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Creating a Collaboration Based SCM Framework. Case Digita Oy

Logistics

Master's thesis

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Creating a Collaboration Based SCM Framework

Case Digita Oy

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Creating a Collaboration Based SCM Framework. Case Digita Oy.

ABSTRACT

The focus of this research is in the area of Supply Chain Collaboration (SCC). More precisely we studied the TeleCom Installation Services supply chain in the case company Digita Oy. Our goal was to identify the key elements to be considered when pursuing towards SCC; highlight the development areas in Supply Chain Management (SCM) in the case company; study how the SCC efforts can improve SCM in the case company; and construct a Collaboration Based SCM Framework for the case company. Overall aim of the framework was to improve visibility and efficiency of the supply chain, as well as, improve material management.

Such a study is important in order to fulfill a gap in existing research in that there is a lack of consensus in the definition of SCC, which causes variation in understanding the concept, as well as, difficulties in implementing such initiative. In addition, SCC initiatives are company and supply chain specific. Also, most of previous research has concentrated on a few industries and a majority of the companies that have successfully implemented SCC approaches fall into the large enterprise category. This, in other words, means that these approaches might be unsuitable for smaller companies, such as Digita Oy. Therefore, the evidence suggests that there was a need for empirical research. The research approach adopted in this dissertation was case study and it included extensive review of relevant literature, as well as, collection and analysis of empirical data obtained from Digita supply chain setting. Primary focus of the empirical work was to gather data by interviews of senior staff from various organisations within the Digita supply chain. In addition, data was collected from company internal systems, documents, project groups and meetings. Finally the findings of both review of literature and empirical research were compared to reach synthesis.

The main findings and conclusions drawn from this study are that there are certain key elements that should be considered in Supply Chain Collaboration, as well as, every company should approach adopting it in a different way. In addition, empirical study indicated that Digita has experienced challenges in their overall supply chain activities, and expecially in material management. Therefore, this dissertation recommended that Digita adopts the Updated Collaborative SCM Framework, presented in this thesis, where an influential and impartial logistics integrator would operate as a moderator and information furnace in the supply chain. In other words, this model would combine consultancy, operative implementation, as well as, running operations under a one umbrella of solutions.

Keywords: Supply Chain Collaboration, Supply Chain Management, Supply Chain, TeleCom, Logistics, Material Management, Visibility, Efficiency

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Yhteistyöhön perustuvan toimitusketjun hallintamallin luominen. Tapaustutkimus Digita Oy.

TIIVISTELMÄ

Tässä tutkimuksessa on tarkasteltu yhteistyöhön perustuvaa toimitusketjun hallinnoimista. Tarkemmin tämä tutkimus on rajattu käsittelemään case-yrityksen, Digita Oy, TeleCom-asennuspalvelujen toimitusketjua. Tutkimuksen tavoitteina oli selvittää yhteistyöhön perustuvan toimitusketjun hallinnoimisessa huomioitavat elementit, tunnistaa case-yrityksen toimitusketjun kehitysalueet toimitusketjun hallinnan näkökulmasta, tutkia miten yhteistyöhön perustuvalla toimitusketjun hallinnalla voitaisiin parantaa case-yrityksen toimitusketjun hallintaa, sekä luoda yhteistyöhön perustuvaan toimitusketjunhallintaan perustuva malli case-yritykselle. Yleisesti tutkimuksen tavoitteina oli parantaa toimitusketjun näkyvyyttä ja tehokkuutta sekä parantaa materiaalihallintaa.

Yhteistyöhön perustuva toimitusketjun hallinta käsitteenä on moninainen ja sen määritelmä vaihtelee suhteellisen paljon. Tämä aiheuttaa omalta osaltaan ongelmia käsitteen ymmärryksessä sekä vaikeuttaa käyttöönottoa. Lisäksi suurin osa aikaisemmasta tutkimuksesta on keskittynyt vain muutamalle teollisuuden alalle ja lähes poikkeuksetta tutkimukset ovat käsitelleet suuria yrityksiä, jolloin ratkaisut saattavat olla sopimattomia pienempien yritysten toimintaan. Tämä tutkimus pyrkii täyttämään aiempien tutkimuksien jättämät aukot sekä ottamaan kantaa esille nousseisiin asioihin empiirisen tutkimuksen kautta. Tutkimusmenetelmäksi valittiin tapaustutkimus, joka koostui kirjallisuuskatsauksesta sekä empiirisen aineiston keräämisestä ja analysoinnista. Empiirisen osuuden pääasiallinen tavoite oli kerätä aineistoa haastattelemalla eri toimijoita Digitan TeleCom-asennuspalveluiden toimitusketjussa. Lisäksi aineistoa kerättiin useista tietolähteistä yrityksen sisäisesti, kuten yrityksen tietojärjestelmistä, dokumenteista, projektityöryhmistä sekä palavereista. Lopuksi sekä kirjallisuuskatsauksen että empiirisen osion löydöksiä verrattiin toisiinsa ja muodostettiin kokonaisvaltainen kuva yhteistyöhön perustuvasta toimitusketjun hallinnasta case-yrityksen näkökulmasta.

Tämän tutkimuksen tärkeimmät löydökset ja loppupäätelmät ovat, että on olemassa tiettyjä osa-alueita, jotka tulisi ottaa huomioon yhteistyöhön perustuvassa toimitusketjun hallinnassa ja jokaisen yrityksen tulisi lähestyä sitä omasta näkökulmastaan. Lisäksi tutkimus paljasti, että Digitalla on ongelmia sekä yleisesti toimitusketjun hallinnassa että varsinkin materiaalihallinnassa. Tämän vuoksi suosittelemme, että Digita ottaa käyttöön tässä tutkimuksessa esitellyn yhteistyöhön perustuvan toimitusketjun hallintamallin, jossa vaikutusvaltainen ja puolueeton logistiikkaintegraattori toimii tavallaan välittäjänä ja informaatiosulatusuunina. Toisian sanoen tässä tutkielmassa ehdotettu malli yhdistäisi konsultoinnin, operatiivisen käyttöönoton sekä toimitusketjun hallinnoinnin.

Avainsanat: toimitusketjuyhteistyö, toimitusketjun hallinta, toimitusketju, telecom, logistiikka, materiaalihallinta, näkyvyys, tehokkuus

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I was fortunate to have the possibility to write my thesis as a part of my job as a Logistics specialist at Digita Oy. This possibility offered both positive and negative sides. Positive, in the sense, that I was able to source great amounts of data and could also constantly reflect my study to practical issues appearing in various projects. Then again, job entails responsibilities that can not wait, so I had to hit the pause button quite many times during the six months of writing. This also caused the fact that my schedule stretched like a rubber band and I had to postpone finishing touches until August. However, now that the hard work is done, I'm grateful to everyone assisting me during this journey. Especially I would like to thank Digita for the opportunity to write this thesis on their assignment, as well as, all my colleagues for the support they provided. In addition, I want to thank my supervisors Markku Kuula and Anu Bask for their insights and, of course, my girlfriend and my family for their support throughout the writing process.

CREATING A COLLABORATION BASED SCM FRAMEWORK
Case Digita Oy

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1. Introduction

In the recent years logistics and Supply Chain Management (SCM) have been the topics amongst business professionals all over the world. Economic pressures, uncertainty and harsh competition in today's markets, as well as, ever increasing customer expectations and thin profit margins cause headache to managers and require restoration efforts (Simchi-Levi et al., 2003; Ireland, 2004). In addition, Ireland (2004: 1) explains that companies are increasingly trying to find ways to increase sales revenue and profit margins by looking beyond their individual enterprises. Therefore, in today's business world the focus is on the effectiveness of the supply chain. Ineffective supply chains tend to turn into money pits that corrode the cash flow and sales revenue, for example, when inventory is not needed or products are not available to sell. As a result, the focus of these efforts is in improving logistics operations and more precisely adopting SCM methods.

The rapidly growing interest in SCM is no surprise when reviewing the following figures. According to Frazelle (2001) logistics expenditures represent about 10 percent of the U.S. gross domestic product and are approximately $1 trillion annually. Also globally the figures are startling, as logistics expenditures exceed $3.5 trillion annually and represent nearly 20 percent of the sum total of the world's GDP. These figures attest that the old fashion view of logistics professionals in the bottom of the corporate ladder can be abandoned. Additionally, Burgess et al. (2006) state that the increase in magnitude of practitioner and academic publications, conferences, professional development programs and university courses in the area of SCM serves as an evidence to support the growth in interest towards SCM.

The forces contributing to the rapid growth in interest toward SCM are many. First of all, companies have consistently reduced manufacturing costs as much as possible. Second, evidence shows that savings can be achieved with better planning and effective management of supply chain. Third, technological advancements in information and communications systems have made efficient information sharing possible. Fourth, the companies aim to reduce uncertainty in order to improve materials management and reduce costs. The previous factors influencing the success of SCM, proposed by Simchi-Levi et al. (2003), increase the evidence that logistics can be seen as one of the last fields to increase overall company performance.

Encouraging examples of companies successfully adopting SCM techniques support the importance of efficient logistics and supply chain operations. Giants like Dell, Cisco, Wal-Mart, Tesco and Procter & Gamble have been able to build networked supply chains with anticipatory business models (Poirier, 2003; Ireland, 2004; and Simchi-Levi et al., 2003). What are in common with these

success stories, is that they all have a culture that encourages collaboration and cooperation within their supply chain. These company examples have also shown that with an anticipatory business model increases in sales revenues and improved profit margins are possible (Ireland, 2004).

However, it has to beard in mind that Supply Chain Collaboration (SCC) as a discipline is relatively young (Burgess et al., 2006). In addition, various researchers (New, 1997; Cox et al., 2001; Lummus et al., 2001; Mentzer et al., 2001; Kauffman, 2002; Quayle, 2003) claim that there seems to be little consensus on the definition of the term. Therefore, one has to be very careful when reviewing existing literature and making conclusions on that basis. Moreover, the previous suggests that empirical research should be conducted to support literature and better understand the phenomenon under study.

Nevertheless, there is a growing amount of evidence that supports the view that collaboration and cooperation are of great importance in SCM. Even though organizations have strived for many years to improve supply chain activities, the result in a supply chain wide perspective has been redistribution of costs and inventory up or down the supply chain (Ireland and Bruce, 2000). Also the forecasting and planning, which are core elements in tackling uncertain demand and reducing costs, have traditionally been isolated (Barratt, 2004). The previous issues are usually the reasons why the improvement efforts are put on hold. The researchers agree that without collaboration and cooperation supply chains cannot succeed too long in today's competitive environment (Barratt, 2004; Ireland, 2004; Frazelle, 2001). Thus, collaboration and cooperation effort have to be recognized as the essential building blocks of the future of SCM.

The idea of collaboration in SCM is rather simple. Poirier (2003) has suggested an approach where companies link together and collaborate in order to focus on customer or consumer satisfaction. Some of the benefits of this approach are that right products would be available at the point of need; goods and services that do not sell could be eliminated; inventory could be reduced; extraneous operating costs could be forced out; and the use of joint assets could be optimized. The previous acts can be inferred to be aiming towards building new revenues, achieving benefits, and providing better customer value together in sustainable and continuous manner. Finally, Ireland (2004: 5) has concluded the rationale of SCC quite well by arguing that: "SCC makes plain old common sense." After all, it is all about communicating demand information to trading partners enabling them to make products, components, and material available at the agreed points in the supply chain at the time of need.

Despite the fact that SCC is quite new management discipline, Cohen and Roussel (2004: 166) remind about the potential it has. They predict that SCC has the potential to change the economics of all companies, when business practices, rules and conventions get adjusted to reflect the realities of integration and increase visibility across supply chains. More importantly, SCC can reduce the significance of scale as a competitive differentiator and make it possible for the small companies to compete evenly with the big ones.

Inferred from the points presented above, the aim in this study is to improve the supply chain of the case company Digita Oy by creating a Collaborative SCM Framework for the company. Digita has been struggling with similar problems as illustrated earlier, such as excess inventory costs, inaccurate forecasts and inadequate communication. The SCM literature offers various suitable approaches to tackle the previous problems. These include, for example, collaboration and cooperation, supply chain performance, and forecasting. In general, aspects from all of the mentioned approaches can be used to improve the company's supply chain.

1.1. Case Company

The selected case company for this study is Digita Oy. Digita, as a part of TDF Group, is the leading Finnish network operator in wireless communications networks and an important developer of data communication networks and infrastructure in Finland. The company operates the national transmission and broadcasting networks, as well as, the radio and television stations. Digita's broadcasting network covers the whole country and comprises of 36 major stations, 151 sub-stations and dozens of transmission link stations. In addition, Digita operates a wireless broadband network with the coverage area of 99 percent of the Finnish population. Digita's main customers are regional and national television and radio broadcasting companies, as well as mobile and broadband operators. Some examples include Yleisradio, MTV Media, Sanoma Entertainment/ Nelonen Media, Digi TV Plus, Canal +, SuomiTV, TeliaSonera, and DNA. (TDF Group, 2010a)

1.2. Research Problem and Objectives of the Study

The purpose of the study is to improve Digita Oy's supply chain by creating a Collaborative SCM Framework for the company. More precisely this supply chain framework will be aimed for the needs of the TeleCom Installation Services supply chain. The research objectives of this study are as follows:

Research Objectives:

1. Identify the key elements to be considered when pursuing towards SCC.
2. Highlight the development areas in SCM in the case company.
3. Study how the SCC efforts can improve SCM in the case company?
4. Construct a collaboration based SCM framework for the case company that:
    - improves visibility throughout the supply chain;
    - improves the efficiency of the supply chain;
    - and improves material management

1.3. Structure of the Study and Research Methodology

The purpose of this thesis is to create a Collaborative SCM Framework for the case company Digita Oy. First, we are going to conduct an extensive review of related literature and create a preliminary Collaborative SCM Framework based on the review. Second we will explain the research methods used in the empirical research. Third, we will proceed to the empirical part of our study by providing an analysis of the current state of SCM in Digita's TeleCom Installation Services supply chain. Fourth, we will conduct interviews to gain a better understanding of the supply chain under study. Thereafter, we will reflect the findings of the empirical research to the related theories revealed in the review of literature. Finally, we are going to conclude the findings and implications and give our recommendations based on conclusions.

Theoretical framework used in this thesis is illustrated in Figure 1. Relevant literature presented in this study discusses first of all about SCM, which is considered as the underlying frame for the study. Collaboration as well Planning & Forecasting is recognized as important topics when reflected to the research objectives. Also, Material Management is closely linked to Planning & Forecasting, since without proper plans and accurate forecast material management costs climb high. Finally, performance theories assure that everything stays together in the means of controlling and measuring the supply chain operations.

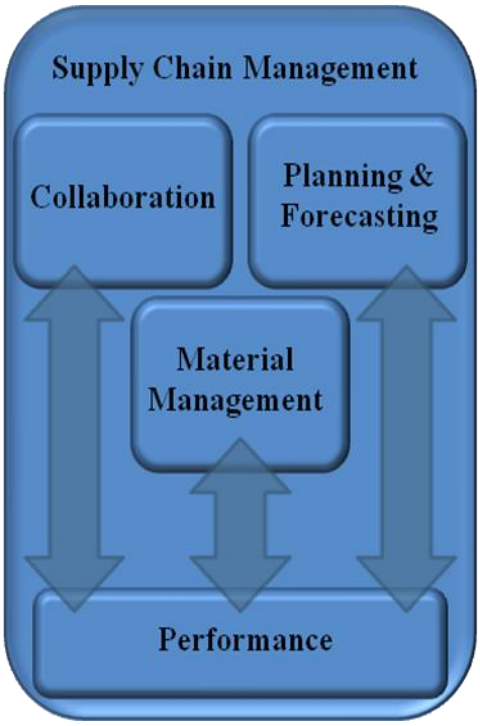


Figure 1. Theoretical Framework

The empirical part of the study is conducted based on the data provided by Digita Oy. The interviews were mainly semi-structured, but also a structured part was included. In addition, we will use documentary secondary data, which will be collected from various Digita systems. Secondary data sources will include, for example, reporting system and enterprise resource planning system. The researcher will, as well obtain secondary data from team meetings, group meetings and project group meetings.

1.4. Scope of the Study

As already mentioned, the purpose of this thesis is to study how the case company - Digita Oy - can improve its supply chain. Analysis of the case company is limited to the TeleCom Installation Services supply chain. Therefore, this study concentrates mainly in discussing about the various aspects of installation services supply chain and does not include analysis of the other supply chains at Digita Oy. The case study of this thesis can be classified as an exploratory case study with some explanatory elements. It should be noted that the conclusions considering the SCM framework for Digita Oy should not be generalized to other companies, without familiarizing oneself with the respective processes of Digita Oy. Also the implications given in this thesis are firm specific and should not be applied to other companies without a careful analysis.

Most of previous literature related in SCC has concentrated mainly on retailing and pure manufacturing industries. For example, according to researchers (Burgess et al., 2006; Ireland,

2004) the SCM literature seems to be concentrating in only a few industry sectors. These dominating industry sectors include consumer goods retailing, computer assembling and automobile manufacturing. Also, majority of the companies that have successfully implemented SCC approaches, such as Collaborative Planning, Forecasting and Replenishment (CPFR), fall into the large enterprise category with a lot of leverage and negotiation power. As evidenced also by the earlier introduced company examples. Companies like Wal-Mart and Dell possess a significant power in their supply chains. This more often means that the SCC approaches are unsuitable for smaller companies, as they tend to be rather heavy and require the strength of a large firm. However, as Småros (2003, 256) has suggested companies can benefit already from highly streamlined cooperation processes. Therefore, the earlier mentioned heavy SCC frameworks, such as CPFR, are not necessarily needed. In other words, for example by sharing relevant information and forecasts, companies can achieve better performance.

The previous in mind, this thesis aims to bring the SCC approaches closer to the smaller companies, as well as, expanding the horizon to new industry, thus, filling the gaps indicated above. In this thesis we construct a collaboration based SCM framework for Digita Oy. This framework will be a streamlined view that combines the best practices and lessons learned in previous studies in the field of SCM and SCC. The implications and framework could then be used in other companies operating in similar industries, and also, in other industries with reservations.

2. Literature Review

This Literature Review will examine previous literature related to Supply Chain Management (SCM) in collaborative sense. Therefore, this chapter consists of five theoretical components, as outlined in sub-section 1.2 of the introductory chapter. These theoretical components are: SCM, Supply Chain Collaboration (SCC), Material Management, Planning & Forecasting, and Supply Chain Performance. The study within this review of literature focuses on research objective 1 as set out in Introduction chapter sub-section 1.1, whereas objectives 2 and 3 will be met through the vehicle of empirical data collection and analysis, as well as, current state analysis. Finally, research objective 4 will be completed as a synthesis of the findings of first three objectives.

Research Objectives:

1. Identify the key elements to be considered when pursuing towards SCC.
2. Highlight the development areas in SCM in the case company.
3. Study how the SCC efforts can improve SCM in the case company?
4. Construct a Collaboration Based SCM framework for the case company that:
    - improves visibility throughout the supply chain;
    - improves the efficiency of the supply chain;
    - and improves material management

By exploring the above mentioned areas of literature, a significant contribution will be made to this research, as it will give us valuable tools for completing the research objectives successfully. In other words, we will be able to formulate a Collaboration Based SCM Framework for Digita Oy based on findings from Literature Review. Finally, we will be able to test the framework in empirical part of this thesis, as well as, provide recommendations and conclusion of the efforts necessary in the case company to achieve the research objectives.

This Literature Review is structured as follows. The first section of this review of literature introduces the concept of SCM. In addition, the first section will also discuss various approaches of how to manage supply chain. The second section discusses collaborative approaches to SCM. Third section is dedicated to Material Management, Planning & Forecasting issues and how they are handled. In the fourth section the concentration will be in supply chain Performance Measurement. Finally, the fifth section draws the theoretical framework together and provides a base for the Digita SCM model.

2.1. The Concept of SCM

This Section reveals the curtain to the world of SCM. First, we define the concept SCM in the context of this thesis. Then, we offer a narrow view to SCM in practice. Finally, we elucidate potential benefits, as well as, issues of SCM, thus paving the road towards SCC models.

2.1.1. Defining the Term SCM

Evidence from previous research indicates that defining SCM is not by any means unified. For example, according to Arns et al. (2002) SCM is an approach where material, product, and information flows are designed, implemented, and evaluated among multiple actors. These actors are defined as suppliers, manufacturers, wholesalers, and retailers who are involved in business processes, such as procuring, producing, and delivering products. Whereas, Monczka et al. (2001: 5) suggest that SCM should be seen as a concept, which principal purpose is to manage and integrate sourcing, material flow and control across various functions and various tiers of suppliers using a complete systems perspective. A similar systems based view has been proposed by Houlihan (1988). He states that supply chain should be viewed as an integrated systems based process across all of the company functions with a company-wide shared objectives and focus in improved perspective on inventory management. La Londe and Masters (1994), then again, define SCM as a long-term relationship of two or more companies based on trust and commitment to develop the relationships. They also state that this kind of relationship involves integration of logistics activities and sharing of demand and sales information with the focus in controlling logistics processes.

However complex the definition of SCM is, some practitioners and researchers have managed to put together a unified view. For example, Lambert et al. (1998, p. 1) present the following definition proposed by The Global Supply Chain Forum: “SCM is the integration of key processes from end-user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.” Moreover, Simchi-Levi et al. (1999: 1; 2003: 3) expand the previous definition of SCM in collaborative manner, as they state that: “SCM is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements.” Mentzer et al. (2001, p. 18), then again, define SCM as follows: “SCM is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of

improving the long-term performance of the individual companies and the supply chain as a whole."

All of the above presented definitions combined, capture the most telling aspects of SCM. First of all, it requires an integrated systems approach to supply chain, which views the supply chain as a whole and where the flow of goods is managed from the supplier to the ultimate customer. SCM also necessitates both intercompany and intracompany cooperation in synchronizing, as well as, unifying operational and strategic capabilities. In addition, all the efforts in managing supply chain should focus in creating customer value and leading to customer satisfaction. As a synthesis of the previously introduced definitions, the definition used in the context of this thesis of SCM is adapted from the previously presented definitions:

"This study recognizes SCM as a management framework to control material flows and processes related to supply chain in integrated and cooperative manner. It requires information, risk and reward sharing throughout the chain from suppliers to customers. Crucial characteristics of SCM are also customer focus and commitment to same objectives as well as pursuit to long-term partnerships."

2.1.2. The Complex Practice of SCM

The definition provided in the previous subsection reveals the complexity of practicing SCM. It involves several functions in several companies, both internally and externally. Lambert et al. (1997) have formulated a SCM framework, which also illustrates the complexity involved in managing the supply chain. It ties up several business functions, such as logistics, marketing & sales, finance, research & development, production, and purchasing, under a single process. Every single one of these functions contributes to the process. Thus, cooperation between the functions is an essential part of SCM. Additionally, Simchi-Levi et al. (2003: 3) explain that SCM is difficult due to two issues. First, designing and operating a supply chain is challenging so that system wide service levels are maintained while costs are minimized. Second, customer demand can not be forecasted exactly, travel times are never certain, and machines, as well as, vehicles tend to break down indicating that uncertainty exist in every supply chain. Therefore, uncertainty can be identified as one of the major challenges involved in SCM.

As can be inferred from the previous, SCM is very information-intensive activity, and thus, information management has a crucial role in it (Closs et al., 2005; Gunasekaran et al., 2008; Zhang et al., 2005). As a few researchers (Ballou et al., 2000; Ketikidis et al., 2008) have pointed out, information is one of the main pillars supporting a solid supply chain. To support the previous,

various researchers (Chow et al., 2008; Handfield and Nichols, 2002; Power, 2005) have shown that delayed, scarce or distorted information may generate severe problems in the supply chain. As a good example of the huge impacts of information to the supply chain, goes the bullwhip effect, which will be discussed in more detail in the subsection 2.2.1.

A current trend suggest that companies strive to develop more accurate demand forecasts, but at the same time they are also trying to be more flexible and agile in order to adapt to uncertainty (Gunasekaran et al. 2008; Stank and Traichal 1998). According to Zhang et al. (2005) being flexible means that the supply chain is more efficient, reliable, and fast. Hayes et al. (2005) add that flexibility itself may appear in form of either a wide range of products or high volumes. Which ever form it materializes, it should be seen as an essential part of SCM. For example, Lee (2004) emphasizes that the ability to react quickly to unexpected demand and changes in supply is a key quality in supply chain performance. Various researchers (Christopher, 2000; Gunasekaran et al., 2008; Lee, 2004), stress that in order to achieve flexibility in logistics and benefit from it, upstream and downstream information flows should work without interruptions. In other words, intensive information sharing and collaboration is necessary throughout the supply chain.

Internal cooperation is only the beginning, as the necessity and significance of collaboration grows when the organizational border is crossed. Lambert et al. (1998) recognize that individual businesses do not compete anymore as single companies, but as supply chains. According to them the future of business management is in inter-network competition and single businesses' success is depending on management's ability to integrate company's relationships network. In other words, companies have to collaborate with suppliers, as well as, customers in order to guarantee efficient product and information flow across the supply chain. In addition, collaboration has to extend throughout the chain from low tier suppliers all the way to the end-customers. For example, the networked nature of the modern-day supply chain sets challenges to material and information flows, due to the fact that companies have their own culture, systems, and processes to coordinate them.

Lambert et al. (1998) have extended the SCM framework, they originally presented in their 1997 article (see Lambert et al. 1997), and by proposing that managing the supply chain requires execution of three closely related elements. First, a company needs to decide upon the supply chain network structure. Second, necessary supply chain processes have to be indicated. Third, a company has to master the so called management components. In other words, success in SCM depends on determining the key supply chain members with whom to integrate processes; what processes should be linked; and what level of integration to apply to the processes. Then there are the management components that work as a cohesive force. They are divided into two categories:

physical and technical, and managerial and behavioral. First category concentrates on planning and control methods, as well as, defining a structure for work flow activity, organization, communication and information flow, and product flow facility. The second group deals with management methods such as culture and attitude, and structures for power and leadership and risk and reward. The previous suggests that collaboration is a vital characteristic of SCM.

All in all, it is important to consider supply chain as a team working together to achieve a common goal. In one way or another approaches pointed out three general characteristics of successful SCM. First, there should be no boundaries in sharing information or knowledge. Second, incentives, as well as, processes and procedures should be aligned throughout the chain. Third, the whole chain should cooperate in order to generate value to the customers. For example, Mentzer et al. (2001) state that integrated behavior, mutual sharing of information, risks and rewards, cooperation, mutual goals and focus in serving customers and process and partner integration should be all included in SCM activities in order to achieve profitable and long-term relationships.

Also, Simatupang et al. (2002) have concentrated in the collaborative nature of the supply chain. They have formulated an approach called Knowledge for Coordination. This approach is divided in the following four dimensions: logistics synchronization, information sharing, incentive alignment and collective learning. The first dimension, logistics synchronization, means aligning logistics process activities to deliver products and service so that customer needs and wants are fulfilled. Second, in order to share information, coherency of information should be realized and cooperation, as well as, following rules should be of great importance in diffusing information across organizational borders. The third dimension, incentive alignment, is not possible without creating mechanisms to distribute benefits and risks associated with logistics functions. The third dimension is crucial in order to be able to motivate independent actors to achieve supply chain profitability. Finally, the fourth dimension collective learning, deals with how to tackle the coherency problem of initiation and diffusion of knowledge across borders.

As can be inferred SCM approaches remark many factors influencing the success of the efforts. When everything is executed efficiently, these approaches offer various benefits to the companies. The next subsection discusses the most common paybacks received from managing the supply chain.

2.1.3. Benefits of Managing the Supply Chain

Companies seek concrete benefits with the various SCM approaches. For example, Lambert et al. (1998) suggest that the structure of internal, as well as, external activities and processes is vital for

achieving superior competitiveness and profitability. They also point out that successful SCM demands integrating business processes with key members of the supply chain. Otherwise, if supply chains are not appropriately integrated, streamlined and managed, valuable resources will be wasted. In addition, some researchers (Lummus et al., 2001; Anderson and Katz, 1998) suggest that the high level of integration with suppliers and customers in the supply chain can potentially generate benefits to the companies. Also, Tan et al. (1998) found that when companies integrate and act as a single entity, the performance of the whole chain will enhance.

