which has resulted in a growth of approximately seven times the speed of the total market growth.

SCAP's vision is "more than a box", which means that they should strive for not only create value with simply providing a box, they should try to add value that exceeds the value of the box. The value adding approach is exemplified through e.g. high-

¹²⁵ SCA Annual Report 2001, p. 24

¹²⁶ SCA Annual Report 2001, p. 25

¹²⁷ SCA Annual Report 2000, p. 26

¹²⁸ For a presentation of SCA, see appendix B

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resolution printing and through logistics services. The goal is that SCAP shall try to provide complete packaging and transport solutions to their customers. Still, the common products without these features constitute the majority of the products sold. Table 6.1 presents SCAP's current situation in numbers.

Key figures SCA Packaging ¹²⁹	2001	2000
Net sales (MSEK)	29.230	24.636
Operating cash flow per stock (SEK) ¹³⁰	19,10	11,66
Strategic investments (MSEK)	4.192	2.118
Average number of employees	20.680	18.346
- Corrugated board	18.065	15.770
- Container board	2.103	2.081
- Other, Deliveries	512	495

Table 6.1. SCAP in figures

6.3 Organization

SCAP is divided into two vertically integrated business units, Corrugated Board (SCA Cr) and Containerboard (SCA Cn), briefly described in the sections below.

6.3.1 SCA Containerboard

SCA Cn produces the paper for the production of the outside layer of the corrugated board and the corrugated inner layer. SCA Cn purchase raw material from SCA Forest Products. SCA Cn produces two qualities: For the outer layer SCA Cn produces kraftliner based on fresh fibre and testliner that is based on recycled paper. For the inner corrugated paper SCA Cn produces fluting based on fresh fibre and *medium* that is based on recycled paper. SCA Cn supplies approximately 2/3 of SCA Cr total demand for different kinds of qualities. Thus, SCA Cr is the major customer as they buy half the volumes produced by SCA Cn. The internal sales are done to market spot price.¹³¹

¹²⁹ SCA Annual Report 2000, p. 25

¹³⁰ Operating cash flow divided by total number of shares

¹³¹ SCA Annual Report 2000, p. 28

SCA Forest Products partially provides both qualities of raw materials, the fresh fibre through internally managed forests and the recycled paper through the company's recycle operations. SCA Forest Products is Europe's leading producer of corrugated board raw material.¹³² Nevertheless, they sometimes can not fulfil the demand of SCAP that accordingly buys parts of their volume of raw material from external suppliers.

6.3.2 SCA Corrugated Board

The production of corrugated board is divided into two steps. The first step includes the corrugation of the inner layer, fluting or medium, and the integration with the outer layer, kraftliner and / or testliner. In the second step the corrugated board is converted into pre-cut and pre-printed boxes. These two steps can be made in three different plants; Sheet Feeder, Sheet plant and Box plant.¹³³ The Sheet Feeder plant produces the corrugated board, the first step in the production. A sheet plant does the second step, i.e. conversion and printing. A Box plant combines the two steps in one factory.

6.4 SCAP Denmark

SCA had an early market presence in Denmark, with acquisitions as early as 1964. This division had a short history and it wasn't until recently that SCAP had a serious presence in Denmark. When SCAP decided to enter the Danish market in 1999, they went in big with two major acquisitions. With the purchase of the two former competitors DanaPak A/S and Danisco A/S, SCAP Denmark (SCAPD) was formed. SCAPD went from a non-existent market share to situate the largest single market presence in the entire SCAP, with 44% of the total packaging market in Denmark. Another acquisition was made in 2000 to further increase its market dominance, Søren Berggreen Display A/S.

Today SCAPD is the packaging supplier with the widest product range within the Danish market. Besides the corrugated board, they offer a variety of products such as displays, cardboards, packaging systems, plastic packaging systems and equipment for punching machines.¹³⁴ SCAPD currently has 19 production and marketing facilities and employs some 1500 people. The SCAPD organization has a complex structure that is divided into seven divisions.¹³⁵

¹³² SCA Annual Report 2000, p.28

¹³³ For a visual presentation of the production process see Appendix E

¹³⁴ <http://www.scapackaging.dk/forretningsomraader>, 2002-01-27

¹³⁵ See Appendix C for a presentation of the divisions within SCA Denmark

6.4.1 The Industry Division

The Industry Division has its origin in the Danish corrugated board manufacturer Danisco A/S. The division consists of two box plants, one in Stevnstrup and one in Taulov, both on Jutland. Prior to March 15th 2002 there was an additional member of the Industry Division, namely a box plant in Brøndby just outside Copenhagen, on Zealand. The Industry Division also consists of two sales offices, Sales West and Sales East, located in Stevnstrup and Brøndby. Earlier, when the Brøndby plant still was running, Sales East was responsible for Brøndby while Sales West was responsible for Stevnstrup and Taulov. The two sales offices are now jointly responsible for the two remaining production plants.

The two plants within the SCAPD Industry Division serve different kinds of customers since they are not specialized in the same type of products. The box plant in Stevnstrup mostly manufactures large boxes, often without printing or with simple printing. A large part of their customers are industrial suppliers. Examples are furniture manufacturers, which deliver to IKEA, and manufacturers of industrial equipment. In Taulov, the plant is mainly concerned with the manufacturing of small boxes, often with advanced printing techniques. These boxes are primarily used when delivering to final consumers. Thus, the boxes also have a commercial value as the carrier of e.g. brands and logotypes. The most prominent customers in the Taulov plant are manufacturers of fast moving consumer goods, like various beverage, food and hygiene product manufacturers. The boxes produced in Taulov are mainly innovative since their life cycles are short and they provide a value-adding concept. The boxes made in Stevnstrup are to a more extent functional since they are more common and standardized. Pareto's law¹³⁶, or the 80/20 rule, is applicable for both Stevnstrup and Taulov. This means that a small part of the customers, approximately 20 %, account for a considerable part, 80 %, of the total sales volume.

Prior to the shut down of the Brøndby plant, the Industry Division was an enterprise with excess capacity taking every order from all customers to maintain the position as the market leader with a 40% market share. The resources became scarcer with just two production plants. Thus, the firm must somehow prioritize to better utilize the available production capacity.

6.4.2 The Previous Organization

Prior to the organizational restructure, the Industry Division consisted of two main departments, which were managed by the production manager and the sales manager.

¹³⁶ Coyle, Bardi & Langley (1996), p. 179

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As visualized in figure 6.2, supporting functions included finance, IT and human relations.

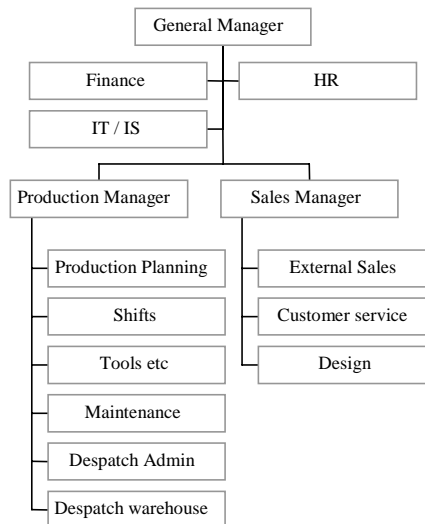


Figure 6.2. The previous organization

SCAPD's functional organizational structure constituted a problem, since conflicts of interests between the different functions arose. As indicated in figure 6.2, there was no one within the previous organization that was responsible for the entire process from order to delivery. This meant that managers tried to improve the process within their "own" department, not focusing on what was best for the entire Industry Division. Furthermore, the understanding of the whole business processes was inadequate due to the "functional silos" which lead to sub-optimization of the firm.

6.4.3 The Order

The trigger in a production process is the order. The order and its embedded characteristics have severe impact on the business processes. By changing the parameters of an order, the production can become e.g. more or less flexible. In table 6.3, the authors' view of relevant order parameters is presented. Depending on the type and sequence of orders, the processes can be less or more optimized. Products have different architecture that affect production lead times and set up times in addition to costs. Furthermore, the length of an order is significant for e.g. cost efficiency, and can offer economies of scale. Due to time compression in the value chains, lead-time is crucial for competition on the market.

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ORDER COMPONENT	
Product Type	Orders with similar product architecture can be produced in a row in order to reduce setup cost
Number of Products	A big order can be split into parts and be produced separately as a means to moderate the capacity utilization fluctuations
Lead Time	The series can be produced during low capacity utilization in order to flatten the production
Overall Deal with Customer	Treaties with the customer can increase information sharing regarding order processing and diminish uncertainty
Type of Order	Make-to-stock orders can be used to level out production fluctuations

Table 6.3 Parameters of an order

6.4.4 The Production Philosophy

The production philosophy has a big impact on stock levels, among other things. A “make-to-stock” system can be used to absorb market fluctuations, as the higher stock levels flatten the production variations.¹³⁷ The “make-to-order” system contributes to a lower level of finished goods, and further to lower costs associated with obsolete goods. SCAP has a mix of production philosophies, there is a key focus on make to order but they also, to some extent, store products for selected customers.

