Supply Chain Visibility
The value of information
A benchmark study of the Swedish industry

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KTH Industrial Engineering
and Management

Master of Science Thesis
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Värdet av information
En utvärdering av den
Svenska industrin

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Godkänt	Examinator	Handledare
2008-04-15	Mandar Dabhilkar	Mandar Dabhilkar
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Sammanfattning

Inom ämnesområdet supply chain management uppkommer ständigt nya modeord och uttryck. Det är underförstått att företag, forskare och konsulter som jobbar inom området skall förstå dessa uttryck. Ett av dessa modeord är supply chain visibility, informationstransparensen i värdekedjan. I denna uppsats undersöks meningen med denna term samt hur företag uppnår supply chain visibility. I befintlig forskning inom området supply chain antas det att om aktörer i värdekedjor har visibilitet i form av efterfrågan, leveranser, lagernivåer, produktion etc. ökar den totala effektiviteten i värdekedjan. I denna uppsats presenteras en definition av supply chain visibility, ett ramverk för hur supply chain visibility kan mätas och hur tät relationen mellan visibility och effektivitet är. Det empiriska underlaget är en benchmark studie med 14 av Sveriges största företag från fyra olika industrier.

Resultaten visar att graden av visibilitet skiljer avsevärt mellan olika företag samt att visibiliteten utvecklas olika i olika branscher. Varje industri visar olika styrkor och svagheter således kan de olika industrierna dra lärdom av varandra. Studien visar även att företag har en tendens att samla mycket information via olika processer och system, men har svårt att använda insamlad data i ett proaktivt syfte. I uppsatsen presenteras mer ingående vilka specifika förbättringsområden som varje industri uppvisar.

Slutsatserna pekar på att visibilitet utvecklas i tre olika faser. Första fasen är att via system och processer samla in information, detta kallas accessible information. Andra fasen innebär att nyttja effektiva kommunikationskanaler i syfte att sprida information mellan olika funktioner, detta kallas visibility vehicle. Tredje fasen innebär att utforma processer och arbetssätt som nyttjar informationen på operationell nivå, detta kallas visibility mode. Dessa slutsatser är presenterade i Conclusion kapitlet, där presenteras även strategier för hur företag kan nå högre grad av visibilitet.

Utöver de slutsatser och resultat som nämns ovan, resoneras även kring hur denna uppsats positioneras gentemot tidigare forskning inom supply chain området. I denna uppsats presenteras modeller som tidigare ej använts inom området. Till att börja med görs slutsatsen att informationsdelning samt relationsmedvetenhet är nyckelfaktorer för att skapa visibilitet. Vidare utvecklas resonemang från tidigare forskning gällande relationen mellan information

(här visibilitet) och effektivitet. Detta görs Dupont analyser av företagen som deltagit i studien samt en generalisering utifrån dessa resultat, allt med ramverket för hur visibilitet kan mätas som stomme i resonemangen. Studien visar en tydlig korrelation mellan visibilitet och effektivitet. Företagen i studien kan i snitt förbättra sin ROA (return on asset) med 3.4 procentenheter.

Nyckelord

Supply chain management; Supply chain visibilitet; Information; Relationsmedvetenhet; Benchmark studie; Litteratur studie; SCOR-modellen; Graden av visibilitet; Trender; Ekonomi; DuPont;

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2008-04-15	Mandar Dabhilkar	Mandar Dabhilkar
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	Connecta	Christer Björk

Abstract

Within the field of supply chain management new buzz words popup constantly. It is understood that individuals, companies and researchers working within the field know the meaning of buzz words and wheatear or not the buzz words have a deeper meaning. One of these buzz words are supply chain visibility. In this thesis the notion of supply chain visibility is explored and further extended. The research in this thesis includes a definition of visibility based on previous research made in the field. It is assumed that if supply chains have visibility into demand, performance, deliveries, inventory levels etc. the total performance of the supply chain will improve. In this thesis a framework for measuring supply chain visibility is presented. The relationship between visibility and performance is further studied in the thesis. Empirical studies including a benchmark study of 14 companies from four different industries support the conclusions made concerning supply chain visibility.

It is found that the level of visibility varies widely between different companies and that the visibility is differently developed within different industries. Therefore, each industry show strengths and weaknesses which other industries can learn from. Furthermore, it is found that companies have a tendency to gather a variety of data trough different processes and systems. However, the data is not used in a proactive manner to achieve excellence performance. It is shown in this thesis that every industry has specific improvement areas.

It is also found that supply chain visibility develops in three steps. First, there are systems and processes in use to gather data, we call this accessible information. Secondly, there are effective ways of sharing the data and information between different functions, we call this visibility vehicle. Thirdly, there are processes which are designed to act on information, we call this visibility mode. These findings are presented in the conclusion p art and clear strategies are presented for how companies can reach a higher level of supply chain visibility.

In addition to the above presented conclusions there are findings which elaborate upon the research of supply chain management. Firstly, it is concluded that information sharing and relationship awareness are key factors for companies in order to reach supply chain visibility. Furthermore, the relation between supply chain visibility and economical performance is

validated. The conclusions are that companies can improve their ROA (return on assets) with an average of 3.4 percent by improving the supply chain visibility.

Keywords

Supply chain management; Supply chain visibility; Information; Relationship awareness; Benchmark study; Literature study; SCOR-model; Level of visibility; Trends; Economics; DuPont;

Preface

This Master Thesis is the final and a compulsory part of the Masters of Science Degree in Industrial engineering and management at the Royal Institute of Technology, Stockholm, Sweden. The thesis has been conducted in cooperation with the management- and IT-consultant corporation Connecta AB, Stockholm, Sweden and department of industrial engineering and management at the Royal Institute of Technology, Stockholm, Sweden.

We would like to offer our thanks and express our gratitude to our supervisors at Connecta AB, Christer Björk and Martin Stenfors and all the Connecta personnel for their enthusiasm for the topic of our thesis as well as for their guidance. Also, our supervisor the Royal Institute of Technology, Mandar Dabhilkar, has been a source of inspiration due to his great passion for supply chain management. Furthermore, we would like to send our appreciation to Kayle Temple for assisting us with a grammar and spelling check.

Finally, but not less essential we would like to thank all respondents and participating corporations in the study and others who in some way have assisted us in carrying out this thesis. Without their contribution this Master Thesis would not be what it is today.

January 18th 2008, Stockholm, Sweden.

Simon Johansson & Johan Melin

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1. Introduction

1.1 Background

In the past decades it has been a trend for companies to outsource functions that are not considered as the firms' core competence. In addition companies have also become more global than domestic. Thus, one company can have its production in one country, source from another country and have the administrative functions in yet another country. The increased globalization adds complexity to the supply chain and the management of the supply chain (source). The increased complexity adds uncertainty to the supply chain. The increased uncertainty implies a need of increased safety stock levels. The alternative to increased inventory levels is to proactively use information to manage the complexity of the supply chain. Information and transparency is the key to make the right supply chain decisions and reduce the costs connected to increased uncertainty (Handfield, Monczka & Trent, 2005). The overall objective in a modern supply chain should be to streamline the operations and efficiency of the supply chain as a whole (Mason et al., 2003). Ellram and Cooper (1993) define it as *"An integrated approach to manage the total flow of a distribution channel from the supplier to the ultimate user"* (Handfield, Monczka & Trent, 2005).

In order to achieve an efficient and effective supply chain, information needs to be shared among the nodes of the network and strategies need to be coordinated (Moberg et al., 2002). New technology such as the internet is changing the requirements for how to share information effectively through the supply chain. The internet allows information exchange on an unprecedented scale. However the access to real time data is not a guarantee for improved supply chain management. The companies need to find the right data and also know what to do with the data, otherwise the information does not provide any value to the supply chain (Mason et al., 2003).

Even though information exchange is understood as one of the most important aspects to provide efficiency to the supply chain, there is little understanding for how information needs to be handled, communicated and interpreted in order to bring value to the supply chain. Information is nothing but an activity, visibility is a potential outcome of the activity which creates efficiency and competitive advantage to the supply chain. Most research has been focused on how to provide information and how to communicate this information (using different systems). Limited research has also been conducted on qualifications for good, valuable information. Most of the information improvement research is based on simulations rather than case studies. Thus, there is a gap in the research that ought to be filled. There is a call for research concerning how information can provide visibility (and at which levels visibility is needed), how it can be conducted, and how good modern supply chains are at achieving visibility and extracting its advantage.

For actors in the business world, it is hard to keep up with the changing environment and at the same time analyze how to reach certain benefits. The high pace in supply chain management has caused companies in the logistic industry and consultancy firms to develop different methods to achieve visibility. The actors have also developed different terminology e.g. visibility, event management, logistic control tower and fourth part logistics. Thus there is a call for an inquiry concerning the different buzz words and how they fit together and more importantly, how they fit into the concept of the supply chain. There is also a need to measure and understand how well developed companies are at communicating data and utilize the value of the data within the supply chains today.

1.2 Problem statement

The high pace of development within the field of supply chain management has caused consultancy firms and logistic service providers to develop different terminology addressing the same issues. Therefore, there is a great uncertainty in the definitions of different services and concepts. Supply chain visibility is one of the concepts that lack a clear cut definition across the industry.

The confusion surrounding supply chain visibility, and the value of it, is further enhanced since there is very limited research covering the topic. Most research is focused on the enablers of information sharing, the value of information or the importance of collaboration. The topic of how information is elevated to visibility is a rather unexplored area. Therefore the confusion surrounding the topic is massive and needs to be addressed by empirical studies and explored in comparative studies.

The assignor has made attempts at describing supply chain visibility and its value before. However such attempts have fallen short due to the lack of proper research and review regarding the topic. One specific case study has been made. The results revealed the importance of commitment to information sharing and relationship building throughout the organization in order to achieve supply chain visibility. One specific case is not sufficient to allow generalization across companies and industries. Without feasible generalizations, it is neither viable to make statements regarding the value of supply chain visibility, nor to develop models for explaining supply chain visibility in a generic manner.

1.3 The assignment and its purpose

The purpose of this thesis is to extend the literature of supply chain visibility. The notion of supply chain visibility will be extended in four main steps 1, 2, 2a and 2b.

The assignment is two-folded. First, there is a need to unravel the confusion of ideas that has emerged in the consulting and the logistic industry. The focus is on defining supply chain visibility and the antecedents of supply chain visibility. Key questions to solve are:

1. How is visibility defined?
2. How is visibility achieved?

Secondly, supply chain visibility should be measured and evaluated through an extensive empirical study of different companies. Through developing a framework for measuring levels of visibility and its connections to performance, supply chain visibility ought to be connected to the bottom line results, revealing the value of supply chain visibility. The results of the empirical study should present the complex issue of supply chain visibility in a comprehensive manner. The visibility ought to be clarified with the use of structured models illustrating the different levels of visibility and the antecedents at each level. As an extension, the assignor has the aspiration to turn the conclusions into a white paper directed at the industry press. The purpose of the white paper is to show the possibilities with supply chain visibility. Key questions to solve are:

2a. How can supply chain visibility be measured, which activities ought to be included in a feasible research model?
2b. How does the visibility develop within companies, are there any different development levels and what are the financial incitements to pursuit supply chain visibility?

The purpose of this thesis is to provide a definition of supply chain visibility from research within the field. Furthermore, the purpose is also to provide a study to observe what level of visibility companies have today and the value connected to an improvement of the existing visibility.

1.4 Focus and demarcations

The focus on this thesis is centered on the SCV in Swedish companies. Thus, the study will be limited to companies situated in Sweden. The financial possibilities connected to SCV is not studied in depth, but rather based on learning's and the competence of the companies. In order to conduct a study which fully covers the financial implications would demand a more in depth approach to the financial side of the companies.

The thesis is not particularly focusing on the technological aspect of information sharing. The technology is regarded as a carrier of information, while the organizations are the enablers of what kind of information to share. Thus, the focus is on information and organization/relation rather than on technological support.

1.5 The assignor

Connecta is a management- and IT-consultant firm operational in the Nordic market. Connecta was founded 1993 and is based in Stockholm, but an additional office is also to be found in Malmö (www.connecta.se). Connecta employs approximately 500 consultants who work within their four business segments videlicet: Change management, Customer relationship management, IT Value and Supply chain management. The first business segment, Change management developed for management of complex changeovers. The second, Customer relationship management works with marketing, sales, service and customer insight. The third, IT Value helps rationalize IS/IT while the fourth, Supply chain management deals with purchasing, logistics, production and planning (www.affarsvarlden.se). The customers of Connecta are top actors within the retail-, banking and insurance-, service and communication high tech industry. Connecta is listed on the Nordic stock market (www.connecta.se).

1.6 Outline of the thesis

In order to guide the reader through this report, an outline of it is presented here containing a brief description of the contents of the different chapters.

Chapter 1 – Introduction

The purpose of this chapter is to provide the reader with a brief background to the area of research. It also describes and explains problem statement, the assignment and its purpose, focus and demarcations of the thesis and gives a short introduction to the assignor of the thesis. The chapter ends with an outline of the thesis.