In practice, the benefits received from successful SCM, are many. Mentzer et al. (2001) identify following three consequences: lower costs, improved customer value and satisfaction, and competitive advantage. Lee (2004) proposes that to achieve sustainable competitive advantage, the supply chain should possess agility, adaptability, and alignment. Fisher et al. (2000) identify that this kind of measures may, for example, reduce the likelihood of selling out items. They may also reduce markdowns and cut losses on products that are not successful. In addition to the previous, also sales figures could improve with such methods.

Also Lee et al. (2000) have discovered similar benefits as Fisher et al. (2000) and Mentzer et al. (2001). They have identified that sharing information alone may provide significant inventory reduction, as well as, cost savings. With these savings additional benefits can be achieved. For example, a company can negotiate special arrangements with manufacturers, such as the use of vendor-managed inventory programs. These may then lead to reduce in overhead and processing costs; price reduction to reduce variable costs; or lead time reduction to reduce inventory costs. Lee et al. (2000) also remind that the underlying demand process, as well as, the lead times can have significant impact on the amount of cost savings and inventory reductions related to information sharing.

As a conclusion, we can infer that successful SCM can lead to improved profitability, more efficient and streamlined processes and better overall supply chain performance, as well as, sustainable competitive advantage. Underlying benefits in these broad categories include such components as cost savings, improved customer value, stronger sales figures, reduced inventories and lead time.

2.1.4. Things to Bear in Mind in SCM

However great the benefits of SCM seem, there are still some issues managers have to take into account. For example, Fawcett and Magnan (2002) have conducted series of interviews that highlight five possible limiting factors hindering the potential of SCM. First, SCM has been made a buzzword. This has led managers to barely add the term SCM on top of traditional practices, and

thus, not adopt the mindset or develop the infrastructure that SCM needs. In other words, managers should not try to not sell SCM as the sole solution to their competitive challenges. Second, as also identified earlier in 2.1.1., definitions of SCM vary widely. This results that SCM practices lack both cohesion and visibility, in addition, the strategies used lack specificity and reach. Thus, managers need to be precise in deciding and communicating specific practices. Third, a functional division seems to exist between the departments inside a company, especially in purchasing and marketing functions. This kind of gap usually consists of physical and emotional distance and is rooted in the organizational structures and culture. For example, in case of many companies it is easier to form collaborative relationships with external supply chain members, than it is with internal functions. Fourth, complexity of the supply chain creates a major challenge. In addition, majority of companies operate in multiple supply chains, which means that defining the boundaries and intensity of specific relationships complicates supply chain design and management. Fifth, a strong focus on immediate returns and gains hinders companies' ability, as well as, patience to transform cultures and establish proper processes and relationships. As cultures change rather slowly and old practices are difficult to move away from, a true commitment must be applied for change to occur.

Also, Skjoett-Larsen et al. (2003) explain that the traditional functional approach in an organization may inhibit efficiency of supply chain cooperation. In order to successfully implement new supply chain practices, companies should move away from a production-oriented approach towards a market-oriented approach. The traditional functional approach, as proposed by Fawcett and Magnan (2002), provides a feeble basis for process development, as every function have their own goals and objectives. In other words, the traditional functional organization creates a situation where the functions are only responsible for the activities within their respective functional areas. Also, these functions often have their own cultures, as well as, specific ways of working. It can be inferred that functional structure inhibits optimization of the business as a whole, and also, causes inadequate communication and coordination between the functions.

The limiting factors presented above depict similar general issues that are faced in case of most change projects. Extensive hype, cultural issues, as well as, impatience are all good examples that often distract managers and companies. These factors together with heavy SCM frameworks often increase the complexity in already byzantine structure of supply chains. However, according to Småros (2003) companies may benefit also from highly streamlined cooperation processes, which means that heavier SCC frameworks are not necessarily needed. Therefore, efforts should be directed to the things that matter in SCM. For example, Storey et al. (2006) found three core

enablers and inhibitors for successful SCM. These are: transparency of information and knowledge; supply chain behavior; and performance measurement. The good old rule, keep it simple, shows its power, especially in complicated situations. In the next, section we will expand the view of SCM by introducing the concept of Supply Chain Collaboration.

2.2. SCC – A Collective Way to Manage Supply Chain

In this Section we are going to dig deeper into the collaborative way of managing the supply chain. We have divided this section into six subsections that in our opinion best explain the idea of SCC. First, we will discuss the foundation of SCC – information sharing and planning. Second, we are going to slightly touch the subject of supplier and partner relationships, which is also an essential part of SCC. Third, we will discuss what SCC is all about. Fourth, we explore some of the best practices and approaches in SCC. Fifth, we will examine the barriers of SCC. And, finally, we explain the potential benefits achievable via SCC.

2.2.1. To Give and Share, for Better or Worse.

Information exchange can be identified as one of the main pillars of successful SCM, as has been already mentioned in 2.1.2. It is common sense that every player in a supply chain should have access to the information affecting the overall supply chain process. If the information is fragmented or gets distorted on its way problems might arise. Therefore, information sharing should be included as an essential part in every SCC initiative.

Even though the impacts of information sharing in supply chains have been extensively studied, a consensus has not yet been reached. A dual view exists, as certain studies (Cachon and Fisher, 2000; Steckel et al., 2004) consider the impacts of information sharing only minor. On the other hand, various studies (Chen et al., 2000; Lee et al., 2000; Disney and Towill, 2003) propose that by sharing information companies may reduce the effects that cause information distortion. In addition, Hall and Potts (2003) stress that coordination between different parts of a supply chain plays a central role. For example, when poorly coordinated decisions are made in different stages of a supply chain, inefficiencies may result. Also, Rushton et al. (2006: 486) emphasize the importance of information. They describe information as the "lifeblood" of logistics and distribution systems. They argue that it is impossible for a distribution system to function effectively, without the smooth flow and transfer of information.

When it comes to information exchange, there is always a danger of distortion and misunderstandings. Bullwhip effect has been identified as one of the major factors behind information distortion. More specifically, it may be defined as either distortion of information (Lee

et al., 1997a) or increase in demand variability (Chen et al., 2000). According to Lee et al. (1997a) the bullwhip effect is caused by following four factors. First factor, demand signaling, occurs due to inadequate visibility of end-demand, multiple forecasts, and long lead-times. Companies can avoid it by sharing sell-through or point-of-sale data throughout the supply chain. Second factor, shortage gaming, implies to an occasion, where a certain party of a supply chain overestimates its under shortage demand and tries to ensure that they can fulfill the needs of their direct customers. The third and fourth factors, order batching and fluctuating prices, are rather self-explanatory issues. The common knowledge suggests that the bullwhip effect increases when moving up the supply chain. Simchi-Levi et al. (2003: 31) support this view by adding that in a supply chain every stage can affect the forecast accuracy of other stages.

Therefore, it can be inferred that the impacts of information sharing are not by any means minor. It has rather significant effect on the supply chain, if only; the effect might be either positive or negative. For example, Lee et al. (1997b) suggest that the bullwhip effect may result in material inefficiencies in a supply chain, such as poor customer service, lost revenues, ineffective transportation, excess inventories, misguided capacity plans, or missed production schedules. In addition, Chen et al. (2000) identified that effects of demand forecasting cause the bullwhip effect to occur. In their study, they claim that the bullwhip effect could not be eliminated, even if demand information would be shared supply chain wide, and all stages would use similar forecasting techniques, as well as, inventory policies. Nevertheless, Simchi-Levi et al. (2003: 25-26) suggest that there are four methods for coping with the bullwhip effect: reducing uncertainty; reducing variability; reducing lead-time; and forming strategic partnerships.

Despite of the previous, the common assumption among researchers is that information sharing in supply chain entails various benefits for a company. For example, Lee et al. (2000), Fisher et al. (2000) and Mentzer et al. (2001) have depicted these benefits, as presented earlier in 2.1.3. Also Zhao et al. (2002) have found that information sharing may increase the performance of the supply chain. According to their study, sharing future order information provides more substantial benefits, than only sharing future demand information. Zhao et al. (2002) also point out, that the total cost savings, supply chain wide, are considerable in most cases. For example, suppliers, in particular, may often cut costs, as well as, improve service levels drastically by exchanging information. In addition, Handfield and Nichols (2002) noticed that information visibility may decrease lead times and costs, as well as, improve profits and decision making.

Also, Simchi-Levi et al. (2003: 19-20) argue that by harnessing available information it is possible to design and operate the supply chain more efficiently than before. They claim that there are six

ways, how the abundant information can improve supply chain. First, it can reduce the supply chain variability. Second, it can improve supplier's forecasts and responsiveness to market changes. Third, it may potentially enable the coordination of manufacturing and distribution systems and strategies. Fourth, it may enable better customer service on retailer side with the use of measures that identify desired products. Fifth, retailers can improve their ability to react and adapt to problems in supply more swiftly. Sixth, it may enable reductions in lead times.

Benefits of information sharing can be achieved with relatively simple approaches. In their article Småros (2003) studied practical alternatives for improving accuracy in forecasts. This study revealed that companies can benefit even from very streamlined SCC practices and heavy frameworks are not necessarily needed. Småros (2003) adds that performance improvements can be achieved by sharing the most relevant and useful information, as well as, forecasts among the supply chain partners. Haapanen and Vepsäläinen (1999: 91) have also found that sharing real-time information may decrease, for example, capacity problems, excess inventories, and availability problems in various stages of the supply chain. Supporting the previous, Closs et al. (1997) and Zhang et al. (2005) stress that information should be used to eradicate redundant activities, reduce lead times and substitute physical inventory. Daugherty et al. (2006) concur with the previous, by stressing that information can be a significant source of competitive advantage.

Above facts suggest that information sharing and related planning actions are of utmost importance when aiming towards SCC. Additionally, Andraski (1998) claims that information and planning gaps may appear in business planning, if collaborative planning and information sharing are not properly organized. For example, in order to develop an accurate forecast in collaborative planning, supply chain partners need to share marketing intelligence and exchange information. Cassivi (2006) adds that the only way to achieve visibility in supply chain is to plan and execute in collaborative manner with both downstream and upstream partners. Also, Lee et al. (2000) fortify the belief that information sharing forms the foundation for SCM and SCC initiatives.

However, great the benefits of information sharing are, it should be coordinated in orderly manner. For example, Liker and Choi (2004) emphasize that information should be shared wisely, as when a lot of information is shared with everyone; no one tends to have the right information available when needed. Due to this, companies should identify which information will be shared in the supply chain (Handfield and Nichols, 2002). In addition, Zailani and Rajagopal (2005) emphasize that information sharing and the level of information quality and participation form the two aspects of communication behavior. These aspects define the effectiveness of information exchange. They

continue that both of the information sharing aspects, quantity and quality, are required for successful development of supplier partnerships.

2.2.2. Finding the Right Partners in the Supply Chain

There are several kinds of distinct partnerships in the business world, but the supply chain partnership is in many ways unique. For example, Zailani and Rajagopal (2005: 380) define the concept of supply chain partnership as follows:

"The concept of supply chain partnership extends the perspective of operations from a single business unit to the whole supply chain where relationships are formed between two independent members in supply channels through increased levels of information sharing to achieve goals and benefits in terms of reductions in total costs and inventories. It is a set of practices aimed at managing and coordinating the supply chain from raw material suppliers to the final user-customer to gain win-win situation."

In other words, supply chain partnership can be described by a simple equation stating that one plus one should be more than two. The above definition implies that companies should understand that by working together as one entity rather than separate actors they can gain more benefits.

Also, some researchers (Edwards et al. 2001; Ellinger et al. 1999; Svensson 2001) have proposed that the traditional vertically integrated business model should be re-evaluated and developed towards increased cooperation, as well as, larger scale information sharing practices with partners in order to avoid interruptions in logistics flows. In addition, several researchers (Bowersox et al., 1992, 1999; Ellram, 1995; Ellram and Cooper, 1990; Gentry, 1996) have indicated that a supply chain might be strengthened by creating long-term and mutually beneficial relationships between the members. Daugherty et al. (2006) continue that companies collaborating with their partners tend to be more successful than their isolated counterparts. These kinds of relationships should be characterized by trust, commitment, and long-term time horizons (Morris and Carter 2005).

While information is often brought up to the pedestal, trust should receive similar consideration, as it is equally important and often a decisive factor in the success of information sharing and collaboration efforts. For example, Beth et al. (2003) consider trust to be an equal source of competitive advantage to information. According to Kumar et al. (2001), trust contains two essential elements. First, trust in the partner's reliability, in other words, the belief that the partner fulfils promised obligations and is sincere. Second, trust in the partner's benevolence, which means that the partner is interested in the firm's welfare and does not conduct actions affecting negatively to the firm. These are the two factors that define the success of any collaborative relationship. Like

Emmett and Crocker (2006: 144) explain - without trust a relationship can not be formed. They continue that trust is fundamentally all about the old phrase: "one for all and all for one."

In order to be able to trust to each other, supply chain partners should show high levels of commitment. According to Zailani and Rajagopal (2005), commitment refers to the buyers and suppliers willingness to strive on behalf of the relationship. Commitment to a relationship usually concretizes in form of committing resources to the relationship, such as time, money or facilities. Therefore, Emmett and Crocker (2006: 157) define partnership as an ongoing relationship among two organizations involving long term commitment and mutual risk and reward sharing. Additionally, they stress that five key factors define establishment of a successful collaborative relationship. First, sharing information both ways. Second, establishing top management support. Third, sharing mutual goals. Fourth, involving supplier early and communicating to them. Fifth, understand that suppliers add distinctive value.

According to Cohen and Roussel (2004: 148), in the end the success of collaboration relationship depends on the partners' ability to operate according to the mutual agreement. Albeit every partnership is distinct, similar guidelines for success apply to all. Cohen and Roussel (2004: 148-149) have identified six partnership success factors. First, companies should master internal collaboration before trying to work with external partners. Second, definition of the appropriate degree of collaboration should be decided for each partner segment. Third, it should be assured that each and every party has a stake in the collaboration outcome. In other words, benefits, gains, losses, and risks should be shared. Fourth, mutual trust is an integral part of successful SCC, and thus, companies should be prepared to share information that once was considered proprietary. Fifth, there should be clear expectations set for each of party. Sixth, technology should be used to support the collaborative relationship. Cohen and Roussel (2004: 163), also, remind that only the largest and most powerful enterprises can use their position to force changes. Thus, majority of the companies should prepare to sell the idea of SCC to prospective partners.

As can be inferred, SCC fundamentally embodies working with supply chain partners in close proximity and it is of utmost importance to pinpoint the right ones. Sabath and Fontanella (2002) stress that partner selection difficulties appear, when companies try to collaborate with everyone. Thus, companies need to be selective in selecting supply chain partners. In addition, Lambert et al. (1998) suggest that companies should segment their supplier and customer relationships between so called arms-length relationships and true partnerships. Zailani and Rajagopal (2005) continue that, regardless of the value creation potential of true strategic partnership, they are expensive to develop and maintain. Additionally, they require specialized investments, and thus, entail risks. This means

that the amount of true partnerships a company can develop and maintain, is limited. Therefore, the focus should be in building the right relationships through careful planning and decision-making.

However, tempting it is to get together, share information, resources, rewards, risks, and succeed; various researchers have evidenced critical reasons for failures in supply chain relationships (Ackerman, 1996; Bowersox et al. 1992; Ellram, 1995; Lambert et al., 1998). Companies should bear the previous in mind and plan and execute their partnering activities by learning from the best practices. For example, Ireland (2004: 186) summarizes seven key learnings from SCC partnerships. First, companies should educate themselves on what the SCC is. Second, executive sponsorship should be obtained. Third, everything should be kept streamlined and simple. Fourth, it should be kept in mind that one size does not fit all and thus collaborative relationship should be tailored to fit the needs of the company, as well as, the needs of the trading partners. Fifth, a company should pick a trading partner that wants to be part of a win-win collaboration relationship. Sixth, companies should understand the potential value a good collaborative partnership may provide. Seventh, most important lessons are learned by actually piloting, so companies should execute SCC, not just study it. All in all, by following the learnings indicated by academics and practitioners, such as Ireland (2004: 186), companies can identify prospective partners in their supply chains and have the knowledge of how to foster these relationships, as well as, harvest the benefits they bring.

2.2.3. SCC – What is it All About?

Earlier in this chapter we have already introduced the idea that working in collaboration with supply chain partners may be beneficial to enterprises. In other words, the motivation to collaborate comes from the various benefits it brings with it. According to Cohen and Roussel (2004: 140), an effective collaboration relationship may have significant strategic and financial benefits. For example, it may accelerate entry into a new market, increase flexibility, and provide access to expertise not available internally in a company. In addition, by collaboration cost savings and increased revenues are possible.

Even though SCC is relatively new approach, seeds have been planted decades ago. For example, Bowersox et al. (1992) stressed already in 1990s that concentration on relationship continuum and forming an extensive link between supply chain partners instead of a series of single transactions are key characteristics of SCC. More recent view has been proposed by Simatupang and Sridharan (2002, 19), who define SCC as follows: “a collaborative supply chain simply means that two or more independent companies work jointly to plan and execute supply chain operations with greater

success than when acting in isolation." Lambert et al. (1998) add that SCC can be seen as a tailored relationship, where partners share risks and rewards in order to improve the competitiveness of both parties.

Cohen and Roussel (2004: 139-142) summarize the previous ideas of SCC by defining that: "collaboration is the means by which companies within the supply chain work together toward mutual objectives through the sharing of ideas, information, knowledge, risks, and rewards." This implies that successful collaboration consists of two components – sharing information and sharing benefits. Information can be seen at the heart of any collaborative relationship. Effective SCC necessitates sharing timely, accurate, and complete information between partners in order to achieve mutual objectives. In addition, each partner has to respect agreed security and confidentiality requirements of others.

However, important elements of SCC information and benefit sharing are, there are also various other factors effecting the success of SCC initiatives. For example, Barratt (2004) has pointed out 16 elements of SCC, which can be both drivers and hindering factors. These elements are as follows: collaborative culture, external and internal trust, mutuality, information exchange in the supply chain, communication and understanding, openness and honesty, managing change, cross-functional activities, process alignment, joint decision making, supply chain metrics, resources and commitment, intra-organizational support, corporate focus, demonstrating the business case, and the role of technology.

Additionally, Emmett and Crocker (2006: 100) have emphasized that collaboration should be based on certain principles. They have recognized five rules of collaboration. First, there must be real and recognizable benefits achievable for all the internal and external players involved. Second, business processes should be integrated at all stages. Third, all of the supply chain components should support the initiative. Fourth, companies should recognize that there are different cultures involved in the initiative. Fifth, people relationships are the key to a successful collaboration. Moreover, Barratt (2004) suggests that many of the problems related to SCC are due to a lack of understanding of what collaboration actually implies.

Inferred from the points brought up above we have expanded the previous definition of SCM presented in 2.1.1 to cover the most important aspects of SCC, as well as, those of SCM. The new expanded definition used in the context of this thesis of SCC is adapted from the definitions proposed by various researchers (Emmett and Crocker, 2006; Barratt, 2004; Cohen and Roussel, 2004; Simchi-Levi et al., 2003 and 1999; ; Arns et al., 2002; Simatupang and Sridharan, 2002;

Mentzer et al., 2001; Monczka et al., 2001; Lee et al., 2000; Lambert et al., 1998; La Londe and Masters, 1994; Houlihan, 1988; and Riley, 1985):

"This study recognizes SCC as a management framework to control material flows and processes related to supply chain in integrated and cooperative manner. The fundamental building blocks of SCC are collaborative culture, communication, trust, openness and honesty. It requires cross-functional information, risk and reward sharing throughout the chain from suppliers to customers. Crucial characteristics of SCM are also customer focus and commitment to same objectives as well as pursuit to long-term partnerships. In addition, it requires adopting the principles of continuous improvement and aligned supply chain performance measurement."

2.2.4. SCC Approaches

As we have touched already earlier, by collaboration companies seek to streamline supply chain and improve efficiency by using information exchange. According to Barratt (2004), the context of SCC originates to the mid-1990s and is still in development phase. Development of SCC has been a process of evolution, as Ireland and Bruce (2000) mention. They continue, that after implementing various efficiency and effectiveness programs, the top executives realized, that internal optimization was not sufficient. Therefore, companies began to seek other possibilities to improve the supply chain and initiatives, such as, Vendor-Managed Inventory (VMI), Efficient Consumer Response (ECR) and Collaborative Planning, Forecasting, and Replenishment (CPFR) were born.

The first collaborative practice, VMI, concentrated in optimizing replenishment. Harrison and van Hoek (2007) and Disney and Towill (2003) have described VMI as a form of SCC where the supplier resumes replenishment responsibility on behalf of the customer. Moreover, Kaipia et al. (2002) suggest that VMI reduces the performance pressures on supplier side by requiring better deliveries. According to them, VMI increases supplier responsibility and authority due to the fact that they manage the whole replenishment process. However, Ireland (2004: 69) disputes the common belief that VMI has been a successful collaboration program. He argues that its shortfall is the fact that the retailer does not take accountability in the process, or assist in the program, and when something goes wrong blames the supplier. The previous, can hardly be characterized as collaboration. Additionally, experience has shown that the bullwhip effect tends to be greater in VMI when compared to other forms of collaborative partnership.

Efficient Consumer Response (ECR) offers an alternative collaborative approach to VMI. According to Seifert (2003:1), ECR consists of two building blocks. The first one is the consumer. In other words, a consumer centric orientation should be pursued, where the needs of the consumer

drive the supply chain. The second block is efficient response, which means that the supply chain needs to be optimized by process-orientation which glues individual elements together. Seifert (2003: 2-3) continues that ECR aims to be a comprehensive management concept for retailing and manufacturing. It bases on value-adding partnership between the participants and consists of various basic strategies. This means that retail and manufacturing should work in cooperation to improve the efficiency, rationality, and consumer-orientation of the supply chain. All the mentioned efforts should aim on improving customer satisfaction. To conclude, the objective of the aspects of ECR is in reducing and eliminating non-value adding activities, and maximization of the factors that improve value and productivity.

The latest edition in SCC is Collaborative Planning, Forecasting and Replenishment (CPFR). Seifert (2003: 28) acknowledges that, in contrast, to the cooperative SCM efforts of early nineties, such as cross-docking, VMI, continuous replenishment, or ECR, CPFR elevates collaboration to a new level. It demands more from the quality of the partnership. Also, the quality and intensity of information exchange necessitates stronger commitment to cooperation from the participating companies, than the classic collaboration initiatives. CPFR also expands the scope of collaboration to comprehend more than just inventory management. In addition, Seifert (2003:28) reminds that the Planning & Forecasting components of CPFR demand intensive information exchange at the logistics, sales management, marketing and finance planning levels. Therefore, CPFR is a comprehensive value chain management tool for an enterprise. Management can use CPFR and involved efficiency advantages in strategic SCM. The goal of CPFR is continuous improvement of the company's own position in the market, as well as, value chain optimization.

According to Småros (2005), CPFR model is aimed at companies that either have or are shifting towards consumer-centric and inter-enterprise oriented organizations. The SCC partners need to have plans for a long-term partnership and a clear vision of the benefits that a deeper relationship would deliver to both parties. However, Småros (2005) stresses that one of the biggest obstacles might be the large investments required to the infrastructure upgrades. For example, there is no common standard for information systems' interfaces, which makes the integration work difficult, time-consuming and expensive. Also, the internal processes are subject to change, which can cause resistance by the employees involved. Thus, the implementation of CPFR model cannot be even considered without top management's approval and commitment to the change process.

As can be inferred from the previous, SCC practices, complex as they are, are not easy to implement. In addition, it should be remembered that there are different kind of SCC relationships (Cohen and Roussel, 2004: 143). These relationships may have very different characteristics, but

are, nevertheless, considered collaborative in nature. Also, the results of collaborative relationships can differ widely depending on the partner. Therefore, the next subsection introduces some of the issues hindering the successful adoption of SCC approaches.

2.2.5. Barriers in the Way of SCC

Collaborative Planning, Forecasting, and Replenishment (CPFR) is currently considered as the best practice in collaboration. Voluntary Interindustry Commerce Standards (VICS, 1999) study revealed that various CPFR pilots, such as Wal-Mart and Sara Lee, have been successful, but CPFR still has to develop in order to become an industrial standard. However, Jain (2003) stresses that only a minority of large and middle-sized U.S. companies has utilized CPFR practices. Småros (2003) adds that finished and successful large-scale implementation projects are rare, especially in Europe. The main reason behind this might be the lack of extensive forecasting process in the customer side. For example, majority of the retailers concentrate on short delivery times, and thus, neglect the significance of forecasting. Also, some of the reasons for the SCC shortcomings according to Sabath and Fontanella (2002) are: first, the difficulty in partner selection; second, lack of trust and common incentives; and third, over-reliance on the information technology. Another significant factor and cause of most early failures in SCC, according to Ireland (2004: 69), is the following attitude: "I win, you figure out how to win." In addition, Emmett and Crocker (2006: 100-101) have discovered similar barriers preventing the achievement of the benefits of SCC: lack of trust, poor communication, no understanding of the big picture, no willingness to take risks, prefer power-based adversary transactional approach, prefer quick and short-term wins, benefits are not shared, planning is inadequate, lack of top management support, concentration on short-term operational efficiency, fear of change, and fear of failure from the existing blame culture.

As mentioned, however good, the rationale and the early benefits, execution of SCC efforts in supply chain has proven to be difficult. Holweg et al. (2005) mention that companies are usually able to get the information, however, they are not capable to digest it, and thus, waste the opportunity to realize the benefits. In addition, Ireland (2004: 159) emphasizes that internal collaboration is often more difficult than external collaboration. This in mind, before implementing a SCC program with the trading partners, companies should get the own house in order, as much as, possible. Also, Emmet and Crocker (2006: 1-6) argue that effective SCM necessitates working together both internally in an organization, as well as, externally with suppliers and customers. They continue by stressing that the starting point of SCM should be the internal supply chain. This means that companies should first ensure the integration, coordination, and control of their internal

operations and activities. Only after the internal processes are honed to perfection, should the efforts be channeled to external partners.

To remove the possible obstacles in the way of SCC Ireland (2004: 129-134) has raised six best practices in implementing a collaborative approach. First, and foremost, people, processes and technology should be aligned. Second, SCC education is critical for everyone involved in the process, since they need to obtain a true understanding on the nature of collaborative partnership and how to implement it. Three common mistakes to avoid in education are: first, the focus of education is on the software with little on the process; second, we educate and then do not use it; and third, we fail to educate everyone. Third, an executive-level sponsorship should be established. In other words, the executives need to work vigorously to break down the barriers of resistance, as well as, provide the support and guidance. The executives should also sponsor the needed changes in culture, organization, incentives and rewards, and technology investments. Fourth, trust is the factor that forms the foundation of SCC. It is also one of the biggest uncertainties in SCC. Fifth, customer-centric focus is one of the most important best practices. Sixth, the trading partner data should be communicated, as well as, internalized and the collaboration executed.

One has to bear in mind that there is no simple and quick solution to SCC, and one size does not fit all. Therefore, Ireland (2004: 52) reminds that each company should individually decide the scale and scope of their SCC effort. In other words, companies have to determine the extent in which they implement SCC based on their internal planning competency and capabilities, their trading partners' capabilities, and the types of products and market in which they operate. As a conclusion, it can be inferred that every company should approach adopting SCC differently.

2.2.6. Benefits of SCC

The previous subsection revealed that implementing SCC can be challenging. However, as has already been touched, companies can benefit significantly when collaborating with their partners. For example, Cohen and Roussel (2004: 163) stress that the goal of SCC is to benefit the partners strategically and financially. They continue that SCC should be all about reducing the overall supply chain costs and sharing the savings instead of only shifting costs from one supply chain partner to another. The previous in mind, we will next introduce some of the most common benefits of SCC.

Increased visibility in the supply chain can be identified as a key motivator, when it comes to partnership building in the supply chain. For example, Holweg et al. (2005) argue visibility to be the most important goal of SCC. According to them visibility may be divided into three categories:

first, supplier visibility; second, customer visibility; and third, internal visibility. Information sharing creates the main challenge for external and internal visibility. In addition to information sharing issues, the internal visibility is often plagued by poor cost tracking, for example, in the case of customer service. Therefore, it can be inferred that information exchange has both a value generating ability, as well as, hindering ability in SCC approaches. Fisher et al. (1994) mention that most companies might not be able to prepare themselves to counter the demand uncertainty that is present in production planning. However, Zhao et al. (2002) propose that information sharing may increase performance of the supply chain. Information exchange can help companies to perfect their forecasting processes, and thus, reduce, for example, the amount of lost sales. On the other hand, the inadequate information sharing may lead to increased inventory and order management costs (Lee et al, 1997a). According to Skjoett-Larsen et al. (2003), the previous might be caused by the traditional functional approach inside the organization, as it creates obstacles on the way of effective SCC. As mentioned earlier in 2.1.4., these companies should move from production-oriented approach towards a market-oriented approach, which includes the integration of internal activities. It also enables use of external information in planning sales and operations, and helps the company to develop its processes.