6.5 The Order Process

During a year, the Industry Division receives approximately 30,000 orders.¹³⁸ The order process, as presented below, is described with a box plant as the ones in Stevnstrup and Taulov in mind. The former lead-time for SCAPD was 16.5 days.¹³⁹ The order process can be described, for the Stevnstrup factory, as follows:

¹³⁷ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-03-15

¹³⁸ Kalling, Madsen & Buus, The supply chain function, Industry Division (Internal presentation)

¹³⁹ Ibid

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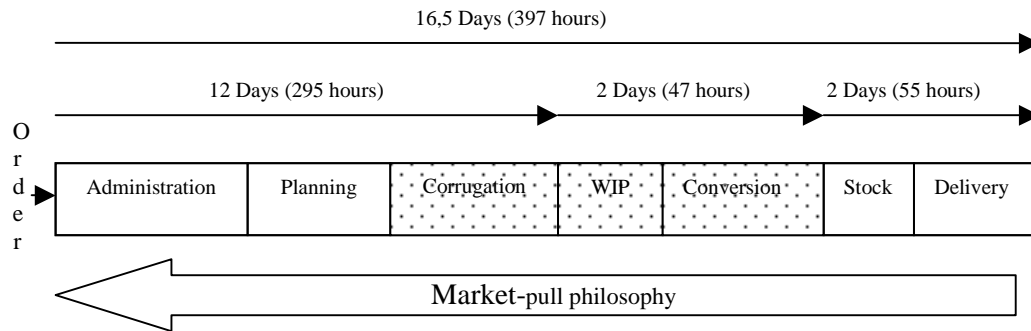


Figure 6.4 The overall lead time composed into administrative, production and outbound logistics

The figure above shows the overall lead time decomposed into administrative, production and outbound logistics lead times. The production pull arrow shows the internal view of the processes. According to some persons within the Industry Division management, the former production process had a clear “pull” characteristic.¹⁴⁰

6.5.1 Administration

Prior to the reorganization the administration process within the Industry Division consisted of:

External and Internal Sales

The external sales functions were not geographically limited to any specific factory. Internal sales were situated in Stevnstrup and Brøndby. The sales personnel offered predetermined lead times depending on the quality and specifications of the product requested. The sales force acted without an explicit sales strategy.¹⁴¹ During a year, the total sales of the Industry Division vary according to figure 6.5 below. The demand was quite predictable, with distinct drops of sales in summer and at Christmas. Still, problems concerning the demand structure existed due to variations in the shorter perspective that affected the overall planning and production process.¹⁴²

¹⁴⁰ Björn D. Hansen, Production Manager, Taulov, 2002-03-15

¹⁴¹ Henrik S. Madsen, Sales Manager, Sales West, 2002-04-15

¹⁴² Henrik S. Madsen, Sales Manager, Sales West, 2002-04-16

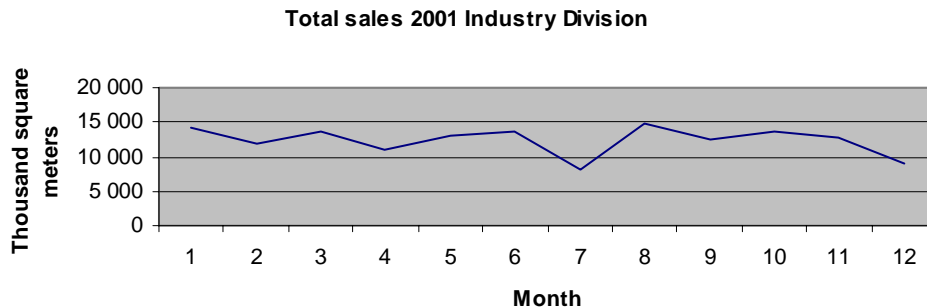


Figure 6.5 Total sales year 2001

Customer service

Customer service function includes functions related to the construction of the product, i.e. Quotations, Finalization, Enquiries, Construction and Graphics etc. The time consumed in this stage is dependent on the costumers' requirements, i.e. if there is a straight re-buy there are finished specifications on the products.

6.5.2 Production planning

The production planning process was divided into two areas, planning for the corrugation process conversion process. Although separated from each other, the two functions cooperated to optimize the production capacity. The first thing a production planner had to take into consideration was the date of delivery. With this day in mind the production planner optimized the production.

6.5.3 Production

Corrugation

Corrugation constitutes the first step in the production phase where the corrugated paper is made. The inputs are various kinds of paper qualities and the output is corrugated sheets. This is a large-scale process that must be optimized in order to reduce waste. The figure below shows the fluctuations of corrugation during year 2001 for the factory in Stevnstrup.

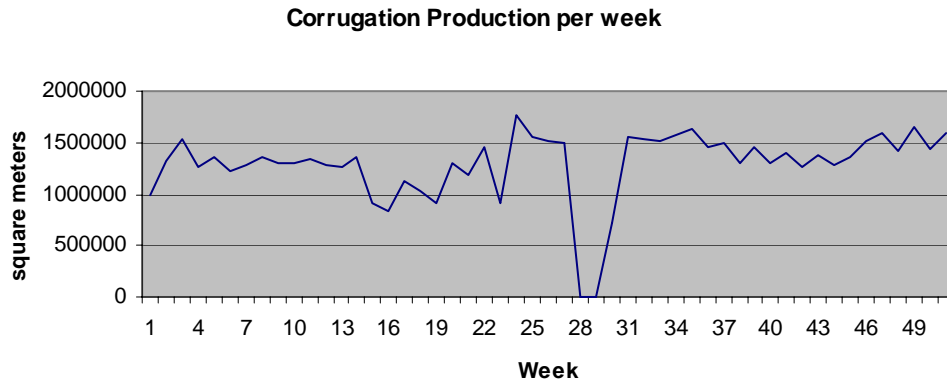


Figure 6.6 Corrugation per week

The production of corrugated board fluctuates much over a year, as shown above. When comparing the length of series with the output efficiency, the correlation is minimal. Thus, the overall output efficiency does not depend on the length of series, within the current range of series-length.

Work in progress

Work in progress (WIP) is the stock between the corrugation machine and the conversion machines. The material in the WIP can be sold separately to other companies, within SCAP or to external customers.

Conversion

This is the last step in the production phase. This is the process in which the corrugated sheet becomes different kinds of packaging solutions, i.e. boxes of different sizes and with different prints. For this purpose, the factories have a variety of machines, e.g. cutters and printers that can differentiate the corrugated sheet into customized products.

Stock of Finished Goods

This stock stores the finished goods before the distribution phase. The stock capacity for Stevnstrup is approximately 550,000 square meters, depending on the types of

products.¹⁴³ SCAPD also keeps stock for certain customers. This equals the sales of 3.5 days. Therefore, external stock capacity must be acquired in order to store the finished goods. The figure below shows the variation of stock size during year 2001 at Stevnstrup plant.



Figure 6.7 Stock size finished goods Stevnstrup plant

The figure shows that stock size peaks in summer and at Christmas. This reflects the shut down of certain customer plants. Since the stock size exceeds the internal stock capacity of 3,6 days, external capacity must be hired. This incurs cost for extra warehousing as well as for extra transportation.

The costs and benefits of an increased stock of finished goods (FG) depend on several parameters. Within the Industry Division, there was a lack of knowledge of the costs associated with increased stock. They believed that a higher level of FG would help optimizing the production and thus make the production planning process easier.¹⁴⁴ Furthermore, it would decrease the variance of production. SCA Industry Division also highlighted the reduction of the overtime of staff as a potential benefit from a smoother production process. Although, the absolute sum of benefits were unknown, and the costs associated with keeping higher stock of finished goods within the company were unclear.

¹⁴³ Laila Skipper Buus, Head of Planning Dept., 2002-04-15

¹⁴⁴ Ibid

6.5.4 Delivery

The entire delivery services in Denmark are outsourced to Honore, which is a transportation firm that used to be a part of the Industry Division. Although not within the company's borders, Honore enjoys an understanding of SCAPD organization due to the fact that they used to be a part of the organization.

6.5.5 The Divergent Production Flow

One main characteristic of the corrugated board production is the divergent flow of materials. Most manufacturing companies have a convergent flow of materials, which implies the need of an effective inbound logistics. The input in SCAP's plants is a number of different paper qualities and the output consists of a large variety of boxes. There is a high level of customization on the products and just a smaller fraction of the product range is standardized. Thus, it is hard to keep stock for all products and customers.

6.6 Problems within the Industry Division

The Industry Division of SCAP Denmark previously faced, and in some cases still face, problems and threats. The problems and threats are both external and internal. Some problems concern production and stem from e.g. the shut down of the Brøndby plant. Others arise from the market position as well as the structural changes in the market.

6.6.1 International Competition

For a long time the Danish corrugated industry has been stable due to stable customer requirements and minor, domestic as well as foreign, competition. On the European continent, on the other hand, the competition has been fierce resulting in massive price reductions. This has forced the European manufacturers to focus on effectiveness and efficiency, with reductions in lead times as well as cost structures as a consequence. The manufacturing costs on the continent are now significantly lower compared to the Danish market. Lower cost structures have enabled a wider geographical reach for the international competitors, i.e. they are able to compete in a more scattered geographical area. This has allowed competitors from e.g. Germany to enter the Danish corrugated market. The new international actors with more customized products have created broader product ranges and thus increased the

competition within the corrugated market.¹⁴⁵ It is clear that SCAPD is faced with a strategic problem with the increased competition that has forced an ongoing transformation of the Danish market to a more continental market structure.

6.6.2 Seasonality and Production Fluctuation

The Danish corrugated industry faces increase in market demand during the summer month. This phenomenon called market seasonality arises from the fluctuations of certain consumer goods, e.g. beverages and vegetables.

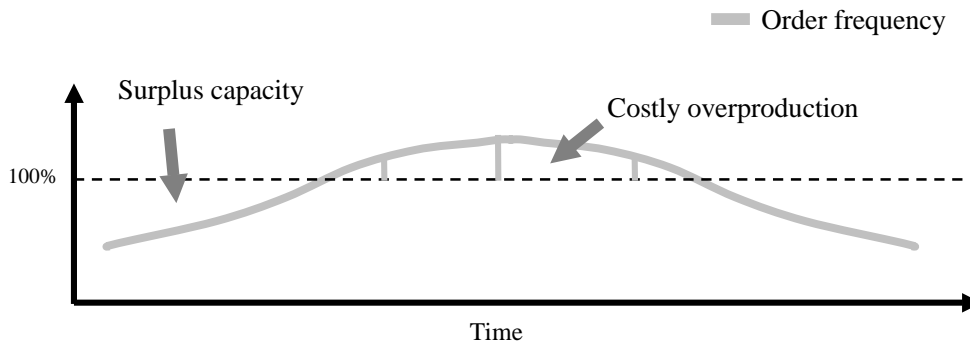


Figure 6.8 Seasonality

The result of the seasonality is an increase in overtime and the use of extra personnel, resulting in a higher cost of production. Along with the market seasonality, there is a fluctuation in the production capacity. This is caused by the fact that overtime work force is less productive compared to the regular employees. This reduces the capacity when production uses extra personnel. It is especially the vacations during the summer that put an extra burden on the production and decreases the capacity.

Hence the causes to the problem during the summer months are the effects of the market seasonality and the production fluctuation. Both combined put a lot of strain on the production.

¹⁴⁵ Internal presentation of the SCM project

6.6.3 Different Cultures within the Organization

The Industry Division has, in addition to the exposure of external problems, had a set of embedded internal problems. The problems are connected to the organizational structure and the work processes.