Chapter 2 – Methodology

The methodology chapter describes the thesis procedure and justifies to the readers the chosen research perspectives and approaches made within this thesis. The authors also describe how they have strived to obtain credibility, objectivity and validity towards the end result together with the practical mode of procedure for the study.

Chapter 3 – Theoretical background

The theoretical background chapter describes the basics of supply chain management. It describes how the concept has developed and the importance of supply chain management in a contemporary corporation. The chapter provides a theoretical context for the following chapters, which are more focused on the studied topic. The supply chain imperative which is described in this chapter is the driving force of development and research in different supply chain areas.

Chapter 4 – Conceptual framework

The chapter conceptual framework starts with a table of research articles concerning supply chain visibility. The article table provides a full review on the areas of research covered concerning supply chain visibility. The presented literature is used as a foundation for the construction of the research model which is presented in the following chapter.

Chapter 5 – Conceptualization of supply chain visibility

The chapter conceptualization of supply chain visibility is an extension of the notion of supply chain visibility. The different areas which are identified as antecedents to visibility are used to build the conceptualization. These antecedents are further developed and explained in the chapter. The conceptualization is used as research model in the empirical study.

Chapter 6 – Result of empirical study

The result of empirical study chapter summarizes the result of the study. A section summarizing all the respondent companies' level of visibility and analysis concerning the clear cluster segmentation begins the chapter. The following section handles the economic impact of visibility in relation to the earlier described level of visibility. The next section summarizes and analyzes the companies and each level of the SCOR-model from a deeper perspective. The final section presents each company individually and detailed both from the level of visibility as from the economic standpoint.

Chapter 7 - Discussion & conclusion

In the discussion & conclusion chapter the empirical findings is further extended by an elaboration upon the trends within supply chain visibility. The findings are further enhanced by a summarization of the results presented in a comprehensible manner under the fulfillment of purpose section. This chapter also position the study academically towards earlier research carried out within the field of supply chain visibility. In addition the authors will also present reflections of the results, the section touch upon the greater implications of the results and criticism towards the result. The final section present inspiration for further research within the topic, how the notion of supply chain visibility can be further explored.

2. Methodology

This chapter aims to explain and validate the chosen research perspective and approach made within this thesis. The authors strive to obtain credibility, objectivity, reliability and validity within the thesis and this will also be declared as well as the practical mode of method for the study. The author's ideal of knowledge ontological and epistemological approach will furthermore be revealed.

2.1 Thesis procedure

The flow chart underneath provides the reader with a general understanding of how the thesis procedure was conducted. Every step of the procedure will be described in detail in the underlying chapters. The entire thesis procedure is conducted in line with a positivistic ideal of knowledge. Videlicet that the world and reality is considered to be an entity that is possible to study unbiased, with the presumption that sources that bother the objectivity can be filtered.

The thesis also goes in line with the epistemological approach that is in line with the positivistic (Johansson Lindfors, 1993; Wiedersheim-Paul, 2001). The flow chart underneath explains that the thesis is built upon a deductive approach videlicet the thesis moves from theory to empire (Wiedersheim-Paul, 2001; Johansson Lindfors, 1993).

Figure 1 - Thesis procedure

Question	Definition	Method	Validity/Reliability
1	How is visibility defined?	**Literature research** - The definition is based upon the consensus found in the articles.	See table 1 – Literature research (Multiple sources of evidence)
2	How is visibility achieved?	**Literature review & empirical findings -** The literature provides the background and the empirical findings draws on the notion of visibility taking it one step further.	See table 1 – Literature research & Thesis chapter (4) Conceptual framework
2a	How can supply chain visibility be measured, which activities ought to be included in a feasible research model?	**Evaluation model –** Creating the instrument	Based upon material from question 2 (Multiple sources of evidence & case study database)

2b	How does the visibility develop within companies, are there any different development levels and what are the financial incitements to pursuit supply chain visibility?	**Semi-structured interviews & Evaluation model –** Interviewing and evaluating the respondents	Interview guide (To make sure interviews were conducted the same), Transliterations & Reviewed drafts by respondents

Table 1 – Reliability and Validity table

2.1.1 Literature research

This thesis procedure was initiated with a research for relevant literature for the study. The chart underneath show the researched areas, used concepts and amount of hits. A large amount of different concepts were used to scan the relevant area and many different sources were used to create validity. A large number of articles were found, but only the articles listed in chapter 4.1 were truly relevant. All relevant hits were carefully studied to make sure no important information or articles were disregarded. Furthermore, a number of books were found to be relevant within the studied area in the research. The books relevant for the study will be found in the theoretical framework (Yin K. Robert, 2003).

Source	Concept	Total articles	Relevant articles
Samsök*	Supply chain visibility	68	19
	CPFR + Visibility	53	3
	Supply chain event management	66	8
	Supply chain risk management	82	13
	Logistic control tower	30	0
	RFID + visibility	67	2
	Track & trace + visibility	50	0
	Supplier + visibility	97	2
	Asset visibility	85	4

Table 2 - Literature research

**Samsök consists of the following databases: CJO Cambridge Journals Online, Highwire Press, NTIS (EV2), ScienceDirect, Scopus, SpringerLink, Web of Science (ISI), Wiley InterScience.*

2.1.2 Conceptualization of SCV

From the outside of the literature collected in the research was it possible to create a definition of supply chain visibility. Furthermore, it was obvious that a few recurring parameters were needed to achieve supply chain visibility. These parameters are the foundation in the evaluating model and the entire thesis. More information about the definition and the parameters are to be found in chapter 5. All literature used as foundation to the definition and the parameters were carefully and rigorously selected to achieve reliability (Yin K. Robert, 2003).

2.1.3 The evaluation models

Two evaluation models were created to measure the respondents. The first model measured the level of visibility and the second calculated how much funds each respondent would be able to save. Both models are available in the appendix. The first model that measured what level of visibility of the respondents was created from the parameters needed to achieve supply chain visibility. The SCOR-model explained in chapter 3.2 was used to simplify the use of the model. Each parameter in the SCOR-model was evaluated by a certain number of questions. The parameters in the SCOR-model were weighted differently due to the fact that they do not affect the level of visibility in the same amount. The used weight percentages were based upon discussions with respondents and experienced SCOR-model consultants (Yin K. Robert, 2003).

The second model videlicet the cost saving model is created from the DuPont-model. By using the annual reports from the respondents made it easier to break down there possible savings. At the end of the interviews were most respondents able to estimate savings in different parts of the corporation. The cost saving model made it possible to calculate the total savings for each respondent. The many questions and the logic in the models help create validity to the evaluation (Yin K. Robert, 2003).

2.1.4 Interviews

The empirical study is performed as a case study research since the studied group consists of a limited group of respondents. The main questions of the study are “how” which makes the case study the strongest method (Patel R & Davidsson B, 1994; Yin K. Robert, 2003). The thesis’ main purpose is to evaluate which factors influence the event in question. The case study method enables the focus on a specific event and was therefore chosen (Bell J, 2000). The methods used are of qualitative character due to the fact that interviews are used to be able to collect all the relevant information.

The interviews were conducted in the respondent’s facilities with a national wide geographic perspective. The respondents in the interviews are 14 of the largest corporations in Scandinavia and some are even global market leaders. The 14 companies originate from four industries videlicet retail, communication high tech, automotive and classic industry. The respondents are generally global or national supply chain managers, with a few exceptions. The title of the respondents as well as a review of the draft of their report was important to create validity to the thesis (Yin K. Robert, 2003).

An interview guide was created from the level of visibility model to make sure all interviews were conducted the same. The interview guide can be found in the appendix. The interview guide was constructed from the evaluation model to make sure that the proper quantity and quality of information was collected. Each interview was carried out during two hours. All interviews were also recorded and transcribed to ensure the reliability of this thesis (Yin K. Robert, 2003).

2.1. Economic evaluation

The cost savings in the summarization of each company, chapter 6.4, are calculated with the DuPont-model and the corporation’s annual reports. All participating companies do not reveal their annual reports and it is therefore impossible to make any calculations in these cases. The DuPont-model

shown beneath is the one used in this report. The sums from the annual report are first added into the DuPont-model which generates the actual return on assets (ROA).

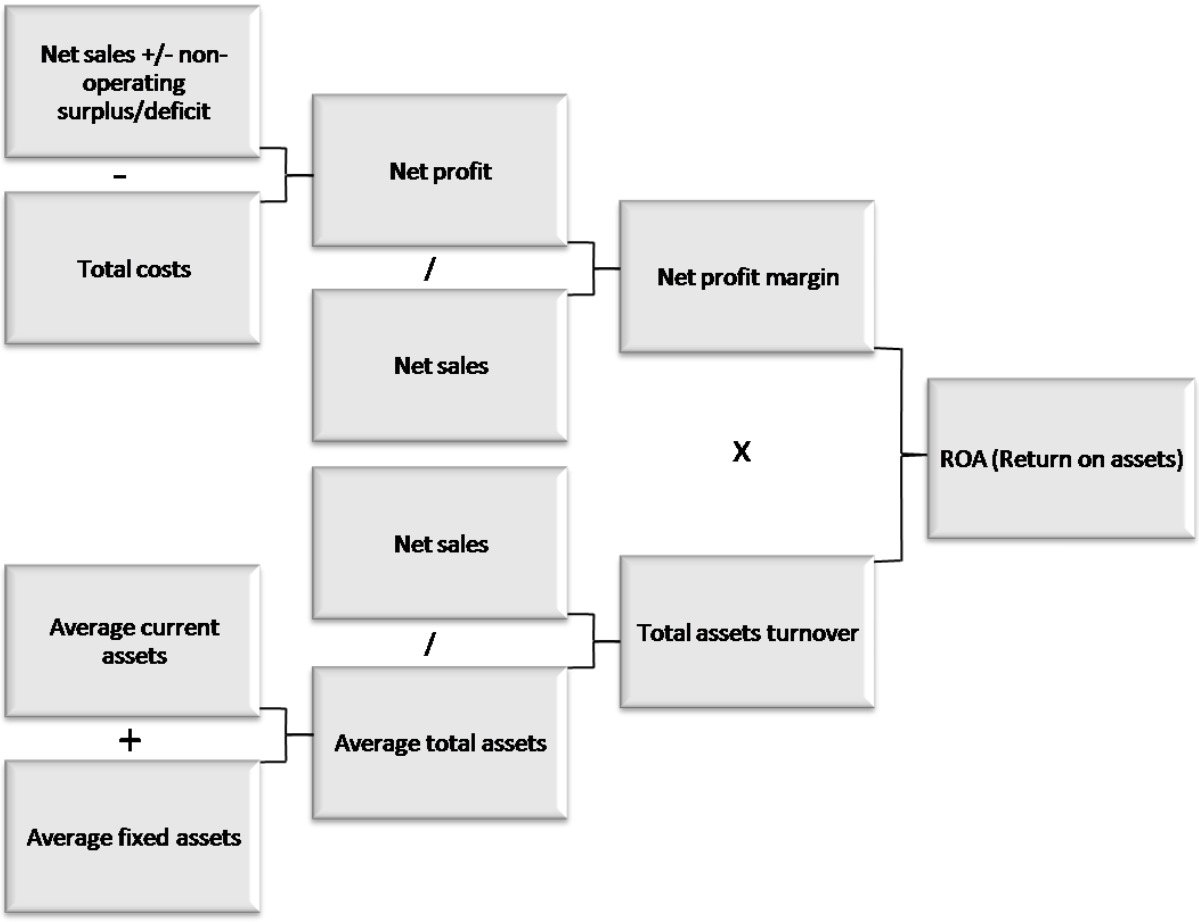


Figure 2 - DuPont-model

The respondents participating in the study were able to estimate cost savings that increased supply chain visibility would generate. The estimations are based upon earlier cases and experiences of the respondents. The estimations are the base of the cost saving calculations made with the DuPont-model. The estimations and the DuPont-model together with the annual report thereafter generate the new return on assets (ROA).

The cost saving calculations has been carefully calculated under direction by the thesis supervisor. An iterative process with the participating companies has also been very important to create validity to the calculations (Yin K. Robert, 2003). It is also important to notice that no investment costs are applied to the calculations.

3. Theoretical background

This chapter briefly describes the basics of supply chain management. It describes how the concept has developed and the importance of supply chain management in a contemporary corporation. The chapter provides a theoretical context for the following chapters, which are more focused on the studied topic. Supply chain visibility will be further elaborated upon in the following chapter. However the supply chain imperative which is described in this chapter is the driving force of development and research in different supply chain areas.

3.1 The supply chain concept

As mentioned in the background the need for an effective management of the supply chain has become a highly important point on corporation´s agenda. The grounds for the rising interest of supply chain management in the past decades are due to a multitude of changes in the business context, such as globalization, understanding and technological innovation (Van Wheele R. 2005, p. 5).