Forecasting is in direct relation to information exchange, and it is one of the most significant benefits of SCC. Helms et al. (2000) suggest that collaborative forecasting provides remarkable opportunity to improve supply chain performance, and thus, it should be considered as an important element for companies adopting a SCC approach. Unified forecasting practices are basically the main benefit of SCC in forecasting. They enable operation in a single supply chain for companies, and therefore, make it possible to form a common strategy, as well as, improve transparency and visibility.

In addition to the visibility and transparency benefits of SCC approaches, they may result also in cost savings, increase in revenue and higher profits. For example, Seifert (2003:3-4) depicts that the benefits of ECR to suppliers and retailers come mainly in form of higher profits. This is enabled through reductions in supply chain costs and increases in revenue through an optimized marketing concept. Seifert (2003: 40-41) continues with the most commonly accounted benefits of CPFR that include drastically improved reaction times to consumer demand; higher precision of forecast; direct and lasting communication; improved sales; inventory reduction; and reduced costs. In addition, the CPFR concept may also have a reductive effect on ramp-up time in supplying goods.

Cohen and Roussel (2004: 142) have identified three categories of common SCC benefits that summarize the most important benefits of collaboration. First, in the customer point of view

benefits are reduced inventories, increased revenues, lower order management costs, higher gross margins, better forecast accuracy, and better allocation of promotional budgets. Second, in the material supplier's point of view benefits are reduced inventories, lower warehousing costs, lower material acquisition costs, and fewer stock outs. Third, in the service supplier point of view benefits are lower freight costs, faster and more reliable deliveries, lower capital costs, reduced depreciations, and lower fixed costs. In the end, it is well justified to remember that simplified usually equals effective. Ireland (2004: 65-68) concurs by emphasizing that even the simple small scale efforts have yielded early benefits.

2.3. Keeping Supply Chain Material Flows in Control

Material management is an essential part of SCM approaches, and SCC does not make an exception. In order to be able to streamline the supply chain and implement efficient practices to harvest the benefits of SCC, companies have to understand their material flows. Material Management, in the context of SCC, can be identified to consist mainly of the following two elements: forecasting and planning, and improved inventory practices. The first subsection describes forecasting and demand planning actions, as they are interrelated topics. In the second subsection, we discuss different inventory management issues.

2.3.1. Forecasting in Supply Chain

Silver et al. (1998: 74) have defined forecasts as predictions concerning the future, which may be based on historical data interpretation and informed estimate of future events. Lapide (2006) agrees with our argument that forecasting is an essential part of modern complex business environment. Mentzer and Moon (2005) also emphasize the importance of forecasting. According to them, three dimensions exist in forecasting performance. They are accuracy, costs, and customer satisfaction. This means that money and efforts spent on forecasting may be viewed as an investment decision, and thus, improved forecasting accuracy should be leading to reduced SCM costs and improved customer service. In addition, Simchi-Levi et al. (2003: 27) have indicated following three rules of forecasting. First, the forecast is always incorrect, in other words, it is unlikely that the forecast demand equals actual demand. Second, the longer the forecast horizon, the worse the forecast, due to the fact that demand forecast far in the future is usually less accurate than the demand forecast in the nearby future. Third, aggregate forecasts are more accurate, meaning that a forecast of individual item is likely to be less accurate than aggregate demand forecast.

Regardless of the above explained rules, forecast should be considered as a critical tool for management. For example, Kahn (2003) studied the influence of forecast errors on a company's

financial performance. In his article, he proposed that already relatively minor forecast errors might have an adverse effect on the bottom line. According to Kahn (2003) forecast errors may be divided into two categories: over forecasts and under forecasts. First category, over forecasting causes excess inventories, which tie up financial resources, as well as, increase inventory-holding costs. Additionally, over forecasting might incur transshipments, inventory obsolescence, and also reduce margin, especially in the case when products have to be sold at a discount. But then again, under forecasting may concretize in order expediting costs, as well as, increased product costs due to decreased order lead-times to supplier direction. Under forecasts may also lead to lost sales, lost companion product sales, and decrease in customer satisfaction, if customers' needs are not fulfilled.

Frazelle (2001: 114-115) has identified a more precise list of four major sources of forecast inaccuracy. These are denial, bias, ignorance, and supply chain ripple effects. First, denial exists in forecasting due to the fact that organizations do not hold anyone accountable for the forecast accuracy. Second, bias, then again, appears when true demand is not recorded or when corporate culture and/or human nature influences excessively the forecasting process. Third, ignorance comes into play if company lacks awareness of high-level industry and economic trends, key customer information, major promotional events and/or price shifts, and forecast accuracy indicators. Finally fourth, supply chain ripple effects refer to a situation where forecast errors are amplified when every actor in a supply chain tries to forecast demand patterns of others.

Ireland (2004: 65) summarizes that the reasons for not using collaborative forecast are people, processes and technology. First, people who are in interaction with the customer can hoard the information in customer forecast and not communicate it to other parts of the organization. Second, the forecast information might be communicated, but not used due to the fact that the accuracy of the forecast is being questioned. Third, companies might also lack the technology to drive the forecast directly into their planning system.

The previous issues suggest that management should concentrate considerable effort on perfecting the forecasting procedures. Also, Mentzer and Moon (2005) stress that functional integration within a company has an influence on efficiency and effectiveness of the company's forecasting function. Functional integration consists of three components, Forecasting C^3, which embodies communication, coordination, and collaboration. First component, communication implies to written, verbal, and electronic information sharing between company functions. Second component, coordination constitutes of the formal structure and meetings between company functions. Third component, collaboration refers to orientation toward common goal setting and it involves the

company both internally and externally, as the key customers should be involved in the forecasting process.

2.3.2. Finding the Right Balance in Managing Inventories in the Supply Chain

The old saying "money makes world go around" turns into "inventory makes logistics go around" in logistics (Frazelle, 2001: 91). The foundation of all logistics is formed by planning, storing, moving, and accounting of inventory. Moreover, inventory availability can be identified as the most important aspect of customer service. For example, according to Frazelle (2001: 91) the goal of inventory management should be to increase the financial return of inventory and at the same time increase level of customer service. Emmett and Crocker (2006: 7) add that the flows of goods and information need to be coordinated in the supply chain in order to minimize inventory levels. They continue that high inventory levels can be viewed as a major symptom of an ailing supply chain and these symptoms must be treated.

Due to the previous, inventory management is an essential part of streamlining supply chain activities, since inventories cause costs to a supply chain in various forms. For example, Frazelle (2001: 91) has listed that some of the most significant qualities of inventory are the inventory carrying costs and difficulty to convert physical inventory into a liquid asset. These are important, since inventory carrying costs are typically the most expensive logistic costs and the lack of liquidity makes inventory a very risky investment.

Additionally, Callioni et al. (2005) have identified three distinct categories of inventory-driven costs. These three are inventory cost item, component devaluation costs, and obsolescence costs. First, inventory cost item may be the most identifiable component of inventory-driven costs. It is often recognized as the traditional inventory cost item and defined more specifically as the holding cost of inventory. Inventory cost item covers the capital cost of money tied up in inventory and the physical cost of having inventory. For example, warehouse space costs, storage taxes, insurance, rework, breakage, and spoilage.

Second, component devaluation costs, for example, refer to a situation, where a company maintains inventory in several places. Every occasion the component prices fall the company will suffer devaluation costs at each of the points the inventory is kept in the value chain. In this kind of situation, a company has no control over the component prices, but it can control its inventories. In other words, a company can reduce the nodes in the supply chain, consolidate manufacturing facilities, take possession of components on a just-in-time basis, pay a going price at a time, and work with suppliers to minimize inventory when a price drop is anticipated.

Third, obsolescence costs usually concern products with a longer life-cycle. While this might provide more lasting and consistent revenue streams, it also possesses a threat that the products will become obsolete. For example, in fast-paced industries, such as computer or fashion industry, this is a real issue as market preferences change very quickly and substitute products appear like flowers in a lea. Companies may counter obsolescence cost by concentrating in short life-cycle products.

According to Callioni et al. (2005), using of inventory-driven costs in decision making can prevent managers to make moves that benefit their own unit, but add to overall costs. Many downstream supply chain costs generate from the choices managers make upstream in the product design phase. Thus inventory-driven costs are a valuable tool in research and development, and marketing decision making. All in all, the greatest benefit of inventory-driven cost metrics may be the fact that they link operational decisions to the corporate goals for creating shareholder value.

As a good conclusion, Frazelle (2001: 92) has listed five initiatives leading to increased inventory return, as well as, increased availability of inventory. First, improve the accuracy of forecasts. Second, reduce the cycle times. Third, lower purchase order and setup costs. Fourth, improve the visibility of inventory. Fifth, lower carrying costs of inventory.

2.4. Keep the Supply Chain Together by Measuring Performance

According to Ramdas and Spekman (2000), despite that there is an increased awareness of the necessity of more effective SCM, a consensus on how to measure performance in the supply chain and what are the factors of high performance has not been reached. This leads to a situation that companies usually measure performance by cost savings only, without paying enough attention to their ability to leverage supply chain partners' expertise.

Due to the previous, collaboration in supply chain, complex context as it is, necessitates measures to control both the internal and especially the external actors in the chain. In this section we are first going to introduce the definition of performance measurement and the fundamental things related to it, as well as, the motivation for measuring performance. Second, we will explore the characteristics needed to establish an efficient and working performance measurement system.

2.4.1. Fundamentals of Performance Measurement in the Supply Chain

Performance measurement can be identified as one of the most important things a company should master, when pursuing towards sustainable growth and success. For example, Frazelle (2001: 39) stresses that what gets measured usually gets improved. However, if there is no holistic set of logistics performance measures in place, wrong things might be improved. In addition, he

paraphrases the significance of logistics performance measures as follows: “It is hard to win a game without a scoreboard. It’s hard to even know what game you are playing without a scoreboard.”

Despite of the previous, many logistics organizations are still operated without a formal set of logistics performance measures, not to mention the fact that the set is rarely aligned with the overall business objectives (Frazelle, 2001: 39). In addition, Cohen and Roussel (2004: 185) fret that minority of companies use cross-functional supply chain metrics, even though they are the key component of an integrated supply chain organization. According to Frazelle (2001: 39), a reason to the previous might be the lack of standardization in the logistics performance metrics. Cohen and Roussel (2004:185) concur that establishment of a performance measurement program can be difficult. Already a great challenge is to agree what to measure, how often to measure and how to define the chosen metrics. Most contentious activity of all, however, can be getting the management to agree on the fundamental purpose of a performance measurement program.

According to Rushton et al. (2006: 485), there are five typical motivators to monitor and control logistics and distribution operations. First, since logistics and distribution objectives should be directly linked to the business objectives, monitoring enables the achievement of these current and future objectives. Second, in order to be able to check that distribution operation is appropriate when reflected to the overall objectives and to facilitate effective provision of logistics services. In other words, doing the right things. Third, to make sure the distribution operation runs, as well as, possible and enable efficient allocation of logistics resources. That is, doing the thing right. Fourth, monitoring supports operation planning and controlling and ensures that appropriate information can be directed back to planning and management. Fifth, monitoring provides measures focusing on real outputs of the business, which enables corrective actions to be taken if something goes wrong or identifies potential improvements to the processes.

As can be inferred from the previous, performance measures should be planned so that they measure precisely the act they are supposed to measure. Otherwise, their information value is close to zero and wrong things will get improved. For example, Frazelle (2001: 38-39) argues that people tend to behave the way they are measured and thus world-class measures lead to world-class behavior. He continues that the design and selection of the performance measures will dictate the practices and overall performance of logistics. Therefore, when the measures are not set, there will be no performance. Vice versa, when the measures are cost reduction oriented, the practices will follow. As well as, when the measures are service oriented, the practices will, evidently, be service oriented. To conclude, when the measures are balanced between cost and service, as should be the case, similar practices will ensue.

There are various reasons why companies want to measure their performance. For example, Robson (2004) suggests that the main reason behind implementing a performance measurement system is to increase the overall effectiveness of the business processes. Cohen and Roussel (2004: 187) add that measurement is the only way to follow up process performance, and more precisely, decide whether it is improving or worsening and what actions are needed. In addition, Keebler et al. (1999) conclude three reasons why companies measure logistics performance. First, their aim is to reduce operating costs. Second, they seek to drive their revenue growth. Third, they pursue to increase their shareholder value. In other words, it can be inferred that the objective of performance measurement should be to provide feedback of the effectiveness of the company to generate value to its customers.

2.4.2. What Makes a Good Supply Chain Performance Measurement System?

Recent interest in SCC has had its effect on supply chain Performance Measurement. Ramdas and Spekman (2000) argue that the measurement of success should be based on extended enterprise level instead of single transactions. Traditionally performance measurement in supply chain concentrate on measuring lead-times, inventory turns, weeks of stock, defect rates, and service levels. However, according to Ramdas and Spekman (2000) preferences should be in supply chain wide measuring, such as unified delivery accuracy, which could then promote binding relationship with supply chain partners and improve customer satisfaction.

However, Lambert et al. (2001) insist that companies are facing problems in supply chain performance measurement. This is due to the fact that most of the metrics measure only internal operations and fail to take into account the supply chain perspective. Additionally, Keebler et al. (1999: 72) have proposed following five barriers to creating logistics performance measures: first, measuring is difficult; second, links between measures and strategy are often unclear; third, functions and processes are complex and often misaligned; fourth, people being measured may be resistant to share information; and fifth, a significant lack of consensus on definitions of terms.

To counter above described issues, Cohen and Roussel (2004: 187) highlight that there are three important objectives for supply chain metrics. First, the metrics should translate financial objects and targets into effective operational performance measures. Second, they should translate operational performance back into accurate future earnings or sales predictions. Third, they should drive behavior supporting the overall business strategy within the supply chain organization. In addition, Cohen and Roussel (2004: 186) list that a right set of metrics can reflect how well each supply chain process performs, highlight points of improvement, ease the process of diagnosing

problems, as well as, help in directing improvement efforts. In addition, they explain that metrics can be a powerful management tool, as they can be used to let people know the expectations and track the progress over time.

When it comes to the goodness of the performance measures, Lecklin (2002: 172) and Keebler et al. (1999:8) have identified necessary characteristics for good supply chain metrics. According to them, metrics should be reliable, unambiguous, understandable, easy to use, just, economical, fast, and relevant. Also possible interpretations of the results should be revealed from the metrics. Of importance is the number of metrics, which should be hold in a limited amount of key measures. Also, when it comes to gathering the data, it should be cost-effective and fast. Cohen and Roussel (2004:188) add that there are seven vital characteristics of performance measurement that decide the efficiency and success of performance measurement system. First, the supply chain metrics should be linked to the business strategy. Second, the metrics should be balanced and comprehensive. Third, internal and external benchmarks form the foundation for target setting. Fourth, targets should be aggressive, but achievable. Fifth, metrics should be visible and monitored at every level of a company. Sixth, supply chain metrics should be used as a continuous improvement tool. Seventh, implementation of metrics follows a formal implementation plan. Therefore, companies should design their performance measurement system carefully and take into account the above mentioned characteristics.

The previous in mind, Rushton et al. (2006: 492-495) stress that companies should decide the values they use to measure against. Otherwise, there is no point in measuring as the figures received from performance measures have no reference and performance improvement would be difficult when there is no clear vision of what should be improved. This can have a major hindering effect on companies' efforts to develop their operations. Nonetheless, Rushton et al. (2006: 502-503) settle that majority of companies are able to identify certain key measures for most of the logistics operations. These measures are more widely known as key performance indicators (KPI). KPI measures should provide an appropriate summary measurement of the operation as a whole, as well as, of the major elements of the operation. They can be categorized in various ways; however, an effective measurement system covers all of the major operational business areas.

2.5. Literature Review Conclusion

The study of relevant Supply Chain Management (SCM) and Supply Chain Collaboration (SCC) literature revealed that they are both very complex and emerging landscapes. In addition, the study revealed that SCM as a discipline, as well as, SCC as one of its sub disciplines lack consensus,

hence the definitions and understanding of the terms vary greatly. The previous sets a huge challenge in developing the discipline and also makes it even more demanding to implement such approaches. Also, while different SCM activities, in general, have been implemented widely among companies, researchers (Jain, 2003; Småros, 2003) accentuate that companies that have successfully utilized SCC approaches are scarce. However, the potential benefits identified in literature review for both SCM and SCC approaches suggest that they should be seriously taken into consideration when reviewing potential initiatives to improve SCM in a company.

Review of literature suggests that SCM and SCC require an integrated systems approach to supply chain, which views the supply chain as a whole and where the flow of goods is managed from the supplier to the ultimate customer. It is also necessary for both the intercompany and intracompany cooperation to be synchronized, as well as, the operational and strategic capabilities to be unified. In addition, all the efforts in managing supply chain should focus in creating customer value and leading to customer satisfaction.

The previous in mind, we have formulated a definition for the context of this thesis of SCC. The definition is adapted from the definitions proposed by various researchers (Emmett and Crocker, 2006; Barratt, 2004; Cohen and Roussel, 2004; Simchi-Levi et al., 2003 and 1999; Arns et al., 2002; Simatupang and Sridharan, 2002; Mentzer et al., 2001; Monczka et al., 2001; Lee et al., 2000; Lambert et al., 1998; La Londe and Masters, 1994; Houlihan, 1988; and Riley, 1985):

"This study recognizes SCC as a management framework to control material flows and processes related to supply chain in integrated and cooperative manner. The fundamental building blocks of SCC are collaborative culture, communication, trust, openness and honesty. It requires cross-functional information, risk and reward sharing throughout the chain from suppliers to customers. Crucial characteristics of SCC are also customer focus and commitment to same objectives as well as pursuit to long-term partnerships. In addition, it requires adopting the principles of continuous improvement and aligned supply chain performance measurement."

Literature review identified two main benefits what companies seek from SCC and SCM initiatives, in general, is to streamline supply chain and improve efficiency by using information exchange. Additionally, the goal is to continuously improve company's own position on the market, as well as, optimize its value chain. Thus, the motivation to SCC and SCM comes from the various benefits it brings with it. Researchers (Holweg et al., 2005; Zhao et al., 2002, Helms et al., 2000; Seifert, 2003; Cohen and Roussel, 2004; Lambert et al., 1998; Mentzer et al., 2001; Fisher et al., 2000; and Lee et al., 2000) indicate that the benefits of SCC and SCM are: increased visibility and

transparency, improved forecasting processes, increase in revenue and higher profits, direct and lasting communication, improved sales, inventory reduction, faster and more reliable deliveries, improved performance, lower costs, improved customer value and satisfaction, competitive advantage and improved competitiveness.

However, literature review also raised some concerns related to SCM and SCC initiatives. For example, according to some researchers (Småros, 2003; Ireland, 2004; Emmett and Crocker, 2006; Sabath and Fontanella, 2002; Zailani and Rajagopal, 2005; Fawcett and Magnan, 2002; Skjoett-Larsen et al., 2003), issues in the way of successfully implementing SCC include following: lack of extensive forecasting processes in the customer side, "I win, you figure out how to win"-attitude, lack of trust, poor communication, no understanding of the big picture, no willingness to take risks, benefits are not shared, planning is inadequate, lack of top management support, fear of change, difficulty in partner selection, over-reliance on information technology, fear of failure from the existing blame culture, high integration costs, the required openness in the development process, the fact that SCM has been made a buzzword and varying definitions of SCM, functional approach in companies, complexity of the supply chain and a strong focus on immediate returns and gains.

The limiting factors presented above depict similar general issues that are faced in case of most change projects. Extensive hype, cultural issues, as well as, impatience are all good examples that often distract managers and companies. These factors together with heavy SCM frameworks often increase the complexity in already byzantine structure of supply chains. Nevertheless, the study of relevant literature indicated that even the small scale efforts have yielded early benefits, and also that companies may benefit also from highly streamlined cooperation processes, which means that heavier SCC frameworks are not necessarily needed (Ireland, 2004 and Småros, 2003).

The previous, then again, suggests that when companies remember the following nine points in their SCM and SCC activities they can be successful (Fisher et al., 1994; Fisher et al., 2000; Lee, 2004; Simatupang et al., 2002; Ireland, 2004; Choi, 2004; Cohen and Roussel, 2004; Barratt, 2004; and Emmett and Crocker, 2006). First, companies should understand and educate themselves on what the terms SCM and SCC really stand for. Second, top management should provide sponsorship for the initiatives. Third, everything should be kept simple and streamlined. Fourth, companies should keep in mind that best practices and initiatives, such as CPFR, are only guidelines, which means that SCM and SCC initiatives should be tailored to fit the needs of the particular company's supply chain. Fifth, companies should be selective in picking their trading partners and ensure that they want to be part of a win-win relationship. Sixth, the benefits should be aligned among the supply chain partners. Seventh, information sharing and cooperative Planning and forecasting methods

should be applied to cope with the information distortion effects and improve the efficiency and performance of the supply chain as a whole. Eight, companies should understand the potential value available in supply chain partnerships. Ninth, most important lessons are learned by doing and thus companies should execute the intended actions, not just study them.

One of the most important things, the study of relevant literature revealed, is that there are different kinds of collaboration relationships (Cohen and Roussel, 2004; and Ireland, 2004). These relationships may have very different characteristics, but are, nevertheless, considered collaborative in nature. Also, the results of collaborative relationships can differ widely depending on the partner. In addition, literature review highlighted that each company should individually decide the scale and scope of their SCC effort. In other words, every company should approach adopting SCC in a different way.

The review of literature strengthened that statement that material management is an essential part of SCM approaches. In order to be able to streamline the supply chain and implement efficient practices to harvest the benefits of collaboration, the companies have to understand their material flows. Material management, in the context of SCC, can be identified to consist mainly of the following two elements: forecasting and demand and supply planning, and improved inventory practices. First, researchers (Kahn, 2003; Mentzer and Moon, 2005) emphasize the importance of forecasting. According to them, three dimensions exist in forecasting performance. They are accuracy, costs, and customer satisfaction. This means that money and efforts spent on forecasting may be viewed as an investment decision, and thus, improved forecasting accuracy should be leading to reduced SCM costs and improved customer service. In addition, already relatively minor forecast errors might have an adverse effect on the bottom line. Reasons for not using collaborative forecast are people, processes and technology (Ireland, 2004: 65). Second, the foundation of all logistics are formed by planning, storing, moving, and accounting of inventory. Moreover, inventory availability can be identified as the most important aspect of customer service. Researchers (Frazelle, 2001: 91; Emmett and Crocker, 2006: 7) stress that the goal of inventory management should be to increase the financial return of inventory and at the same time increase level of customer service, as well as, the flows of goods and information need to be coordinated in the supply chain in order to minimize inventory levels. They continue that high inventory levels can be viewed as a major symptom of an ailing supply chain and these symptoms must be treated.

Finally, literature review identified, perhaps, surprisingly that many logistics organizations are still operated without a formal set of logistics performance measures, not to mention the fact that the set is rarely aligned with the overall business objectives (Frazelle, 2001). In addition, Cohen and

Roussel (2004) fret that minority of companies use cross-functional supply chain metrics, even though, they are the key component of an integrated supply chain organization. Researchers (Cohen and Roussel, 2004; Lecklin, 2002; and Keebler et al., 1999) have described various important characteristics for performance measures. Performance measures should be reliable, unambiguous, understandable, easy to use, just, economical, fast, relevant, linked to the business strategy, balanced and comprehensive, targets should be aggressive, but achievable, visible and monitored at every level of a company, used as a continuous improvement tool. Since, Performance Measurement can be identified as one of the most important things, when pursuing towards sustainable growth and success, companies should include it effectively in any SCM initiative. This means, in other words that a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in any SCC initiative.

3. Collaboration Based SCM Framework

Based on the definition of Supply Chain Collaboration (SCC) and the emerged issues in literature review, we have constructed a Collaboration Based SCM Framework. This framework is illustrated in the Figure 2. In this framework we have tried to include the crucial aspects of SCC identified in the study of relevant literature, while keeping the framework as simple as possible. The model takes into account nine important elements of successful SCC: internal collaboration, external collaboration, communication and information sharing, Planning and forecasting, unified process flow, customer centricity, aligned measurement of supply chain performance, continuous improvement, and long-term profitable partnerships.

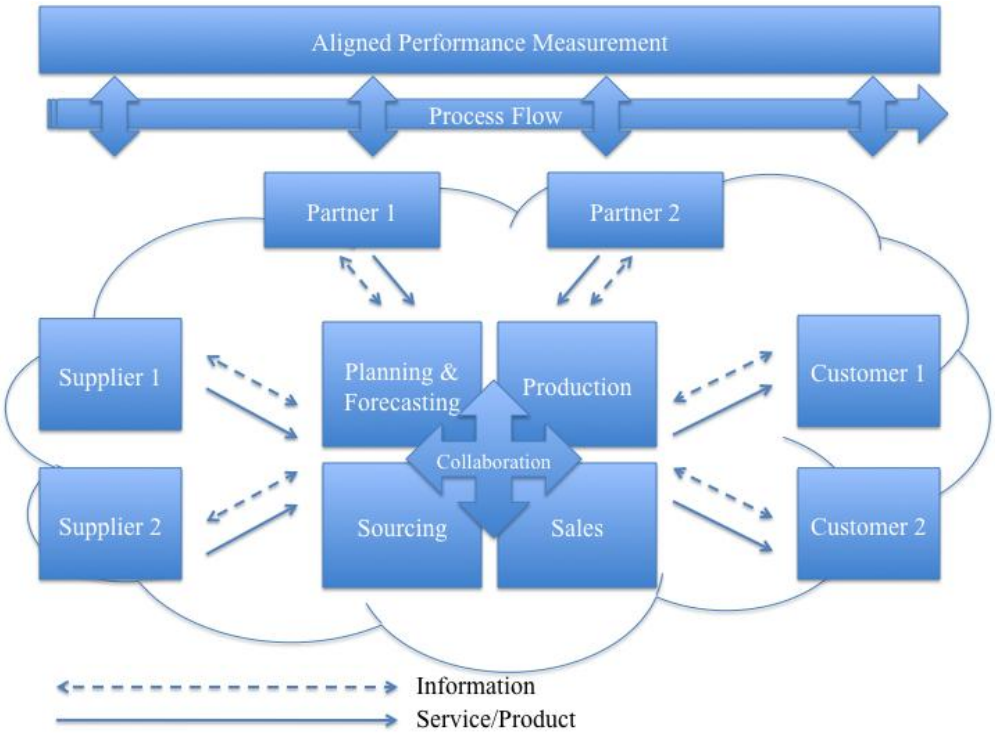


Figure 2. Collaboration Based SCM Framework.

First, internal collaboration between different business functions is depicted in the middle part of the model as the four boxes marking the company internal functions and the four-dimensional arrow depicting the necessity to collaborate both internally and externally. This should include communication between the functions inside a company on forecasts and demand plans, as all of these affect on every function involved in the supply process. Sales function should exchange demand information with the customers and then collaborate with other internal functions to create a demand forecast. Thereafter, this demand forecast is communicated to the suppliers and partners

in order to reach a supply chain wide unified consensus forecast by involving every single party in a supply chain from customers to suppliers.

Second, external collaboration was partly touched already in the previous paragraph, as it has a tight linkage to internal collaboration. It basically means that supply chain partners communicate with each other to provide necessary information of, for example, future demand. This open communication then enables a smooth and continuous process flow throughout the supply chain and maximizes the value for customer. External collaboration is illustrated in the model as the cloud surrounding the different parties in a supply chain and the four-dimensional collaboration arrow in the middle.

Third, communication and information sharing among partners inside a supply chain is crucial for a SCC initiative primarily due to the fact that without it the supply chain is scattered and disintegrated. In other words, information exchange and open communication enables efficient and continuous process flow in supply chain, improves material management, and overall makes the necessary information available when needed in the supply chain. Information exchange also can improve the visibility and transparency in the supply chain. In our model information sharing, or information flows, is illustrated as the dashed lines between supply chain partners and the four-dimensional collaboration arrow in the middle.