The organization prior to the SCM organization had an embedded complexity. Due to lack of communication the value chain was sub-optimized. In the former organizational structure there were too many decision-makers with responsibility for parts of the supply chain. The organization had strong forces acting towards gaining benefits for specific departments, e.g. sales or production. Due to this fact, no one that was responsible for the entire business process, ensuring the holistic treatment of an incoming order. One contributor to this problem has been the lack of a shared corporate culture. This was probably a result of the divisions shattered history.

6.6.4 The Organizational Structure

As acknowledged above, SCAPD's functional organizational structure constituted a problem, due to the conflicts of interests between the different functions. This has complicated the communication between the different functions. The interactions between the functions are a result of the shattered organization and the lack of a corporate culture. Further, the managers in the separate functions have strong personalities that have further contributed to the communication difficulties. An example of this is the problem that the sales functions experience, i.e. the difference in opinion about how to run the organization. According to the sales manager, many persons tried to convince the sales personnel that their customer or order was the most important. Hence, too many exceptions from the ordinary routines were made. The conflict within the organization was a major threat to the implementation of the new organization.

Furthermore, the different plants within SCAP have strong leaders with profit responsibility. Due to this fact, Industry Division has not focused on reducing costs. Instead, they have tried to solve problems through expansion and through providing value adding solutions. These solutions often have considerably higher costs than a normal offer, thus making the profit of a value adding solution equal to normal products.¹⁴⁶

¹⁴⁶ Thomas Kalling, Assistant Professor Lund University, 2002-04-12

6.6.5 Customer Strategy

The Industry Division has an overall strategy that focuses on keeping their 40 percent share of the Danish market.¹⁴⁷ Thus, they focus mainly on retaining high volumes instead of assessing the value of the individual customer. As illustrated by the chart there are clear differences in lead-time. Hence, the cost of producing varies to some extent with the different customers.

Furthermore, the relation between the Industry Division and another firm within SCAP Denmark, Packaging Services is problematic. This firm is a major customer of the Industry Division. Packaging Services has contradictory to other firms, direct access to the production planning systems within the Industry Division. This means that they do not have to go through the ordinary routines when making an order. This fact makes the planning process within the Industry Division even more complex. Also, it creates misunderstandings regarding whether Packaging Services is a customer or a part of the Industry Division.

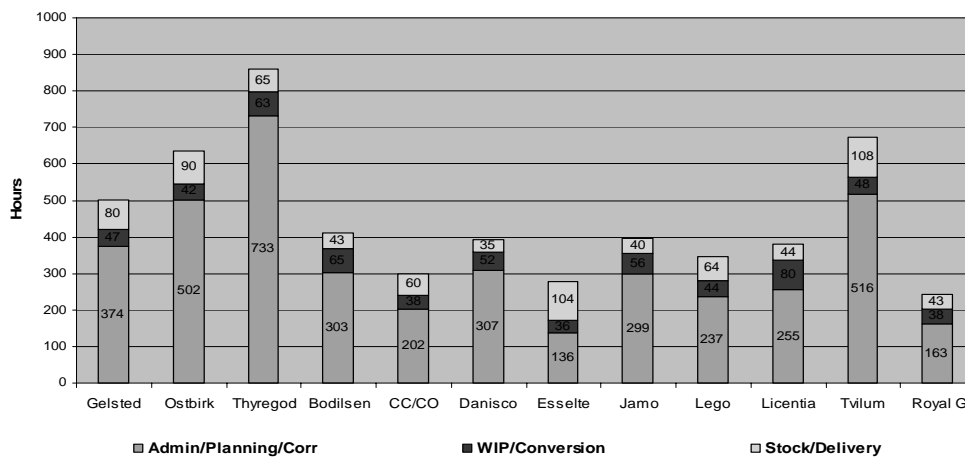


Figure 6.11 Lead times for selected customers

The problem is that the sales team lacks an instrument for prioritizing customers. There are no clear rules set by management regarding how to prioritize and choose the “right” customers in order to increase firm profit. Since there are no clear guidelines that can relieve the burden, the sales and production personnel have a great responsibility for the customer strategy.

¹⁴⁷ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

6.6.6 Overtime

The Industry Division had significant costs for overtime work before the implementation phase began. Overtime can be divided into two categories; a higher utilization of existing personal and the use of extra personnel. During year 2001, the total overtime salaries reached almost DKK 1.000.000 in Stevnstrup and DKK 2.500.000 in Taulov, in addition to the costs associated with reduced productivity when utilizing extra personnel.

Danish legislation states that one hour of overtime must be compensated with one our of paid vacation time. The effect of this legislation is an overtime-overtime spiral, i.e. if one employee works one hour overtime, he/she must be compensated with two hour paid vacation and during this period another employee must work overtime and so forth. The overtime work is concentrated into the summer months, and the source of this problem is probably vacation.

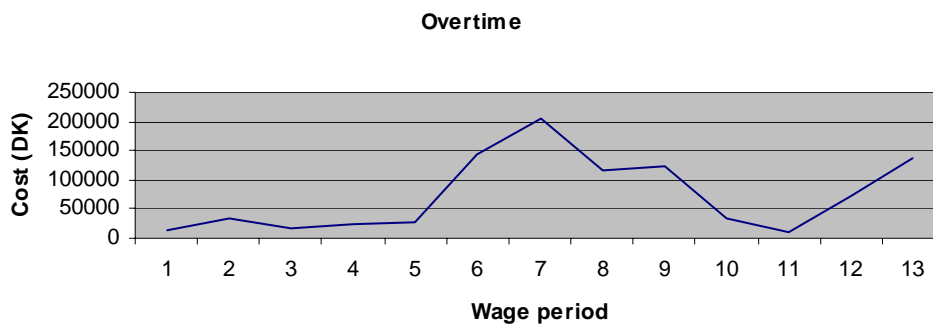


Figure 6.9 Overtime costs during year 2001 at Stevnstrup plant

The management team of the Industry Division claimed that the high costs for overtime was related to the market seasonality.¹⁴⁸ Other stressed the overtime spiral and the shut down of the Brøndby plant as factors triggering the overtime work level, in addition to the seasonality. More reasons that has been mentioned is the lack of sales strategy, which might be a reason why overtime costs rise during summertime.¹⁴⁹

¹⁴⁸ Henrik Madsen, Sales Manager, Sales West, 2002-03-16

¹⁴⁹ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

6.6.7 Lead Time

According to the previously presented order process, administration and planning was a major part of the lead-time. Hence, the problem was that the value adding activities were a small part of the total lead-time from order to delivery. This problem is illustrated in figure 6.10 below.

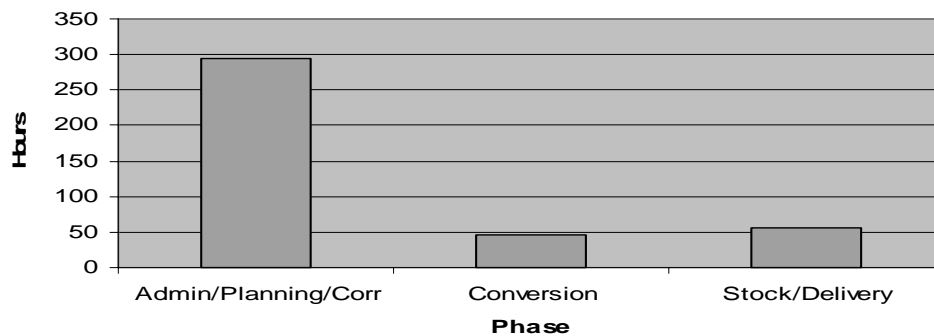


Figure 6.10 Lead times Industry Division

The management team of the Industry Division has recognized the importance of reducing lead times.¹⁵⁰ Due to stable customer requirements, the problem hasn't been taken into consideration and no reduction of lead times has been induced. With the new SCM organization, the question of lead time reduction will be highlighted.

6.7 The Development of a SCM Organization

In order to meet the increasing competition, domestic and foreign, SCAPD made the decision to implement a SCM organization within the Industry Division. SCAP headquarters in Brussels supported the decision since the firm views SCM as a necessary step to accomplish the overall vision of SCAP: "More than a box".¹⁵¹ The rising amount of pan European companies which demands high responsiveness in several markets simultaneously is another factor that has increased SCAP's interest in the SCM concept. The SCM project in Denmark was lead by a logistics & organization analyst from SCAP headquarters. The project manager has the role of a knowledge disseminator within the entire SCAP. He uses a standardized SCM concept and applies it to the various organizations within SCAP. As in theory, SCAP defines a supply chain as:

¹⁵⁰ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

¹⁵¹ Ibid

“A supply chain for a company is defined as all the business processes starting from your suppliers or even suppliers’ suppliers and all the way through to the deliveries of finished goods of your company to your customers or even customers’ customers”¹⁵²

This definition states that it is essential to view and analyze the entire process, from raw material to end consumer. Consequently, SCAP’s purpose with SCM is to:

“Eliminate all non value adding steps, e.g. duplicated buffer stocks or unnecessary handling of goods or information, creating a lean, responsive organization”

According to the project manager, the organizational structure is a key determinant for successful SCM. In order to be more process- and customer oriented the organization should become flatter which enables faster communication and thus more efficient decision-making.

The project manager had a different view of the supply chain performance, than SCAPD. He emphasized that there were a clear push structure of the supply chain,, rather than a pull structure. Furthermore, he highlighted that the production process was not harmonized with the constraints of the organization, i.e. the traditional functional structure built up natural conflicts with the flow of the production process.

6.8 Implementation

The preferred way to proceed when developing SCM is to start with the top management. The management team’s understanding of the concept is, according to the project manager, crucial to the outcome of an implementation. Changing the way management thinks, from functions to processes, is also seen as one of the hardest parts of a SCM project. This comprehension of what SCM really means is essential to the success of the new supply chain organization.

Further, SCAP has done a thorough mapping of the business processes. This was done to get a comprehensive description of the supply chain performance. This chart constituted the decision basis for what type of SCM organization they would implement.

Even though SCM is a term that spans over several actors within a chain, SCAP’s view is that one must start with the internal processes in order to develop efficient and effective SCM. According to the project manager one must “clean one’s own

¹⁵² Internal presentation of the SCM project

backyard”¹⁵³ before developing partnerships with firms in the supply chain. This means that a firm must have control over its internal processes, e.g. order processing, production and warehousing, before taking on the responsibility of managing other firm’s processes. When the internal processes are in place, the firm is able to handle external processes, i.e. develop structure capabilities, in a more suitable way. One example of external processes is VMI (Vendor Managed Inventory), which SCAP currently is running with selected customers around Europe.¹⁵⁴ VMI is the management of customer warehousing, which provides a possibility to decrease the total amount of products in warehouse throughout the supply chain.