Traditionally supply chains have been regarded as fragmented where each entity in the chain act on its own. The fragmented view of the supply chain resulted in a slow flow of material and products downstream, and a similar movement of data back upstream. The lack of material and data torrent results in increased uncertainty in both supply and demand. In order to keep the desired service level to customers in an environment with great uncertainty the inventories and safety stocks must be increased. As a consequence carrying costs increase, lead times increase and difficulties to responding proactively to real-time changes which all together have decreased profits and weakened customer goodwill (Mason S. et al. 2003). However the understanding for how the supply chain affects all involved entities/corporations in the chain has been recognized for decades.

Porter early described the value chain network as a series of primary processes that add value to the output of firm; inbound logistics, sales and service operations and outbound logistics. Over time other researchers and writers have expanded the value chain network framework into the following three parallel flows.

Figure 3 – A value chain model

The three flows affect and influence each other. The product development determines the focus of the firm, which also defines or determines the customer and the potential relationships, thus affecting the customer relations. The relationships in its turn determine how products are distributed and how customer requirements are met, thus affecting the configuration of the supply chain. Vice versa the supply chain influences product development trough production capabilities, capacity and distribution. Furthermore the supply chain also conditions customer relations trough performance

and efficiency. However the understanding for the flows does not capture the true problem with the disconnected flow mentioned earlier. In the value chain network the supply chain was merely understood as a commodity chain or a distribution channel (Schary P. et al. 2002, p 23).

3.2 Supply chain management

The supply chain management concept emerged as a solution to the problems with duplication and responsiveness in the traditional commodity chain or distribution channel. The supply chain management concept clearly expresses the connection between the different entities in the supply chain. Cooper and Ellram (1993) define supply chain management as;

"An integrative approach to manage the total flow of a distribution channel from the supplier to the ultimate user"

In this definition the distribution channel includes suppliers, manufacturers, distributors and customers. It also implies a set of supporting links in transport, communication and other facilitators to connect the entities together. The product flow extends across both functional boundaries (production, inventory, transportation) and organizational boundaries (manufacturers, carriers, distributors and customers). However the product flow also crosses geographical boundaries to deal with global markets and global supply. Thus the supply chain is understood as a complex network with different actors and different flows between these actors. The major challenge in the supply chain and of the management of the supply chain is to manage the integration across all boundaries. The challenge is further complicated by the fact that all actors in the supply chain is different in terms of culture, management structure, economic characteristics, investment priorities and information systems (Schary P. et al. 2002)

In the latest decade the return flow has been acknowledged as a part of the supply chain management. The flow in not only from raw material to end user, but from raw material to end user and back to raw material again. The recycling process has become more and more important, Cooper et al. (1997) (secondary source) defines it as *"dirt to dirt"*. The insight that physical goods does not disappear after going out to customers and nor does the value incorporated in the products disappears triggers additional business transactions. Used products are sold in secondary markets, product upgrades and recycling are examples of such business transactions. The "new" flows goes upstream in the supply chain also called "reversed logistic", the return flows are growing in size when more and more products are recycled or reused (Schary P. et al. 2002). The existing literature compresses the complexity and conceptualizes the supply chain into three main flows, as shown in the figure below.

Figure 4 - The supply chain as described in the contemporary literature

In this thesis the SCOR model is leveraged as a tool to describe the supply chain and the different processes which it involves. The SCOR model is an industry standard designed by the Supply Chain Council. The model is represented in the figure below.

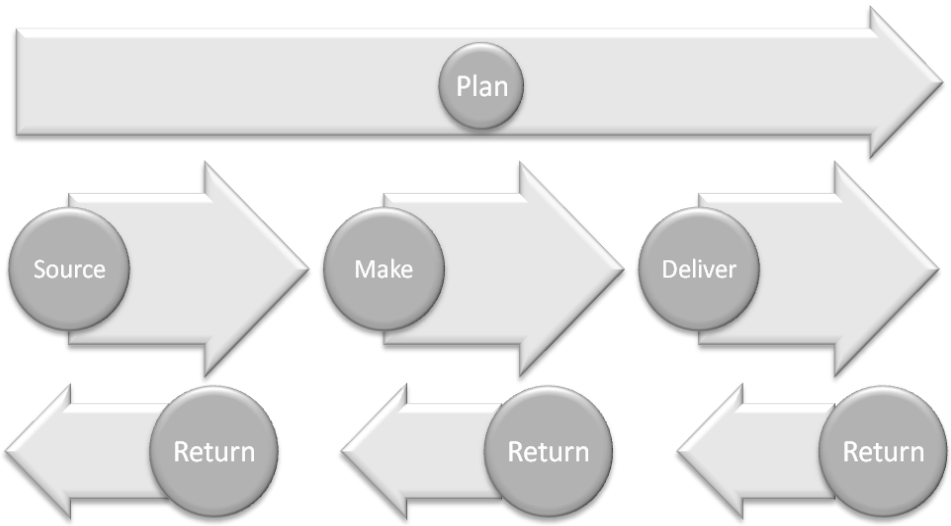


Figure 5 - The processes within each entity of the supply chain described by the SCOR-model

The SCOR model consists of five different processes. The plan process involves all planning that need to be undertaken in a supply chain, the plan process is disconnected from the other process and is a comprehensive process. The source model concerns the flow of material into the focal supply chain, this process consist of both supplier relations and logistics. The make process concerns the internal production or manufacturing, thus the make flow is internal logistics and internal flows. The deliver process concerns all the different actions in the distribution to the next node in the supply chain, thus it is external logistics, customer relations and other activities undertaken in the outgoing flow. The return flow is concerning both goods going back due to quality problems, wrong delivery, recycling etc. the return process also consists of the information feedback e.g. all information and material looped back to the previous node (www.supply-chain.org).

3.3 The imperative

The supply chain is, as described, a complex function which needs to be acknowledged by all actors participating in it. However, the paradigm change from viewing the supply chain as fragmented into understanding the supply chain in a more holistic manner is not the solution to the problem with long lead times and access inventory. In the contemporary business context new challenges has arise. Companies are more about buying and less about making today. The market is changing more rapidly and in-house production is rather inflexible. Thus the buying decision is strategic in a volatile environment, this is described by Gadde and Håkansson (1994). In a study concerning the amount of purchased goods in engineering industry conducted by Håkansson (1989) it was shown that components and systems purchased accounted for two-thirds of the total turnover. Thus, the importance of managing all transactions is obvious.

Business has entered the global era and are both selling and buying on a global market. Outsourcing and off-shoring has become well known strategies within supply chain management (moving production or sourcing from other countries). The reasons to use off-shoring are diverse and stretch from cut costs to get the benefit of cutting edge technology. The common denominator with outsourcing is the added complexity of managing a multitude of flows and relationships (Albert G. et al. 2004).

All together the supply chain is becoming increasingly uncertain. The coordination of multiple and diverse supply sources enhance the uncertainty of the supply chain. The extended transactions between the members in the supply chain enhance the uncertainty. In order to cope with the uncertainty without increasing the inventories and safety stock the management of the supply chain is crucial. This is the supply chain management imperative (Schary P. et al. 2002, p. 181-185).

Countless of different supply chain strategies have developed over time to cope with the increased complexity in which the companies are acting, and new strategies and tools are developing constantly. These strategies involve reducing uncertainty by integrating suppliers e.g. developing the relationships and collaboration with selected suppliers, and cutting the total supplier base. Supply chain management also involves the use of information in order to reduce uncertainty. Information helps identifying potential supply and demand, potential issues, track products and gain transparency in the supply chain. Supply chain management is the remedy to inflexibility, inventory costs and long lead times (Schary P. et al. 2002, p. 185; Handfield R. et al. 2005, p. 24-25).

4. Conceptual framework

Since supply chain visibility is an ill defined term the literature review starts with a table of research articles concerning supply chain visibility. The article table provides a full review on the areas of research covered concerning supply chain visibility. In the extended literature review various sources are presented which relates to the topic, this in order to provide a holistic review which cover the entire topic. The presented literature is used as a foundation for the construction of the research model which is presented in the following chapter.

4.1 Literature review

The notion of supply chain visibility stretches over a number of different areas within supply chain management. The concept is interlinked with a number of different concepts which is described in the latest research. Supply chain visibility is nearly a synonym to buzz words such as event management, management by exception or logistic control tower. Thus these concepts need to be regarded as a part of the supply chain visibility notion.

To grasp the concept of supply chain visibility a careful review of the research articles concerning the topic is presented in this chapter. It is found that the research articles concerning supply chain visibility can be divided into three general areas; technology for sharing information, information criteria and the benefits of sharing information.

Enablers of information sharing: Articles in this area is focused on enablers of information sharing stretching from information technology solutions and relational matters which allows information sharing across different inter-organizational linkages. This is further elaborated in chapter 4.2.

From information to visibility: Articles in this area is focused on how information sharing in elevated to visibility e.g. by only sharing relevant information. This is further elaborated in chapter 4.3.

Visibility and performance: Articles in this area is focused on how information sharing (extended to visibility) affect performance of the different nodes in the supply chain. This is further elaborated in chapter 4.4.

Enablers of Information Sharing				
Author	**Year**	**Focus**	**Research**	**Conclusion**
Bailey and Pearson 1983	1983	How to establish satisfaction and information transparency in the era of computers	Interdisciplinary approach in order to develop a measurement tool	A definition of computer user satisfaction and a valid approach for measuring satisfaction.
C. Garita, Hamideh Afsarmanech and L.O Hertzberger	2000	The need for different levels of visibility in information systems (IT). Different nodes (actors) need different information. The focus are, how great the need of different visibility levels are, and how this can be achieved.	Case study based research. Studying the development of an information system	The key conclusion is regarding the data visibility, which means that the level of visibility (information access) must be determined on a node level with respect for the information needed in other nodes. The whole article mainly regards how to share data within the system rather than to tackle the question of which data.
Alexis Barlow, Feng Li	2004	How internet related technology can be a tool to share information in inter-organizational linkages.	Case study based research on four different actors, how they use technology and what information they share.	The researchers identify the importance of handling different relationships in different ways and that strategic relationships should be paid more attention when designing IRT. Visibility is identified as information that has been streamlined by members of the network and technology to fit each linkage perfectly (right information in the right way).
Elini Mangina, Ilias P. Vlachos	2004	This article analyze how agent technology can provide improvement (structure, flexibility, transaction harmonization and simplicity) in the supply chain and the information flow in the supply chain.	A review of existing literature and a model to support the hypothesis	Agent technology can be used to create effective supply chains. Visibility is understood as the right information at the right place at the right time. As a consequence, the success of any technology improvements depends on its ability to deliver visibility into the system.
Scott J Mason et al.	2003	To examine the cost benefits of a fully integrated system for warehousing and transportation	The empirical material is gathered from a discrete event simulation tool (data simulation of reality).	Real time information does not provide visibility. Visibility is provided by the right information at the right time. An integrated system can provide global inventory visibility. The benefits are, less excess inventory, shorter lead times and increased accuracy.

Fosso Wamba, S., et al.	2007	To investigate the potential of RFID and the EPC network in the supply chain. Furthermore, it also elaborates on the implementation and usage of RFID and EPC network.	Case studies based on several inter-related firms in a supply chain. The study is based on interviews and focus groups.	Confirm great opportunities with the technology. Most improvements lie in the reduction of information handling for employees and in improved efficiency in certain business processes. Main thresholds are that firms need to move from focal firm focus toward network collaboration in order to reap the benefits of the technology. In the conclusion, it is also acknowledged that the potential savings of implementation of RFID is substantial.
From Information to Visibility				
Author	**Year**	**Focus**	**Research**	**Conclusion**
J. Grffiths, D. Margetts	2000	This article concerns, the inbound logistics and production of a manufacturer and how internal decisions affect the supply chain.	Hypothesis which are explored and supported by case study research.	Visibility is understood being achieved by exchange of information. The conclusion is that demand information is of utterly importance to support the supply chain. By sharing demand changes the supply chain is operating more efficiently.
Mark Barratt and Adegoke Oke	2007	The research focus, on finding the pillars of supply chain visibility. How visibility can be achieved and give a sustainable competitive advantage. This study regards the link between information and visibility rather than the link between information and performance.	The empirical material is gathered from interviews and studies of five different external supply chain linkages. The visibility is measured from a resource based perspective in order to identify how visibility provides a sustainable competitive advantage.	Information sharing does not provide visibility. Visibility can be provided by both technological and non-technological resources employed in the supply chain. The need of visibility is dependent on the strategic importance of the inter-linkage. Informal procedures and behavior are crucial to achieve distinctive visibility. Trust and commitment are needed to support the deployment of the resources needed to provide visibility.
Jakki J. Mohr, Ravipreet S. Sohi	1995	The development and testing of a model to measure communication value and distinguish relevant communication from the buzz.	The research is based on a literature study. Based on the literature study a model, which measure the value of information, is developed. A survey study is used in order to validate the model.	Information sharing within a relationship is significantly related to the communication flow within that relationship. The bilateral expectations of information exchange created by the norms, concerning information sharing, help foster an atmosphere conducive to an open communication.