Fourth, information exchange forms a continuum to Planning & Forecasting, where the future demand is anticipated and used as the basis for production scheduling and material sourcing. If demand information communicated to Planning & Forecasting function is not precise and uniform, it may cause information distortion, for example, in the form of bullwhip effect. This, then again, can cause difficulties in material management that concretize, for example, as overstocking or under stocking, inability to deliver demanded products, and delivery delays. In general, all the previous material management difficulties generate excess costs for each partner in the supply chain. As introduced earlier, the dashed lines depict the information exchange between supply chain partners and they are the channel used to communicate the demand plan from customers to every party in the supply chain.

Fifth and sixth, as already mentioned, the process flow should be unified throughout the supply chain, as well as, customer centric. In other words, there should be unified processes in place supply chain wide that guide operational activities and enable continuous flow from suppliers to customers. Other important element of these processes, and whole supply chain also, is the customer centricity. In our model every partner, operation and process should aim to generate as much value to the

customer as possible. The process flow arrow in the upper part of our model depicts this unified process flow throughout the supply chain. Also, the lines between the actors are used to depict the continuous collaborative process flow.

Seventh, due to the complex nature of supply chains there has to be an agreed and aligned set of performance measures in place in this kind of SCC framework. These measures should be created to control the various activities in the supply chain. In addition, they should be simple and effective, meaning that they are easy to use and interpret, as well as, precisely measuring the intended operation or action. By measuring performance the supply chain may be more visible, as well as, transparent. Also, performance measurement may improve the roles and responsibilities in the supply chain by making people responsible for the efficiency of their work. The long rectangular box in the upper part of our framework illustrates the performance measurement system and the two-way arrows depict the process of getting feedback from the supply chain operations.

Eight, performance measurement enables continuous improvement. Feedback from the various supply chain operations can be used to improve their efficiency. Also, open communication between supply chain partners, together with the aligned set of measures, gives companies in a collaborative relationship the possibility to learn from each other. Both of these elements may lead to innovations and at least educate the partners of each others businesses, and thus, improve supply chain wide understanding. The ability to continuously improve is illustrated in our model with the two-way arrows in the upper part of the model.

Ninth, collaborative supply chain partnership necessitates open and honest relationships between supply chain partners. These partners should be selected carefully, as maintaining these kinds of partnerships is costly. Only the ones ready to commit to a win-win partnership that is beneficial for both parties should be considered. In our model, the amount of partner boxes, in addition, to the cloud surrounding them depicts the amount of true collaborative relationships that a company can possibly maintain.

4. Research Methods

The issues depicted in this literature review conclusion suggest that there is a need for empirical data to test the feasibility of the framework we have created, as well as, arrive at a deeper understanding of the supply chain of Digita Oy. First, motivation to gather empirical data is affected by the facts that Supply Chain Collaboration (SCC) is still an emerging discipline and there is no single understanding of its meaning. In addition, the fact that successful SCC implementations are scarce and these initiatives should be tailored to fit specific company and supply chain needs, strengthen the need for empirical research. Second, we have to develop a deeper understanding of Digita's supply chain by gathering empirical data in order to be able to provide final conclusions and recommendations of how the supply chain could be improved with SCC efforts. Also, we need to test the feasibility of the literature based framework by letting Digita's internal and external reviewers to comment it.

Specifically, the mentioned research will attempt to find out what the development areas in SCM in Digita Oy are; how SCC efforts can improve Supply Chain Management (SCM) in the case company; and, what the key elements of SCC are. The next stage of this research details what research methods will be used to capture the empirical data, including details on the adopted research strategy, data collection techniques, sample selection and management of the researcher's role.

This research study has four inter-related research objectives set within the context of case company Digita Oy.

Research Objectives:

1. Identify the key elements to be considered when pursuing towards SCC.
2. Highlight the development areas in SCM in the case company.
3. Study how the SCC efforts can improve SCM in the case company?
4. Construct a collaboration based SCM framework for the case company that:
    - improves visibility throughout the supply chain;
    - improves the efficiency of the supply chain;
    - and improves material management.

A valuable aspect to this research work relates to Objective 2: the opportunity to identify development areas in the case company's current SCM through the empirical study. Answer to Objective 3 is derived as a result of the findings from Objectives 1 and 2, and finally, Objective 4 is

fulfilled as a synthesis of the first three objectives. By finding answers to these objectives we will be able to fulfill the objectives of this study, as well as, provide recommendations for the collaboration based SCM framework for Digita Oy.

As indicated in the review of literature, SCC is complex and emerging landscape. Understanding the term varies greatly, due to lack of consensus in definition and this has also affected negatively to the amount of successful implementations (Jain, 2003; Småros, 2003). In addition, the study of relevant literature revealed that there are different kinds of SCC relationships, which should be tailored to meet the firm and supply chain specific needs (Cohen and Roussel, 2004; and Ireland, 2004). Therefore, through empirical research we will be able to identify the firm and supply chain specific necessities for the Collaboration Based SCM Framework for Digita Oy, and also, distribute the knowledge of SCC to the supply chain of Digita Oy. And, finally, be able to indicate the elements that should be included in the framework by comparing empirical research findings to literature review findings.

Chapter 2 identified a gap in existing research in that there is a lack of consensus in the definition of SCC, which causes variation in understanding the concept, as well as, difficulties in implementing such initiative. Also, it was revealed that SCC initiatives are company and supply chain specific. In addition, Chapter 1 indicated that most of previous literature has concentrated on retailing and pure manufacturing industries and a majority of the companies that have successfully implemented SCC approaches, such as Collaborative Planning, Forecasting and Replenishment (CPFR), fall into the large enterprise category with a lot of leverage and negotiation power. This, in other words, means that these approaches are unsuitable for smaller companies, such as Digita Oy, as they tend to be rather heavy and require the strength of a large firm. Thus, the evidence suggests that there is a need for empirical research to test the feasibility of our framework, as well as, arrive at a deeper understanding of the supply chain of Digita Oy; and be able to provide company and supply chain specific recommendations for Digita Oy.

Research objective 1 was initially addressed in the second section, in the form of a review of literature in the field of SCC; Research objective 2 and 3 take this research one step further through the collection and analysis of empirical data obtained from Digita supply chain setting. Primary focus of the empirical work will be to gather data by interviews of senior staff from various sources within the Digita supply chain, including company internal, supplier, customer and partner sources. In addition, data will be collected from, for example, company internal systems, documents, project groups and meetings. These data sources will provide an opportunity to explore possible development areas in Digita Oy's SCM, gain a deeper understanding of the supply chain as a whole

and get feedback of the Collaboration Based SCM Framework, initially presented in Chapter 2. By comparing Literature Review findings with the empirical research findings, the researcher will gain a fuller understanding of the issues surrounding SCC and so be better placed to contribute useful knowledge, as well as, recommendations in relation to SCC in the context of Digita Oy's supply chain, and thus, complete research objective 4.

This Research Methods chapter will provide the details of the research strategy adopted to address the research issues identified above. It will also introduce the means of collecting data for analysis, including sample and site selection, and the analysis approach to be chosen. Additionally, this chapter will discuss the potential limitations and problems related to the chosen research strategy and its implementation.

4.1. Research Strategy

Biggam (2008: 82) explains that a research strategy refers to the description of how a person intends to implement a research study. For example, research strategy is the strategy that a person intends to adopt in order to be able to complete the empirical study. Saunders et al. (2007: 141) add that when it comes to research strategies it is not the label attached to a particular strategy that matters, but whether it is appropriate for the particular research. The empirical research in this study is interested in an in-depth study within a particular company's supply chain. More precisely, the primary focus, in terms of Digita Oy's supply chain, will be in TeleCom Installation Services supply chain. The previous in mind, we have adopted case study as the research strategy in implementing the empirical research in the context of this thesis. In the next paragraphs, we will first explain what a case study really is, as well as, justify the selection of it as the research strategy in this study.

Cohen et al. (2000: 182) explain a case study as follows: "In a case study researcher typically observes the characteristics of an individual unit – a child, a class, a school or a community. The purpose of such observation is to probe deeply and to analyze intensely the multifarious phenomena that constitute the life cycle of the unit." According to the previous definition, a case study is concerned with close observation of how a particular group behaves in a particular context. Therefore, a case study approach facilitates this researcher's aim to develop a deeper understanding of the SCM in the particular case company.

Eisenhardt (1989) has a slightly different approach to case study, as he defines it as a methodology of generalization based on comparisons and identification of causality. In a case study the main purpose is often to give a general answer based on existing theory and empiric results in order to predict outcomes of other similar cases. As stated in the previous definition, case study aims in

giving generalizations comparing existing theory and empiric results. Also, in this research we have the aim to compare existing theory in the field of SCC to the findings of our empirical research. When it comes to giving a general answer for predicting outcomes to other similar cases, we express certain caution due to the fact that the study of only one company's supply chain might not satisfy the sufficient sample amount. Therefore, we stress that the recommendations given in this thesis are company and supply chain specific and they should not be applied to other companies and supply chains without a careful analysis.

In addition, to the previous definitions of a case study Yin (2003: 13) adds that case study is a suitable research strategy when something that is or has recently been going on is studied and the research variables cannot be controlled. This definition suits the purpose of our research, since SCC is a rather young discipline and it can be identified as hot topic among researchers and practitioners, as identified in Chapter 1. Also, the research variables seem to be difficult to control. For example, as mentioned in Literature Review there is confusion over what is meant by the term SCC; further the boundaries between traditional logistics and SCM, and SCC are not clearly evident.

As seen from above introduced definitions, there seems to be some disagreement about what constitutes a case study. However, when the aspects proposed by Cohen and Manion, Eisenhardt and Yin are put together we get a rather exhaustive indication of what characteristics a case study should include and can justify the implementation of this strategy in our research. To conclude, the nature of this research is an in-depth study of a contemporary phenomenon, in a complex environment, where a variety of stakeholder perspectives are sought and where the underlying research philosophy is based on an interpretive understanding of the phenomenon. Then again, the case study approach is meant to provide a focus based on an assumption that real life can be understood only through interactions in social setting, and that the environment of the context under study is complex. Therefore, based on the definitions depicted above, a case study is the research strategy that sufficiently meets the needs of this research.

4.2. Data Collection

Case studies are usually considered to be qualitative in nature. Also, Biggam (2008: 86) defines that qualitative research is usually linked to in-depth exploratory studies, where an opportunity for quality responses exist. In other words, qualitative studies aim to answer why questions. On the contrary, Biggam (2008: 86) explains that quantitative research refers to research that is concerned with quantities and measurements. So quantitative research can be inferred to answer on how questions. In this study, we aim to gain a deeper understanding in a certain case company's, Digita

Oy, supply chain and identify possible development areas, as well as, indicate the efforts necessary to improve these areas. In other words, we aim to study Digita's supply chain in its most natural setting in our empirical research by mapping the views of various stakeholders, as well as, utilizing the company information resources. The previous captures the essence of qualitative research proposed by Denzin and Lincoln (2000: 2). They stress that qualitative research should involve study of things in their natural setting and attempt to make sense of, or interpret; phenomena in terms of the meanings people bring to them.

When deciding upon the appropriate sampling method, we considered the various characteristics of the case study explained earlier in this chapter. Biggam (2008: 89) has proposed a suitable approach by stating that convenience sampling is the sampling method commonly used in exploratory research. It is a tool that should give ideas and insight that might lead to more detailed and representative research. Thus, we ended up using convenience sampling in selecting the interviewees in the context of Digita's supply chain. Biggam (2008: 89) continues by defining convenience sampling as a non-probability approach to sampling, due to the fact that it is non-random. It is usually implemented, because it is the most convenient to the researcher.

There are two reasons for the selection of convenience sampling as the sampling method. First, in the context of this study convenience sampling is the most convenient method for data sampling, because the researcher works at the case company. Second, convenience sampling is used because of time issues and easy access to the interviewees. The selection of convenience sampling implies that the interviewees were not selected randomly, and thus, we do not claim to achieve representative views that could be directly applied to other similar cases in other companies or industries. Instead, this research focuses on aiming to achieve an in-depth and qualitative insight into SCM at Digita Oy. However, introductory chapter already indicated that SCC, which is the main focus of this thesis, is an area of interest among practitioners and researchers and so the findings of this study might be of interest to those involved with similar issues.

This case study data will rely on three distinct data collection techniques: first, semi-structured one-on-one theme interviews; second, structured email theme interviews; and third, documentary secondary data. Of these the first two act as the primary source of data. According to Lindlof and Taylor (2002) a structured interview has a formalized limited set of questions, while semi-structured interview is more flexible and allows interviewer to bring up new questions as a result of what the interviewee says. They add that semi-structured interviews generally use themes to control the flow of interview and a sketched interview guide is provided to the interviewees beforehand. In this study, we have adopted both interview methods, as we will conduct one-on-one semi-structured

interviews and also structured email interviews. Both of these are divided into themes and the interviewees will receive a guide of themes and questions before the actual interview. By using two distinct interview techniques, semi-structured and structured, we attempt to harness the advantages of both techniques, such as flexibility, depth, control, and time consumption.

The third data collection technique, documentary secondary data will be collected from various Digita systems, including, for example, reporting system and enterprise resource planning system. In addition, the researcher will obtain secondary data from team meetings, group meetings and project group meetings. Secondary data will be used for comparing the findings of the review of literature and empirical research and gain a richer picture of the current issues in Digita TeleCom Installation Services supply chain.

Semi-structured themed interviews and themed structured email interviews as the primary data collection technique can be identified as the appropriate means to collect qualitative data, and thus, commonly used in case studies. For example, Yin (2003: 89) states interviews to be an essential source of case study information. This is mainly due to the fact that most cases tend to be human affairs and interviews enable getting insight into complex situations. The themed semi-structured interviews and themed structured email interviews used in this research enable collecting qualitative data in a manner that provides a structured focus for the interviewer, but also gives the interviewee the opportunity to express their own opinions. In addition, semi-structured themed interviews and themed structured email interviews were selected due to the fact that the researcher has limited time to conduct the research from other projects and obligations at work. In addition, the interviewees have also experienced serious time issues, and thus, there was no possibility to interview everyone one-on-one basis.

Due to previously stated issues, use of themed semi-structured interviews and themed structured email interviews is the appropriate method for this research. In addition, the use of three data collection methods, themed semi-structured interviews, themed structured email interviews and documentary data together, will provide the opportunity to relate different stakeholder views to the actual data gathered from various processes inside Digita supply chain. Thus, we can get a richer perspective of the current state of SCM at Digita, as well as, infer potential development areas more precisely.

As mentioned above, the sampling method used in this study is convenience sampling. In other words, we have selected the interviewees based on convenience to the subject of this thesis and to the author. The previous in mind, also the site selection has been conducted according to

convenience sampling principles. The main site will be Digita Oy headquarters, as majority of interviewees work there, but data will also be gathered in other sites, such as customer, supplier and partner premises. Altogether, there will be five sites involved in this study. Due to previous, this case study is not intended to be an exhaustive study of all the possibly ongoing SCC initiatives in Finland. Such a study would be enormously time consuming, if reliable results are sought. Thus, we have focused our study in one particular supply chain – Digita Oy TeleCom Installation Services supply chain. Therefore, also the interviewees are conveniently sampled inside this supply chain and from such internal units or external suppliers, customers and partners that are involved in TeleCom Installation Services. This way we gain a focused, achievable approach to our study.

The overall aim of this empirical study is to gain a deeper understanding of the current state of SCM at Digita Oy and identify potential development areas. In order to be able to achieve this aim, we must involve a variety of stakeholders in the empirical part of our research. So to gain a fuller perspective of Digita's supply chain, we have selected the interviewees from both company internal and external sources. There will be seven company internal interviewees from units that are involved in TeleCom Installation Services. In addition, to previous there will be four supplier, customer, or partner representatives as interviewees. External interviewees have been chosen based on the importance and activity on TeleCom Installation Services supply chain. Appendix A contains the example of semi-structured questions to be used for internal interviews; and Appendix B contains the questions to be used for external interviews. Following internal and external representatives were sent the request to be interviewed:

Internal interviews

1. Kari Laine, Logistics Manager/Management Group LOGY SCM Forum
2. Olli Turkkila, Sourcing Director
3. Matti Pajunen, Manager TeleCom Installation Services
4. Harri Lipponen, Business Manager, TeleCom
5. Jaakko Harno, Vice President, Business Solutions
6. Markus Ala-Hautala, Head of Radio Frequency
7. Heikki Isotalo, IT Group Manager

External interviews

1. Raimo Luoto, Sales Manager, Elektroskandia
2. Juha Ruotsalainen, Sales Director, DHL Supply Chain (Finland) Oy/Chairman LOGY SCM Forum
3. Petteri Svartström, Sourcing Director, Elisa Oyj
4. Seppo Kallio, Manager, TeliaSonera Finland Oyj

Figure 3 illustrates an outlined model of the above listed anticipated stakeholder groups under study. By selecting a variety of stakeholders internally, as well as, externally, it is expected that an enriched understanding of SCM in Digita's TeleCom Installation Services supply chain will emerge, one that will enable identification of development areas and make it easier to indicate the measures needed to improve the supply chain.

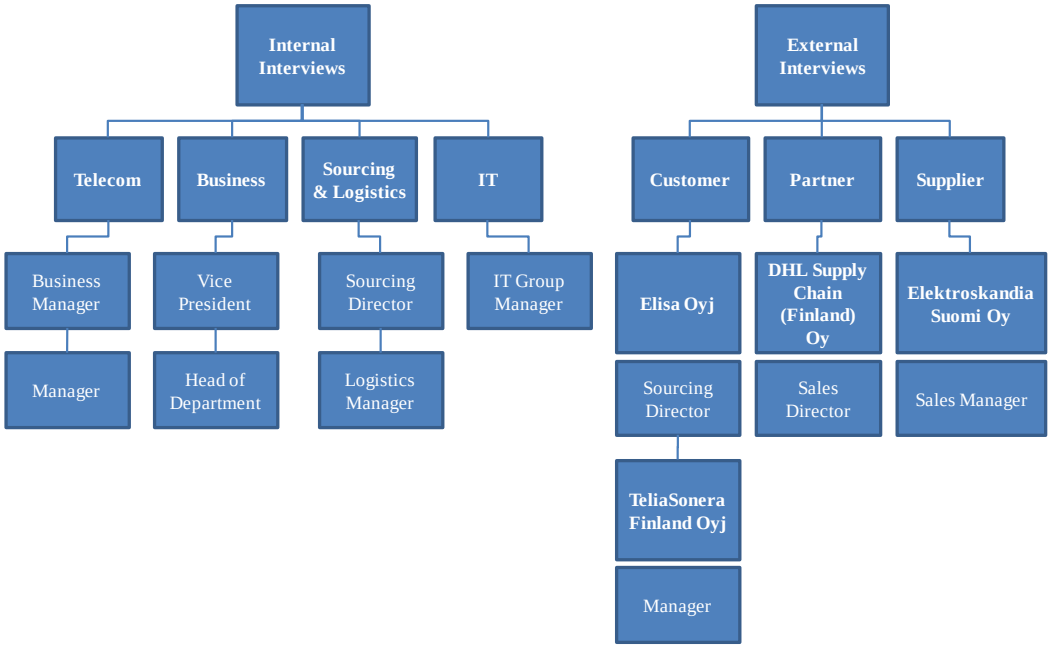


Figure 3. Anticipated Stakeholder Groups Under Study.

Secondary data, in the form of company internal information sources will also be collected to form part of the analysis. The secondary data will come from a variety of sources:

- Digita reporting systems (Discoverer and Cognos)
- Digita enterprise resource planning system (Oracle)
- Sourcing and Material Management team meetings and group meetings
- Various project group meetings.

The secondary data, coupled with the interview data, will assist us in providing a rich picture of SCM at Digita Oy, as well as, indicate the necessary development areas and also enable us to make appropriate recommendations for the company to move towards SCC.

4.3. Framework for Data Analysis

In order to help focus the interviews in terms of reflecting the objectives of this research and ease the analysis of the qualitative data, we have structured the interview questions according to themes. These themes reflect the overall aim and objectives in this research, as well as, have reference to the main areas brought up in the review of literature. The themes are as follows: General, Current State

of SCM and SCC, Benefits and Barriers, Material Management, Performance Measurement, and Collaboration Based SCM. One should bear in mind that these themes are not to be viewed as separate topics, but as an entity, since they are inter-related. To conclude, the themes serve the purpose to help the interviewer and interviewee focus, and also aid the analysis of the transcripts. Table 1 reveals a breakdown of questions under each theme, for both internal and external interviews.

Table 1. Breakdown of Themes and Questions.

Theme	Internal questions	External questions
General	1	1
Current State of SCM and Collaboration	5	4
Benefits and Barriers	6	6
Material Management	2	2
Performance Measurement	6	6
Collaboration Based SCM	2	2
Total	**22**	**21**

As Table 1 suggests, the interviewees will receive a combination of open questions under each theme. For example, under the theme Current State of SCM and SCC, internal interviewees will be questioned on their opinions on following issues: the current state of SCM at Digita Oy, degree of collaboration among supply chain stakeholders, customer centricity of supply chain activities, and information sharing and communication both internally and externally. Altogether, there will be 22 questions asked in internal interviews and 21 questions in external interviews.

In Figure 4 we have depicted graphically the three-step data analysis approach adopted to analyze case study data in this study. This approach is adapted from process called "description, analysis and interpretation" of the collected data (Wolcott, 1994). First, we will collect the data by using methods discussed earlier in this section. Second, we will describe data by grouping it according to the themes and issues used in the review of literature and interviews. Third, we will perform data analysis and interpret what is happening in the context of this thesis. Fourth, we will compare the results of the empirical part of our research with the results of the review of literature. An important part of this research is to analyze the case study data by comparing different stakeholder

perspectives and reflect these results with the findings in the Literature Review, thus we have added this comparison of findings in the original model.

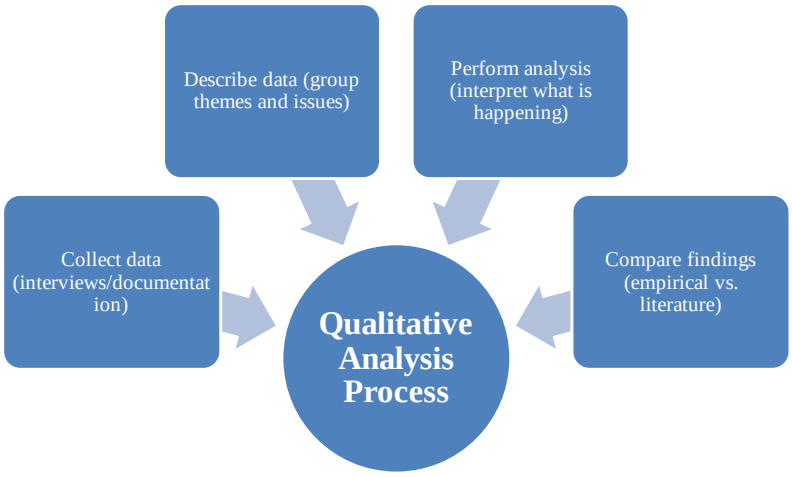


Figure 4. Qualitative Data Analysis Process for Case Digita Oy.

4.4. Limitations and Potential Problems

Almost any research strategy has its critics, as well as, there are certain limitations related to them. Case study as a research strategy does not make an exception, as it has experienced critique and there are also certain limitations related to it that a researcher should address. There are three issues related to any research strategy: validity, reliability and objectivity.

First, validity of this study has been already discussed and addressed earlier in this chapter by openly explaining the research strategy used in the context of this study. Biggam (2008: 99) explains that a research is valid when it is acceptable to the research community. This implies that the study should be based on tried and tested research strategies and data collection techniques; it should use data analysis techniques appropriate to the research; and all of the previous should be implemented properly. We have conducted our research according to the principles depicted by Biggam (2008) and by that part we can claim that our research is valid. Additionally, this study is interested in comparing the findings of Literature Review with the findings of the case study. Therefore, as opposed to giving generalizations in the form of new hypothesis, we aim to achieve an improved understanding in order to support the development of SCM at Digita Oy, as well as, construction of the Collaboration Based SCM Framework. The previous in mind, we stress that the recommendations in this study should not be applied to other similar cases without caution and only after a careful analysis.

Second, the question of reliability should be addressed, especially when interviews are used as the primary means of data collection. As mentioned also earlier, Biggam (2008: 100) explains that a

valid research is related to how a researcher gathers and analyses the empirical data, whereas reliable research focuses on the necessity to evidence that the research is conducted by the researcher in a fair and objective way. In addition, Yin (2003: 38) tutors that one way to deal with reliability is to make all the steps as operational as possible, as well as, conduct the research as if there is someone supervising you. In other words, reliability discusses whether a particular research can be trusted or not. We have attempted to satisfy the requirements for reliability and trustworthiness of our study in various ways. First of all, we have provided examples of the interview questions in Appendix A and B. We have also explained that we are not seeking for generalizations, but rather expect to gain a rich picture of a particular company's SCM. Thus, the results are reliable in the context of this study and generalization should not be made without reservation as explained earlier. In addition, we have used non-random sampling which means that the views presented by the interviewees might not be representative of the views of all the actors in the supply chain. However, they are sufficient in the context of this study and give us deeper knowledge of the particular supply chain, which is our aim. To conclude, we have assured the reliability of this study by using highly structured, transparent and detailed approach. In other words, we have used such research strategy and data collection techniques in this research that have the validity in the research community.

Third, the issue of objectivity has also been taken into account in this research. Phillips and Pugh (2007: 50) remind that there is no such thing as unbiased observation. Biggam (2008: 100) continues that researchers' own prejudices, experiences, and personal baggage have an effect on the problem of bias. However, he counters that recognition of the problem of bias and rehearse of constant self-control can help to improve the reliability of a study. In our study, we face the issue of objectivity in form of interviewing our own colleagues, which might cause skewing in their answers. It is certain that our study is not unbiased, as Phillips and Pugh suggest. However, we have put effort in reducing the effect of bias as low as possible by recognizing the problem and rehearsing strict control in conducting our empirical research in various ways. First, we have made it clear to the interviewees that they are research subjects and not colleagues during this research, which reduces the necessity to please the interviewer as he is a colleague. Second, we have clarified that every interview is anonymous if the respondent desires so. Third, we have obtained the trust of respondents by guaranteeing that quotations will not be attributed to specific named individuals, unless permission is given. Further on, we have reduced bias by transcripting the interviews only after all of them were conducted, this way restraining ourselves from affecting to other respondents. Fourth, bias has also been reduced by selecting various stakeholders as respondents, as has been

discussed earlier in this chapter. Fifth, we trust that respondents as business professionals have answered truthfully to the questions presented to them, which suggest that the results can be trusted on.

To summarize, Arbnor and Bjerke (1997) point out that in order to interpret the outcomes soundly, it is vital to obtain a rich depiction of the system or organization under study. As a researcher, it is impossible to get an exhaustive depiction, because in a social setting, organization and system limits are difficult to define (Goode and Hatt, 1952). Nevertheless, the aim of a case study is to combine together the relevant characteristics of a problem being studied. In addition, Eisenhardt (1989) and Yin (2003) both stress that use of multiple sources and analyzing data in multiple ways can assure the validity of the findings. In addition, case study validity and reliability is impacted on the veracity of the information provided by the interviewees.

In this study, we have aimed to an in-depth study of a particular company's SCM habits and tried to include the relevant characteristics of the case company and its supply chain in it. In addition, we have used multiple sources of data and analyzed them in multiple ways to assure the validity of the research. Also, we have selected business professionals, involved in the particular case company's SCM, as respondents to get trustworthy results out from our empirical research.

This chapter has provided details of the research strategy used in this research. It has also addressed the limitations of this research and depicted the measures used to minimize potential criticism. In the next two chapters – Case Digita Oy and Case Study Results – we place the study within the context of Digita Oy, as well as, discuss and analyze the findings of the case study.

5. Case Digita Oy

In this chapter we will provide a more detailed introduction of the case company of our study, as well as, an in depth analysis of the current state of Supply Chain Management (SCM) at Digita Oy. First, we are going to introduce the parent company behind our case company, TDF Group. Second, we present our case company, Digita Oy. Third, we will analyze the current state of SCM at Digita Oy and identify possible development areas. More precisely, we will explain further the issues Digita Oy is currently facing in their TeleCom Installation Services supply chain.