6.8.1 The Sequence of Implementation

The work processes within the Industry Division were to a small degree regulated by rules and directives. Instead, they were performed in a way similar to the concept “the way we do things round here”. The work structure was to a high extent embedded in the mind of the individual employee. In order to succeed with the new SCM organization, the individual activities were to be screened and thereafter changed in a way that would optimize the entire supply chain¹⁵⁵. The change project therefore included the identification and mapping of all processes and activities. When implementing a new organizational structure, the changes in activities and processes will be communicated through explicit rules and descriptions. There will e.g. be documents that describe how to perform the new assignments. This is necessary in order to change the embedded routines and habits among the employees.¹⁵⁶ The project manager also recognizes problems associated with adding new routines to existing knowledge of the firm.

At managerial level, the knowledge of the SCM concept is spread through SCM summits. By sharing solutions from the markets that has implemented SCM the individual manager is provided with a greater comprehension, and can accordingly enhance the performance of the concerned supply chain. Also, work-shops are conducted on managerial level in order to increase the supply chain thinking.

6.9 The SCM Organization

The essence of the new SCM organization is the creation of a new department, the supply chain department, which is one of three departments along with production

¹⁵³ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

¹⁵⁴ SCA Packaging Inside, issue 1/2002, p. 8

¹⁵⁵ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

¹⁵⁶ Ibid

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and sales. An important task for the supply chain department is to strengthen necessary links and overcoming natural conflicts between departments. According to the general SCM model used throughout SCAP, the new department was implemented at the same organizational level as the previous two departments. The supportive functions have remained the same as they were prior to the reorganization. The new SCM organization is presented in figure 6.12 below.

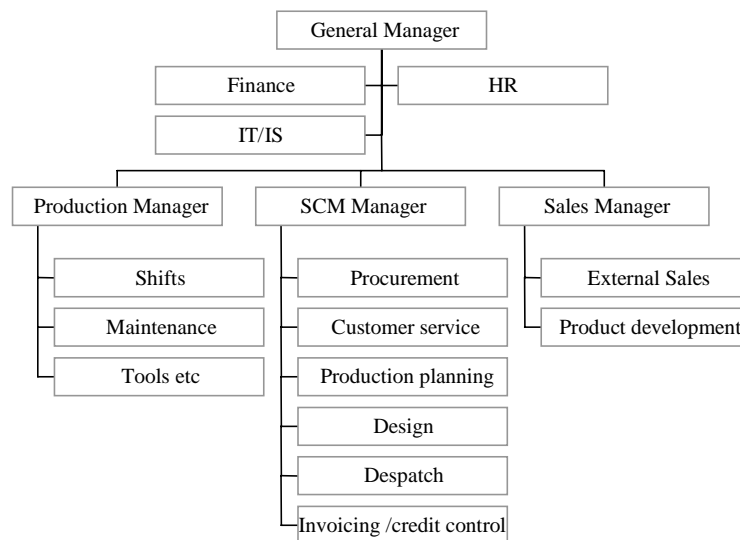


Figure 6.12 The SCM organization

The project team responsible for the implementation considered the question of centralization by purpose previous to the implementation. They recognized that several organizational processes would benefit from being located centrally. The overall capacity planning responsible for apportioning the orders to the different plants had to be centralized, since they are dealing with comprehensive issues. On the other hand, functions close to production that needs to be swift and flexible, e.g. production planning, would benefit from a location adjacent to the plant.

6.9.1 Supply Chain Manager

An additional function was appointed within the new department, the supply chain manager, who is responsible for the entire business process. The supply chain manager has got a key role within the new organizational structure since she/he is the one who is able to view the entire process. This function is a coordinator and integrator of other departments and functions. It is not an easy task since the manager

should possess a strong personality and dignity in order to handle sales and productions managers in a skilful way. Otherwise the processes of the firm won't change, but on paper. By intention, the Supply Manager acts as the advocate of the order. The previous organization had several strong forces affecting the order flow. The Supply Chain Manager is the third force defending customer requirements from the strong wills of the Production and Sales department.

The work as a SCM manager is complex and requires many skills in various areas since the manager should be able to understand the entire process, from order to delivery. Furthermore, working as a SCM manager within SCAP is highly proactive since they should focus 30% of their time on operational tasks. The remaining time should be spent on projects in order to enable a constant development of the firm's processes.

6.9.2 The Effects of the New Organization

The key differences between the new SCM organization and the old functional structure are that key functions in the Production and Sales functions has been placed under the SCM function, see figure 6.13.

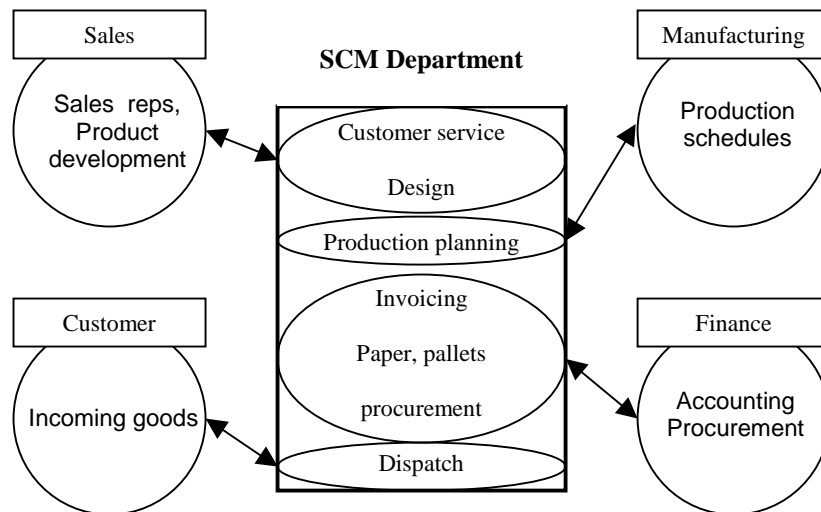


Figure 6.13. The result of the SCM organisation

The reason for this restructuring is to reduce the power of the Sales and Manufacturing departments. By doing this SCAPD tries to minimize the conflicts between the Manufacturing department and the Sales department. The new supply chain manager instead decides the functions crucial to supply chain success, i.e.

SCAP has allocated the functions that had the most disputes between them to the control of the supply chain manager.

6.9.3 Benefits from the SCM Organization

The new organizational structure has set up a pull structure of the business process. The business processes are now adapted to the technical and organisational constraints of the new organisational structure.

Due to the early stage, it is difficult to assess any actual benefits. With this approach, the Industry Division should achieve benefits as stronger customer orientation due to flatter organization and swifter communication. SCAP expects to increase customer awareness throughout all departments. Improved financial result is another goal that should be accomplished through a leaner organization and less capital requirements. Furthermore, the aim is to increase the responsiveness of the organization through process orientation, which also will improve coordination and execution of business processes.¹⁵⁷

SCAP believe that the distinct responsibility held by the supply chain department will minimize sub-optimizations and establish a shared view of the firm as a part of a supply chain. Due to the fact that the different plants are separated, the company believes that the centralized SCM function will extract synergies and increase the level of cooperation between the plants.¹⁵⁸ Further, they expect an increased competitiveness through the possibility of offering value adding logistics services. The ability to use the new organization as a platform for further improvements is also an important aspect. Further improvement could be better usage of ERP-systems, enabling solutions like VMI.

¹⁵⁷ Internal presentation of the SCM project

¹⁵⁸ Peter Schmutzler, Organization and Logistics Analyst Europe, 2002-05-02

7 Analysis

In this chapter, the preliminary theoretical framework is compared to the empirical findings of the case study. The first section called Applying the Framework includes the assessment of the SCMC-quadrangle with a search for patterns. In the subsequent section, Enhancing the Framework, the preliminary framework is improved according to our findings in the comparison with the empirical case study. Finally, the enhanced framework is presented.

7.1 Introduction

When changing an organization, one can imagine that the underlying capabilities are developed or improved in a way. The implementation of the SCM organization within the Industry Division of SCAP Denmark will in one way or another change the resource base and the deployment of resources. The preliminary theoretical framework, the SCMC-quadrangle, reveals the essence of the authors' view of building SCM capabilities. In this chapter, the preliminary theoretical framework will be compared with empirical findings from the case study. The analysis is basically a matching process where overlaps and misfits between theory and empirical findings are identified. The analytic process aims to find areas where the empirical findings might add knowledge to existing theory. This comparison will also provide a perspective for evaluating and validating theory.

7.2 Applying the Framework

The SCMC-quadrangle consists of a four step guideline. The following sections include the assessment of empirics with the steps of the proposed framework in mind. It mainly includes a comparison between the theoretical framework of how to build SCM capabilities and the practical work of how to build a SCM organization within the Industry Division of SCAP Denmark.

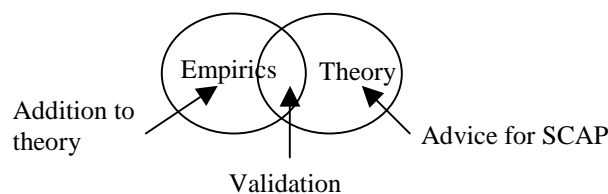


Figure 7.1 The authors view of contribution

As visualized in figure 7.1 above, the empirical material partly overlaps the preliminary theoretical framework. The overlapping area verifies the theoretical framework. Empirical findings that are not presented in the preliminary framework add to the understanding and should thus be integrated in the framework. Parts of the framework that can not be found in the case study should be provided to SCAP as advice for future development.

7.2.1 SCM Comprehension

According to the SCMC-quadrangle, the first step is to develop SCM comprehension at management level within the organization. The first step of the framework further stresses the mapping of business processes within the current supply chain.

Management Comprehension

It is important that the management team, initial to the development of capabilities, obtain understanding of the SCM concept and the effects it has on firm strategy. It is thus important to gain management dedication before implementing a change program of this size.

The case study showed that the first step in the process of developing and implementing a SCM organization within the Industry Division was to give the management team an understanding of SCM. The project manager saw this step as very important to the success of the entire organizational change. SCAP's way of providing management with this understanding was through discussions and education concerning the concept of SCM. Also, department managers were involved in the project team responsible for the design of the SCM organization. All of these things together did increase the overall comprehension of SCM among managers within the Industry Division.