Edward G. Anderson Jr, Douglas J. Morrice and Gary Lundeen	2005	The article examines the bullwhip effect in service supply chains and examines if sharing customer demand will be helpful to reduce backlog variations.	Modeling of the supply chain with variable backlogs instead of make-to-stock and lead time reduction.	Visibility is different levels of information (sharing demand information). By sharing end user demand, the variance in demand can be reduced, thus mitigating the bullwhip effect. However, the information shared needs to be adapted to each node. The bulk of the backlog information (end user demand information) needs to be at the stage closest to the user. The information shared to other nodes needs to be the proper information needed for them in order for the other nodes to act on the information.
Visibility and Performance				
Author	**Year**	**Focus**	**Research**	**Conclusion**
F.T.S. Chan	2003	How the supply chain can improve the efficiency and effectiveness of not only product transfer, but also information sharing between all tiers of a complex hierarchy. This article mainly aims at giving different performance measures for supply chains.	A literature study in combination with a case study which verifies the presented model.	Visibility is a measure of performance. Visibility is measured by time and accuracy, visibility is to transfer information or access to information.
Christopher S. Tang	2005	A classification of supply chain risk management articles.	Literature study reviews different quantity models.	Visibility is understood as the information shown across the linkages of the supply chain. It is argued that visibility can reduce risk in the supply chain. The main areas for creating better visibility is understood to be greater collaboration by coordination of forecasts and planning, CPFR, and with support of technology such as RFID.
D. Berry, M.M. Naim	1996	To develop a framework for analysis and design of supply chains, concerning the material flow and the information flow.	Modeling and simulation of various redesign approaches.	The focus of this article is that most supply chains have simply evolved and not been designed to perform excellence. Each entity regards the next entity as their customers rather than acknowledging the end customer. By redesigning them, the supply chains will become more efficient.

James R. Luedtke and Chelsea C. White	2004	The study of how asset visibility actually affects the efficiency in a common supply chain.	The empirical material is gathered through numerical modeling.	There is no significant evidence that asset visibility has a positive impact on common supply chains. The result is questionable due to the limitations of the modeling.
Riikka Kaipia, Helena Hartiala	2006	How companies can benefit from incremental visibility in a situation when market changes are rapid. The demand chain is then fragmented, which forces manufacturing and upstream suppliers to face ever harder requirements.	The research is based on a case study of a case from the electronic products industry. The current state of visibility of an original equipment manufacturer operating in a fast-changing consumer product market is investigated.	The conclusions can be summarized in three points: 1. Full plans (demand, production etc.) should be gathered on the most aggregate level and deteriorate towards the upstream of the supply chain. Such approach allows efficient information sharing, thus creating visibility. 2. The visibility in the demand supply network is affected by changes in customer demand and internal decisions. 3. Visibility could be improved by raising the quality of demand plans. Main points are the importance of collaboration and accurate forecast planning to support visibility.

4.2 Information sharing and performance in supply chains

Efficient supply chain management is crucial for streamlining the flows and transactions between the different actors in a value network. Ultimately, supply chain management is also crucial to the success of the company and its supply chain partners. There is a strong connection between information and performance in the supply chain. Performance, in this case, meaning short lead times, no excess inventory, no bullwhip effect and similar achievements. The knowledge of how information is connected to performance is well documented by researchers in both articles and in common supply chain literature (Barratt et al. 2007).

According to contemporary supply chain literature, a multitude of information needs to be shared both upstream and downstream in the supply chain to provide information visibility into the network. Examples of what information should be shared upstream are forecasts, changes in production schedules and performance measures. Types of information which should also be shared upstream are lead times, capacity levels, order status and inventory levels.

The benefits of sharing information across the supply chain are reduced lead times, improved constraint management, better decision making, lower costs and increased profits. The benefits of a properly implemented information system are also that it breaks organizational barriers, builds visibility in the supply chain, encourages collaboration and reduces opportunity and problem solving latency. All together, the benefits of information sharing and information systems seem endless (Handfield R. et al. 2005, p. 616).

The benefits of information sharing are the most documented research in the field of visibility. Several articles focus on exploring the value of sharing only one set of data e.g. demand or point of sales (POS). A lot of attention is also given to how to of measure performance as well as the value of it. The performance is based on general improvements, such as reduced inventory, shorter lead times and increased accuracy (Chan F.T.S. 2005; Tang C. 2005; Berry D. et al. 1996; Luedtke J. et al. 2004; Hartiala H. et al. 2006). Sharing demand information and production schedule information are argued to be an effective way to reduce the effect of internal decisions and changes. This type of visibility is a well documented remedy in order to mitigate the bullwhip effect. However, in order to support the performance, only the required information should be shared with each node, and the bulk of demand information should remain at the point closest to the market (Anderson et al. 2005; Griffiths J. & Margetts D. 2000; Berry D. & Naim M.M. 1996). Information exchange is crucial to improve performance, however, it is also understood that increased information exchange is not equivalent with improved performance.

Generally, the above review of the contemporary research shows the well documented and studied correlation between information sharing and performance. However, these studies have been focused on information sharing rather than providing visibility. We argue that visibility is an outcome of information sharing when conducted in the right manner. As well the studies do not provide applicable general examples on how the information sharing can be increased and elevated into visibility in each node of the supply chain.

4.3 Information sharing and visibility

Research argues that not all information provides visibility (Barratt M. & Oke A. 2007). In order for information to provide value to the members in the value chain, the information needs to be timely, of the right quality, in a readily usable format, accurate and trusted (Barratt M. & Oke A. 2007; Cutler B.D. et al. 2002). It is unimportant whether the information is shared by technology or not. It is of more importance that trust and commitment are given to the shared information, and the information exchanging parties. The organizations which share the information must understand the need of informal procedures and behavior which is crucial to build trust and commitment to the inter-linkage. It is also argued that this is of greater importance in those inter-linkages which are of strategic importance. Visibility is achieved by sharing the right level of information with the right nodes. Thus, visibility can be achieved with small resources and small amounts of information sharing in some linkages, while others need greater resources and a large amount of information sharing in order to achieve visibility (Barratt M. & Oke A. 2007).

Barlow et al. argues that information needs to be accessible from different nodes in the supply chain in order to provide visibility, as described by figure 4.

Figure 6 - Directed information flows between different nodes in the supply chain.

Enabling access to information by directly to different nodes in the supply chain allow business critical information to be shared across the supply chain without delays. This information sharing will not be asymmetric due to limitations in the information sharing, thus enabling visibility in all nodes in the value network (Barlow A. & Li F. 2004). Garita et al. (2000) supports the conclusions of sharing information across the nodes. Garita et al. (2000) also argue that the level of visibility e.g. what kind of information that need to be accessible at each node, should be decided on node level. Therefore, information needs to be shared asymmetrically to different nodes in the supply chain; however, the level of visibility need to be decided based on the need and the trust of each node (Afsarmanesh H. & Garita C. 2000).

According to Barlow et al., it is not enough to share information across different nodes in the supply chain in order to obtain full visibility. The information need to be shared in a direct manner across the inter-firm linkage in order to support full visibility. Each node in the supply chain should not have a key person who controls the information sharing, rather, the information should be shared between the different functions of the nodes. Figure 6 further elaborates on the reasoning of having information sharing in a function to function way.

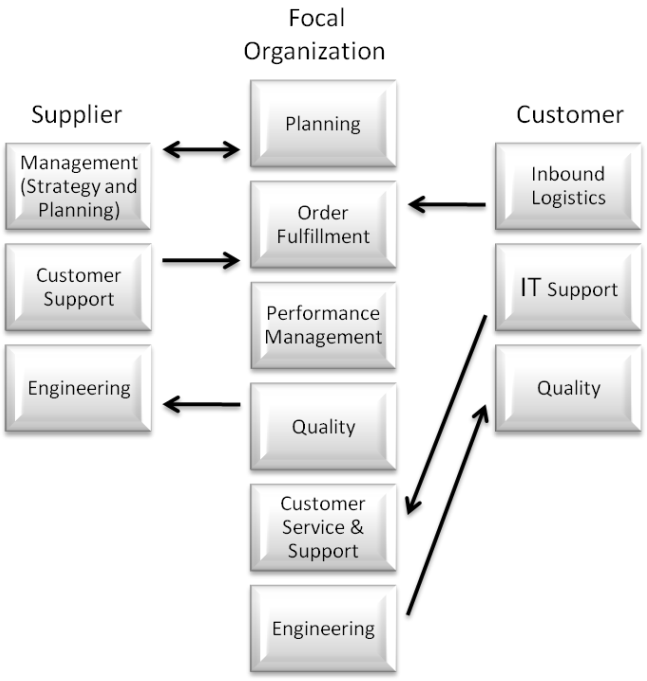


Figure 7 - Information flow directly between concerend functions within nodes in the supply chain.

Figure 6 clearly shows that information needs to be shared in a straight manner across the nodes to obtain supply chain visibility as argued by Barlow and Li (2004). In order to allow the sharing of information across the different nodes and directly between different functions in the nodes it is crucial to integrate inter-organizational processes. Such integration allows the information shared to become understandable and to be shared in a readily usable format across the concerned nodes (Fosso Wamba S. et al. 2007).

To allow visibility, the organization must support the information sharing and collaboration among different nodes in the supply chain. It is important that strategies are changed from firm-oriented to network-oriented, allowing every member of the company to understand the importance of information sharing and collaboration (Berry D. & Naim M.M. 1996; Fosso Wamba S. et al. 2007). The strategy sets the tone for the company and the entire supply chain. From the strategy, different tactical and operational activities can be performed to further enhance the visibility continuum (Fosso Wamba S. et al. 2007).

Generally, the above review highlights the need of having an exchange of high quality information and trust between the communicating organizations to obtain visibility. It is also argued that information should be shared between different nodes in the supply chain regardless of their position in order to support full visibility. However, it is also underlined that not all nodes need access to the same information. To ensure visibility, the information which provides value to the other nodes should be shared, rather than all information which only provides an ill defined blur to the other nodes.

4.4 Enablers of information sharing in supply chains

A survey conducted by the Aberdeen group reveals that close to 60 percent of all companies try to overcome outsourcing challenges by improving communication and collaboration. Furthermore, technology solutions are the main means in the pursuit of better communication and collaboration (Bharadwaj S., internet source, 2006). Thus, the main enablers of information sharing are communication, collaboration and technology. There have been multiple industry initiatives on information sharing, such as quick response, efficient consumer response, sharing point-of-sale data (POS), vendor managed inventory (VMI), Collaborative planning forecast and replenishment (CPFR). This is a token of the focus of information sharing as a generic cure for supply chain issues (Barratt M. & Oke A. 2007).

In addition to the different information sharing initiatives, there are a multitude of technology applications to support information sharing and visibility in the supply chain. This has been a predominant theme in the supply chain literature, with electronic data interchange (EDI) as an example (Barratt M. & Oke A. 2007). Other systems which represent the technology enablers of information sharing are examples such as MRP and ERP, which are used both for internal information, and to some extent, for external information. MRP systems keep track on inventory and scheduling. ERP are more holistic and, therefore, integrate disparate information systems into a single system. This is to keep better track on information and support decision making. To allow inter-organizational communication and information flow technologies such as EDI (electronic data interchange), XML and ebXML are used (Handfield R, Monczka R & Trent R. 2005). Spiders or web services are a growing technology used to share information with external partners or vendors. These technologies allow companies to share information without being directly connected or having the same software (Deitel, DuWaldt & Trees 2003).

Even though the information is an enabler of information sharing, it is argued that implementation of information technologies must be preceded by collaboration, commitment and communication between the trading partners. A successful implementation of information technology rests upon the solidity of the relationship between the trading partners (Barratt M. & Oke A. 2007). Therefore, the relationship between trading partners needs to be in focus in order to provide visibility into the supply chain.

There is extensive literature concerning the relationships among trading partners within a value network. The buyer-supplier relationship and its impact on performance is a widely explored research area. The proliferation of alliance relationship among firms competing in the same industry, members in marketing channels, firms in international joint ventures, as well as buyers and sellers in industrial markets, have all suggested that cooperation can be a strategic tool for achieving competitiveness. The alliance or exchange relationships, however, depict a complex form of interactions and relational outcomes among the organizations concerned. Fung P. (1999) argues that relationships do not exist in a context free vacuum. The relationship must be broken down into fractions or components, together the components sum up to the entire relationship. The components of a relationship can be understood from its structural part as well as the cultural part. The structural part can be fractionized into different inter-firm structure attributes which the relationship consists of, such as the connectedness and the relationship involvement. The cultural part is defined by the norms which have developed in the relationship (Fung P. 1999). The

relationship and its character are decisive factors for deciding which information to share. A strategic relationship with good relational performance allows more information exchange than a strategic relationship with poor relational performance. In an arms-length relationship the information exchange will be accordingly what is appropriate and required. Thus, the relational development and the relational performance allow different levels of information exchange (Cox A. 1996; see Wang W. 2004 p. 23).