5.1. TDF Group

The TDF Group operates radio-relay networks and shared infrastructures. TDF assists its television network, radio station, telecommunications operator, Internet service provider and local municipality clients across the entire value chain of audiovisual and telecoms networks. TDF operates both upstream in broadcasting, content management and delivery solutions; and downstream in transport, deployment and network operation, on-site hosting of operators' equipment at its sites and maintenance areas. TDF is present in France, Germany, Finland, Hungary, Spain, the Netherlands, Poland, Estonia, Austria and Monaco. (TDF Group, 2010b)

During fiscal year 2008-2009 TDF Group had a total of 5540 employees of which 375 in Finland at Digita Oy. It operated approximately 11300 sites all over Europe and 500 sites in Finland. Consolidated turnover of the group was 1.63 billion Euros and Digita Oy comprised 5.3%, which is 87 million Euros of it. (TDF Group, 2010c)

The TDF Group’s corporate strategy is founded on a solid European base and it aims on overall growth, on innovative projects with operational and marketing objectives, and on all areas linked to digital growth, such as HDTV, Mobile TV, digital radio and 3D cinema (TDF Group, 2010b).

5.2. Digita Oy

Digita, as a part of TDF Group, is the leading Finnish network operator in wireless communications networks and an important developer of data communication networks and infrastructure in Finland. The company operates the national transmission and broadcasting networks, as well as, the radio and television stations. Digita’s broadcasting network covers the whole country and comprises of 36 major stations, 151 sub-stations and dozens of transmission link stations. In addition, Digita operates a wireless broadband network with the coverage area of 99 percent of the Finnish population. Digita's main customers are regional and national television and radio broadcasting

companies, as well as mobile and broadband operators. Some examples include Yleisradio, MTV Media, Sanoma Entertainment/ Nelonen Media, Digi TV Plus, Canal +, SuomiTV, TeliaSonera, and DNA. (TDF Group, 2010a)

Digita's values are openness, humanity, reliability and innovativeness (Digita Oy, 2010). These values guide the internal operations, as well as, communication and relationship to the customers, suppliers and partners. Based on these values Digita has created a business idea of providing creative solutions to digital world (Digita Oy, 2010). It can be inferred that both the values and business idea are guided by the overall group strategy of growth and innovation.

5.3. Digita Oy TeleCom Installation Services Supply Chain

As we have indicated earlier in 1.4. the focus of this thesis is in TeleCom Installation Services supply chain. Therefore, in this section we will provide an overall view of the TeleCom Installation Services Supply Chain at Digita Oy. First, we are going to explain the infrastructure of the supply chain. Second, we introduce the stakeholders in the supply chain. Third, we will explain a simplified supply chain process.

5.3.1. TeleCom Installation Services Supply Chain Infrastructure

Currently Digita has 25 small local sub warehouses all over Finland that also act as job starting points. Digita also has a central warehouse located in Vantaa. Of these the central warehouse represents approximately 60% of the total inventory value. In addition, both the local sub warehouses and central warehouse possess inventories of customer's spare parts and devices.

Network implementation material used in TeleCom installations is delivered either directly to the local sub warehouses or via central warehouse. This material is delivered by Digita's own material suppliers and also by Digita's customer's material suppliers. Network implementation material is usually delivered in multiple shipments from various suppliers and timeframes. In addition, receipts are entered in various information systems, including Digita's own enterprise resource planning system (ERP) and customer's ERPs.

5.3.2. TeleCom Installation Services Supply Chain Stakeholders

Supply chains are often very complex entities, largely due to the amount of stakeholders involved in the overall process. Also, in the case of Digita TeleCom Installation Services supply chain various stakeholders contribute to the process of supplying the customers what they desire. In more detail, we have identified four distinct stakeholder groups in TeleCom Installation Services supply chain that are the most relevant considering the scope and objectives of this study. The stakeholder groups

are illustrated in Figure 5 and are as follows: Digita Internal Stakeholders, Digita Suppliers, Digita Partners, and Digita Customers.

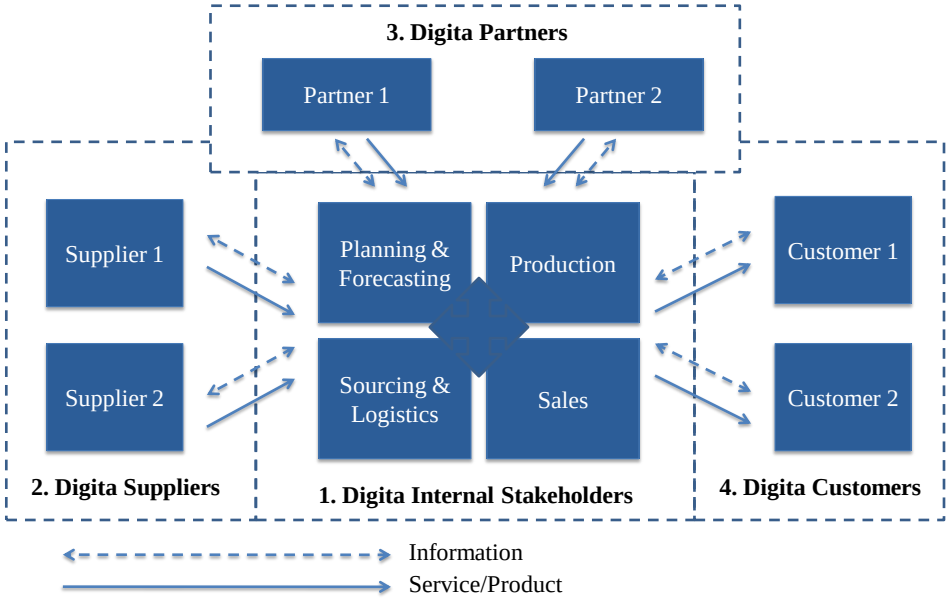


Figure 5. TeleCom Installation Services Supply Chain Stakeholder Groups.

First group, Digita Internal Stakeholders, consist of the different departments involved in the production of TeleCom Installation Services at Digita. These departments include Sales, Planning & Forecasting, Sourcing & Logistics and Production. Second group, Digita Suppliers, represents the actors who distribute sourced materials to Digita. Third group, Digita Partners, are the actors who provide support services, such as freight transportation. Fourth group, Digita Customers, are the ones buying the service from Digita. How the above described stakeholder groups are involved in the TeleCom Installation Services supply chain, will be explained more thoroughly in the next subsection where the supply chain process is depicted.

5.3.3. TeleCom Installation Services Supply Chain

There are three distinct sub-supply chains in the TeleCom Installation Services supply chain. These are divided according to the three customer types and named respectively as Customer 1, 2 and 3. First, some customers deliver part of the network implementation material used in their installations themselves and part of the material is sourced by Digita. Second, there are customers that source and deliver all of the material used in their installations by themselves. Third, for some customers Digita sources and delivers all of the required material.

Figure 6 represents the first customer type supply chain of TeleCom Installation Services. In this supply chain the process includes material sourcing from both the customer and Digita. Customer places an order for TeleCom Installation, which is handled by Digita Sales department. From there on, the Planning & Forecasting department performs a site survey to identify required resources, installation instructions and materials. Alternatively, the corresponding information to the site survey is delivered on the behalf of the customer. After this, Planning & Forecasting indicates required resources to the operational production, as well as, plans the materials for the particular installation work and distributes installation instructions.

The demanded material is entered in the ERP. Simultaneously current inventory levels are checked and required materials transferred from the central warehouse to a local warehouse; or when certain material is not available at the local or central warehouse, a purchase proposal is directed to Sourcing & Logistics department who in turn purchases the demanded material from supplier(s). At the same time customer has a similar sourcing process for the material that they have agreed to deliver.

All of the material, both those sourced by customer and those sourced or transferred from inventory by Digita, are delivered to the same local warehouse where they are received. Receipt is done in both Digita's own ERP, as well as, customer's ERP. Thereafter, installation work dedicated material is collected and allocated resources execute the work at a particular installation site. Finally, the radio network specialists responsible for the installation task perform documentation and mark the job done in Digita's ERP.

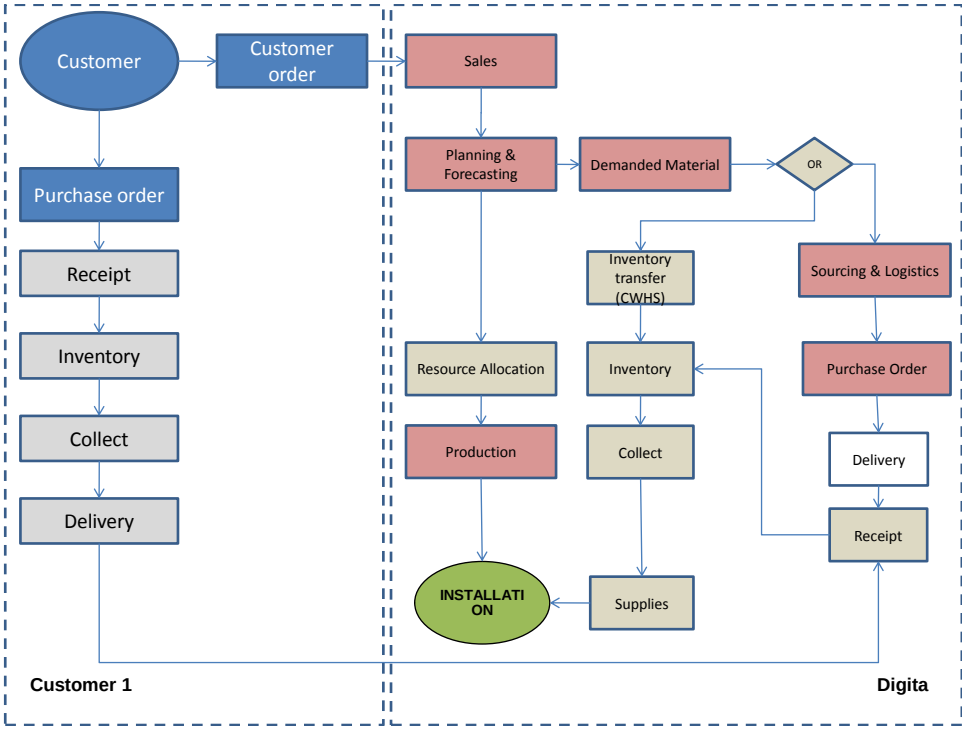


Figure 6. TeleCom Installation Services Supply Chain: Customer 1.

The second customer type supply chain of TeleCom Installation Services is illustrated in the Figure 7. The process in this supply chain differs from the first one in such a way that the customer is responsible for delivering all material. Due to the previous customer only places an order for TeleCom Installation and this is handled by Digita Sales department. From there on, the Planning & Forecasting department performs a site survey to identify required resources and installation instructions. Alternatively, the corresponding information to the site survey is delivered on the behalf of the customer. After this, Planning & Forecasting indicates required resources to the operational production and distributes the installation instructions for the particular work.

At the same time customer has an undergoing sourcing process for the installation materials, which are delivered to a local warehouse either in smaller multiple shipments or as a large single shipment. At the local warehouse Digita's personnel receive the shipment, and thereafter, a receipt is done in customer's ERP. When all the materials, dedicated to an installation work have been received, the allocated resources execute the work at a particular installation site. Finally, the radio network specialists responsible for the installation task perform documentation and mark the job done in Digita's ERP.

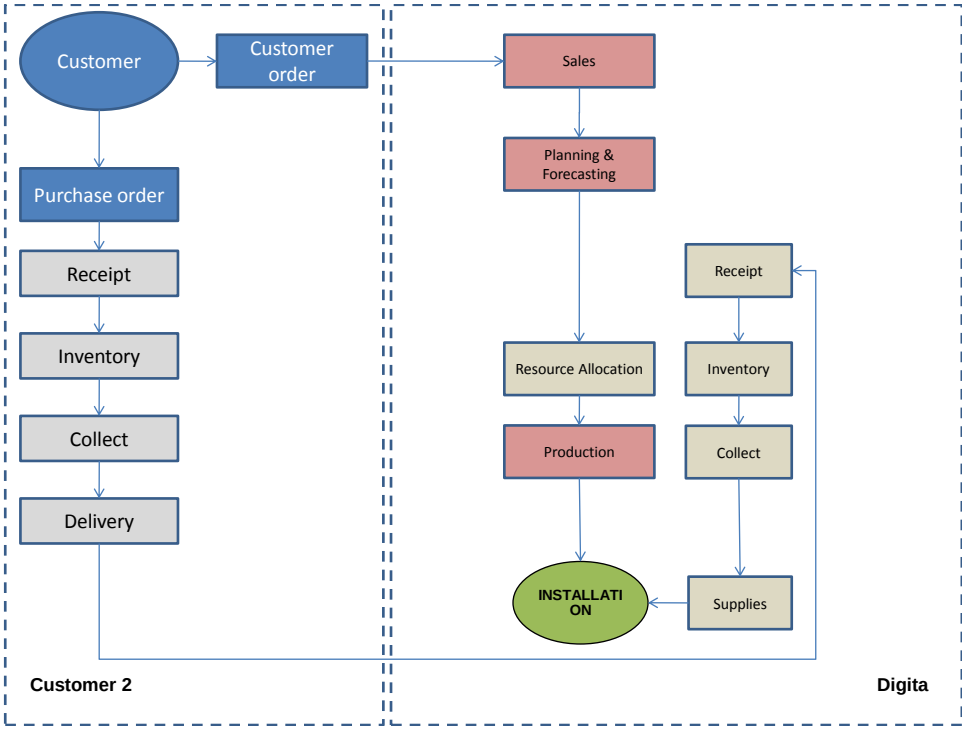


Figure 7. TeleCom Installation Services Supply Chain: Customer 2.

As mentioned earlier, there are three types of supply chain in TeleCom Installation Services and the third one is depicted in Figure 8. In this supply chain, the process includes material sourcing solely by Digita. Therefore, customer only places an order for TeleCom Installation, which is handled by Digita Sales department. From there on, the Planning & Forecasting department performs a site survey to identify required resources, installation instructions and materials. Alternatively, the corresponding information to the site survey is delivered on the behalf of the customer. After this, Planning & Forecasting indicates required resources to the operational production, as well as, plans the materials for the particular installation work and distributes installation instructions.

The demanded material is entered in the ERP. Simultaneously, current inventory levels are checked and required materials transferred from the central warehouse to a local warehouse; or when certain material is not available at the local or central warehouse, a purchase proposal is directed to Sourcing & Logistics department, who in turn purchases the demanded material from supplier(s). Then the materials are delivered to the same local warehouse where they are received. Receipt is done in Digita's own ERP. Thereafter, installation work dedicated material is collected and allocated resources execute the work at a particular installation site. Finally, the radio network specialists responsible for the installation task perform documentation and mark the job done in Digita's ERP.

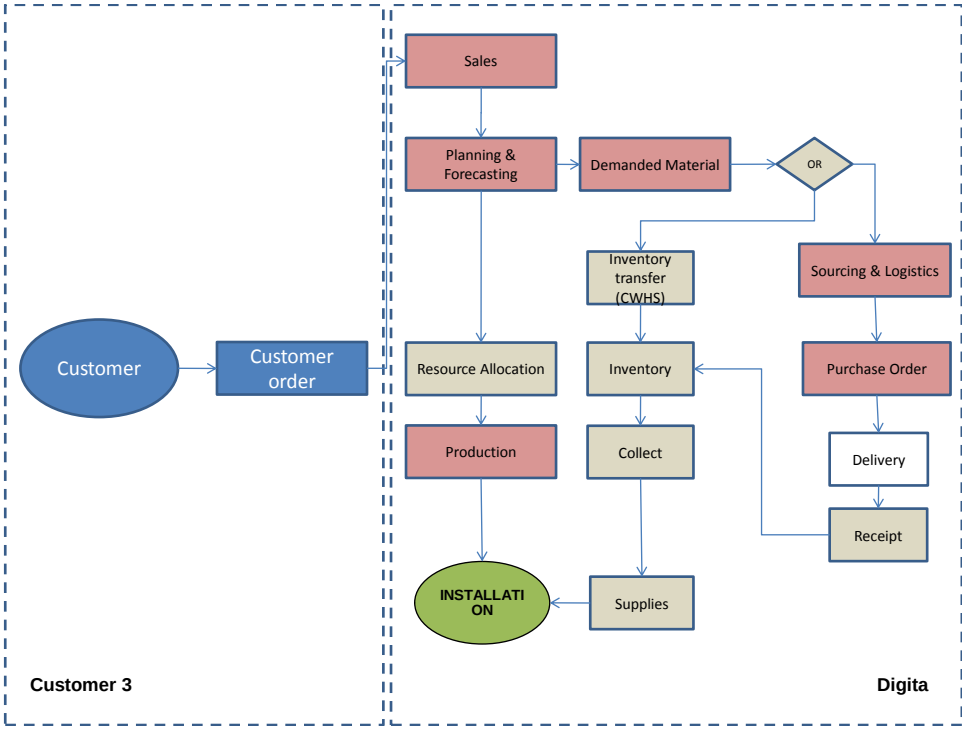


Figure 8. TeleCom Installation Services Supply Chain: Customer 3.

The above illustrated simplified supply chain process diagrams indicate how the TeleCom Installation Services supply chain is currently operated at Digita. Together with the description of TeleCom Installation Services supply chain stakeholders, presented in 2.3.2, these depictions form the foundation for our analysis of the current state of the SCM at Digita. More precisely, they will be used as illustrative aid in the next section where the current state analysis of Digita's SCM is performed.

5.4. Analysis of the Current State of SCM at Digita Oy

In this section we are going to analyze the current state of SCM at Digita Oy in TeleCom Installation Services supply chain. Since our focus in this thesis is in Supply Chain Collaboration (SCC), we will analyze the current supply chain operations and activities at Digita Oy according to the five main theoretical disciplines related to SCC in the context of Digita Oy's supply chain. These disciplines were already introduced in the first chapter of this thesis and they have been inferred from the objectives of this study. They illustrate the overall development areas indicated by Digita Oy when the assignment for this thesis was given:

1. Gain visibility throughout the supply chain;
2. Improve the effectiveness and efficiency of the supply chain;
3. Improve material management.

The disciplines anticipated to best provide solutions to these objectives are as follows: SCM, SCC, Planning & Forecasting, Material Management and Performance Measurement. In other words, the current state analysis is reflected to the review of literature. Additionally, we are going to use illustrative examples, such as process diagrams, figures and tables from various Digita Oy information resources, to support our current state analysis. In addition, we will utilize the information from multiple team meeting records and presentations

The structure of this analysis section is as follows: first, we will analyze the current state of SCM and Collaboration in the supply chain in question; second, we are going to dig deeper into Planning & Forecasting and Material Management; and third, an analysis of current Performance Measurement activities is provided.

5.4.1. SCM and SCC

Currently, Digita has a Sourcing and Material Management (SoMM) department that is responsible for SCM at the company. This, however, generates the main issue in terms of SCM, as there is no general understanding of SCM in other functions involved in the supply chain process. Therefore, problems such as information distortion, excess inventory, inefficient processes, and lack of transparency and so on erode the potential of SCM and generate unnecessary costs. In addition, the old ways of working have rooted deep in the corporate culture, and thus, resistance to change is lurking around every corner.

Figure 9 below is adapted from Haapanen and Vepsäläinen (1999). It illustrates one of the root reasons behind the inadequate SCM activities at Digita as explained by company's Logistics Manager, Kari Laine (2010). A typical evolution in logistics is to move step by step from company owned logistics to 4^{th} party logistics. However, in case of Digita the jump is made from 1^{st} party logistics to 3^{rd} party logistics. In addition, even more telling of the current state of Digita's SCM is the fact that company has been operating its logistics twenty years in the past until now, as can be inferred from the figure. The previous explains somewhat clearly, why SCM is not understood too widely in the company and inefficiencies occur.

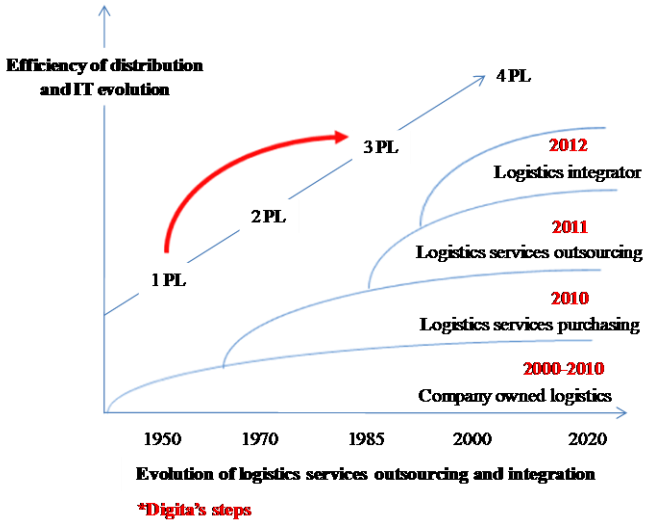


Figure 9. Evolution of Logistics Services Outsourcing and Integration (Haapanen and Vepsäläinen, 1999).

As briefly touched above, there are various challenges identified in the TeleCom Installation Supply Chain's management. One of the Digita Production Managers, Petri Soirala (2010) identifies four of these. First, communication between sales department and Planning & Forecasting does not work properly. Second, in general sales does not distribute important customer demand information effectively, which causes contribution margin issues, since, for example, sales has agreed too low prices with the customer. Therefore, sales might refuse to use agreed contracts as they have discussed something else with the customer and unnecessary work is generated. Third, changes in demand or purchase prices and other similar changes are not communicated effectively, which causes price lists to be outdated, and therefore, services might be sold with incorrect prices. Fourth, communication with the customers does not work properly.

Also, Laine (2010) expressed similar concerns of inadequate source information in planning, both internally and externally. There were total of three issues that came up. First, there is possibility that customers provide outdated information about their sites. Second, also Engineering and Solution Management (ESM) might provide incorrect information. Third, site-survey might not be conducted properly, which fundamentally causes information distortion. These three issues are interrelated, and thus, have a causal relationship, and therefore, when one information source is incorrect the others tend to follow the same path. In other words, this kind of information distortion can be identified as bullwhip effect explained thoroughly in 2.2.1.

Figure 10 illustrates the bullwhip effect in case of Digita Oy. It depicts the effect of information distortion in a local warehouse on a certain cable for a given time period from 30th April 2009 to

31st March 2010. As can be seen from the figure, inventory quantity of Cable X has been 1500 meters in the beginning of the timeframe in April 2009. Then ESM has anticipated demand and increased stock to 4000 meters, which has then spent over four months in the warehouse with minimal consumption. After August 2009 there has been a somewhat higher consumption, but not worth the amount that was purchased in April 2009. Thereafter, 2000 meters of Cable X has again stayed in the warehouse for three months with minimal consumption. For some reason, on November 2009 a purchase of 4000 additional meters has been executed for anticipated consumption. As before, this additional amount has also stayed four more months in the warehouse without consumption. As can be inferred from the previous, there has been huge amount of money laying down in the warehouse; and considering the riskiness of inventory as an investment this has caused a huge financial threat. As a conclusion, Figure 10 clearly illustrates the information sharing, as well as, Planning and forecasting related problems identified earlier in this subsection. These will be discussed further in the next subsection.

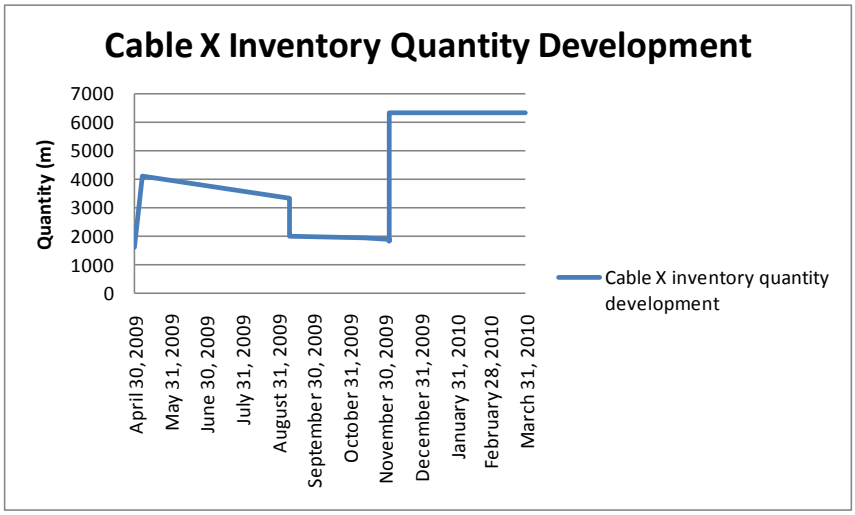


Figure 10. Cable X Inventory Quantity Development.

In addition to information distortion problems, there is variability in the ways of working, as well as, vagueness in the roles and responsibilities of functions. For example, company's TeleCom Manager, Matti Pajunen (2010) explains that in the current state either Network Services (NeWS) unit or Engineering and Solution Management (ESM) provide the information to Sourcing and Material Management (SoMM) unit. The previous causes an unsystematic process where mixed information is delivered and such problems occur as explained earlier. Also, currently there is basically a different way of doing things in every local unit in the field. Some use standardized material and execute according to specified processes, but many use what-so-ever material they want and perform installations however they want. Soirala (2010) concurs that there is a place for

process improvement and better ways to work. The fact that different personnel in the field use different amount of time and material to a similar installation generates excess costs time-, material- and moneywise.

As can be inferred from the above explained issues, information sharing is the key to ensure profitability and efficiency in supply chain operations. In Digita's case the information that should be precise includes installation critical information, such as, mast information, site layout information and installation material demand information (Laine, 2010). All in all, the source information should be improved. Additionally, communication with customers and suppliers is vital in order to improve customer satisfaction and material management, as well as, avoid shortages, unnecessary installation trips and excess material orders. Also, to support the information exchange, there should be a clear process and ways of working in place, as well as, clear roles and responsibilities in order to ensure sound flow of correct materials throughout the supply chain. In addition, both material and installation process should be standardized to avoid confusion and excess spend.

5.4.2. Planning & Forecasting and Material Management

In 2000 Digita built approximately 50-60 sites with average duration of three months per site. Nowadays yearly count is about 6000 differing installation tasks and average duration of site is two days (Pajunen, 2010). This sets challenge to both Material Management and sourcing, as well as, information exchange, because deliveries need to be precise and in time. Otherwise, there is possibility of having lots of unnecessary visits to sites, and therefore, excess costs.

When it comes to material management, there is huge variability between different sub warehouses. As Laine (2010) explains some sub warehouses are managed according to agreed principles and processes, but there are many that do not operate according to these ways of working. The previous causes excess inventories and low inventory turnover rates, as well as, swells the stock value. As an example, in Digita's case it is rather common that some sub warehouse persons in charge do not perform inventory withdrawals in time, thus, causing inventory balance to distort. This sets huge challenges to forecasting as historical consumption information can not be trusted. Therefore, forecasts tend to be incorrect and cause inaccurate purchases, excess inventories, as well as, excess costs.

Table 2 depicts the current state at Digita in Material Management and indicates the effects of information distortion in the long run. In addition, it portrays the potential inventory cost savings, as well as, return for capital for the excess material standing in inventory. Table 2 consist of a sample

of eighteen highest value materials currently in inventory. As can be read from Table 2 total current inventory value for these eighteen materials is 450k€ and average weeks of supply 105. In other words, there is a huge amount of invested capital exceeding the materialized consumption and burdening company's balance sheet and causing excess inventory carrying costs. This material has been piled up in the inventory during the years due to inaccurate forecasting, inefficient ways of working and lack of information sharing in the supply chain. As can be seen in Table 2, if the weeks of supply would be reduced to three weeks potential savings in the cost of invested capital could be over 400k€ and on average 93%, with the inventory value being only a little over 30k€. In addition, the saved capital could be invested with a rate of 11% that could potentially generate 45k€ in return of capital. Even though, three weeks of supply sounds like a huge drop from 105 days, it should be realistic for two reasons. First, mostly for all of the material in inventory, delivery time is three weeks or considerably less. Second, like Simchi-Levi et al. (2003: 27) indicate the longer the forecast horizon, the worse the forecast, due to the fact that demand forecast far in the future is usually less accurate than the demand forecast in the nearby future. Thus, future demand for three weeks should be reasonable.

Table 2. Weeks of Supply – Top 18 highest inventory material values.