In addition to the managerial comprehension during the project phase, SCAP has ensured continuity of comprehension through the development of a new supply chain department. With a strong supply chain manager position, the organization has fundamentals for a long lasting improvement process. Since the supply chain manager have scheduled time for strategic thinking and improvement projects, the performance prognosis is even better. The empirical case study has thus established the view of the SCMC-quadrangle. That is, management comprehension of the SCM concept is the first and most important thing when building SCM capabilities.

Business Process Mapping

The first step in the SCMC-quadrangle also stresses the mapping of business processes within the supply chain, aimed to provide management with a holistic view of the company and its logistics structure. This should be done in order to reveal the areas within the current business processes that must be restructured to enable effective and efficient SCM.

In the case of the Industry Division, the project team responsible for the organizational change conducted a thorough mapping of the business processes within the supply chain as it was structured prior to the implementation of the new SCM organization. This mapping was done through a careful registration of the sequence of work within all activities involved in the making of a box. Through this process mapping, shortcomings and leverages in the processes were identified. This process mapping was according to the project manager an important part of the reconstruction of the organization. Without this mapping it would have been harder to structure and describe the new business processes to employees. Hence, the mapping was a prerequisite for the reorganization from functions to processes.

Summary

In conclusion, both of the suggestions in step one of the theoretical framework are supported by the empirical findings from the Industry Division. The firm spent a lot of effort in giving the management team an understanding of SCM and the effect it has on the company. Hence, the procedures within SCAP match the suggested method in the first step of the SCMC-quadrangle. On the basis of the empirical case study, we find no reason to revise the initial step of the SCMC-quadrangle.

7.2.2 Identify Preferred Supply Chain

The second step of the preliminary theoretical framework suggests an identification of the preferred supply chain. According to the framework, a supply chain can be characterized by several parameters, e.g. cost efficiency, flexibility and reliability, which should be taken into consideration when building SCM capabilities. It is thus important to identify in what areas the supply chain should perform excellent, in order to structure the supply chain in the most appropriate way.

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Parameters

According to the SCMC-quadrangle, the supply chain should be chosen with regards to the produced products, the market and the costs associated with production and warehousing. The ability to forecast demand is another aspect that should be taken into account when deciding on the flexibility of the supply chain.

In addition to the SCMC-quadrangle, a theory concerning different types of supply chains is presented in section 3.7. This theory has a sharp set of parameters concerning product and market features as the basis for deciding the appropriate type of supply chain. These both models are to a high extent structured and show what parameters should be measured when implementing a new supply chain.

Within the Industry Division of SCAP Denmark, the identification of preferred supply chain has to a lower extent, compared to theory, focused on the features of the concerned market (in this case Denmark). This is a result of the firm-wide policy for development of SCM organizations within SCAP. This means that fairly similar SCM organizations are developed throughout the various national organizations of SCAP.

Instead of analyzing the parameters of the national markets prior to every single SCM implementation, the SCM concept was analyzed and developed on a pan-European basis. The project team responsible for the SCM implementations throughout the entire SCAP has considered several features of the product and the market when deciding on the features of the SCM organization. The market trend that aims toward value-adding solutions has e.g. been considered as an important parameter. Table 7.2 presents our opinion of the aspects that SCAP viewed as essential in their decision process of choosing the appropriate supply chain.

Type of aspect	Aspect
Value chain aspects	Increase of value adding solutions Reduction of stock levels Integration between activities
Porterian aspects	Increase of customer's bargaining power across Europe Increased rivalry on the European continent
RBV aspects	Increase efficiency of resource utilization

Table 7.2. Reasons for SCM implementation at SCAP
(Developed by the authors)

Furthermore, the vision and the strategy of the firm should be important parameters when deciding on the type of preferred supply chain. According to us, a SCM

organization must be developed in accordance with the overall strategy of the firm in order to be effective. The empirical case of this study clearly exemplifies the problems associated with the absence of a clear vision.

The project team at SCAP headquarters, responsible for SCM development considered several strategic aspects when they decided upon the structure of the SCM organization. The preliminary theoretical framework stress several product features in addition to strategic aspects as important when building SCM as the features provide possibilities and/or set constrains to the structure. The difference in the output between the procedure of the SCMC-quadrangle and the case study is that the preliminary theoretical framework proposes a more detailed description of the supply chain. When implementing a SCM organization, it is hard to assess the theoretical models exactly since some parameters are tacit and hard to measure.

SCAP stresses that the new SCM organization will enhance flexibility as well as cost efficiency. Our view is that their choice to just a small extent is a trade off between these parameters. Instead, our view is that they increase performance within most SCM related performance metrics as a result of SCM thinking. That is, new mindset among employees makes a considerable difference to the efficiency within the business processes. When acquiring the preferred type of supply chain, the company is not in a position to choose between them. Our view is that a supply chain is built through the creation of relations with other companies. Thus, a company has limited possibilities to affect the whole supply chain. Instead, the supply chain can be adjusted to some extent through a structured approach to relations.

With this thought in mind, it is remarkable that the Industry Division lacks a structured approach to customers, e.g. customer segmentation, in order to develop an efficient customer strategy. According to the theoretical framework, structural capabilities lie in the relations with other actors, e.g. customers. The lack of strategy within this area will have severe implications on the ability to gain structural capabilities.

Summary

The case we have studied at the Industry Division is hard to compare to the second step of preliminary theoretical framework since the developed supply chain organization has a standardized structure, which is used throughout all SCAP organizations. On the other hand, SCAP's standardized SCM concept was developed with several strategic aspects in mind, even though SCAP did not consider all the aspects proposed in the preliminary theoretical framework. Maybe this is the case since several of the parameters are highly theoretical and hard to measure. But nevertheless, we think that the theoretical aspects fulfil an important purpose in the

framework since they help managers to think in a SCM manner. Furthermore, we view the proposed framework as appropriate since it contains theoretical areas that emphasize the aspects considered by the project team at SCAP.

7.2.3 Identify SCM Capabilities

The third step of the preliminary theoretical framework proposes an identification of capabilities that is needed in order to perform in accordance with the parameters stated in the preceding step. Figure 5.3 stresses a hierarchic work structure when identifying the various capabilities that are visualized in the conceptual model. SCAP also have a significant hierarchical structure in the process of identifying SCM capabilities, but the prioritizing of the groups is dissimilar to the conceptual model we presented in chapter 5.

SCAP's method for identifying capabilities related to logistics and SCM is a result of a "learning-by-doing" process developed during similar projects in Europe. There is no explicit logic – a manual or model – that describes the sequence of work. Even though there is a lack of explicit material there exist clear work structures in the identification process. The method is to a high extent connected with key persons within the organization, e.g. internal consultants that implement organizational changes throughout the entire SCAP. With this approach, SCAP's best practice is replicated from one national organization to another.

Even though the hierarchies differ, one similarity is that both of them emphasize the importance of identifying management capabilities prior to the other capability-groups. The preliminary theoretical framework and SCAP's practical method structure agrees upon the notion that the primary concern should be to develop management comprehension of SCM.

The major difference between the theoretical model and the practical sequence of work is that SCAP emphasizes the importance of well functioning internal business processes before the external supply chain structure capabilities are taken into consideration. SCAP puts more effort in the efficiency on the operational aspects compared to the effectiveness of the supply chain structure. According to the firm, business processes within and between the departments of the company must learn to work as one unit and develop customer comprehension, so that the business processes can respond efficiently within the supply chain. SCAP emphasizes that it is important to have a well functioning logistics function before the company can exploit the full leverage of SCM. The argument is that one has to be efficient in internal processes in order to meet the demand of the external actors. This is contradictory to the hierarchy proposed by the conceptual model, which proposes that the structure of the supply

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chain should be defined before the process capabilities. The different approaches are presented in figure 7.3 below.

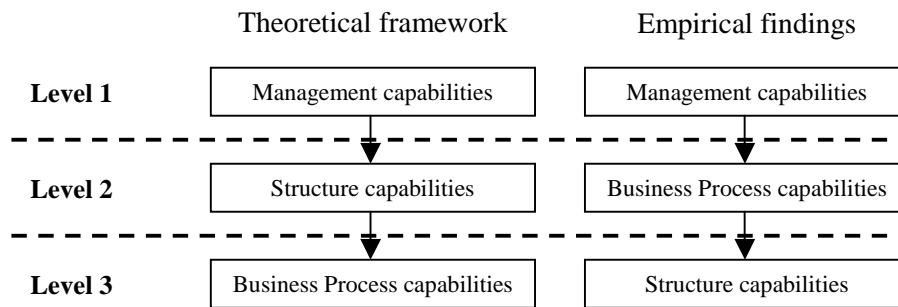


Figure 7.3 The difference in the identification phase

The conceptual model stresses a conscious development of structure capabilities, because of the importance of preparing the business processes to changing environment, i.e. the supply chain. This should enable the development of supply chain comprehension capabilities in the business processes. It is obvious that SCAP focuses mainly on internal business processes with the new SCM organization. With this approach, the business processes are not adjusted in accordance with customer and supplier demands. With the approach of the SCMC-quadrangle, the business processes would have been adjusted in accordance with the requirements of other actors within the supply chain.

When optimizing business processes prior to confronting structural issues, there is a risk of an overall push solution. An additional risk with the internal focus of SCAP is sub-optimization of the supply chain through the optimization of the logistics function within the firm. The primary theoretical framework emphasizes that it is important not only to develop customer comprehension capabilities in the business processes, there must also be comprehension of the entire supply chain.

The different sequence of work used by SCAP in this case can on the other hand also be a result of lack of urgency. That is, they do not need to exploit the leverage of an effective supply chain at the time of implementation. This can give them time to develop an efficient logistics function, without taken the complete supply chain span into consideration. The lack of urgency may exist in other firms and in other industries. Thus, it might be useful to introduce an aspect that puts improvement in relation to time.

Summary

It is clear that SCAP's view of the hierarchy among the three groups of capabilities differ from the view of the SCMC-quadrangle. Management comprehension should be secured in the initial phase of a project, according to both views. Subsequent to management comprehension, the theoretical framework proposes that structure capabilities should be identified while SCAP focuses on the internal business process capabilities. Furthermore, the empirical findings suggest an introduction of an improvement/time aspect to the SCMC-quadrangle.