Generally, the above review highlights that despite the need and use of technology to allow visibility, there is a growing recognition what technology in itself is not sufficient to provide visibility. The technology ignores the relational factors such as corporate culture and people related issues with information sharing. The relational view acknowledges the greater perspective of information sharing, thus, providing a holistic approach to information sharing in the pursuit of visibility.

5. Supply chain visibility conceptualization

This chapter is an extension of the notion of supply chain visibility. The different areas which are identified as antecedents to visibility are used to build the conceptualization. The conceptualization is used as a research model in the empirical study.

The research made on supply chain visibility concludes that information, technology and relationships are the three pillars of visibility. However, the articles also point towards a new paradigm where IT is unimportant, since it will provide no threshold in the future IT is no longer a competitive advantage (Barlow A. Li F. 2004). Furthermore, research holds that the implementation of an IT system has in the past depended on a strong relationship preceding the implementation. Thus, IT is not of significant importance to visibility even though IT is crucial as a carrier of information (Handfield R. Monczka R. & Trent R. 2005). The two most important antecedents of supply chain visibility ought to be relationship and information; IT is merely the tool for communication.

Information is based on the antecedents described by Barrat M. and Oke A. (2007), which are, trust, accuracy, timeliness, quality and that it comes in a readily usable format. Relationship, on the other hand, can be described from the article by Fung, where the relationship is based on the inter-firm structure and the norms which have developed within the relationship. This provides a manageable framework for evaluating supply chain visibility. The research model can now be represented by figure 7.

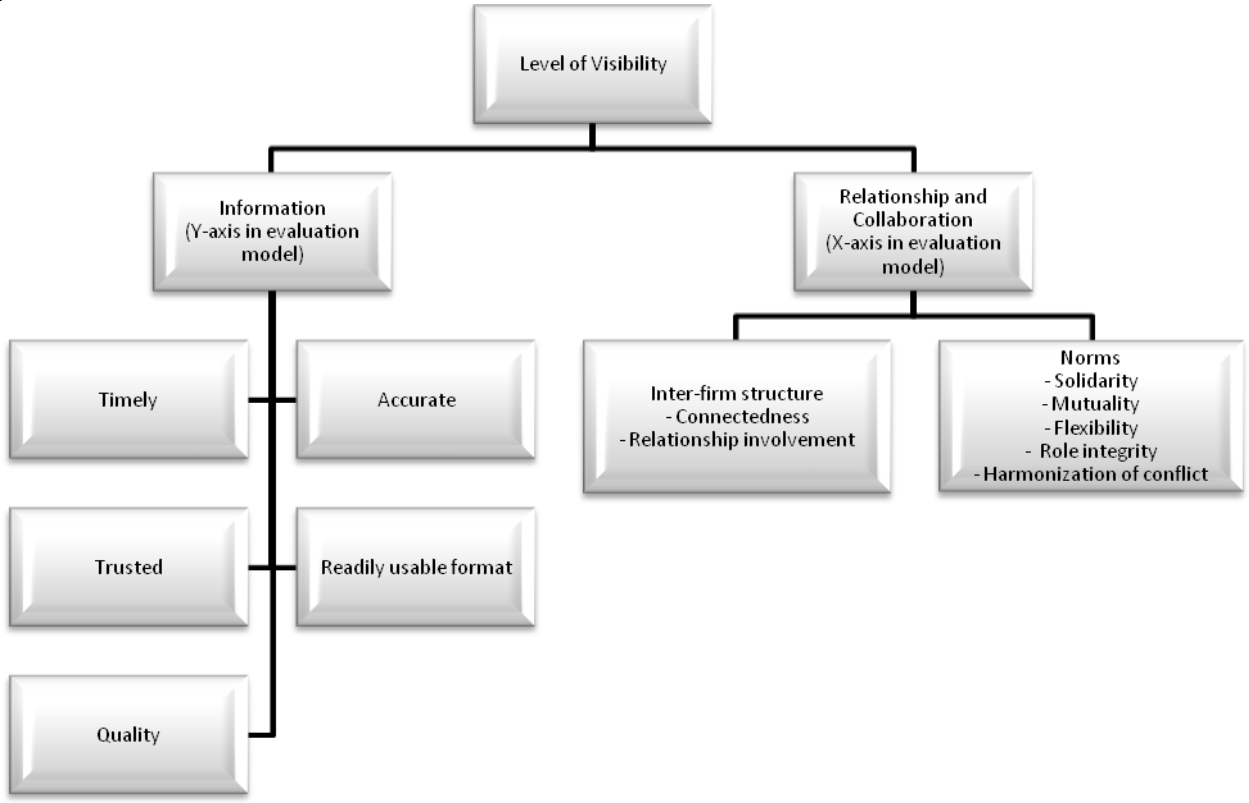


Figure 8 - The research model: Conceptualization of supply chain visibility.

The inter-firm structure is defined by the attributes used by Fung P. (1999):

- **Evaluate the economic consequences of relationships;** A business relationship is based on the potential economic outcome of the relationship. Therefore, the economic consequence of each relationship ought to be understood in order to evaluate the importance of the relationship.

- **There is a need for relationship variety;** All relationships are different, thus, there is a need to handle relationships differently. Acknowledging the differences between relationships is a key to handle the relationships in an appropriate way.

- **Avoiding over- and under-involvement in relationships;** With support in the two earlier bullet points, each relationship needs to be balanced between the strategic importance and the economical consequence which might be the outcome of the relationship. To keep the relationship efficient, each relationship needs the right degree of involvement. Over involvement means wasting resources, under involvement can cause bad performance and loss of important knowledge, business or efficiency.

The inter-firm structure can be defined and measured by the concrete attributes described in the table below.

Connectedness - "How different nodes in the value network connect in terms of systems"	Relationship involvement – "The degree of involvement in a relationship ought to be equal to the benefits of the relationship"
• Determining appropriate interfaces with suppliers • Interdependences should not be avoided, but must be handled • Partnerships require an interested supplier	• Determining appropriate interfaces with suppliers • Interdependences should not be avoided, but must be handled • Partnerships require an interested supplier

Table 3 – Inter-firm structure

The inter-firm structure is basically mapped out by the relational aspect and the communicational aspects of the relation.

The culture which characterizes the relationship is defined by the norms which have developed between the parties involved; the norms are structured by the attributes described in the table as follows:

Solidarity – "To what degree common interests and responsibilities are the foundation of unity"	•Preserve a good relationship •Act together to find solutions to problems
Mutuality – "To understand the needs of the counterpart"	•Base the relationship on mutual trust •Find and work towards mutual benefits in the long run
Flexibility – "The bilateral expectation that exchange terms might change due to modifications, legislation, demand or any unforeseen reason"	•Cooperate when forecast fails •Flexibility in performance •Flexibility in terms
Role integrity – "The mutual understanding for the complexity of the exchange and the roles played in the exchange and how it extends beyond the transaction"	•Acknowledge the broader issues during negotiation •Share information about market and products •Take the longer perspective and plans into the relationship
Harmonization of conflicts – "Solve conflicts in a positive manner, find mutual beneficial solutions"	•Do not turn to legislation in order to solve conflict

Table 4 – Culture and norms

This summarizes the relation and collaboration parts of supply chain visibility. The second element in supply chain visibility is information. The five informational attributes are described in the table below:

Timely - "The shared information must be accessible at the desired time"	•Desired time might in some cases mean the real-time and in others daily, weekly or perhaps even monthly
Accurate - "The shared information must be exact, valid and unquestionable so there is no doubt about the usage"	•Depending on factors such as background, knowledge and education, information is interpreted differently
Trusted - "The shared information must be exact, valid and unquestionable so there is no doubt about the usage"	•If information (or a source) has proven not to be valid, it is likely to be diregarded in the future
Readily usable format - "The shared information must be received in a format that is readable and understood by all parts"	•This includes IT-systems, languages etc.
Quality - "The shared information must contain qualitative information that is usable for the receiving part"	•If the information does not hold any interest to the receiving part, it is likely to be regardad as being of "low" quality

Table 5 – Informational attributes

This conceptualization of supply chain visibility provides a holistic approach to how visibility is achieved. The conceptualization framework provides a general model which is applicable across different industries, different geographical areas and different companies. Different key attributes are identified and defined as antecedents of visibility in the conceptualization. The attributes allow visibility to become quantifiable, thus, the conceptualization makes supply chain visibility measurable. The conceptualization is the foundation in the empirical study. The evaluation model used is based on the conceptualization and is presented in the appendix.

6. Result of empirical study

This chapter summarizes the results of the empirical study. This chapter includes a section summarizing all the respondent companies' level of visibility and analysis concerning the clear cluster segmentation. Following this, the next section handles the economic impact of visibility in relation to the earlier described level of visibility. After that, the next section summarizes and analyzes the companies and each level of the SCOR-model from a deeper perspective. The final section presents each company individually and in detail, both from the level of visibility, as well as from the economic standpoint.

6.1 The summarized level of visibility

This section will present a summary of all respondent companies. The following diagram exposes all the respondents' level of visibility. One thing which is imperative to understand is that the companies not are compared to each other, but rather evaluated after their level of visibility. The level of visibility is calculated from the earlier created evaluation model.

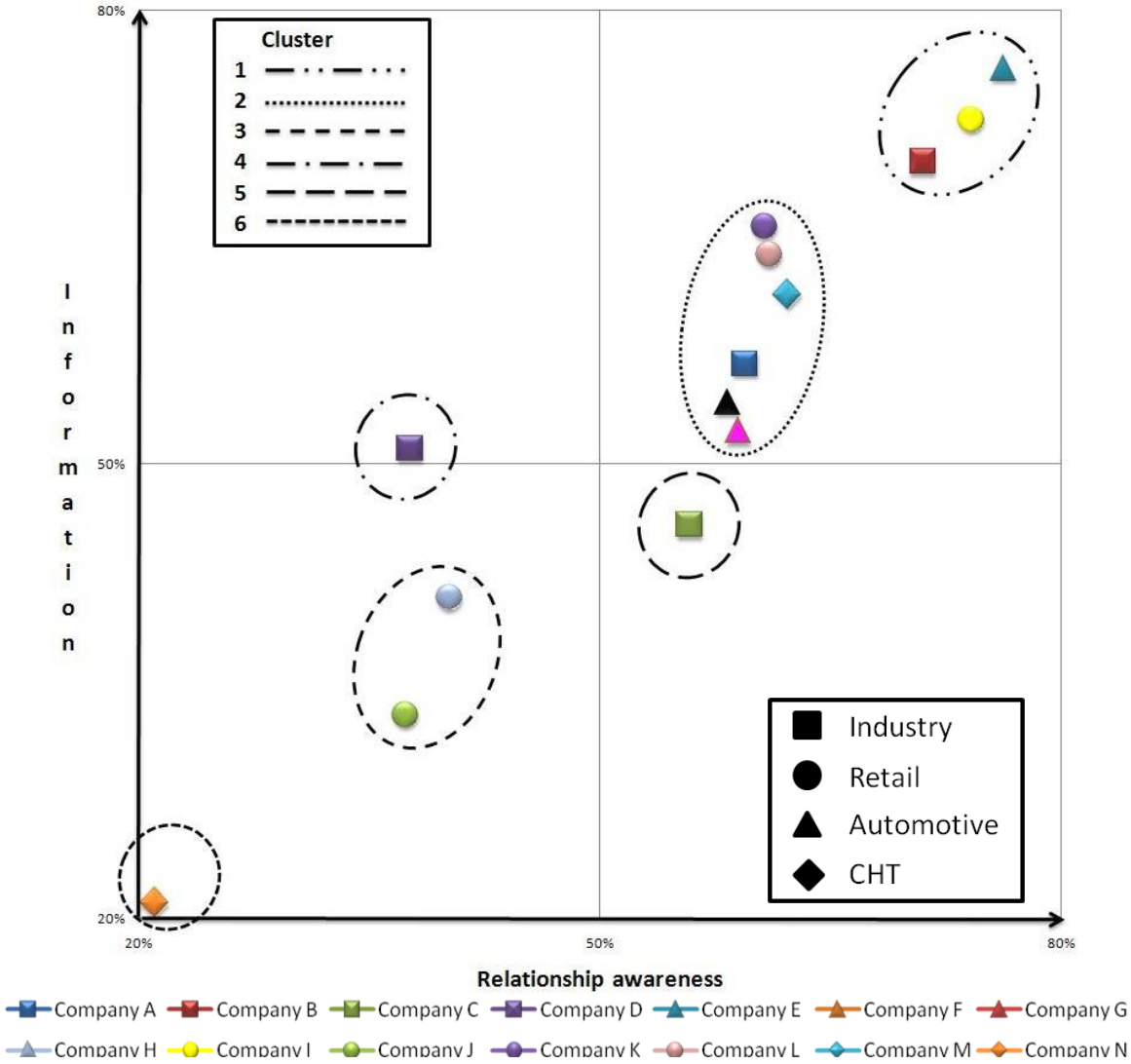


Figure 9 – Summarized level of visibility

The evaluation model is based upon earlier conceptualization of supply chain visibility. The axis of the diagram therefore exist of those two parameters videlicet information and relationship awareness. A deeper understanding of why each respondent receives a certain level of visibility will be established when studying each individual company either later in this chapter, or in the appendix.