Weeks of Supply - Top 18 highest values									If Weeks of Supply would be				
									3				
Item	Description	Inventory Balance	Unit	Cost per Unit (€)	Inventory Value (€)	Volume (pcs)	Weekly Volume (pcs)	Weeks of Supply	Inventory Balance would be	Inventory Value would be	Savings in Cost of Capital (€)	Percentage (%)	Return on Capital (11%) (€)
Item 1	Cable X	37 336	m	3	114 152	44 601	858	44	2 573	7 867	106 285	93 %	11 691
Item 2	Cable Y	12 705	m	3	40 217	51 933	999	13	2 996	9 484	30 733	76 %	3 381
Item 3	Clamp F	225	pcs	136	30 617	30	1	390	2	236	30 381	99 %	3 342
Item 4	Cable G	14 277	m	2	26 463	23 763	457	31	1 371	2 541	23 922	90 %	2 631
Item 5	Cable E	1 283	pcs	20	25 936	549	11	122	32	640	25 296	98 %	2 783
Item 6	Cable W	954	pcs	24	23 345	144	3	345	8	203	23 142	99 %	2 546
Item 7	Cable O	1 080	pcs	21	22 277	819	16	69	47	975	21 302	96 %	2 343
Item 8	Connector J	2 011	pcs	10	19 935	1 269	24	82	73	726	19 209	96 %	2 113
Item 9	Cable U	1 060	pcs	17	18 174	981	19	56	57	970	17 204	95 %	1 892
Item 10	Cable T	1 099	pcs	16	17 775	336	6	170	19	314	17 461	98 %	1 921
Item 11	Cable P	3 025	m	6	17 746	2 367	46	67	137	801	16 945	95 %	1 864
Item 12	Cable B	607	pcs	27	16 638	1 743	34	18	101	2 756	13 882	83 %	1 527
Item 13	Cable N	796	pcs	20	16 083	2 529	49	16	146	2 948	13 135	82 %	1 445
Item 14	Clamp Z	348	pcs	39	13 572	111	2	163	6	250	13 322	98 %	1 465
Item 15	Connector L	1 315	pcs	10	12 686	516	10	133	30	287	12 399	98 %	1 364
Item 16	Cable Conductor I	5 825	m	2	12 426	3 545	68	85	205	436	11 990	96 %	1 319
Item 17	Cable Conductor K	5 690	m	2	11 878	6 963	134	43	402	839	11 039	93 %	1 214
Item 18	Cable Conductor M	5 402	m	2	11 319	6 909	133	41	399	835	10 484	93 %	1 153
				Inventory Value Total	451 239		Average Weeks of Supply	105		33 108	418 131	93 %	45 994
										Value Total (potential)	Total Savings (€)	Average %	Total Return on Capital (€) (potential)

Table 2 above indicated potential savings based on a sample set of materials. To go further, Figure 11 below illustrates potential savings in percentage on all the material currently in Digita inventory. For the total inventory the average weeks of supply is currently 24.5. The curve depicts that the

amount of savings increase when the weeks of supply reduces. For example, if the weeks of supply is reduced to half, we would experience savings worth of 50%. Figure 11 together with the above Table 2 portray that there is huge potential for efficiency improvements in Digita supply chain.

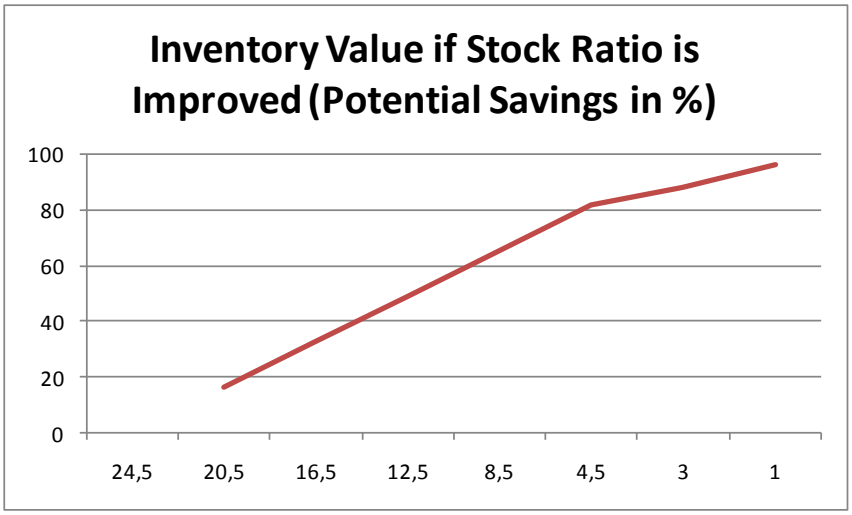


Figure 11. Inventory Value if Stock Ratio is Improved.

As mentioned already earlier, forecasting is part of Digita's planning activities. However, there are still lots to improve in this sector. Soirala (2010) explains that currently the resource forecast is conducted every month's last day either based on historical data or the figures received from customers, which ever is available. The major issue making it demanding, in addition to customers providing inadequate information, is that employees in the field do not document their work properly. For example, in extreme cases documentation might take as long as six months, which means that money is lying in the processes, and therefore, figures for forecasts are inaccurate, as consumption tends to pile in certain months. However, he mentions that forecasts have improved, especially, from a year ago, but satisfactory accuracy levels are still far away.

As can be inferred there are many fundamental issues to be solved in the Material Management, as well as, Planning & Forecasting. However, the above mentioned issues could be improved by simply changing the overall way of working in the supply chain and adopting a supply chain mindset, which of course includes various steps. First of all, communication and information sharing should be improved supply chain wide, both internally between departments and externally between customers, partners and suppliers. Also, the Planning and forecasting should be changed so that, for example, site surveys are conducted properly. Extensive and effective information exchange makes the previous possible, as then the whole supply chain would be working with same figures and information distortion, as well as, excess costs, such as sanction payments, could be

avoided. In addition, material should be ordered only when it is needed, as this way excess inventories would not build up.

5.4.3. Performance Measurement

Measuring performance is an essential part of any company's daily operations. As brought up in the review of literature, when it comes to performance measurement what gets measured usually gets improved (Frazelle, 2001: 39). However, if there is no holistic set of logistics performance measures in place, wrong things might be improved. In addition, Cohen and Roussel (2004: 185) identified that minority of companies use cross-functional supply chain metrics, even though they are the key component of an integrated supply chain organization. These two issues materialize in Digita's performance measurement. First, some kind of Key Performance Indicators (KPI) are used, but they are mostly function specific and provide superficial information that does not enable continuous improvement. Second, the metrics used seem to be such that they do not measure right things. All in all, generally measures are used in some functions; however, the information value in the context of process development is vague.

Soirala (2010) concurs that the above indicated issues materialize in Digita's operations. He stresses that performance measurement is mostly guessing. For example, documentation quality measurement is alright in a way that it indicates money is standing still in the system due to delays in documentation. However, the measurement does not provide suitable information, and therefore, give tools to develop the processes, which should be its main priority.

As also Pajunen (2010) explains, currently there are no performance metrics in place or they are non-specific. He gazes to the future and states that by using metrics that are supply chain wide, it could be possible to follow up on how precise, for example, the plans and forecasts are. In addition, efficient performance measures could enable better control, visibility and improvement of processes.

5.5. Summary of the SCM Development Areas at Digita Oy

As mentioned in the review of literature, in this study SCC is defined as follows:

"SCC is a management framework to control material flows and processes related to supply chain in integrated and cooperative manner. The fundamental building blocks of SCC are collaborative culture, communication, trust, openness and honesty. It requires cross-functional information, risk and reward sharing throughout the chain from suppliers to customers. Crucial characteristics of SCC are also customer focus and commitment to same objectives as well as pursuit to long-term

partnerships. In addition, it requires adopting the principles of continuous improvement and aligned supply chain performance measurement."

When the above explained definition of SCC is reflected to the current state analysis conducted in this section we can see a gap between current way of SCM and the ideal situation of SCC. First of all, collaboration, both internally and externally, is not at the level it should be. Second, ancient culture affects the ways of working and causes trust, openness and communication issues in the supply chain. Third, as can be inferred from the previous points, information sharing is not conducted effectively enough. Fourth, current performance measurement and continuous improvement efforts seem superficial, as there is no standardized set of measures and processes to utilize the information received from metrics. Fifth, customer centric view in supply chain operations is already adopted in operations on some level; however, there is room for improvement also in this area. In other words, in order to achieve visibility throughout the supply chain, improve its effectiveness and efficiency, as well as, clarify roles and responsibilities in the supply chain and improve materials management, Digita should adopt a supply chain mind set all over its organization.

Pajunen (2010) summarizes well the current issues in the TeleCom Installation Services supply chain. He explains that currently the problems arise mainly due to inadequate Planning and forecasting, information sharing and lack of clear and streamlined processes. As indicated earlier in this section, the previous issues can cause information distortion, which in turn generates incorrect material purchases and causally leads to loss of valuable installation time due to the fact that installation can not be executed without correct material; or radio network specialists have to drive back to the local warehouse, or go to store and purchase material in high price. Pajunen (2010) continues that Digita's competence should be based on world-class planning. The current way of doing things in the field is causing huge costs, and therefore, a change is needed.

At this point of the study it is worth to mention that the company is currently striving to develop its supply chain activities. There are various ongoing projects related to this study. These projects include material management, overall SCM and Performance Measurement development projects. In fact, the author of this study is currently participating all of these supply chain development projects. Therefore, this thesis provides valuable aid to the pursuits of Digita in improving its SCM activities. As mentioned earlier there is room for improvement with rather large savings and efficiency gain potential. For example, according to Laine (2010) one supply chain development pilot program indicated that 20% cost savings might be possible, in addition, to reducing installation time from two days to one day. As an example, this pilot showed that the amount of

time used at the installation sites could be reduced, as well as, the necessity to move cardboard waste back and forth could be eliminated. In addition, the pilot would enable more cost efficient material sourcing.

In this chapter we have introduced the case company and its TeleCom Installation Services supply chain, analyzed the current state of the supply chain operations, as well as, identified the major improvement areas based on our own analysis and the analysis of company professionals. The next chapter is called Case Study Results: Description, Analysis and Synthesis and it is dedicated to description, analysis and discussion of the results of the empirical research.

6. Case Study Results: Description, Analysis and Synthesis

This chapter reveals the results of the case study in the form of interviews as described in Chapter 3 - Research Methods. The research concentrates on two groups of stakeholders. First, Digita internal stakeholders that are involved in the TeleCom Installation Services supply chain. Second, external stakeholder involved in the mentioned supply chain. Description of the findings of this research is approached in a highly structured way. We will provide a description of Digita internal interview results, as well as, external interviews, theme by theme. Examples of the sheets used in the interviews can be found in appendix. Internal interview sheet as Appendix A and external interview sheet as Appendix B.

As we have mentioned in Chapter 3 – Research Methods, the gathering of empirical data for this research is based on a case study, to allow an analysis of real problems in a set context. Prior to a description and analysis of the case study results, a profile of related aspects of Digita TeleCom Installation Services supply chain was made in Chapter 4 – Case Digita Oy. It is in the context of the developments, self-perceptions, and aspirations in which the context of this study is implemented. Also it should be appreciated that supply chains, as well as, companies are complex things and that the previous chapter is not an attempt to explain Digita Oy nor describe fully its operation or culture, but merely to place the study in context of TeleCom Installation Services supply chain.

Altogether, we enquired eleven stakeholder representatives of the possibility to interview them. They were offered the possibility for a traditional one-on-one interview or e-mail interview depending on their busyness. Finally, we received responses from five stakeholder representatives, which of three were Digita internal and two external stakeholders. Of these five interviews one was an e-mail interview and the rest were one-on-one interviews. In addition, there were two Supply Chain Management (SCM) experts among the interviewees – one internal and one external. The person's we received response to our interview tender from, were as follows:

Internal interviews

1. Kari Laine, Logistics Manager/Management Group LOGY SCM Forum
2. Olli Turkkila, Sourcing Director
3. Heikki Isotalo, IT Group Manager

External interviews

4. Raimo Luoto, Sales Manager, Elektroskandia
5. Juha Ruotsalainen, Sales Director, DHL Supply Chain (Finland) Oy/Chairman LOGY SCM Forum

Therefore, the response rate of our empirical part stayed below 50% in 45.5%. However, the results of this research are rather representative in the context of Digita's TeleCom Installation Services supply chain. When deciding upon the interviewees, we wished to have interviewed stakeholders from every aspect of the supply chain, in other words, supplier, customer, partner and internal representatives. However, this aim did not fully materialize, as we were not able to obtain a customer interview. All in all, we are satisfied of the results, but at the same remind that they do not represent comprehensive view of Digita's TeleCom Installation Services supply chain due to the fact that we did not receive customer response to the interview.

6.1. Description, Analysis and Synthesis of the Interview Results.

In this section we will provide description, analysis and synthesis of case study results for both the internal and external interviews theme by theme. We are going to go through both the internal and external interviews at the same to be better able to compare the responses. Also, the reason for this approach is the fact that Supply Chain Collaboration (SCC) is all about working together as one unite entity, and therefore, internal and external groups should not be separated. Finally, we will provide a summary of the findings in the end of this section.

6.1.1. General

General theme was implemented to get an overall picture of the understanding of SCC in the supply chain under study, as well as, map the elements that interviewees see crucial for SCC. In this theme we had the following question:

"1. How do you understand SCC?"

Response to question 1

As mentioned in the review of literature, SCM and SCC as disciplines lack consensus, hence the definitions and understanding of the terms vary greatly. This was reflected also in the responses of the interviewees as each had a somewhat different view of SCC. Three of the interviewees identified information sharing as an essential part of SCC. In addition, all of the interviewees recognized the whole supply chain or end-to-end view as an important element of SCC. Also three of the interviewees indicated that the collaboration would improve the efficiency of the supply chain via common ways of working and processes. Only two of the five interviewees explained that

sharing benefits should be an essential part of SCC. Also the importance of creating partnerships and mutual learning was recognized twice. Characteristics that were mentioned once included: trust, customer centricity, transparency and mutual objectives. However, on one element all of the interviewees agreed as they recognized the importance of cooperation in SCC.

Surprisingly, there were rather similar views on both internal and external side. Therefore, no significant differences in understanding of SCC could be found. However, internal stakeholders seemed to have a slightly more versatile view than external stakeholders in general, as they included more elements in their definitions. This might be explained by the fact that internal stakeholders have a better understanding of the supply chain under study. All in all, similar characteristics could be found in both groups definitions and this is, perhaps, explained by having a SCM expert on both interviewed groups.

In Literature Review we defined SCC as follows:

"Supply Chain Collaboration is a management framework for controlling material flows and processes related to supply chain in integrated and cooperative manner. The fundamental building blocks of SCC are collaborative culture, communication, trust, openness and honesty. It requires cross-functional information, risk and reward sharing throughout the chain from suppliers to customers. Crucial characteristics of SCC are also customer focus and commitment to same objectives as well as pursuit to long-term partnerships. In addition, it requires adopting the principles of continuous improvement and aligned supply chain performance measurement."

When compared to the previous definition of SCC we can infer that similar issues came up in the empirical research. However, the overall understanding of SCC in Digita TeleCom Installation Services supply chain is closer to the traditional views of SCM than SCC. For example, interviewees did not mention such important elements as collaborative culture, risk sharing, continuous improvement and aligned supply chain Performance Measurement.

The variation in understanding the concept of SCC might suggest that it would be difficult to implement such approach in the supply chain under study. However, as can be inferred from the replies of the interviewees cooperation and unified processes are identified as the most important things of SCC, and moreover, information sharing and end-to-end view are also recognized as important element among respondents. Therefore, we believe that when actors in a supply chain understand even these main elements, regardless of the various views, of SCC they can be united around the same table to discuss of the larger concept. In other words, they can achieve the power of one, when multiple companies form one unified entity and merge their knowledge. In addition,

they can be more easily educated on the SCC, since they already have some knowledge of the principles.

6.1.2. Current State of SCM and SCC

In this theme we aimed to capture an overall depiction of the current state of SCM and SCC at Digita. Therefore, we asked the following from the interviewees:

"2. What is your opinion of the current state of SCC at Digita Oy?

a) What is the degree of cooperation with the customers, suppliers and partners (e.g. what forms does it take, or is there any)?

b) Is Digita Oy aiming to customer centric supply chain view (e.g. are all the efforts intended to generate value to customers)

c) (Internal only) Do the different internal functions communicate with each other (e.g. is necessary information communicated with all functions, do the functions cooperate in Planning and forecasting)?

d) *How about the external communication (e.g. does Digita communicate with its supply chain partners about i.e. demand, is the customer, supplier or partner information shared with all of the functions involved in the process)?"*

Response to question 2a

As mentioned earlier in the first question, all of the interviewees identified cooperation as one of the key elements in SCC. Therefore, it is stunning that current level of cooperation in Digita TeleCom Installation Services supply chain is in its infancy, as can be inferred from the responses. For example, one of the internal interviewees explained that collaboration supply chain wide in customer and supplier interfaces is a new thing for Digita. This has lead to the point that the term supply chain partnership has not been understood, and therefore, its potential has not been utilized. Also one external respondent provided a supporting reply by stating that cooperation is rather subtle in Digita's TeleCom Installation Services supply chain. What fortifies the previous views, is the fact that one internal and one external interviewee replied that collaboration is on a traditional level. In other words, it could basically be described as "we sell they buy"-cooperation, which can hardly be even classified under the title supply chain cooperation. In addition, one internal respondent cited that there has been hardly any collaboration with customers or suppliers during the past years.

In general, one of the external interviewees stated that many of the companies in Finland still rehearse the so called Nokia-model. In other words, there are only suppliers and very few partners, as well as, no real supply chain wide collaboration. As a reason, he explained that SCC is entering Finland little by little and currently it is dependable on the efforts of certain individuals. When the previous is reflected to the findings of the review of literature, it can be inferred that it is not

uncommon to rehearse the so called traditional SCM. For example, researchers (Jain, 2003; Småros, 2003) have found that while different SCM activities, in general, have been implemented widely, companies that have successfully utilized SCC approaches are scarce.

However, three out of five interviewees identified that, some customers and suppliers have participated on certain mutual projects with Digita. Lately this kind of collaboration has been extended and tightened, for example, in SCM development and in electronic purchasing projects. In addition, collaboration with other subsidiaries in TDF concern is rehearsed in certain product categories, for example, in media services. In contrast, one of the external interviewees reminded that in this SCM project all the information was not shared equally. Indicated reasons were lack of experience in SCC and unfamiliarity to a new concept. For example, this mutual SCM project was not evaluated together, which indicates the two issues mentioned above, as well as, that the value of information is not fully recognized.

All in all, the small scale SCC initiatives, already, suggest that Digita is moving to the right direction in its SCM. As also, one of the internal interviewees recognized the SCM project might possibly be the first step towards a true collaborative partnership with mutual benefits. Noteworthy is that regardless of the size of the initiative, potential benefits can be significant. As also, has been indicated by some researchers (Ireland, 2004 and Småros, 2003), even the small scale collaboration efforts have yielded early benefits. In addition, companies may benefit also from highly streamlined cooperation processes, which means that heavier SCC frameworks are not necessarily needed.

Response to question 2b

As Literature Review highlighted, various researchers (Emmett and Crocker, 2006; Barratt, 2004; Cohen and Roussel, 2004; Simchi-Levi et al., 2003 and 1999; Arns et al., 2002; Simatupang and Sridharan, 2002; Mentzer et al., 2001; Monczka et al., 2001; Lee et al., 2000; Lambert et al., 1998; La Londe and Masters, 1994; Houlihan, 1988; and Riley, 1985) consider customer centric view in SCC important. In other words, all the efforts in managing supply chain should focus in creating customer value and leading to customer satisfaction.

Therefore, it was interesting to find out that the question of whether Digita's supply chain is customer centric divided the respondents into two groups of opinions. First, two of the internal interviewees were unanimous in expressing that Digita's current supply chain is not very customer centric. For example, usually services are sold such as the customer enquires which means that tailored and expensive solutions are made that might not be the best solutions to customers' needs. Therefore, it can be inferred that Digita does not pursue in finding the real needs of the customer,

and thus, can not sell a solution better suitable to the customers needs. Then again, one internal and both external interviewees expressed that Digita is already currently operating its supply chain with a focus on customer. For example, supplier's representative described that customer wishes are openly communicated to the supplier. In addition, the internal interviewee explained that Digita is aiming at customer centric supply chain operations, for example, by delivering according to the schedule defined by customer. Interestingly, the other external interviewee, despite of describing Digita's supply chain as customer centric, expressed concerns about the support of the whole organization to the aim of being customer centric.

Differing opinions of the degree of customer focus in Digita's supply chain may indicate that the understanding of the current SCM and operations vary greatly. In addition, there might be some variation in processes and ways of working, since different actors in both internal and external side experience customer focus differently. However, what is encouraging two of the internal interviewees indicated that customer focus in supply chain is under development and in every development project customer centricity has been applied as one of the main goals.

Response to question 2c

Review of literature indicated that internal collaboration is often more difficult than external collaboration. Therefore, the starting point of SCM should be the internal supply chain and before implementing a SCC program with the trading partners, companies should get the own house in order, as much as possible (Ireland, 2004:159; Emmet and Crocker, 2006:1-6). In other words, this means that companies should first ensure the integration, coordination, and control of their internal operations and activities. Only after the internal processes are honed to perfection, should the efforts be channeled to external partners.

In case of Digita, only one out of three internal interviewees believes that internal communication is on satisfactory level. Yet, even this person admits that sometimes problems occur. For example, data can be inadequate or might be late. Other two internal interviewees elicited that internal communication is in its infancy. For example, Digita's internal activities are based largely on working within a single department, which then leads to part optimization. In other words, it can be inferred that people work in silos and the overall supply chain process is not recognized. Therefore, people only execute the tasks defined to their respective department and interfaces and do not take information sharing into account or execute it effectively.

It is rather clearly visible that in Digita's case improving internal communication and information sharing between departments, as well as, perfecting the internal supply chain process should be

number one priority. Only thereafter, the efforts should be directed towards external collaboration. Somewhat relieving is that according to one internal interviewee, internal processes and communication are under development. However, he continues that the change process is unfortunately slow due to old culture of resistance whenever something is renewed.

Response to question 2d

Review of literature revealed that information sharing forms the foundation for SCM and SCC initiatives (Lee et al., 2000). In addition, it can be seen as a source of competitive advantage (Daugherty et al., 2006). Therefore, information sharing can be identified to be the number one priority, when pursuing towards SCC. In Digita's case, when it comes to external communication two factors, inconsistent state of internal communication and processes, have a great effect on it. All of the five respondents expressed similar unanimous concerns about the state of external communication by stating that it is not effective. For example, one of the internal interviewees explained that demand and supply information are not that much taken into account when discussing with customers and suppliers. Some respondents identified that, even though, there is communication and information sharing to some extent, it is mainly for the use of certain personnel or departments and is not utilized in the supply chain activities of the whole company. Therefore, it can be inferred to be traditional information exchange, as also explained by one of the external interviewees. In other words, information that is recognized as classified is tightly held inside the organization.

In addition, when it comes to information exchange, there is always danger of distortion and misunderstandings. Literature review indicated that if collaborative planning and information sharing are not properly organized, information and planning gaps may appear in business planning (Andraski, 1998). This can be inferred to be exactly true in Digita's case, as information distortion is caused by the different departments hoarding the information and inadequate discussion between supply chain partners, as well as, inadequate base information for installations or data and information being late.

In the review of literature we stressed that information sharing should be included as an essential part in every SCC initiative. In this light, Digita has a lot to improve in its supply chain operations. A change is needed, in both the ways of working, as well as, sharing information internally and externally. However, as also mentioned earlier, one internal respondent stressed that it is of utmost importance to put the own house in order first. In addition, suppliers' representative accentuated that Digita should develop its internal processes, so that information would flow from customer via

Digita to the supplier. This kind of working with single set of numbers could, for example, ease the supplier's delivery process in Digita's end, as material deliveries could be rationalized.

Encouragingly, two of the five interviewees claimed that the above depicted issues have improved lately and goals have been set to improve the situation further. In this point, however, it should be remembered that benefits of information sharing can be achieved with relatively simple approaches as revealed in the review of literature (Småros, 2003). Therefore, when constructing the collaboration based SCM framework, it should be kept as streamlined as possible. In addition, performance improvements can be best achieved by sharing the most relevant and useful information, as well as, forecasts among the supply chain partners (Småros, 2003). The previous, then again, indicates that while communication should be open and transparent, partners are better to agree on the information necessary to them well in advance.

6.1.3. Benefits and Barriers

Theme benefits and barriers aimed at identifying possible positive sides of SCM and SCC, as well as, indicate the factors making it difficult. There were total of two questions asked in this theme. First one was:

"3. Can you identify some benefits received from possible collaboration with external customers, suppliers or partners and are these benefits currently equally shared?"

Response to question 3

Literature review identified two main advantages companies seek from SCC and SCM initiatives. In general, these are streamlining supply chain and improving its efficiency by using information exchange. In addition, the review of literature highlighted a number of more specific benefits from SCC. These included: increased visibility and transparency, improved forecasting processes, increase in revenue and higher profits, direct and lasting communication, improved sales, inventory reduction, faster and more reliable deliveries, improved performance, lower costs, improved customer value and satisfaction, competitive advantage and improved competitiveness (Holweg et al., 2005; Zhao et al., 2002, Helms et al., 2000; Seifert, 2003; Cohen and Roussel, 2004; Lambert et al., 1998; Mentzer et al., 2001; Fisher et al., 2000; and Lee et al., 2000). The interviewees, altogether, mentioned only six of these fourteen benefits, which was rather surprising. The benefits mentioned included improved efficiency, enhanced competitiveness, better forecasting and material planning procedures, cost savings, intensified information sharing and more accurate deliveries. While three out of five interviewees acknowledged the importance of the supply chain wide view, it was surprising that no one mentioned improved customer value and satisfaction as a benefit of

collaboration. This might be explained by the issues indicated in theme two considering the customer centricity and that it is still in development phase. Therefore, we can infer that the importance of customer focus in SCM and SCC is not fully understood at Digita.

However, it was relieving to notice that all of the interviewees recognized the crucial role of information exchange and sharing, when it comes to the benefits, as well as, SCC in general. While, interviewees stressed earlier that information sharing is in its infancy at Digita, the previous acknowledgement strengthened our belief that the issue is taken seriously and will be developed, as the interviewees also mentioned. In addition, we can infer that the whole supply chain can be involved in the process of developing information sharing, since they all understand its importance. Thenceforth, the actors in the TeleCom Installation Services supply chain may be more easily engaged to other supply chain wide development projects, since they have already participated in one before.

One of the external interviewees also indicated such benefits that were not identified in the review of literature. For example, through SCC understanding of new industries is enabled. In addition, it might bring along new business possibilities and customers. Also, when working together with an influential partner a company can obtain various synergy benefits. These include, for example, experience of the industry and global network that enable development in wider perspective by using available references for benchmarking.

When it comes to sharing benefits, only two of the interviewees were able to provide an answer, one internal and one external of which both were experts on SCM. This was not a surprise as benefit sharing can be identified among the most difficult things in SCC. The next question about the barriers of collaboration can shed light on its part to the reason why benefits sharing is difficult. Internal interviewees opinion was that currently benefits are not shared because of the fear of losing own revenue and increasing own costs. The external interviewee that replied to the issue of benefit sharing explained that benefit sharing is currently so-so. For example, reference and immaterial benefits materialize on both sides. However, win-win situation, that should be the ultimate goal of SCC, is not materialized. In addition, he reminds that sharing monetary benefits is, especially, difficult due to greed. Therefore, for example, gained cost savings might not be evenly shared. As a reason to the difficulties in benefits sharing the internal interviewee offered the following explanation that captures in our opinion the main issue: *"Benefits are not shared, because a supply chain mindset is not adopted among the actors in the supply chain."* In other words, there is no supply chain wide view, which we have already earlier indicated as one of the development points in Digita's TeleCom Installation Services supply chain.

All in all, the benefits mentioned in the review of literature are gathered from many studies and are therefore rather exhaustive list of benefits. The previous of course makes comparison difficult, as a small number of interviewees might not be able to provide comparable list of benefits. However, as review of literature also revealed, one of the most important things in SCC and SCM is that there are different kinds of relationships (Cohen and Roussel, 2004; and Ireland, 2004). These relationships may have very different characteristics and also the results can differ widely. Therefore, each company should individually decide the scale and scope of their SCC effort. In other words, also Digita should approach adopting SCC in a different way and the benefits identified by the interviewees might depict the most important development areas at Digita TeleCom Installation Services supply chain. Thus, these issues need to be taken into special consideration when formulating the final Collaborative SCM Framework, as well as, recommendations to Digita.