7.2.4 Implementation

The implementation of a SCM organization resembles the concept of building SCM capabilities in several ways. To view the matches and differences, the implementation is described from several perspectives that are important when building SCM capabilities.

Management Involvement

The building of the new SCM organization within the Industry Division of SCAP Denmark shows similarities with the proposed framework of how to build SCM capabilities. One important match is the identification of management dedication as crucial for successful implementation. The theoretical framework suggests more involvement from division managers. The implementation team stresses the value of changing procedures and directives at strategic as well as operational level. Furthermore, they highlight the connection between organization and logistics performance. Thus, these findings overlap areas within the theoretical framework.

Embedding routines

Routines are an essential part of the SCM capabilities concept. The project team that implemented the new SCM organization recognized path dependencies and rigidity among the embedded routines. Due to this insight, they were probably more successful when implementing the new organization. When implementing a new organization, it is critical to understand the processes and routines that are affected by the change. The project team at SCAP conducted a mapping phase in order to understand how these routines and processes could be improved. This is in alignment with the proposed theoretical framework. However, we suggest that the process mapping should cover managerial processes in addition to the operational

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activities studied. The managerial processes are to a great extent important when building SCM capabilities.

The implementation team discussed the organizational change in terms similar to codification. They spread tacit knowledge through e.g. work shops and seminars, and more explicit knowledge was disseminated through written rules and directives. The implementation of a supply chain and process thinking among the employees was a matter that to a high extent concerned spreading of tacit knowledge. On the other hand, rules concerning operational matters were implemented through written work descriptions. The knowledge processes within the Industry Division are visualized in figure 7.4 below.

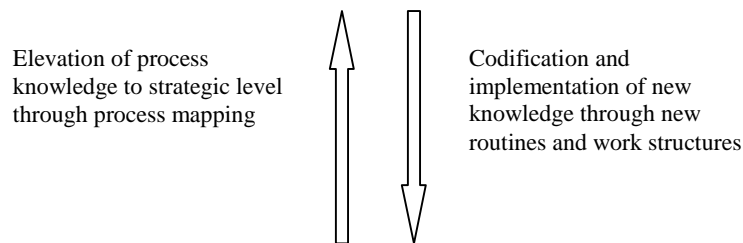


Figure 7.4. The knowledge process

Since the old routines were embedded in the minds of the individuals, it was hard to change the old behaviour only through new written directives. We therefore believe that the codification of new routines through written directives was insufficient in order to improve the supply chain performance. We further believe that implementation at operational level must include more than written rules. To increase cooperation between functions, it is essential to give the employee a holistic view of the processes and the interrelations. To succeed with the implementation of a SCM organization, the SCM understanding must be disseminated in the entire organization.

Knowledge Development

The theoretical framework illuminates the importance of continuous improvement within processes. There is a need for structures that enable constant improvements at various levels. The new organizational structure allows the supply chain manager to work intensively with projects that aim to enhance the supply chain performance. Thus, there is a structure that enables integration within and between the business processes as well integration with external supply chain members. This is in alignment with the proposed theoretical framework.

Furthermore, SCAP has developed a best practice within SCM that is replicated successfully through using internal consultants with tacit knowledge regarding the field of SCM. These consultants are specialists and familiar with many parts of the organization. Through inductive practice and deductive analytical thinking, they have acquired knowledge that can be easily spread within the organization. Thus, they act as carrying elements of best practice knowledge.

Summary

Though the analysis we have found several similarities between the theoretical framework and the empirical material. Even though SCAP does not use the theoretical terms of KM, they use many of the mechanisms without knowing. This implies the practical relevance of KM theory. In short, SCAP has great awareness of the importance of building an organisational structure which can spread and absorb knowledge in an efficient manner.

7.3 Enhancing the Framework

Through the comparison between the preliminary theoretical framework and the empirical findings, we have identified overlapping areas as well as areas where empirics add knowledge to the preliminary theoretical framework. In this section, the empirical contribution as well as overlapping areas is presented in order to enhance the understanding of how to build SCM capabilities.

7.3.1 SCM Comprehension

In this, the first step of the SCMC-quadrangle, there is a match between the preliminary theoretical framework and the empirical findings from the Industry Division of SCAP Denmark. Both theory and empiric material highlight the significance of gaining management comprehension in an initial phase when building SCM capabilities. Furthermore, mapping of business processes is important according to the preliminary framework as well as to the empirical study. In the empirical case, management routines were assessed previous to the implementation. The project manager analyzed the responsibilities along the internal value chain and found that no one had main responsibility for the order processing. Further, this process revealed the need to mediate between different stakeholders of the firm. These mentioned findings add to the theoretical framework.

The empirical case study enhances understanding through concrete examples of how to manage the process of creating management comprehension. That is, the empirical

findings from the Industry Division add understanding since it concretizes the proposed theoretical framework. According to our findings, SCM comprehension can be acquired through e.g. discussions, education and workshops for individuals at management level. We consider the practical methods as highly important aspects since the aim of the proposed theoretical framework is to provide managers with a tool in the process of building SCM capabilities. Thus, the empirical findings of practical methods at SCAP are integrated in the enhanced theoretical framework in order to make it more practically applicable to managers.

7.3.2 Identify type of Preferred Supply Chain

In the analysis of the second step in the SCMC-quadrangle, we state that it is difficult to compare the theoretical model with the SCAP work structure because of the different prerequisites. SCAP's standardized SCM concept was mainly developed with strategic aspects in mind. The firm did not consider all the aspects proposed in the preliminary theoretical framework. Apparently, many theoretical parameters are hard to measure and thus, they don't get used very often outside the academics sphere. We have identified a lack of discussion within the empirical case regarding the appropriate type of supply chain. SCAP merely discussed the features of well functioning SCM, without decomposing the attributes that is needed. We although view all the theories proposed in the preliminary theoretical framework as relevant since they can be of great help to managers. That is, they help managers to think in the right direction.

Through the empirical case study, it is also quite clear that the choice of appropriate supply chain is not as easy as in theory. There is a series of aspects that affect the choice of the appropriate supply chain. We believe that a company can merely adapt to the environment and develop its supply chain in accordance with it.

When considering the appropriate supply chain to acquire, it is important to assess the firm's position within the value chain. Depending on the firm's position and relative power, a firm can to a more or less extent shapes the supply chain. An assessment procedure that identifies the firm's relative power in the supply chain should thus be added to the SCMC-quadrangle.

7.3.3 Identify SCM Capabilities

One main difference between the preliminary theoretical framework and practice is the sequence of implementation. The empirical findings suggest that a company must concentrate on the internal logistics function before developing a supply chain

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structure. The theoretical framework suggests that structural capabilities, e.g. customer segmentation or sales strategy, must be considered in a much earlier phase. It is our opinion that structural matters must be included prior to the optimization of the internal business process in order to match supply chain features with customer requirements. Thus, it would be appropriate to add a tool for segmentation of external actors within the supply chain. According to us, it is not appropriate to develop relationships or even partnerships with every external actor. A firm must possess a capability that enables them to choose the right relationships and partnerships based on the value they constitute.

Furthermore, the empirical finding concerning the urgency of creating a SCM organization brought our thoughts to the aspect of time in comparison to the desired improvement. The project team had to make a trade-off between implementation speed and organizational constraints. This issue is an important aspect of building SCM capabilities that adds to the theoretical framework. If a firm isn't in a hurry when building SCM capabilities they can afford to go through the SCMC-quadrangle several times before they must possess a certain capability. Furthermore, a firm can be anxious about making to large restructures at once. As a consequence of this reasoning, an improvement aspect is introduced in the SCMC-quadrangle. Thus, the theoretical framework from now on is referred to as the SCMC-spiral.

Using the spiral as a metaphor for improvements hopefully makes it easier to understand how we view the area of building SCM capabilities. Each loop in the spiral represents the five steps in our framework. Every single step, e.g. from step one to step two, increases the elevation within the spiral. The increase in elevation represents the organization's improvements of SCM capabilities.

If the organization is urgent to build SCM capabilities, the spiral is highly extended which implies that the firm must make large improvements in every single step. On the other hand, if a firm has a lack of urgency, the spiral is less extended and thus the firm can afford to make improvements that are not as large.

The internal focus when implementing a SCM organization within the Industry Division of SCAP Denmark constitutes an example of a firm that operates in a less extended spiral. That is, SCAP merely focused on a part of the SCM concept, the internal organization, in the first lap of the spiral. Thus, the single steps within the spiral are small.

7.3.4 Implementation

The comparison between empirics and theory has revealed a set of parameters important for successful implementation. Even if not described with the same words, the same phenomena occur in theory as well as in the case study. The SCM organization was implemented in accordance with the theoretical model. One important aspect of implementation not mentioned in theory is the important trade-off between centralization and local responsibility. In the new SCM organization, many decisions are made at a central level in order to enhance coordination and integration between plants. Certain functions that need to make swift decisions at plant level are placed locally. The trade-off between centralization and local responsibility is thus important.

One other important aspect of building SCM capabilities can be discerned in the empirical case. When the SCM organization was implemented, the project manager took the question of implementation speed under serious consideration. The previous organization had an embedded resistance to changes that would affect the success of implementation. Thus, when implementing SCM capabilities, one might consider a one step solution as opposed to a slower implementation in several small steps.

Theoretical terms like e.g. codification and structural capital are embodied in practical activities such as process mapping, work descriptions and work-shops. Even though their names differ, the content is basically the same. This implies the great use of KM as an applied theoretical field. Thus, the empirical case enhances the framework through providing several ways of applying KM.

7.3.5 A Fifth Step

The preliminary theoretical framework consists only of deductive methods for learning. That is, they all happen in the minds of employees. Thus, no capabilities are shaped through application of capabilities. Through the empirical case study at SCAP, we have captured the importance of an inductive learning process when building SCM capabilities, since much knowledge is created through a learning-by-doing process. When implementing a SCM organization, the decision is highly deductive. As the organization has been implemented, it has to be continuously improved. This is the reason why we have decided to introduce an additional step in the theoretical framework. The fifth step, Applying SCM Capabilities, will add an inductive learning process to the proposed framework. The aim of the fifth step is to increase the practical applicability for SCM managers outside the academic sphere, which would increase the relevance of the SCMC-spiral.