When evaluating the companies the diagram shows a great spread of supply chain visibility which allows five clear clusters to be defined. All clusters exist of different attributes that separates them from each other. The clusters and their specific attributes are explained in detail below.

There is a need to acknowledge the differences between the companies, the markets they act in and the business models they use, since all these factors affect the evaluation of supply chain visibility. In order to further elaborate on the differences created by supply chain visibility, the following penetrates each SCOR-process of the companies, thus, analyzing the differences in each process.

6.1.1 Cluster 1

The first cluster represents the advanced supply chain visibility. Typically, in this cluster, companies have clear communication strategies and controlled processes for information sharing. To support the processes, these companies use various systems to allow timely and exact information sharing across different nodes of the supply network. Typical systems and processes used are:

- Use VMI, VMR or other processes for streamlining demand and work collaborative.
- Companies who have supplier portals or systems for direct communication with suppliers, the companies in this cluster have developed specific systems in order to take control over information sharing.
- Service functions which take control over transportation and events, which then share the information with the affected nodes e.g. logistic control tower.
- Extensive sharing of plans, demand and future plans (upstream and downstream).
- Sharing of events taking place at suppliers' production, suppliers sourcing, focal production and transportation.
- Strong relationships with customers to predict demand and collaborate with planning and forecasting.
- Information is shared both among nodes in the supply chain, and also across affected functions within the focal organization (the production will be notified if there is a problem with sourcing or if planning need to be changed in compliance with demand).

6.1.2 Cluster 2

The second cluster represents the companies with common visibility. Typically, in this cluster, there is a desire to work like the companies who have advanced supply chain visibility, however, the processes and systems do not fully support the visibility across nodes and functions. Systems and processes which represent this cluster are:

- Use VMI, VMR or other processes, however, not as extensive or as effective as the advanced companies.
- Systems for communication with suppliers are less advanced, thus, not supporting direct communication to the same extent as the advanced companies.

- Plans, demand and future plans are shared. However, this information is not easily understandable and usable for the suppliers. The information sharing is less structured than the companies with advanced visibility.
- The relationship with suppliers is not expounded enough to allow effective collaboration with forecasts and plans.
- Information sharing between functions in the focal organization is limited, thus, the production might not be aware of a sourcing problem or a change in demand. Altogether, this makes it difficult to work in a proactive manner.

6.1.3 Cluster 3

The third cluster represents the companies with basic supply chain visibility. These companies are somewhat underdeveloped compared to the other members of the study. Typically, for the companies in the third cluster, the supply chain is fragmented and the information between customers, focal organization and suppliers is based on orders and deliveries, rather than an integrated information approach. Therefore, companies in the third cluster might be using advanced systems for ordering and invoicing etc., however, the information sharing is limited to these basic activities. Systems and processes which represent this cluster are:

- Manual ordering although transferred by systems.
- Limited sharing of plans, demand and forecasts with suppliers.
- Limited sharing of POS data with suppliers or poor tracking of POS data.
- Unstructured communication processes both upstream and downstream.
- Limited systems to support different information sharing processes.

6.1.4 Cluster 4, 5 & 6

The last three clusters consist of just one company each and are, therefore, rather exceptions than clusters. These clusters are, therefore, hard to see any specific trends within, compared to the previous three.

The fourth “cluster” shares information both upstream and downstream, however, the information is shared either in an ad hoc manner, or hard to interpreter to the suppliers. The company frequently changes suppliers, therefore, not developing any strategic value or benefits in the relationships.

The fifth “cluster” shares information with suppliers both through systems and through face-to-face meetings. However, the information is shared mainly through emails, thus making it rather unreliable and open to interpretations. Furthermore, information concerning events which occur in between order and delivery is not shared among the nodes of the supply network. There is also a lack of connection with the end consumer to track demand and to allow extensive information extraction from the market.

The sixth “cluster” lacks the organizational structure on which visibility is build. There are no clear processes for how to handle the logistical flows. Each entity within the organization handle ordering, warehousing etc. in different ways. Thus, there is no consensus within the organization which allows extended cooperation neither within the focal organization nor with external nodes.

6.2 Economic impact of increased visibility

This section will summarize the economic impact of increased visibility. The diagram illustrated beneath is the same as in the earlier section, although this one includes economic calculations. The calculations are based on the estimations of the respondents. The estimations are described more explicitly at the end of each company description. This section explains the growing economic impact of visibility as the level of visibility decreases.

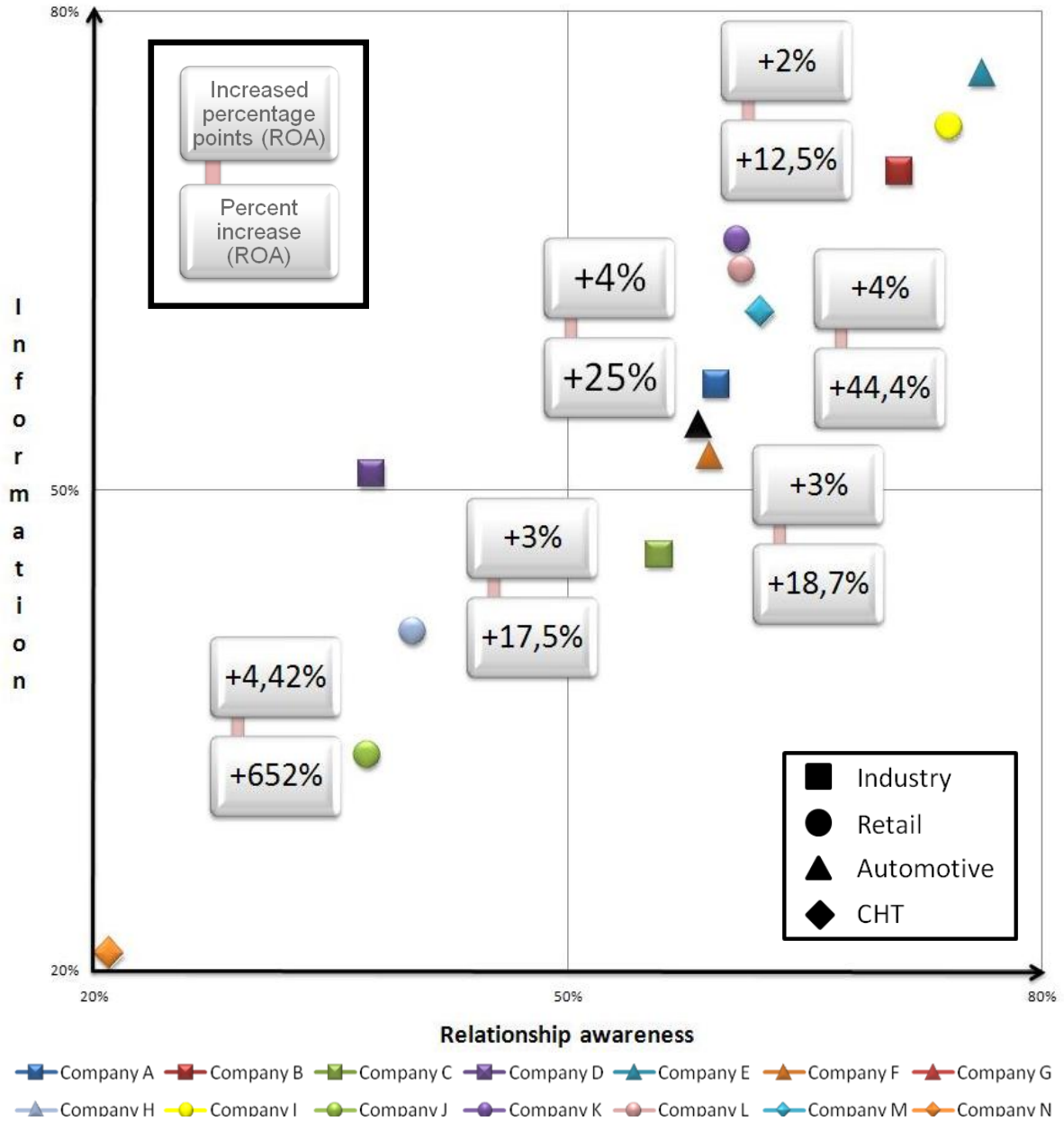


Figure 10 – Level of visibility vs. estimated cost saving

The diagram above shows the economic results of the estimations the respondent made during the interviews. These are estimations, but important to remember is that they are estimations made by experienced top managers. The uppermost percentage shows the increased profitability calculated in

the DuPont-diagrams. The bottommost percentage show the percent increase difference calculated from the estimations.

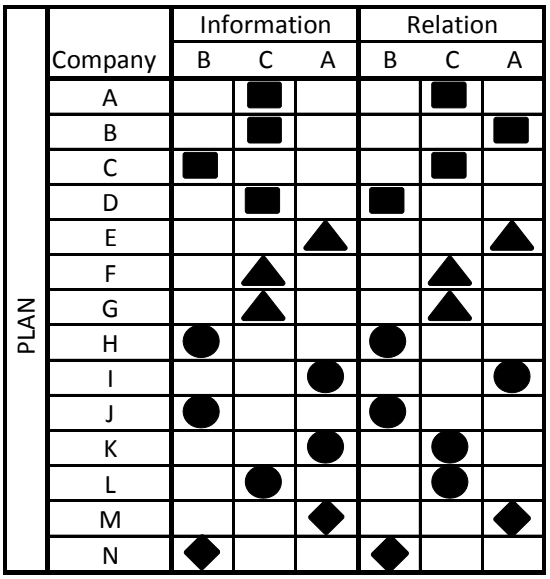
Not all respondents have been able to, or interested in estimating what economic impact increased supply chain visibility can have. The once able to estimate cost savings did estimate them upon developed business cases or experiences. Visible in the diagram above is that the economic estimations made are grouping themselves after level of visibility. The diagram above is in fact showing that the higher visibility, the less economic improvements.

An example of this is that company B, in the top estimates future cost savings, aim to increase profitability by 12,5 percent, while company J, in the bottom estimate future cost savings, aims to increase profitability by 652 percent. Company J with a low level of visibility believes that their profitability could increase six times. Company A, C and E with a medium visibility aim to increase their profitability by 20-40 percent while company B aim to increase it by 10 percent. The diagram and estimations with company B in the front and company J in the bottom show that economy and supply chain visibility are linked together. A lower level of visibility allows room for larger economic savings than a high visibility, but also, high visibility allows large cost savings.

There appears to be room for cost savings in most departments of the corporations. The possibilities to reduce safety stocks and reduce inventory levels overall seems enormous. Also, the logistic costs seem to be a black hole and cost cuts would be available through higher visibility. Furthermore, the administrative costs become a pinpointed saving point for costs as visibility increases. The possibilities to stop running empty in customer's shelves and always having products to sell remains a black hole that will be reduced as visibility increase.

6.3 Level of perceived visibility in the different SCOR-processes

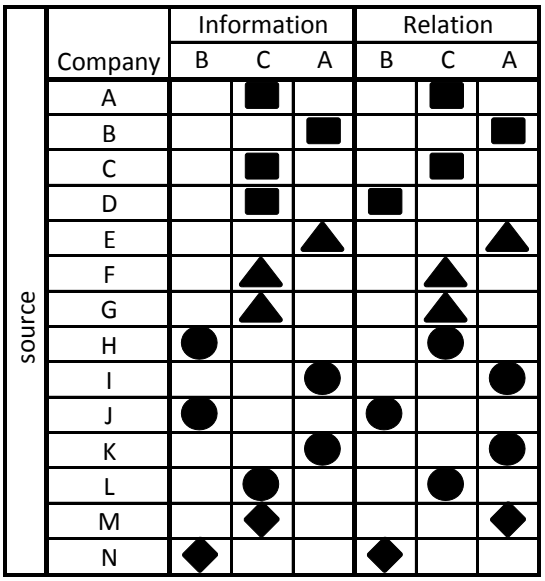
This section analysis each SCOR-process individually and exhaustively and compares each of the companies' information and relationship awareness, to each other. This section makes it less complicated to study and compare the respondents every step of the SCOR-model. It becomes easier to understand which one of the respondents is the best of every single process. This section also handles the processes as they normally occur in the SCOR-model and finishes off with a theoretical reflection of the perceived results.