Second question in Benefits and barriers theme was:

"4. Can you identify some barriers hindering the possibility to collaborate externally with the supply chain partners?

a) *Information sharing, Planning and forecasting related?*
b) *Partnering related?*
c) *Benefit sharing related?*
d) *Something else?"*

Response to question 4

As mentioned in Literature Review supply chains are complex entities, and therefore, managing them is not easy. Review of literature raised altogether fifteen major concerns related to SCM and SCC initiatives. These included the following barriers that might hinder the success of SCC efforts: "I win, you figure out how to win"-attitude, lack of trust, poor communication, no understanding of the big picture, no willingness to take risks, benefits are not shared, planning is inadequate, lack of top management support, fear of change, fear of failure from the existing blame culture, high integration costs, the required openness in the development process, definitions of SCM vary widely, functional approach in companies, complexity of the supply chain and a strong focus on immediate returns and gains (Småros, 2003; Ireland, 2004; Emmett and Crocker, 2006; Sabath and Fontanella, 2002; Zailani and Rajagopal, 2005; Fawcett and Magnan, 2002; Skjoett-Larsen et al., 2003).

When the responses of the interviewees are compared to the findings of the review of literature in SCC barriers, similar issues did appear. For example, the interviewees mentioned inadequate

information sharing as a barrier four times and lack of trust three times. In other words, these two issues were acknowledged to be the major reasons for unsuccessful SCC initiatives. In addition, interviewees identified six other factors, similar to the ones revealed in the review of literature, hindering the success of SCC. First, when the whole supply chain is not understood and the concept of SCC is an unknown concept, it is difficult to utilize collaboration. Second, old fashioned way of thinking that suggests improvements are not possible. Third, fear of change. Fourth, lack of internal resourcing and backwardness of the processes. Fifth, deeply rooted culture, where mistakes are punished and even a modest change arouses resistance. Sixth, inaccurate forecasts.

Similarly, as with the benefits, the interviewees also introduced barriers that were not discussed in the review of literature, such as, fear of leaking the own competitive advantage to competitors and fear that transparency might have an effect on prices. These are, of course, closely related to the issues depicted earlier in both literature review and interviews, but nonetheless give a deeper understanding of the case company specific barriers. Benefits and barriers seem to be in relation as many issues can be, actually, both. An old saying goes "the coin has two sides". This is also true with SCC and SCM, as recognized benefit might turn into a barrier when implementation process is unsuccessful. Interestingly, the interviewees seemed to be slightly more cautious in expressing their views of benefits than on barriers. The reason for this might be that problems have already concretized, but the benefits are difficult to recognize, since the development projects are yet in their kick-off phases.

The SCM experts among the interviewees provided interesting insight into the barriers of SCM that capture the essence behind unsuccessful initiatives (Laine, 2010; Ruotsalainen, 2010). It could be inferred that, in general, companies do not have enough knowledge of their logistics, therefore, it can not be shared. In other words, they can not get rid off traditional selling, purchasing and old ways to operate things. In addition, it is common that logistics is not on the priority list of the company board. Moreover, there is usually no competence or experience in logistics in the board. Thus, companies tend to get stuck on the model they have built and repeat it on and on. Whereas, world is constantly changing and so should the companies.

6.1.4. Material Management

The fourth theme aimed at capturing the current state of Material Management operations at Digita. Thus, the questions was:

"5. How does material management work currently (e.g. are the forecasts used, are they correct, are they communicated)? Is there some issues that could be improved (e.g. via communication and cooperation)?"

Response to question 5

The review of literature revealed that according to researchers (Kahn, 2003; Mentzer and Moon, 2005) forecasting is an important part of material management in supply chain. Forecasting can be divided into three dimensions: accuracy, costs, and customer satisfaction. When reflected to these dimensions, it can be inferred that the issues depicted earlier in this study have remarkable effect on Digita's forecasting part of material management. Quite telling fact is that four out of five interviewees indicated that Digita has significant problems in their material management. All of these interviewees claimed that forecasts are either not used, or they are not accurate. For example, customers share data in some extent, but it is not utilized in forecasting due to the fact that customer forecasts have not been on adequate level. One of the internal interviewees indicated two additional reasons for the difficulties in utilizing forecasts. First, inadequate base information, which is due to lack of transparency, both internally and externally. Second, the lack of understanding of the supply chain causes errors in the forecasts. Therefore, usually, forecasts are either too high or for wrong material, which causes excess stock to pile up.

However, all three of the internal interviewees reminded that there is a project in place that tries to automate forecasting based on the consensus of historical consumption and future demand and generate a three week demand forecast. Yet, inadequate base information and lack of understanding of the supply chain cause difficulties, as well as, slows down the progress. One of the internal interviewees claims that when the base information is perfected this automated forecasting could bring a significant improvement to material management. Supplier's representative of the external interviewees concurs that the previous might improve the efficiency of operations. For example, three week marginal in demand information and forecast should be enough to avoid material management issues.

Another external interviewee explained that forecasting is one of the major challenges in operations planning. Company that is unable to plan resources in advance faces problems. Therefore, Planning and forecasting should be a common process for the whole supply chain. For example, marketing campaigns, seasonal products, and industry specific issues are examples of such situations that only certain actors in the chain have the information, and thus, it should be shared to the knowledge of everyone. Also, Haapanen and Vepsäläinen (1999: 91) have found that sharing real-time

information may decrease, for example, capacity problems, excess inventories, and availability problems in various stages of the supply chain. Both of the external interviewees agree as they stated that information sharing both ways to every actor in the supply chain is crucial.

6.1.5. Performance Measurement

Performance Measurement theme was aimed at finding out whether performance measures are used in Digita's operations and to what degree. Ergo, the following questions was asked from the interviewees:

"6. What is the current state at Digita's supply chain in your opinion?

a) Is performance measured?
b) Are there simple and effective metrics and are they aligned?
c) Is there an owner accountable for every single measure?
d) Do the metrics used enable continuous improvement?
e) Are the metrics supply chain wide or just internal measures?"

Response to question 6

Interviews revealed that a dual view of the current state of performance measurement in Digita TeleCom Installation Services supply chain exists. One out of three internal interviewees replied that performance is measured. However, other two claimed that performance is either not measured or the metrics are not effective. This is rather interesting, as the views vary so much. Explanation for this variation might be found among the barriers described earlier. Inadequate information exchange between departments and a strong silo mentality could lead to this kind of situation, where departments do not have knowledge of other department's activities. In other words, if metrics were used in some departments others would not have visibility to them. Therefore, it seemed strange that one of the internal interviewees explained that the transparency of the measures is good, when there obviously is none, at least, in wider supply chain perspective.

The internal interviewees were also able to provide reasons for the current situation. First, being the fact that there is no understanding of the performance measurement correlation to operations. Second, performance measures are not public or under the knowledge of wider employee base. Third, earlier right things have not been measured. The reason for the previous is the lack of clear supply chain process and the fact that measurement has only been conducted for parts and problems instead of the whole supply chain and other essential things operation wise. Fourth, metrics are often experienced to measure only "wrongdoings", and thus, the competence to use them to develop

operations is unfamiliar to personnel. These issues explain on their part the division of opinions on performance measurements current state, as depicted above.

Additionally, two of the three internal interviewees indicated that there is a clear ownership of the measures. However, one interviewee stressed that in Digita's culture this means that the measurement and utilization of results is left solely to the owner's responsibility. The interviews also revealed that currently metrics cover the internal parts of the supply chain. One of the internal interviewees mentioned that there are also metrics for the whole supply chain, but they are not perceived as such. Whereas, another internal interviewee explained that measures are only internal and supply chain wide perspective is not adopted. In addition, according to one respondent the information value of the used metrics was claimed to be on good level, measures are well linked to the financial goals and they measure the things that they are supposed to measure.

A dual division on performance measurement appeared also among external interviewees. Other external interviewee considered performance measurement to be an essential part of supply chain activities. He also provided an example of the effect of performance measurement by stating that his company has improved its efficiency even though volumes have declined during the economic downturn. Whereas, the other external interviewee simply replied that there are no metrics used. This he justified by saying that materials have been agreed with contract and the promised delivery time for these is two days. Therefore, metrics do not improve operations, as materials are largely individualized and supplier makes sure that contracted items are available. In other words, measuring is based on keeping up the material contract. Even though, metrics are not used, he recognized their importance in whole supply chain point of view, by stating that aligned metrics measuring right things would be good. In addition, the metrics should be reliable and suitable for their purpose, as well as, generate quantifiable benefits.

As can be inferred from the previous, Digita has quite a lot to learn in performance measurement. Also, all of the three internal interviewees responded that the measures should be developed further. However, currently, they explained that performance measurement is being developed via projects, and thereby, it is on right tracks. In addition, one of the interviewees reassured that the metrics that will be defined in the project will be simple and effective. The review of literature provided a useful list of performance measure characteristics that should be taken into account in this development project. Performance measures should be reliable, unambiguous, understandable, easy to use, just, economical, fast, relevant, linked to the business strategy, balanced and comprehensive, targets should be aggressive and achievable, visible and monitored at every level of a company, as well as, used as a continuous improvement tool (Cohen and Roussel, 2004; Lecklin, 2002; and Keebler et

al., 1999). If these characteristics are utilized in the development project, the final result should be a solid performance measurement system.

In addition, to the points explained in the review of literature, partnership with external logistics service provider would offer a good reference point for Digita in performance measurement. For example, the representative of the company explained that they have both internal measures and customer specific measures in use. Of these, the customer specific measures are decided in collaboration with the customer and they are transparent to some extent. Then again, internal measures are for the development of the internal operations only and include metrics from global to customer and site specific measures. Naturally, company also has a person accountable in every metric. Therefore, Digita could consult an external logistics service provider in their Performance Measurement development project, and thus, harness their expertise on the field of supply chain operations and performance measurement.

When the interview results are compared to the findings of the review of literature, we can infer that the current state of performance measurement in Digita's TeleCom Installation Services supply chain is not by any means exceptional. Literature review identified, perhaps, surprisingly that many logistics organizations are still operated without a formal set of logistics performance measures, not to mention the fact that the set is rarely aligned with the overall business objectives, or cross-functional (Cohen and Roussel, 2004; Frazelle, 2001) Therefore, performance measurement can be identified as one of the most important things, when pursuing towards sustainable growth and success, and thus, companies should include it effectively in any SCM initiative. This means, in other words that a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in any SCC initiative.

6.1.6. Collaboration Based SCM

This final theme was asked to get feedback of the suggested Collaboration Based SCM Framework for Digita Oy. In addition, we wanted to hear possible development ideas to make it more suitable for Digita's use. Therefore, we asked the following question from the interviewees:

"7. Please consider the things mentioned in the earlier questions and reflect them into your own opinions. Do you think that this kind of model would improve the overall performance of supply chain, as well as, create competitive advantage? Also, if you have some comments of the model in general or other ideas related to it, please share them."

Response to question 7

As mentioned we have created a suggestion for a Collaboration Based SCM Framework for Digita Oy based on the definition of SCC and the emerged issues in literature review. A more thorough explanation of the different elements of the framework is provided in subsection 2.5.1. The framework tries to capture the crucial aspects of SCC identified in the study of relevant literature, while keeping the framework as simple as possible. The model takes into account nine important elements of successful SCC: internal collaboration, external collaboration, communication and information sharing, Planning and forecasting, unified process flow, customer centricity, aligned measurement of supply chain performance, continuous improvement and long-term profitable partnerships.

When the framework was presented to the interviewees, following feedback was received. Four out of five interviewees considered that this framework depicts an ideal world, where operations are improved and rationalized in general. Three of these interviewees also reminded that this kind of model requires a very large and influential actor. In addition, two of the interviewees pointed out that in Digita's case it could be difficult to run a similar framework, since they are a rather small player compared to their suppliers and customers. In addition, two of the five interviewees offer a solution where Digita, as a small actor, could use persuasion and "sales talk" to get their partners to commit to this kind of SCC initiative. For example, we assume that TDF Group collaboration might provide enough leverage to adopt this kind of model either directly as is it or through persuasion using the negotiation power of the group.

However, a better solution in case of a smaller company such as Digita could be, for example, a partner operating as a moderator and information furnace, as one of the external interviewees proposed. Also, one of the internal interviewees suggested utilization of 3rd party expertise in rationalizing SCC. In other words, the partner would be the adhesive force in the supply chain who gathers data, controls operations, measures and suggest development ideas, as well as, leads the discussion. There is, nevertheless, the possibility that this kind of model could close out some actors. Therefore, the operator should be an impartial one who is not tied to, for example, in any freight company. In our opinion, this kind of framework would require a new business model, for example, sort of a logistics integrator who managers logistics operations. A possible reference point could be the cloud-model used in IT world. In other words, this model would combine consultancy, operative implementation, as well as, running operations.

The interviewees, also, expressed their opinions of the necessary characteristics of the originally proposed model. They listed following three characteristics necessary for the success of the SCC model. First, communication and information sharing with the whole chain is vital. Second, also necessary is the utilization of synergies and expertise of other players in the supply chain. Third, every actor should adopt the supply chain mindset. These three qualities capture on some part the corresponding characteristics revealed by the review of literature and presented in this chapter in analysis of question one. However, these are not as exhaustive as the ones depicted in literature. Therefore, when formulating the final version of the framework a synthesis of the elements in literature and the findings of the case study is required in order to construct a solid and feasible model for the use of Digita.

In addition, the interviewees recognized six core benefits of the model, as it is currently. First, role as a controller between suppliers and customers could make operations more efficient in the supply chain. Second, customer centricity could be improved. Third, cost savings would materialize in the viewpoint of the whole chain. Fourth, flow of goods could be improved. Fifth, transparency could create benefits to every actor. Sixth, competitive advantage would be enhanced and longer customer relationships enabled. The above described benefits identified by the interviewees are similar with the ones discussed earlier in the review of literature and reviewed also in this chapter in question three.

All in all, two of the internal interviewees involved in the SCM development project, explain that Digita's focus has been on other things than supply chain process development until very recently. Therefore, competitive advantage is hard to achieve, as compared to competition Digita is lagging behind. Despite of the fact that many things are in their infancy, the interviewees reassure that light can be seen in the end of the tunnel. For example, SCM and related projects might decrease the gap when successful. However, practical view is of importance when seeking for possible solutions, as well as, the fact that in order to hold on to the current market position, collaboration with customers and suppliers in the corresponding interfaces should be implemented quickly. In addition, one of the SCM experts interviewed emphasized that already implementing transparent measurement and collaboration with customers would rationalize operations and enhance competitive advantage, as well as, generate added value to the customer. This is well in line with the earlier presented findings of some researchers when they proposed that even the small scale efforts have yielded early benefits, and also that companies may benefit also from highly streamlined cooperation processes, which means that heavier SCC frameworks are not necessarily needed (Ireland, 2004 and Småros, 2003).

6.3. Summary of the Case Study Results

Analysis of the case study revealed that each of the interviewees had a somewhat different view of SCC. Surprisingly, there were rather similar views on both internal and external side. Therefore, no significant differences in understanding of SCC could be found. However, internal stakeholders seemed to have a slightly more versatile view than external stakeholders in general, as they included more elements in their definitions. When compared to literature review findings, the overall understanding of SCC in Digita TeleCom Installation Services supply chain is closer to the traditional views of SCM than SCC.

The variation in understanding the concept of SCC might suggest that it would be challenging to implement such approach in the supply chain under study. Since, the current level of cooperation in Digita TeleCom Installation Services supply chain is in its infancy. In other words, the term supply chain partnership has not been understood, and therefore, its potential has not been utilized.

In addition, it was interesting to find out that the question of whether Digita's supply chain is customer centric divided the respondents into two groups of opinions. First, two of the internal interviewees were unanimous in expressing that Digita's current supply chain is not very customer centric. However, some interviewees suggested that Digita is already currently operating its supply chain with a focus on customer. Differing opinions of the degree of customer focus in Digita's supply chain may indicate that the understanding of the current SCM and operations vary greatly, as mentioned earlier. In addition, there might be some variation in processes and ways of working, as different actors in both internal and external side experience customer focus differently.

When it comes to communication and information sharing, it is rather clearly visible that in Digita's case improving internal communication and information sharing between departments, as well as, perfecting the internal supply chain process should be number one priority. Only, thereafter, the efforts should be directed towards external collaboration. In addition, when it comes to external communication two factors, inconsistent state of internal communication and processes have a great effect on it. All of the five respondents expressed similar unanimous concerns about the state of external communication by stating that it is not effective.

Benefits and barriers portray the difficulties that may appear when planning and executing a SCC initiative. When compared to the review of literature the interviewees, altogether, mentioned approximately half of those benefits. The ones mentioned included improved efficiency, enhanced competitiveness, better forecasting and material planning procedures, cost savings, intensified information sharing and more accurate deliveries. However, it was surprising that no interviewee

mentioned improved customer value and satisfaction as a benefit of collaboration. This might be explained by the issues indicated in theme two considering the customer centricity and that it is still in development phase. Therefore, we can infer that the importance of customer focus in SCM and SCC is not fully understood at Digita. In addition, empirical study revealed that currently benefits are not shared because of the fear of losing own revenue and increasing own costs.

Similarly, when the responses of the interviewees are compared to the findings of the review of literature in SCC barriers, similar issues did appear. The interviewees mentioned following barriers: inadequate information sharing, lack of trust, utilization of collaboration is difficult if the whole supply chain is not understood, old fashioned way of thinking, fear of change, lack of internal resourcing and backwardness of the processes, deeply rooted culture and inaccurate forecasts. In addition, the interviewees also introduced barriers that were not discussed in the review of literature: fear of leaking the own competitive advantage to competitors and fear that transparency might have an effect on prices.

Empirical study indicated that Digita has significant problems in their material management. All of the interviewees claimed that forecasts are either not used, or they are not accurate. Alarming finding is that company is unable to plan resources in advance and faces problems. Therefore, Planning and forecasting should be a common process for the whole supply chain.

Interviews revealed that a dual view of the current state of performance measurement in Digita TeleCom Installation Services supply chain exists. One out of three internal interviewees replied that performance is measured. However, other two claimed that performance is either not measured or the metrics are not effective. As can be inferred from the previous Digita has quite a lot to learn in performance measurement. This means, in other words that a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in any SCC initiative.

Finally, we asked the interviewees feedback and possible development ideas of the suggested Collaboration Based SCM Framework for Digita Oy. Interviewees considered that the framework depicts an ideal world, where operations are improved and rationalized in general. In addition, the interviewees pointed out that in Digita's case it could be difficult to run similar framework, since they are a rather small player compared to their suppliers and customers. However, a better solution in case of a smaller company such as Digita arose as a part of the interviews. This model could be a partner operating the supply chain as a moderator and information furnace. In other words, this model would combine consultancy, operative implementation, as well as, running operations. The interviewees, also, expressed their opinions of the necessary characteristics of the originally

proposed model. They listed three characteristics necessary for the success of the SCC model: communication and information sharing, utilization of synergies and expertise of other players and adoption of supply chain mindset. In addition, the interviewees recognized six core benefits of the model: improved efficiency, improved customer centricity, cost savings, improved flow of goods, better transparency and improved competitive advantage and longer customer relationships.

In this chapter we have described the case study results, as well as, provided an analysis and synthesis of the mentioned results. The next chapter is called Conclusion and Recommendations and it is dedicated to wrapping up this study by concluding the findings of the study and providing recommendations to the case company Digita Oy.

7. Conclusion and Recommendations

The overall aim of this research was to advance an understanding of Supply Chain Management (SCM) in a certain case company's supply chain, particularly in collaboration point of view. The case company in question was Digita Oy and the supply chain under study TeleCom Installation Services supply chain. There were four inter-related research objectives set within the context of case company Digita Oy. The specific research objectives were:

Research Objectives:

1. Identify the key elements to be considered when pursuing towards Supply Chain Collaboration (SCC).
2. Highlight the development areas in SCM in the case company.
3. Study how the SCC efforts can improve SCM in the case company?
4. Construct a collaboration based SCM framework for the case company that:
    - improves visibility throughout the supply chain;
    - improves the efficiency of the supply chain;
    - and improves material management.

This chapter will revisit the research objectives above, summarize the findings of this research work and offer conclusions based on the findings. Recommendations for future research will be discussed, in terms of how to progress this research study. Importantly, the contribution of this research to the SCM and SCC fields will be clarified. In addition, a section reflecting on the research process that has been undertaken is included. By adopting this structure it is intended that the research work will be concluded so as to reflect on whether or not the objectives stated at the start of this research have been met, including consideration of the value of this study. Also, guidance will be offered on how this research work can be progressed.

7.1. Research Objectives: Findings and Conclusions

7.1.1. Research Objective 1: Key Elements of SCC

The literature revealed that SCM and SCC require an integrated systems approach to supply chain, which views the supply chain as a whole and where the flow of goods is managed from the supplier to the ultimate customer. It is also necessary for both the intercompany and intracompany cooperation to be synchronized, as well as, the operational and strategic capabilities to be unified. In addition, all the efforts in managing supply chain should focus in creating customer value and leading to customer satisfaction. Therefore, the key elements of SCC according to literature are: collaborative culture, communication, trust, openness, honesty, cross-functional information

sharing, risk and reward sharing, customer focus, commitment to same objectives, long-term partnerships, continuous improvement and aligned supply chain performance measurement. In practice, as evidenced in the case study, similar elements of SCC came up in the empirical research. However, it seemed that the overall understanding of collaboration in Digita TeleCom Installation Services supply chain is closer to the traditional views of SCM than SCC. For example, interviewees did not mention such important elements as collaborative culture, risk sharing, continuous improvement and aligned supply chain performance measurement.

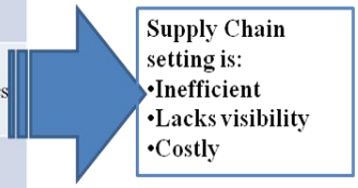
When comparing the findings of the review of literature with the findings of the empirical part of this study, we can make the assumption that the elements that should be considered when pursuing towards SCC are the twelve points presented above. Additionally, one of the most important things, the study of relevant literature revealed, is that there are different kinds of collaboration relationships. Also the results of collaborative relationships can differ widely depending on the partnership. Therefore, every company should approach adopting SCC in a different way. Due to this it is of importance to create the SCC framework exactly for the needs of the case company Digita Oy.

7.1.2. Research Objective 2: SCM Development Areas in the Case Company

When the above explained key elements of SCC are reflected to the current situation at the case company, we can infer that there is a gap between the current way of SCM and the potential ideal situation of SCC. The main development areas in Digita's SCM are summarized in Table 3. Altogether there can be inferred to be five main issues currently hindering the SCM at Digita. First of all, collaboration, both internally and externally, does not seem to be at the level it should be. Second, ancient culture seems to affect the ways of working, as well as, cause trust, openness and communication issues in the supply chain. Third, the previous issues suggest that information sharing is not conducted effectively enough. Fourth, current performance measurement and continuous improvement efforts seem somewhat superficial, as there is no standardized set of measures or processes to utilize the information received from metrics. Fifth, customer centric view in supply chain operations can be inferred to be already adopted in operations on some level; however, there is room for improvement also in this area. As a conclusion, currently problems arise in the TeleCom Installation Services supply chain mainly due to inadequate Planning and forecasting, information sharing and lack of clear and streamlined processes. These issues may cause information distortion, which in turn generates incorrect material purchases and causally leads to loss of valuable installation time. The current way of doing things in the supply chain is causing excess costs, and therefore, a change is needed.

Table 3. Summary of Current Development Areas in Digita SCM.

Supply Chain Issue	Description	Causes
Collaboration	•Internal •External	•Various as depicted below
Ancient corporate culture	•No supply chain mindset	•Lack of trust •Lack of openness
Information sharing	•One set of numbers	•Information distortion •Inadequate communication
Performance measurement	•Continuous improvement	•No visibility •Supply chain metrics not effective
Customer centricity	•Customer value	•Customers receive service that is less approriate for their needs
Material Management	•Planning & Forecasting •Excess stock	•Excess stock •High purchase prices •Incorrect material deliveries
Lack of streamlined processes	•Work is not conducted according to standard processes	•Inefficiencies •Lost time



Additionally, empirical study indicated that Digita has experienced challenges in their material management. Our research indicated that forecasts are either not used, or they are not accurate. Therefore, Planning and forecasting should be a common process for the whole supply chain. When it comes to communication and information sharing, it is rather clearly visible that in Digita's case improving internal communication and information sharing between departments, as well as, perfecting the internal supply chain process should be number one priority. Only, thereafter, the efforts should be directed towards external collaboration. Empirical study also revealed that a dual view of the current state of performance measurement in Digita TeleCom Installation Services supply chain exists. On some parts performance is measured, however it seemed that the metrics are not effective.

Finally, literature review revealed, surprisingly, that many logistics organizations are still operated without a formal set of logistics performance measures that are aligned with the overall business objectives. As can be inferred from the previous statement and the issues presented above a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in Digita's SCC initiative.

7.1.3. Research Objective 3: Improvements through SCC

Literature review identified two main benefits what companies seek from SCC and SCM initiatives. First, is to streamline supply chain and improve efficiency by using information exchange. Second,

the goal is to continuously improve company's own position on the market, as well as, optimize its value chain. Thus, the motivation to SCC and SCM comes from the various benefits it brings with it. According to the review of literature these are: increased visibility and transparency, improved forecasting processes, increase in revenue and higher profits, direct and lasting communication, improved sales, inventory reduction, faster and more reliable deliveries, improved performance, lower costs, improved customer value and satisfaction, competitive advantage and improved competitiveness. Additionally, the review of literature strengthened the statement that material management seems to be an essential part of SCM approaches. In order to be able to streamline the supply chain and implement efficient practices to harvest the benefits of SCC, the companies have to understand their material flows. As can be inferred from the previous, high inventory levels can be viewed as a major symptom of an ailing supply chain and these symptoms must be treated. Also, the empirical part of our research indicated similar benefits as the review of literature. However, it was surprising to find out that improved customer value and satisfaction as a benefit of collaboration were left out by the interviewees. Therefore, we can infer that the importance of customer focus in SCM and SCC is not fully understood at Digita. In addition, empirical study revealed that currently benefits are not shared, because of the fear of losing own revenue and increasing own costs.

However, both literature review and empirical study raised some concerns related to SCM and SCC initiatives that should be taken into account in planning phase. These issues included: lack of extensive forecasting processes in the customer side, "I win, you figure out how to win"-attitude, lack of trust, poor communication, no understanding of the big picture, no willingness to take risks, benefits are not shared, planning is inadequate, lack of top management support, fear of change, difficulty in partner selection, over-reliance on information technology, fear of failure from the existing blame culture, high integration costs, the required openness in the development process, the fact that SCM has been made a buzzword and varying definitions of SCM, functional approach in companies, complexity of the supply chain, a strong focus on immediate returns and gains, fear of leaking the own competitive advantage to competitors and fear that transparency might have an effect on prices.

Review of literature, as well as, empirical study suggested that benefits and barriers portray the possibilities and difficulties that may appear when planning and executing a SCC initiative. Therefore, these issues need to be appreciated and both the potential gains from SCC initiatives, as well as, the possible hindering factors should be recognized. This approach might lead to smoother planning and implementation of a SCC initiative.

7.1.4. Research Objective 4: Collaboration Based SCM Framework for Digita Oy

In sub-section 2.5.1. we introduced a Collaboration Based SCM Framework for Digita Oy based on the definition of SCC and the emerged issues in literature review. The framework aimed to include the crucial aspects of SCC identified in the study of relevant literature, while keeping the framework as simple as possible. In short, the model takes into account nine important elements of successful SCC: internal collaboration, external collaboration, communication and information sharing, Planning and forecasting, unified process flow, customer centricity, aligned measurement of supply chain performance, continuous improvement, and long-term profitable partnerships.

In the empirical part of our study, we asked feedback and possible development ideas of the suggested Collaboration Based SCM Framework for Digita Oy. Empirical study revealed that the framework depicts an ideal world, where operations are improved and rationalized in general. In addition, it was pointed out that in Digita's case it could be difficult to run a similar framework, since they are a rather small player compared to their suppliers and customers. However, the empirical study generated an idea of a better solution in case of a smaller company such as Digita. This kind of model could be, for example, a 3rd party partner operating as a moderator and information furnace. In other words, this partner would be the adhesive force in the supply chain who gathers data, controls operations, measures and suggest development ideas, as well as, leads the discussion. There is, nevertheless, the possibility that this kind of model could close out some actors. Therefore, the operator should be impartial who is not tied to, for example, in any freight company. In our opinion, this kind of framework would require a new business model, for example, sort of a logistics operations integrator who managers logistics operations. A possible reference could be the cloud-model used in IT world. In other words, this model would combine consultancy, operative implementation, as well as, running operations.