SCAP has ensured this continuous improvement through scheduling managerial time to improvement projects. Since this fifth step include inductive learning mechanisms such as practice and mistakes, managers must elevate knowledge and encourage the sharing of useful information. Furthermore, the firm must measure performance related to SCM and bring improvements up to the surface.

7.4 The Enhanced SCMC-spiral

This section contains the final proposal of how to build SCM capabilities. The iterative model including five steps is based on theory as well as on empirical findings. Furthermore, we provide a checklist of explicit advice for each step within the SCMC-spiral. The general structure of the SCMC-spiral is presented in figure 7.6 below.

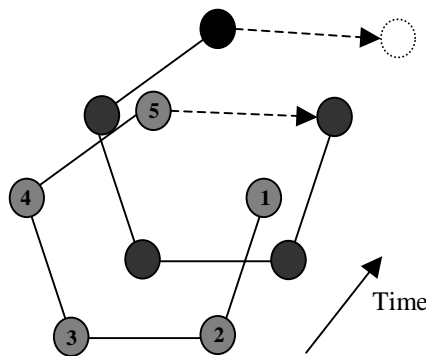


Figure 7.6. The SCMC-spiral

The SCMC-spiral is a guideline for how to build SCM capabilities. Along with the conceptual model, we believe that it can be an efficient tool for managers when developing SCM capabilities. The figure highlights the iterative character when building SCM capabilities. Furthermore, it recognizes that the improvement process proceeds along a time path. Table 7.7 below illustrates the activities within the each single step of the framework.

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<i>The elements in the SCMc- Spiral</i>
<p><i>Step 1 - SCM Comprehension</i></p> <ul style="list-style-type: none"> • Education • Strategic workshops • Discussions • Business process mapping • Assessment of management routines, e.g. number of influencers within the supply chain • Analysis of organization and its affect on SCM, e.g. functionality and strength of influencers • Schedule managerial time for strategic thinking regarding SCM improvements
<p style="text-align: center;"><i>Step 2 – Identification of the Preferred Supply chain</i></p> <ul style="list-style-type: none"> • Identification of supply chain actors/partners • Analysis of product attributes affecting SCM • Analysis of firm position within supply chain through I/O perspective • Assessment of Supply Chain Features critical for success • Customer segmentation • Supplier segmentation • Analysis of market trends • Analysis of customers' market trends • Analysis of cost structure of the chain • Comparison of cost vs. flexibility
<p style="text-align: center;"><i>Step 3 - Identification of capabilities</i></p> <ul style="list-style-type: none"> • Identification of current capabilities and the dependent processes • Identification of Management capabilities • Identification of Structure capabilities • Identification of Business Process capabilities • In coherence with strategy, identify needed capabilities to reach goals • Analysis of needed changes of routines and processes in order to build capabilities • Analysis of current organizational constraints to the building of SCM capabilities • Awareness of change resistance
<p style="text-align: center;"><i>Step 4 - Implementation</i></p> <ul style="list-style-type: none"> • Operative workshops • Creation of structure capital • The biggest change is in the minds of the individuals • Create a platform for constant improvement • Management dedication • Mediation between stakeholders that affect SCM success • Replicate knowledge from similar implementation projects through using internal consultants • Elevate useful knowledge and codify into explicit routines • Codification of work processes through education/binders with directives • Strengthening processes through horizontal integration • Split up responsibility between central strategic SCM level and local swift decision level • Consider the speed of implementation in order to reduce risk for organizational shock
<p style="text-align: center;"><i>Step 5 – Applying SCM capabilities</i></p> <ul style="list-style-type: none"> • Elevate created knowledge at business process level • Encourage sharing of new knowledge • Measure supply chain performance and communicate • Measure and communicate improvements • Implement Best Practice sharing within SCM • Encourage trial & error

Table 7.7. Checklists for Building SCM capabilities

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The checklist above shows important aspects concerning SCM capabilities building. The theoretical framework consists of theories covering most parts of a firm. These abstract theories are brought to an explicit operational level through the SCMC-spiral, thus increasing the applicability of the theories for managers. Furthermore, the model has revealed the factors that successful SCM depend upon. We do not view the model as the correct answer, but it reveals the questions that must be asked.

8 Conclusions and Implications

This final chapter aims to extract the findings from the previous chapter. Furthermore, it will describe the contribution and validity of the proposed and enhanced theoretical framework. This discussion will enhance the understanding of the applicability and the relevance of the theoretical as well as empirical findings.

8.1 Conclusions

Through the case study and the exploration of theory, we have been convinced that there is a need for a tool that explains and describes the building of SCM capabilities. Our first conclusion is that the involvement of resources and capabilities is useful when describing the building of effective and efficient SCM, especially through the recognition of longitudinal aspects. Furthermore, the integration of KM mechanisms provides more practical advice that brings abstract theories to explicit level. Through the case study, we have found e.g. replicating structures that exemplifies the application of KM. We suggest that SCAP to a higher degree should recognize the building blocks behind SCM, not just the attributes.

We view the managerial comprehension as the single most important factor when building SCM capabilities. Comprehension of the causalities within a supply chain enable managers to consider the most important factors that successful implementation depend upon. In accordance with the theoretical framework, SCAP has recognized the importance of gaining managerial comprehension in the initial phase of a SCM project.

Through the theoretical exploration, we have discerned a hierarchy among capabilities that affects the building. The hierarchy of capabilities is based on their organizational location, their degree of codification and their interrelations. SCAP understands the value of gaining managerial acceptance before starting with any organizational restructuring. What differs between our proposed hierarchy and the procedure used by SCAP is that they to a less degree focus on structural matters within the supply chain. Instead, they view SCM more as a tool for internal efficiency. We suggest that SCAP to a higher degree should consider structural aspects, such as customer segmentation and sales strategy.

When SCAPD developed its SCM organization their main focus was to create business process capabilities. Their conviction is that it is important to build an effective internal organization before exploiting the full leverage of SCM. It can be stated that the new SCM organization focuses mainly on internal matters and resembles the concept of logistics more than SCM. We believe this implies that

SCAP doesn't consider the different markets as unique. They make the assumption that the industrial environment in the European packaging market is homogeneous. This might be principally true, but we would like to prompt that the SCMC-spiral emphasizes the importance of the industry environment by highlighting the development of structural capabilities. The SCMC-spiral proposes a stronger structural approach in its formation. This makes the procedure of the SCMC-spiral more suitable for a total adjustment to specific markets.

Another reason for SCAP to use the SCMC-spiral is that it stresses inductive learning. In other words, when the implementation phase is over, i.e. the new organization is in place, it is up to the supply chain manager to develop the organization in the right direction. Hence it is important for him/her to absorb the knowledge created within the organization and learn from it.

8.2 Contribution and Validity

In this section we wish to discuss how this study has fulfilled the purpose to provide a framework of how to build SCM capabilities. The integration of the two theoretical areas, SCM and capabilities, is an important part of this discussion. Furthermore, we will address the questions of how the study has enhanced the understanding of theory, and the validity of the conclusions, which is determined through relevance and explanatory power of the proposed framework in relation to other models.

8.2.1 Integration

Integration of the different theoretical aspects has served as a profound basis when seeking to fulfil the purpose of the study. Chapter 5 provided the reader with our view of how the theoretical aspects of this study should be integrated. The chapter thoroughly discussed how the elements of the different theories fit together. Also, a conceptual model of how the theories, when combined, enhance the understanding was presented in chapter 5. The chapter was concluded with the integrated preliminary framework of how to build SCM capabilities. The framework was then further integrated in chapter 7, where the framework was enhanced according to the empirical findings of the case study.

8.2.2 Explanatory Power

Since the proposed framework is an attempt to integrate two separate theoretical areas that have not been integrated prior to this study, the explanatory power is obviously

high. In relation to the content-based SCM framework proposed by Cooper et al., our framework has a clear advantage since it considers the process of developing SCM capabilities. That is, the proposed framework goes beyond the static view of identifying elements needed in SCM through the deployment of a process-based view and Knowledge Management mechanisms.

Compared to prior work within RBV, this study applies capabilities to a new theoretical field, i.e. the field of SCM. Applying the theory of capabilities on SCM gave us the opportunity to view capabilities from a different angle and to increase the understanding of the theory.

Conclusively, we would like to say that even though the framework has particular qualities that can not be found in other theoretical models, it is impossible to state that the proposed framework has higher explanatory power than other theoretical models in every situation, until more extensive testing has been completed.

8.2.3 Relevance

Due to the approach of this study, the one-case approach, it is infeasible to draw conclusions regarding the applicability of the framework in other situations. Currently, we can merely speculate about the relevance in situations other than the one we have studied. As the explanatory power, the practical relevance of the SCMC-spiral must be further tested before any statements can be made. Hence, the discussion of relevance must focus on the single case that we have studied: the development of a SCM organization within the Industry Division of SCAP Denmark.

The different steps of the proposed framework, the SCMC-spiral, have captured the practical process of developing SCM capabilities within the Industry Division. This means, contradictory to content-based research that it focuses on the processes of developing SCM capabilities. This is indeed an important progress that has been made, which increases the practical applicability of theory.

8.3 Concluding Remarks on Future Research

This thesis has investigated the cross section between SCM theory and Capability theory, which is a new area of investigation. Due to the embryonic state of this cross section, there are numerous fields within this area that can be investigated further. Given the recognition of SCM as an efficient tool to create a competitive advantage, and given the uncertainty that follows a decision to implement such an organization, it appears imperative to conduct future research into these processes in general.

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In our study we propose a framework for building SCM capabilities, in the framework some ideas are presented about how to categorize and prioritize capabilities when building a supply chain. This study could be an aid to go deeper into the construction of an efficient supply chain organization.

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- Thomas Kalling*, Assistant Professor, Institute of Economic Research, Lund University, Lund, Sweden
- Henrik S. Madsen*, Sales Manager, Sales West, Industry Division SCA Packaging, Stevnstrup, Denmark, 2002-03-15, 2002-04-15, 2002-04-16 & 2002-05-13.
- Peter Schumutzler*, Organisation & Logistics Business Analyst Europe, SCA Packaging Business Group, Brussels, Belgium, 2002-03-08, 2002-03-14, 2002-03-15, 2002-05-02 & 2002-05-13
- Laila Skipper-Buus*, Head of Planning Department, Industry Division SCA Packaging, Stevnstrup, Denmark, 2002-03-15, 2002-04-15, 2002-04-16 & 2002-05-13.