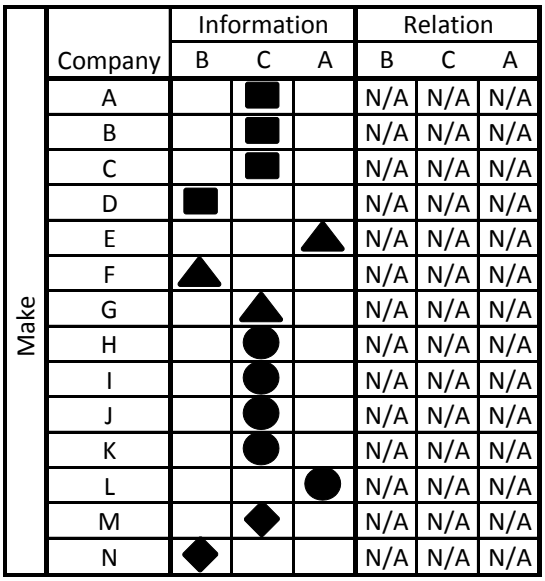
The perceived visibility is highly irregular between the different companies engaged in the study. The process and structures for sharing and extracting information concerning planning varies between the companies. While about four of the companies are perceived as advanced in the plan process, three companies are perceived as basic in the plan process. There are considerable differences between the basic and the advanced companies when it comes to structures, processes and system support to share and extract information in the plan process. While the most advanced companies have full collaboration with the sales channel or customers to produce forecasts and demand, the most basic companies are unconnected to the customers. It is a direct correlation between companies with low perceived visibility in the plan process and high estimations on cost savings by extending the information transparency within the supply chain. On the other hand, the companies with high perceived visibility estimate more modest savings with increased information transparency. The reasoning is in line with the literature concerning performance and information sharing reviewed in chapter four. The perceived performance and collaborative approach by the companies with perceived advanced visibility is in line with the reasoning of Handfield R. et al. 2005, p. 616;Chan F.T.S. 2005; Tang C. 2005; Berry D. et al. 1996; Luedtke J. et al. 2004; Hartiala H. et al. 2006. Thus the findings draw upon the notion of supply chain visibility and the importance of information exchange within the supply chain.

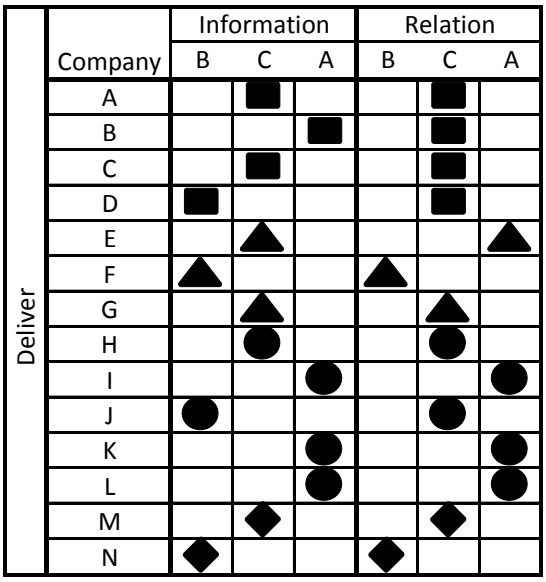
The irregularity between the perceived visibilities among the studied companies is quite extensive in the sourcing process. There are only two companies with basic perceived visibility. These companies have a highly limited interaction with suppliers. The sourcing is typically focused on ordering and receiving goods rather than developing sustainable processes, structures and systems to streamline the supply chain. Overall, the companies in the study are slightly more focused on the relational awareness rather than the information sharing. The relational awareness is given higher attention since these companies realize the value of a more collaborative relation with suppliers. This is shown by the efforts to create VMI and VMR solutions to harmonize the differences in production plans and production schedules (batch sizes). There is also a relational awareness in terms of focusing on strategic relations, once again in line with the literature presented in chapter four. The companies showing the most advanced information sharing and relational awareness make use of both

collaborative processes and advanced information sharing. Examples of collaborative processes are VMI /VMR (sometimes by passing functions in the focal company to make the process more efficient) and collaboration to achieve more lean processes and to assure procurement, (second tier suppliers) etc. The information exchange is based on highly structured face to face meetings and extensive system to share information. The systems are adapted to fit the suppliers' technology level and the information as such is adapted to fit the suppliers' knowledge level. Among these companies, there are both fully integrated systems, and portals to share information concerning KPI´s, inventory levels, production plans, production or procurement events etc. Thus, there is a wide gap between the most advanced companies compared to the more basic companies in terms of visibility within the sourcing process.

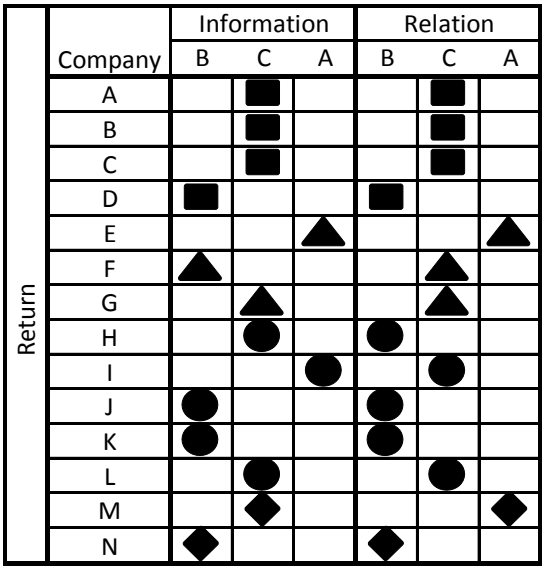


Concerning the make process, most companies are perceived as common rather than advanced. Most companies have a structured and controlled make flow. Therefore, they have the ability to use systems that track goods within the make process and track lead times, costs etc. The companies with perceived basic visibility in the manufacturing process still have a somewhat controlled manufacturing process. However, they lack the quickly to act agile to information concerning procurement issues or delivery demands. There is a thoroughgoing notion that most companies lack the information transparency between the different functions within the organization. Therefore, the supply chain visibility is perceived quite well since the sharing of information and collaboration between nodes in the supply chain is handled effectively. However, there is a lack of visibility within the focal organization, thus, causing reduced action-ability up on information. This is understood as having difficulties to connect the strategic level with the tactical and operational level within the organization. There are no references to this in the contemporary literature or in the research frontier presented in chapter four. Therefore, this is a threshold to further develop the visibility within organizations which have reached a high level of collaboration and information exchange with nodes outside the focal organization.





The delivery process, in line with the plan and source process are spread quite extensively between basic, common and advanced among the respondents. The rationale behind the spread is similar to the rationale described in the sourcing process. The companies with visibility which is perceived to be advanced use a highly structured process and have an organization which is shaped to deal with the delivery process. The process consists of a large collection which shares POS data, orders, plans and deviations of deliveries. They also communicate the KPI´s in a structured way which can be portals, so that all nodes know how they should perform and how to improve on their performance. Furthermore, the demand is tracked and collaboration is used to keep the demand as in volatile as possible, thus creating a harmonized supply chain process. This is achieved by using VMI system, allowing customers to communicate with suppliers, and by advanced collaborative planning. The organizational attributes are exemplified by the LCT which holds all information concerning the delivery process, which assures that every affected node, gets the right information in an event based manner. This lays the foundation for the companies to act in a proactive manner. The companies with visibility perceived as basic lack the structure in the process and the clear function in the organization to handle the delivery process. These companies have a delivery process which focuses more on the movement of goods than actually harmonizing the inventories at different nodes in order to increase availability of the products. There is no strong collaboration with the customers to improve the process and increase the efficiency of the delivery process. Also, there is no event information going out to affected nodes in a structured manner, information is handled rather ad hoc approach.



The return process concerns the return flows in the supply chain. The companies are evenly distributed across the different grades of visibility in the return process. Most companies use the ISO standard to structure the return process. However, the companies are separated by the efficiency of spreading the information and internalizing the information throughout the supply chain. In some cases companies score quite low, however, they have a very limited return flow which minimizes the importance of the return flow process. Therefore the return flow evaluation can be understood as partially biased even though such factors have been acknowledged. Overall, the companies which scores quite high here have a return flow which is crucial e.g. return of low quality products which might inflict great damage if not handled efficiently. These companies efficiently gather information

concerning returns and then forward it to the affected nodes. The information is spread through systems so that the information is stored and internalized throughout the affected parts of the supply network. The most advanced companies have segmented the return flow depending on the nature of the return. If the return is urgent, there is a alert system which notifies affected nodes immediately. In case of a normal return or return of wrapping or carriers, the information is passed on as normal delivery information instead. The companies with basic perceived visibility have less structured return processes. The return information is commonly handled by phone communication and the flow itself needs to be registered as an exception flow. Thus, there are a variety of ways for how the return flow can be handled. The different ways depend both on the strategic importance of the return flow and how developed the visibility is at the company. The companies in the study acknowledge that the return flow is not a focus area of improving visibility, there are other areas where there are greater savings to be made. Of course, there are always a few exceptions to this approach concerning the importance of the return process.

All in all, the companies which have reached the perceived advanced level of visibility are working in line with Cooper and Ellram's definition (1993), that a supply chain is "an integrative approach to manage the total flow of a distribution channel from the supplier to the ultimate user". In order to reach this level, they share information in a relatively free manner among the nodes in the supply chain network. The information is also shared in a manner which makes it comprehensible to the suppliers and reduces the risk towards the focal organization.

The companies perceived as reaching a common level of visibility have a vision to achieve an integrated supply chain approach. However, these companies are struggling with different difficulties and road blocks on the way to achieving the integrated supply chain. Mostly, the road blocks consist of poor structure of communication and processes rather than information technology. The technology is nothing like a sustainable competitive advantage today, but rather, bread and butter to companies. Thus, the true understanding for how to structure the information flows across the nodes of the supply network and the internal functions of the focal organization is the key to achieve a higher level of visibility.

Companies reaching basic perceived visibility, approach the supply chain members in a more disconnected manner. The approach is similar to the value chain which Porter defined, thus acting as if the different nodes of the supply chain are disconnected entities, where the inter-connection are both the goods and monetary transactions (Schary P. et al. 2002, p 23). However, all companies in the study show a focus on pursuing a higher level of supply chain visibility. Therefore, there is an understanding for the connectedness of the supply chain. However, there are plenty of road blocks to overcome in order to reach higher visibility. There is a need for clarification of the steps to take on the way to the next level of visibility so that the energy of the organization can be focused in the right direction.

6.4 Company summation

This section is a summation of all interviewed companies. Every company will be shortly introduced to provide the reader with a deeper understanding of the respondent's presumptions. The introduction will be followed by a "level of visibility SCOR diagram" to describe the visibility level of each part in the SCOR-model. Beneath, a standardized table will illustrate why the level of visibility of each part is reached. A short text will provide a more detailed description of the facts which distinguish the respondent. To finish each summation, the financial estimations made by the respondents are revealed together with relevant calculations.

6.4.1 Company A

This is an interview with a company in the industrial segment of the research, the company will be referred to as company A. Company A is in a market where there is small to non seasonal change, thus, the demand rate is stable and easy to handle. Most of the components are manufactured in-house, company A has a very limited supplier base. Company A more depends on in-house sourcing and delivery excellence than suppliers, which sets the scene for the analysis. Detailed information about company A will be found in the appendix.

The following diagram shows company A's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company A is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company A can be found in the appendix.

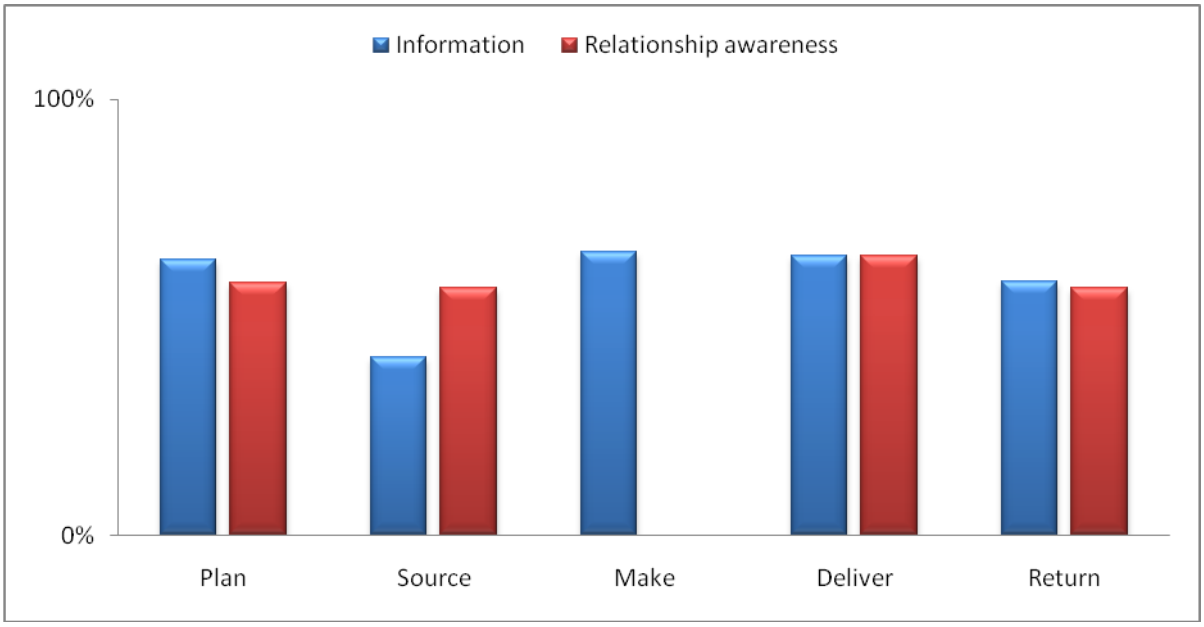


Figure 11 – Company A's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning: Rolling demand plan &	*Advanced supplier segmentation *Basic customer segmentation *Basic collaborative

	production plan, timely, trustworthy *Basic sharing of future range and future production capacity	planning *Common collaborative development
Source	*Basic inventory information *Common POS-data sharing *Common lead-time information *Advanced order procedure *Common production capacity *Basic production event information *Basic track & trace information *Basic cost structure information *Common BOM and blueprint information sharing *Common KPI measurement	*Various systems: EDI, XML, web solution and standard systems *Face-to-face *Basic supplier development *Common conflict management *Common risk management *Advanced differentiation of clearance levels *Basic 2-tier supplier awareness
Make	*Common inventory levels *Common WIP information *Advanced production planning *Common cost structure *Common asset visibility	
Deliver	*Advanced inventory information/ATP/delivery date *Advanced POS-data collection *Advanced lead-time information *Advanced order procedure *Basic production capacity information *Basic production event information *Common track & trace information *Common KPI measurement *Basic focal organization development information	*Various systems: EDI, XML, web solution and standard systems *Advanced face-to-face communication *Common service function *Common direct communication between functions *Common conflict management *Advanced risk management *Common differentiated clearance levels
Return	*Advanced traceability *Common rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Common return flow segmentation *Common direct communication *Common return flow improvement collaboration *Advanced return flow process *Common node notification

The diagram above shows that company A is slightly better than common in the planning process. Company A has a relatively uncomplicated plan process with a constant demand curve, thus, the customers do not need to share extensive information and the demand can shared directly with the suppliers. The plans are shared in various formats, however, mainly by face-to-face interaction.