In addition, the empirical study revealed valuable insight into case company specific necessary characteristics of the originally proposed model. Following three characteristics were raised up in the discussion: communication and information sharing with the whole chain is vital; utilization of synergies and expertise of other players in the supply chain is necessary; and every actor should adopt the supply chain mindset. These three qualities capture on some part the corresponding characteristics revealed by the review of literature. However, these are not as exhaustive as the ones depicted in literature. Therefore, when we formulated the final version of the SCM framework, a synthesis of the elements in literature and the findings of the case study was pursued in order to construct as solid and feasible model as possible for the needs of Digita Oy. This Updated Collaborative SCM Framework will be discussed more thoroughly in sub-section 7.2.1.

7.1.5. Research Findings: Summary of Findings and Conclusions

According to the synthesis of review of literature and the empirical study, the key elements of SCC are: collaborative culture, communication, trust, openness, honesty, cross-functional information sharing, risk and reward sharing, customer focus, commitment to same objectives, long-term partnerships, continuous improvement and aligned supply chain performance measurement. Additionally, one of the most important things, the study of relevant literature revealed, is that there are different kinds of collaboration relationships and also the results of collaborative relationships can differ widely depending on the partnership. Therefore, every company should approach adopting SCC in a different way.

When the above explained key elements of collaboration are reflected to the current situation at the case company, we can infer that there is a gap between the current way of SCM and the potential ideal situation of SCC. Altogether, there can be inferred to be five main issues currently hindering the SCM at Digita: internal and external collaboration, ancient culture, information sharing, performance measurement and continuous improvement, customer centric view. As a conclusion, current problems arise in the TeleCom Installation Services supply chain mainly due to inadequate Planning and forecasting, information sharing and lack of clear and streamlined processes. As can be inferred the current way of doing things in the supply chain is causing excess costs, and therefore, a change is needed.

Additionally, empirical study indicated that Digita has experienced challenges in their material management. Our research indicated that forecasts are either not used, or they are not accurate. Therefore, Planning and forecasting should be a common process for the whole supply chain. Also, when it comes to communication and information sharing, it is rather clearly visible that in Digita's case improving internal communication and information sharing between departments, as well as, perfecting the internal supply chain process should be number one priority. Only, thereafter, the efforts should be directed towards external collaboration.

Our study indicated that on some parts performance is measured as Digita Oy, but it seemed that the metrics are not effective. However, literature review revealed, surprisingly, that many logistics organizations are still operated without a formal set of logistics performance measures that are aligned with the overall business objectives. As can be inferred from the previous a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in Digita's SCC initiative.

Literature review identified two main benefits what companies seek from SCC and SCM initiatives, in general, is to streamline supply chain and improve efficiency by using information exchange. Additionally the goal is to continuously improve company's own position on the market, as well as, optimize its value chain. Review of literature, as well as, empirical study suggested that benefits and barriers portray the possibilities and difficulties that may appear when planning and executing a SCC initiative. Therefore, these issues need to be appreciated and both the potential gains from SCC initiatives, as well as, the possible hindering factors should be recognized. However, we can infer that the importance of customer focus in SCM and SCC is not fully understood at Digita. In addition, empirical study revealed that currently benefits are not shared because of the fear of losing own revenue and increasing own costs.

Empirical study revealed that the suggested Collaborative SCM Framework depicts an ideal world, where operations are improved and rationalized in general. In addition, it was pointed out that in Digita's case it could be difficult to run a similar framework, since they are a rather small player compared to their suppliers and customers. However, the empirical study generated an idea of a better solution in case of a smaller company such as Digita. This kind of model could be, for example, a 3rd party partner operating as a moderator and information furnace. In addition, the empirical study revealed valuable insight into case company specific necessary characteristics of the originally proposed model. Following three characteristics were raised up in the discussion: communication and information sharing with the whole chain is vital; utilization of synergies and expertise of other players in the supply chain is necessary; also every actor should adopt the supply chain mindset.

The conclusions have to be viewed in terms of caveat. The conclusions are based on an extensive review of related literature and a case study, which means that the conclusions are linked to these two sources only. One is not generalizing that what was concluded in this research automatically applies to all other supply chains or companies. Instead this research is appealing to the concept of relatability: that what was researched in this study will be of interest to other researchers and practitioners interested in SCC and that it will add, incrementally, to the patchwork of research in SCC. Additionally, another limitation is that customer perspective was not included in the research, due to the fact that we did not receive a reply to our interview tender. Such empirical data would have added richness to the study, and therefore, the study currently does not give an exhaustive depiction of Digita's TeleCom Installation Services supply chain.

7.2. Recommendations

In this section we will introduce our recommendations based on the conclusion we have made. These recommendations are summarized in Table 4 and explained more thoroughly in the lines below.

Table 4. Summary of Recommendations.

Conclusion	Recommendation
Key elements of SCC	These elements should be included in the framework.
Company specific approach	Framework should be tailored according to company needs.
SCM development areas at Digita	These issues should be improved, in order to make supply chain more effective and visible.
Benefits and barriers	Should be taken into account in planning phase and reviewed during implementation.
Performance measurement not effective	Set of aligned metrics should be adopted.

Our first two conclusions stated that according to the synthesis of review of literature and the empirical study, the key elements of SCC are: collaborative culture, communication, trust, openness, honesty, cross-functional information sharing, risk and reward sharing, customer focus, commitment to same objectives, long-term partnerships, continuous improvement and aligned supply chain performance measurement. Additionally, we concluded that every company should approach adopting SCC in a different way. From these two conclusions we recommend first that the mentioned elements should be included in the Updated Collaborative SCM Framework. Second, we recommend that the framework would be tailored to the specific needs of the case company and its TeleCom Installation Services supply chain. These needs of the TeleCom Installation Services supply chain were improvement of visibility, efficiency and material management.

First, visibility could be improved by letting the logistics integrator to manage the supply chain, thereby gathering demand, forecast, supply, site survey and other material management related data from the various sources and actors inside the supply chain and remolding it into unified package of supply chain information. Second, efficiency could be improved as a byproduct of the improvement of visibility. However, it would also need the adoption of standardized operative practices – in other words effective and streamlined processes. This process improvement will be discussed further in

our third and fourth recommendation. Third, material management could be automatically improved by outsourcing the management of supply chain to a 3rd party logistics integrator with excellent references in Digita's industry. The improvement in material management would come, basically, from the best practices and expertise of the 3rd party integrator in handling and optimizing everyday material flows, warehousing, transportation, forwarding and supply chain knowledge. Also, a curious fact is that in the TeleCom Installation Services supply chain material tend to already flow through a certain 3rd party logistics operator in some point of the supply chain. This, in other words, means that by strategically choosing this particular operator as the integrator all the material used in the supply chain would be under one roof. Therefore, time, money and resources would be spared for other more value adding activities in the supply chain.

Third, we concluded that there is a gap between the current way of SCM and the potential ideal situation of SCC. Currently, problems arise due to inadequate planning and forecasting, information sharing, and lack of clear and streamlined processes. Altogether, there can be inferred to be five main issues currently hindering the SCM at Digita: internal and external collaboration, ancient culture, information sharing, performance measurement and continuous improvement, customer centric view. Additionally, fourth we concluded that Digita has experienced challenges in their material management and forecasts are either not used, or they are not accurate. Therefore, first we recommend that in Digita's case improving internal communication and information sharing between departments, as well as, perfecting the internal supply chain process should be number one priority. Only, thereafter, the efforts should be directed towards external collaboration. However, collaboration and benchmarking should be used already in this pursuit. Open discussion with the supply chain players could offer new insight of how to make the supply chain more efficient and create as much value as possible to every party. In other words, Digita should first reform its processes in TeleCom Installation Services supply chain by standardizing site survey, installation, sourcing and information sharing procedures. For example, centralizing pre-installation of site pack in industrial manner in one location could enhance the installation process. In practice this would mean that part of the work that has been traditionally executed on the small site locations is shifted to a central location on manufacturing line. This could reduce time used on installations and guarantee that all material is included in the installation-ready site pack. Second, we recommend that planning and forecasting should be a common process for the whole supply chain. This can be achieved by working together with the 3rd party logistics integrator. By using the influence of the 3rd party integrator Digita could be able to persuade other companies in the TeleCom Installation Services supply chain into a deeper supply chain collaboration relationship and thus improve

information sharing. This way the 3rd party integrator would have the necessary information to manage the supply chain and as a consequence every player in the supply chain would be working on the same set of numbers, therefore, eliminating inefficiencies.

In addition, fifth we concluded that benefits and barriers portray the possibilities and difficulties that may appear when planning and executing a SCC initiative. In addition, empirical study revealed that currently benefits are not shared because of the fear of losing own revenue and increasing own costs. These issues need to be appreciated and both the potential gains from SCC initiatives, as well as, the possible hindering factors should be recognized. Therefore, we recommend that when creating the Collaboration Based SCM Framework for case company, the above mentioned issues are taken into special consideration. Also, if the framework will be actually implemented, these issues should be emphasized in the planning phase, as well as, carefully executed. In other words, Digita should embrace new corporate culture that encourages the change in old ways of working. Joint projects with mutual interest and goals should be conducted to learn from other supply chain partners in order to enable continuous improvement and mutual benefits.

Our sixth conclusion was that on some parts performance is measured at Digita Oy; however it seemed that the metrics are not effective. Also, we can infer that the importance of customer focus in SCM and SCC is not fully understood at Digita. Therefore, we recommend that a carefully reviewed set of aligned, cross-functional and supply chain wide metrics should be incorporated in Digita's SCC initiative. This way it would be possible to gather feedback more efficiently on the supply chain processes and operations, thus, feeding continuous improvement and learning. In addition, it would clarify the roles and responsibilities in the supply chain. In other words, every player would know exactly what, how and when they are supposed to execute assigned tasks. 3rd party logistics integrator could be conveniently used to manage the performance measurement system, however, single companies together should decide upon the metrics and reporting. The most important thing is that the metrics are aligned and supply chain wide, as well as, tightly linked to the process they measure. Metrics could include, for example, such measures as site survey, demand and supply forecast accuracy (planning and forecasting/information sharing); correctness of material deliveries or inventory sufficiency (material management); installation time and resources used (production); and overall lead time (customer value).

Finally, we concluded that the originally suggested Collaborative SCM Framework depicts an ideal world, where operations are improved and rationalized in general. In addition, it was pointed out that in Digita's case it could be difficult to run a similar framework, since they are a rather small player compared to their suppliers and customers. Thus, we have reformulated the original

framework to better serve the necessities of the case company. This framework aims to capture all the recommendations presented above, as well as, pursue to achieve the objectives set for the framework. So, as our grand recommendation we offer the Updated Collaborative SCM Framework for Digita's use. This updated framework and benefits achievable through the adoption of it, and thereby, the benefits of our recommendations, will be discussed more thoroughly in the next sub-section.

All in all, the recommendations we have presented necessitate a change in the ways of working and corporate culture. Ancient "I do as I will"-culture should be abandoned. This requires commitment from everyone in the organization and especially true top management sponsorship. That is the only way to make the change happen and thus improve supply chain visibility, efficiency and material management.

7.2.1. Updated Collaborative SCM Framework for Digita Oy

As a result of the feedback received through empirical study we have updated the Collaboration Based SCM Framework for Digita Oy. The reformulated framework is based on the recommendations, and therefore, act as a summary of them. In addition, this framework is based on the same nine axioms as the original one, and therefore, they will not be explained again here. However, we explain the parts of which the updated model differs from the original one. Additionally, we have also taken into account the findings of empirical research when reformulating the original framework, and thus, it is anticipated to offer a better fit to the needs of Digita Oy.

The updated framework is illustrated in the Figure 12. It differs from the original framework in three ways. First, external collaboration and partnership is illustrated in the model as the ellipses and rectangular box surrounding the different parties in a supply chain. The communication is mainly conducted via the 3rd party logistics integrator, but there are also external collaboration directly between Digita and its customers and suppliers. The ellipses, as well as, the rectangular box illustrate that there can be identified total of five collaborative partnerships. These are either between Digita and its customers and suppliers, between 3rd party integrator and Digita's customers and suppliers, and the main partnership between Digita and the 3rd party logistics integrator.

Second, information sharing, or information flows, are illustrated as the dashed lines between supply chain partners. Basically, the idea of this framework is that the 3rd party logistics integrator consolidates the information from various sources and distributes it to each of the parties in the supply chain. Information should consist of, for example, site survey data, demand and supply forecasts, process development feedback and other similar crucial data to make the supply chain

more effective. This way it is possible to achieve continuous flow of information and it should also guarantee that every partner has the same information available. In addition, as there is one actor working as the integrator we are able to achieve a unified process flow that serves the aim of generating customer value. The process flow arrow in the lower part of our framework depicts this unified process flow throughout the supply chain. Also the product or service lines between the actors are used to depict the continuous process flow.

Third, through this kind of framework we can achieve aligned set of performance measures. The long rectangular box in the upper part of our framework illustrates the performance measurement system. When the logistics integrator operates as the furnace to melt the information, described in 7.2., in to one set of numbers, it would also enable them to able to digest the information via performance measurement and produce meaningful reports to the overall performance of the supply chain to each actor. This way one operator can control the whole chain and the overall supply chain process, as well as, initiate improvement actions. Thus, we are able to speak of true SCC that enables continuous improvement.

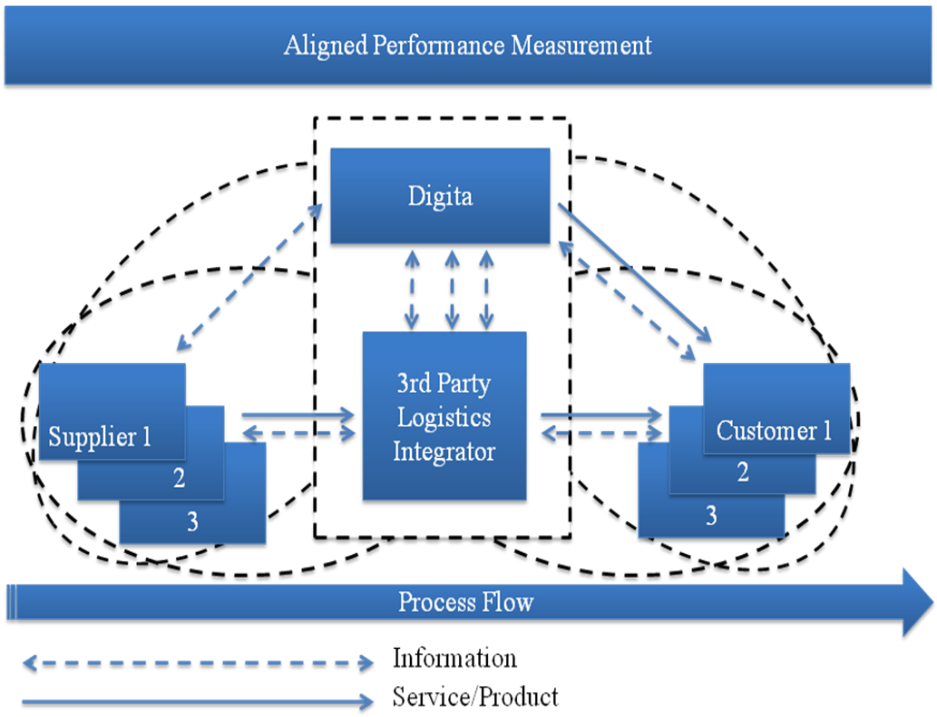


Figure 12. Updated Collaboration Based SCM Framework for Digita Oy.

To conclude, this model would involve an influential and impartial 3rd party logistics integrator operating as a moderator and information furnace in the supply chain. In other words, the integrator would work as the adhesive force in the supply chain who gathers data, controls operations, measures and suggest development ideas, as well as, leads the discussion. Hence, it would enable

the companies inside the supply chain to concentrate on their core competencies and that way possibly generate better value for their customers. The concept itself is not new, as it is comparable to outsourcing. However, our framework widens the scale of traditional outsourcing and creates a new dimension to it. It can be liken to jump from 2D to 3D image or from flat to multifaceted environment. This framework would require a deep collaborative partnership with a 3rd party logistics integrator in a sense that has not been tried before, at least to the knowledge of the author. Therefore, this kind of collaborative relationship would require utilization of a new business model and a concept, where the integrator managers logistics operations. In other words, this model would combine consultancy, operative implementation, as well as, running operations under a one umbrella of services. All in all, our framework would enable Digita to concentrate on the core business in TeleCom installations and leave out a lot of hassle that has previously been going on in the supply chain.

The value of our research lies in the number of benefits that the recommended framework might involve. It, of course, entails all the benefits of earlier SCC and SCM initiatives. Such as, uninterrupted and unified process flow from the suppliers to the end-customer, operation according to one set of numbers, enhanced communication, customer focus and continuous improvement. These benefits would then concretize in more accurate forecasts, ideal stocks, better customer service, supply chain wide cost savings, as well as, material and immaterial benefits to the supply chain partners. Moreover, material management would improve, as handling of all the material is performed under the same roof. Also, visibility would be enhanced, as there would be one operator holding the supply chain together and everyone would have the same information available. In addition, the framework would eliminate inefficiencies in the supply chain via standardized processes and ways of working. Most importantly, this model would enable smaller companies to adopt SCC with a simple approach, without byzantine management structures. Additionally, the influence of the logistics integrator would provide potential competitive advantage to the smaller company through the leverage and negotiation power of the partner.

As a conclusion, we claim that this suggested framework could make it possible to achieve the three objectives set for the framework in the beginning of this thesis. First, gain better visibility throughout the supply chain. Second, improve the efficiency of the supply chain. Third, improve the material management. The framework achieves these objectives via utilization of best practices featured in the extensive review of relevant SCM and SCC literature spiced with the company and supply chain specific characteristics learned through the empirical research.

7.2.2. Avenues for Future Research

Although thorough research has been conducted for this project, there are other related areas of study that could benefit this work in SCC. For example, further research could focus on the study of the actual implementation process of Collaborative SCM Framework both on practical point of view, as well as, on scientific point of view. In other words, the suggested study could work as a follow-up of this study. Also, it would be of interest to study the softer side of SCC. For example, the effect of corporate culture and people on the implementation process.

Another avenue for future research would be to conduct a research related to the suitability of the originally proposed framework to the needs of a larger company. Additionally, it would be interesting to find out the possibilities and feasibility of the framework we recommended to the case company in other companies, as well as, industries. Moreover, it could be fruitful to study the proposed SCC framework in practice.

7.3. Contribution to Knowledge and Managerial Implications

The review of literature made it clear that SCM and SCC are both very complex and emerging landscapes. Moreover, SCM and SCC frameworks tend to be rather heavy, which often increases the complexity in already byzantine structure of supply chains. Also our empirical research indicated that most supply chains in Finland are operated traditionally. In other words, there are only suppliers and very few partners, and thus, no real supply chain wide collaboration. Evident, therefore, was that SCC is entering Finland little by little and currently it is dependable on the efforts of certain individuals. In addition, according to researchers (Burgess et al., 2006; Ireland, 2004) the SCM literature seems to be concentrating in only a few industry sectors. These dominating industry sectors include consumer goods retailing, computer assembling and automobile manufacturing.

This study has readdressed the above depicted gaps in earlier research in four ways. First, we have brought SCC closer to the smaller companies by constructing a simple and streamlined framework. Second, we have expanded the understanding of SCC in the case company. Third, we have also expanded the SCC horizon to a new industry sector. Fourth, we have further enriched the research of SCC in Finland. These claims we build on the following statements sourced from literature. Researchers (Ireland, 2004; Småros, 2003) indicated that even the small scale efforts have yielded early benefits, and also that companies may benefit also from highly streamlined cooperation processes, which means that heavier SCC frameworks are not necessarily needed. In addition,

Cohen and Roussel (2004) remind that SCC can reduce the significance of scale as a competitive differentiator and make it possible for the small companies to compete evenly with the big ones.

In addition, our study has multiple managerial implications. First, it offers a SCC framework for the use of the case company that can improve the visibility, transparency, efficiency and material management of the supply chain under study. These aspects cover the objectives set for this study. In addition, the framework constructed in this study may enable smaller companies to challenge larger corporations by partnering with a 3rd party logistics integrator and that way harness the benefits of SCC. Third, this study can increase the overall understanding of the TeleCom Installation Services supply chain inside the case company. Finally, according to the principle of relatability our study offers managers in other equally sized companies a reference model of how to arrange SCM in their respective companies.

7.4. Self-reflection

This research work started rather well. The general topic, as well as, the objectives were agreed with the case company – Digita Oy – quite well in advance. On this part the advice given is to seek for the possible thesis topic, whether it is a commission or self-defined topic, as early as possible to guarantee peace of mind and avoid unnecessary stress. The actual writing process got a good kick-start via the Thesis Writing Workshop course and it can be recommended to everyone thinking to begin writing their thesis. The relatively tight schedule of the class kept the pace on good level for the first couple of months of the seven month project.

However, the challenge to dovetail other duties at work and thesis writing began to appear after a couple of months. Therefore, the estimated completion date had to be postponed many times. This generated a little bit more stress than had been anticipated in the beginning of the project. The best advice that can be given to anyone writing their thesis as a commission is to negotiate the percentage amount of time you have for your project well and hold dearly to what you have negotiated. Otherwise you will be in trouble completing your thesis on time.

All in all, now that the project has been completed I can say that I was fortunate to be able to write my thesis as a part of my daily job. In addition, the previous gave access to valuable data, which eased the overall thesis writing and research process quite a lot. Even though, the empirical part of the research was not as comprehensive as planned, due to the lack of few interviews, the overall result is something that one can gladly be happy of.

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Internal Interviews:

Isotalo Heikki, IT Group Manager, Digita Oy, Helsinki, May 31st 2010 [email].

Laine Kari, Logistics Manager, Digita Oy/ Management Group, LOGY, SCM Forum, Helsinki, June 16th 2010.

Turkkila Olli, Sourcing Director, Digita Oy, Helsinki, June 30th 2010.

External Interviews:

Luoto Raimo, Sales Manager, Elektroskandia Suomi Oy, Helsinki, June 17th 2010.

Ruotsalainen Juha, Sales Director, DHL Supply Chain (Finland) Oy/Chairman, LOGY, SCM Forum, Helsinki, June 29th 2010.

Appendices

Appendix A. Example of Internal Interview Sheet

I am a graduate student from Aalto University School of Economics currently writing my thesis. Subject of the thesis is Creating a Collaboration Based Supply Chain Management Framework, Case: Digita Oy. The thesis is conducted in cooperation with Digita Oy where I work as a logistics specialist. The reason why I am contacting you is that I would like to hear your opinion of the following matters in connection to supply chain improvement. So I politely ask you to answer shortly to the following questions.

General

1. How do you understand supply chain collaboration?

Current State of SCM and Collaboration

2. Supply chain management is first and foremost based on collaboration. The necessary characteristics are often cited to be information sharing, planning and forecasting, partnering, benefit sharing and customer centricity throughout the supply chain. What is your opinion of the current state of supply chain collaboration at Digita Oy?
    a. What is the degree of cooperation with the customers, suppliers and partners (e.g. what forms does it take, or is there any)?
    b. Is Digita Oy aiming to customer centric supply chain view (e.g. are all the efforts intended to generate value to customers)
    c. Do the different internal functions communicate with each other (e.g. is necessary information communicated with all functions, do the functions cooperate in planning and forecasting)?
    d. How about the external communication (e.g. does Digita communicate with its supply chain partners about i.e. demand, is the customer, supplier or partner information shared with all of the functions involved in the process)?

Benefits and Barriers

3. Can you identify some benefits received from possible collaboration with internal functions or external customers, suppliers or partners and are these benefits equally shared?
4. Can you identify some barriers hindering the possibility to collaborate both internally and externally?
    a. Information sharing, planning and forecasting related?
    b. Partnering related?

c. Benefit sharing related?

d. Something else?

Material Management

5. Inventory management is an essential part of supply chain collaboration. Planning and forecasting have a significant impact on this element of supply chain management. How does it work currently (e.g. are the forecasts used, are they correct)? Is there some issues that could be improved (e.g. via communication and cooperation)?

Performance Measurement

6. Performance measurement is the key tool to holding the supply chain together, as well as, enabling continuous improvement. These measures should be aligned throughout the chain. What is the current state at Digita Oy?
    a. Is performance measured?
    b. Are there simple and effective metrics and are they aligned?
    c. Is there an owner accountable for every single measure?
    d. Do the metrics used enable continuous improvement?
    e. Are the metrics supply chain wide or just internal measures?

Collaboration Based SCM

7. Following figure (Figure not attached in this example.) presents a Collaboration Based Supply Chain Management Framework for Digita Oy. The intent of the model is that “one plus one is more than two” and by cooperating rather than competing companies can achieve greater benefits. In the model supply chain is seen as a unified continuous process flowing from one end of the chain to another. The cloud surrounding the middle part depicts that all of the players in the supply chain work together to generate as much customer value as possible. They also communicate and share information, as well as, learn from each other and pursue to continuous improvement. In addition to the external communication the internal communication plays a major role and it is illustrated in the middle four boxes. Please consider the things mentioned in the earlier questions and reflect them into your own opinions. Do you think that this kind of model would improve the overall performance of supply chain, as well as, create competitive advantage? Also, if you have some comments of the model in general or other ideas related to it, please share them.

Appendix B. Example of External Interview Sheet

I am a graduate student from Aalto University School of Economics currently writing my thesis. Subject of the thesis is Creating a Collaboration Based Supply Chain Management Framework, Case: Digita Oy. The thesis is conducted in cooperation with Digita Oy where I work as a logistics specialist. The reason why I am contacting you is that I would like to hear your opinion of the following matters in connection to supply chain improvement. So I politely ask you to answer shortly to the following questions.

General

1. How do you understand supply chain collaboration?

Current State of SCM and Collaboration

2. Supply chain management is first and foremost based on collaboration. The necessary characteristics are often cited to be information sharing, planning and forecasting, partnering, benefit sharing and customer centricity throughout the supply chain. What is your opinion of the current state of supply chain collaboration with Digita Oy?
    a. What is the degree of cooperation inside the supply chain with Digita's customers, other suppliers and partners (e.g. what forms does it take, or is there any)?
    b. Do you think that Digita is aiming to customer centric supply chain view (e.g. are all the efforts intended to generate value to customers)
    c. How is Digita's communication with external partners (e.g. does Digita communicate with its supply chain partners about i.e. demand, is the customer, supplier or partner information shared with all of the functions involved in the process)?

Benefits and Barriers

3. Can you identify some benefits received from possible collaboration with external customers, suppliers or partners and are these benefits equally shared?
4. Can you identify some barriers hindering the possibility to collaborate externally with the supply chain partners?
    a. Information sharing, planning and forecasting related?
    b. Partnering related?
    c. Benefit sharing related?
    d. Something else?

Material Management

5. Inventory management is an essential part of supply chain collaboration. Planning and forecasting have a significant impact on this element of supply chain management. How

does it work currently (e.g. are the forecasts used, are they correct, are they communicated)? Is there some issues that could be improved (e.g. via communication and cooperation)?

Performance Measurement

6. Performance measurement is the key tool to holding the supply chain together, as well as, enabling continuous improvement. These measures should be aligned throughout the chain. What is the current state at Digita's supply chain in your opinion?
    a. Is performance measured?
    b. Are there simple and effective metrics and are they aligned?
    c. Is there an owner accountable for every single measure?
    d. Do the metrics used enable continuous improvement?
    e. Are the metrics supply chain wide or just internal measures?

Collaboration Based SCM

7. Following figure (Figure not attached in this example.) presents a Collaboration Based Supply Chain Management Framework for Digita Oy. The intent of the model is that "one plus one is more than two" and by cooperating rather than competing companies can achieve greater benefits. In the model supply chain is seen as a unified continuous process flowing from one end of the chain to another. The cloud surrounding the middle part depicts that all of the players in the supply chain work together to generate as much customer value as possible. They also communicate and share information, as well as, learn from each other and pursue to continuous improvement. In addition to the external communication the internal communication plays a major role and it is illustrated in the middle four boxes.

    Please consider the things mentioned in the earlier questions and reflect them into your own opinions. Do you think that this kind of model would improve the overall performance of supply chain, as well as, create competitive advantage? Also, if you have some comments of the model in general or other ideas related to it, please share them.