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Annual report 2001, SCA

Competitor and market analysis from the Packaging Research Program, Lund University, Sweden

Internal documented presentations of SCAP Industry Division, Denmark.

Internal documented presentations from SCAP headquarters, Brussels, Belgium.

Internal report concerning the supply chain function at SCAP Industry Division, Denmark.

SCA Packaging Inside (Issues from 2001 & 2002)

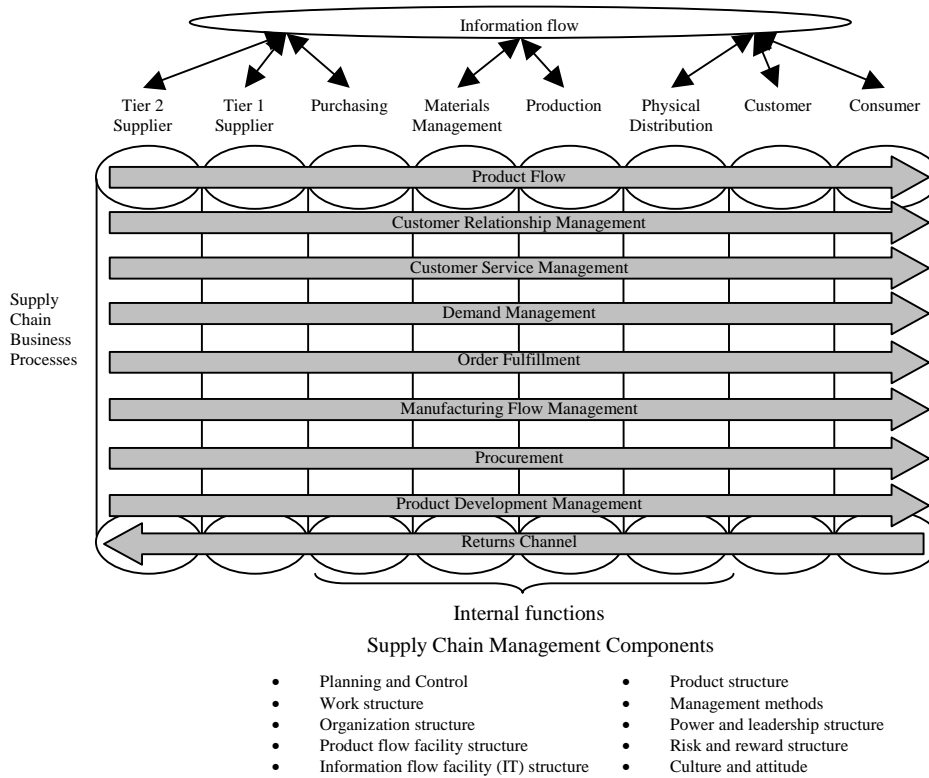
SCA Investor Report (Issues from 2001 & 2002)

9.5 Other

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Appendix A Cooper, Lambert and Pagh's Framework



Appendix B The SCA Group

History

SCA is a European company with a global approach, which has its origin in a number of Swedish 17th century companies. The company is the result of Ivar Krueger's foresight when he saw the potential of consolidating the Swedish forest industry. SCA was incorporated in 1929 as a holding company for some ten forest related companies which produced paper pulp and sawn goods in the north of Sweden.

Since the beginning the company has expanded rapidly from a group of sawmills to a multinational corporation with the wooden fibre as a common denominator. During the 1990's the SCA group has gone through a number of changes, i.e. during 1999 SCA Graphic Paper and SCA Forest products merged to form a new business area: Forest products. Hence today SCA is divided into three business areas; Hygiene Products, Packaging, Forest Products.¹⁵⁹ The company is now represented in more than 40 countries in all the continents and the main market is Western Europe. Every business area within the SCA group is related to the original core business of SCA, hence fibre, and follows the vision; "we add value to fibre".¹⁶⁰

Today

SCA's main goal is to provide value to their stockholders, through creating a positive cash flow. To achieve this SCA has adopted an aggressive growth plan including both organic growth and company acquisitions. Due to overcapacity in a consolidating market the main focus of SCA's attentions has been in the latter part.¹⁶¹ The expansion plans is concentrated in the Hygiene and Packaging business areas since these business areas are less cyclic, hence minimizes the fluctuations in future cash flow and adds value to stockholders. Furthermore, SCA expects a great deal of future cash flows generated by its relatively new business area North America.¹⁶² Table 6.1 provides a company overview for the reader, which presents the current financial and general situation, in numbers.

¹⁵⁹ See appendix B for the SCA group organisation structure.

¹⁶⁰ www.scapackaging.com/history , 2002-01-21

¹⁶¹ SCA investor report 3/00 page 5-6

¹⁶² Annual report 2000, p. 7

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KEY FIGURES SCA GROUP ¹⁶³	2001	2000
Net sales (MSEK)	82.380	67.157
Earnings after financial items (MSEK)	8.090	7.296
Operating cash flow per stock (SEK)	48:38	28,49
Dividend per stock (SEK)	8:75	7,75
Strategic investments (MSEK)	- 15.503	3.957
Equity (MSEK)	45.983	39.898
Return on Equity (%)	13	14
Average number of employees	42.049	37.700

¹⁶³ Annual report 2001, p. 2

Appendix C The divisions of SCA Packaging Denmark

The Food Division: The Food Division has strong connections to the important Danish food and beverage industry, and supplies packaging solutions to these customers. This industry is geographically scattered, hence demands an effective distribution system of the packaging systems.

The Packing Service Division: This Division offers customized packing solutions to various customers. They manufacture a wide range of packaging products and offer swift deliverance. They are a large customer of the Industry Division.

Display Division: The Display Division offers advanced printed corrugated board products made for sales display in shops and stores. This division was previously called Søren Berggreen Display A/S, but is now an integrated part of SCAP.

The Flamingo Division: The Flamingo Division offers plastic packaging solutions to their customers. The advantageous properties of these products are their light weight and the resistance to water.

The Carton Division: This Division is focused on high finish packaging products and have two production facilities, in Mariager and in Skovlunde. This division has a great variety of customers that all demand a package that attracts the end user at the shelf.

The Packing System Division: The Packaging Systems Division offers machines and systems for the packing of goods.

The industry division: see chapter 6.

Appendix D Six methods to measure value

Customer satisfaction

Customer satisfaction is the least quantitative measurement in financial terms. It focuses on the fulfilment of the marketing mix, product, price, promotion and place (the four P's) It is an essential measurement because it forces the management to focus on customer needs and the related strategy. The customer satisfaction measurement has a strong advantage in its simplicity to implement; this is usually done by some form of benchmarking.

Customer Value-Added

This method of measurement is also focused on customer satisfaction but in the case with Customer Value-Added (CVA) it is accomplished by providing value to the customer beyond price, which is seen as a part of the total value delivered. The customer value is an equation composed of the perceived benefits divided by the perceived sacrifice. Hence companies must add value which can be sold to the customer at a price that succeeds the cost of generating it. The CVA measure is measured relative to its competitors. Managers must collect data on the parameter chosen, which is usually done by collecting data from customers with questionnaires, and compare this with competitors to get a ratio, which in turn is compared with the PIMS data base¹⁶⁴. There are several classifications made e.g. if a company is to consider to be "world class" it has to be 10% better than the best of its competitors.

Total cost analysis

The total cost analysis is a way to eliminate the subjective manner of the first two methods, i.e. the weaknesses in the first two measurements are that it leaves it up to the customer to determine the economic benefits of each method, i.e. it is difficult for a company to show the value of logistics in money terms when the customer satisfaction or the CVA measure is used. The core of the total cost analysis is expressed by Lambert and Burdurglu: *"If management expects the customer to pay for better service, then is management's responsibility to express to the customer the benefits of the higher levels of customer service in financial terms."* The Total cost analysis is about minimizing the total cost of logistics, with all of its components. An even wider definition of the term is that it includes the total cost of ownership. The main ambition of the total cost analysis is to compare the total cost of doing business

¹⁶⁴ After the ratio gained from the CVA is multiplied with 100

with customers and hopefully be able to show the overall economic benefits of the firms higher service performance gained by supply chain management. One must emphasize that it is not about optimizing one firm's performance but for the entire supply chain and it is not just about reducing costs.

Profitability analysis

Total cost analysis makes the assumption that the suppliers under consideration are revenue neutral, i.e. the sales is not affected by choosing a certain supplier. It is this dilemma that the profitability analysis aims to solve through measuring profitability with a contribution approach. The purpose of the method is to establish each supplier's impact on customer revenues, i.e. the focus doesn't just focus on the cost impact but also on the revenues' influence of a certain supplier on the customers' sales volume. This method is a strategic tool which helps management decisions such as product line to add or drop etc.

Strategic profit model

Neither the Total cost analysis nor the profitability analysis measures the cost of assets other than inventory and accounts receivable. The strategic profit model uses the Dupont model to highlight the strategic possibilities of effective asset and margin management in combination with supply chain management decisions. Hence the strategic profit model helps to determine the overall impact of decisions with regards to cash flow and asset utilization. The two most practices to elaborate with in margin and asset management are accounts receivable and asset inventory. It is essential have a holistic view business to use both or just one without any consideration on the effects on logistics and the supply chain can have harsh effects on the company.

Shareholder value

Shareholder value is a widely accepted measurement tool to measure value of companies and the effects of different strategies by looking on future cash flows discounted with the cost of capital. A company creates value for the shareholders when its business creates when it exceeds its cost of capital that accurately mirrors its investment risk. There are two main schools of thought in the creation of shareholder value: The first method is Shareholder value analysis (SVA) which in short measures

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the shareholder value of the strategy by measuring the present value of the future cash flows discounted by cost of capital over the period¹⁶⁵.

In the industry today the most common methods/models of measuring the value of logistics are customer satisfaction methods. And as mentioned above these are also the ones that have the most difficulties of showing and hence selling the value to the customers. Every model has different attributes and has its pros and cons but in the end it all sums up to how the company sells the value to its customers both internal and external. One important thing which has to be highlighted is that value is a moving target. What might be considered incremental value for a customer today may not be considered to be incremental value tomorrow. This fact forces management to continually uncover new ways of doing business.

¹⁶⁵ By using the perpetuity model values of periods past the planning period can be calculated

Appendix E The value chain