Company A is rated average in the source process. Company A has a few advanced processes and systems to allow high visibility in the sourcing process. Company A uses a variety of systems to

communicate with suppliers. However, most information shared concerns the orders and needs of company A, thus, not allowing any collaborative planning such as VMI or VMR etc.

The make process of company A is above average visibility. The make process is structured to allow compliance to procurement problems and demand. The make process is, however, not combined with the actual demand, but rather, connected to finished goods inventory. The make process visibility is further limited by the ability to trace goods within the factory and forward this information.

The deliver process has above average visibility. The process is mainly controlled by fixed lead times and time controlled distribution. Communication with customers are handled in a variety of systems and processes, a web portal is used to allow ordering with direct notification and delivery date. An example of visibility limitations is that customers will not be notified in case of deviations in delivery and due to a lack of track and trace functions. The deliver process is highly effective (short time to deliver cycle), however, here only the visibility is rated.

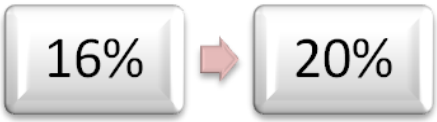
The return process has average ratings in visibility. The information is handled in a structured process with traceability so that quality issues can be tracked to different batches and components. The information is spread with both systems and by more ad hoc traditional communication, thus the visibility is somewhat limited.

Finance

Company A has been working with improvements of the visibility in their supply chain during at least the past 20 years. The respondent finds it impossible to estimate the total savings of a higher level of supply chain visibility. Although, it can be based upon cases which create possibilities to make estimations about what effects the VMI solution will generate when implemented. The respondent believes that it will be possible to reduce inventory levels by 15-20 percent. A decrease of the purchase costs by 15-20 percent is also in sight as well as a reduction of administrative costs by 10 percent.

The respondent also bases an estimation of what effects the implementation of a portal solution will have upon cases. In all probability administrative costs will be reduced by 10 percent due to the implementation. Furthermore is it likely that sales will be increased by 2% according to the respondent.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.2 Company B

This is an interview with a company in the industrial segment of the research, the company will be referred to as company B. Company B is in a market where there is small to non seasonal changes. The demand rates are stable with OEM customers, but vary with others. Many of the components are manufactured in-house, but larger parts are sourced. Company B has a wide supplier base. They also depend on both sourcing and delivery excellence, which sets the scene for the analysis. Detailed information about company B will be found in the appendix.

The following diagram shows company B's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company B is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company B can be found in the appendix.

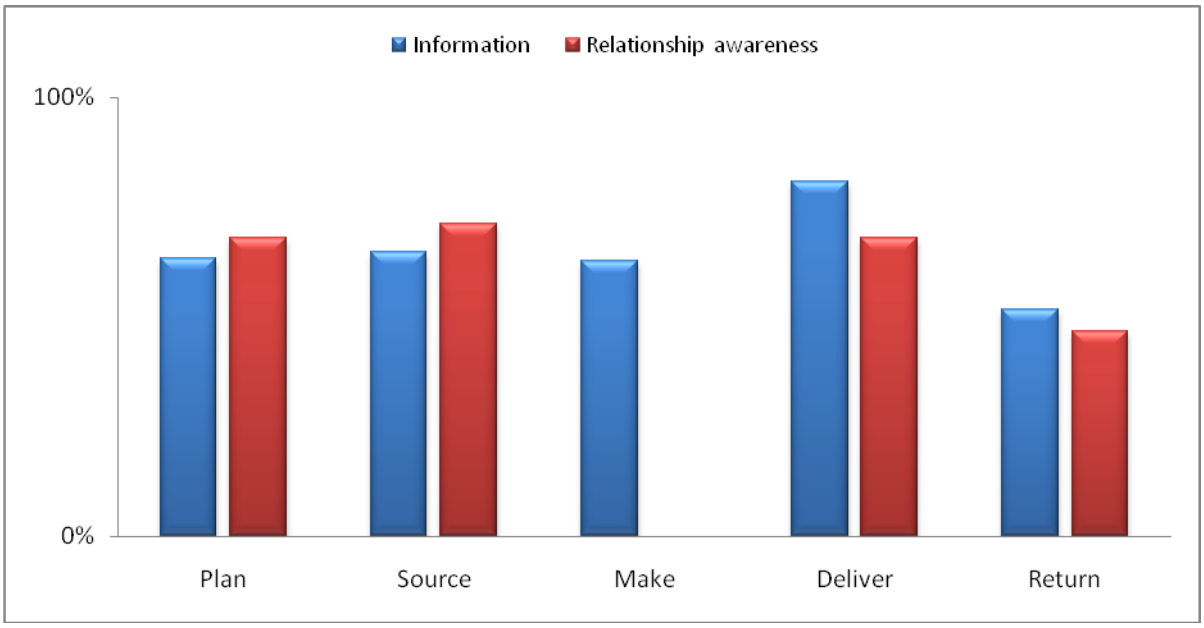


Figure 12 – Company B's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning upstream: Rolling demand plan & production plan, timely, trustworthy *Basic sharing of forecast & demand planning downstream from customers *Basic sharing of future range and future production capacity	*Advanced supplier segmentation *Common customer segmentation *Common collaborative planning *Common collaborative development
Source	*Advanced inventory information *Basic lead-time information *Advanced order procedure *Basic production capacity *Basic production event information	*Various systems: EDI, XML, web solution and standard systems *Face-to-face *Common supplier development *Common conflict management *Common risk

	*Common track & trace information *Basic cost structure information *Advanced BOM and blueprint information sharing *Advanced KPI measurement	management *Advanced differentiation of clearance levels *Basic 2-tier supplier awareness
Make	*Common inventory levels *Common WIP information *Common production planning *Advanced cost structure *Basic asset visibility	
Deliver	*Advanced inventory information/ATP/delivery date *Advanced lead-time information *Common order procedure *Common production event information *Advanced track & trace information *Advanced KPI measurement *Common focal organization development information	*Various systems: EDI, XML, web solution and standard systems *face-to-face communication *Advanced service function *Common direct communication between functions *Common conflict management *Common risk management *Common differentiated clearance levels
Return	*Advanced traceability *Advanced rational return information/specification *Basic return information format *Basic proactive response	*Basic return flow communication *Common return flow segmentation *Basic direct communication *Common return flow improvement collaboration *Advanced return flow process *Basic node notification

The diagram above shows that company B is slightly above average in the planning process. Information concerning plans, demand and activities are spread in formats that are easily comprehensive for the suppliers. The plan process is somewhat limited with customers since most of the products are MTO. However, a limited number of customers are MTS the exchange of information in the plan process can be increased in order to gain higher visibility.

Company B is rated above average in the source process. Company B is highly advanced in information towards suppliers. The information is passed on using a special system (a vendor information system). However, the information is rather one way thus leaving limitation of visibility into suppliers. In addition the track & trace ability on the flow is highly limited.

The make process of company B has about average visibility. The make process is structured to allow compliance to the procurement of problems and demand. The visibility of the make process is limited by the ability to track goods within the factory and forward this information.

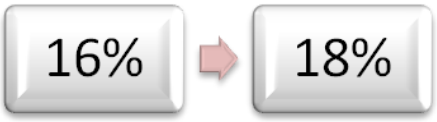
The deliver process has advanced visibility, the process is “best in class”. The leading edge of the deliver process is the logistic control tower (LCT) function. The LCT controls the delivery process and holds all information concerning production plans, transportation providers, the goods whereabouts, the delivery time, deviations to plan, etc. The information is found online for customers or by notification of deviations by the LCT.

The return process is rated average in visibility. The information is handled in a structured process with traceability, so that quality issues can be tracked to different batches and components. Information concerning return flows is mainly spread by manual means, thus, making the flow of information rather slow. In addition, the different affected nodes are not informed in a timely manner.

Finance

Company B is one of the top companies in the evaluation, and yet, a higher level of visibility will generate cost savings. The respondent finds it impossible to estimate the total savings of what supply chain visibility could generate. Although, possible to estimate possible cost savings per year due to earlier cases. The respondent estimates that 1 percent reduction per year of inventory levels, purchase costs, value added and logistic costs due to constant higher visibility are plausible.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.3 Company C

This is an interview with a company in the industrial segment of the research, the company will be referred to as company C. Company C is in a market that is highly volatile and viable forecasts are unavailable. Company C's production is set both by MTO and MTS. The customers are handled by an in-house sale organization which also helps the customer to optimize the products for their needs. This sets the scene for the analysis. Detailed information about company C will be found in the appendix.

The following diagram shows company C's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company C is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company C can be found in the appendix.

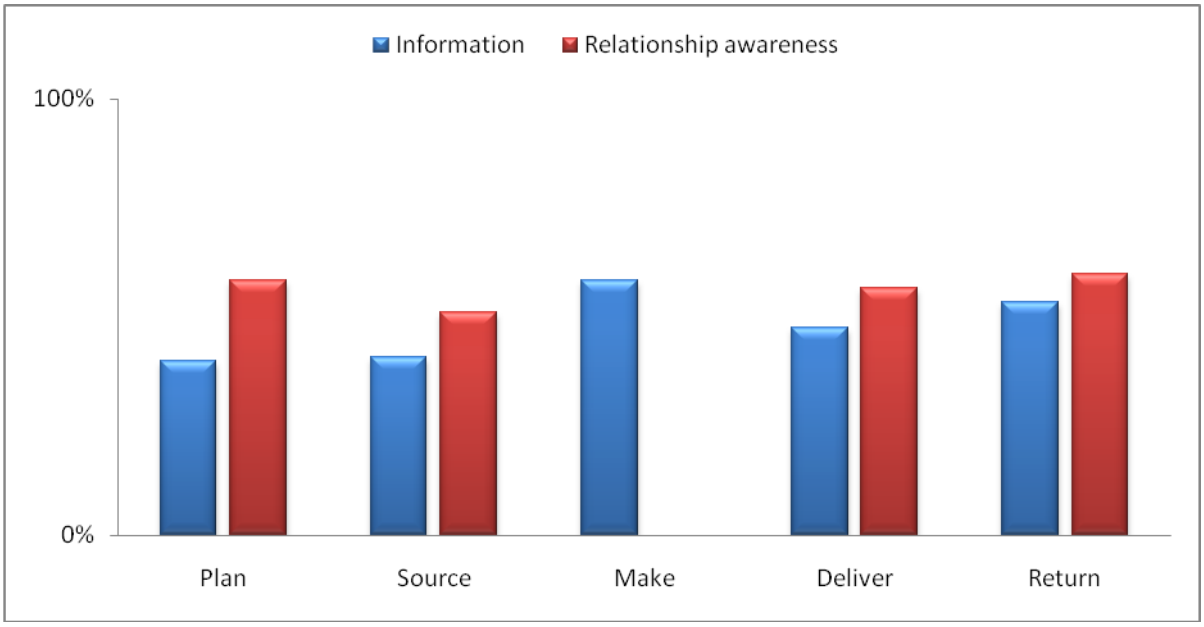


Figure 13 – Company C's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Common sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity downstream *Basic sharing of future range and future production capacity upstream	*Common supplier segmentation *Basic customer segmentation *Basic collaborative planning *Common collaborative development
Source	*Basic inventory information *Basic POS-data sharing *Basic lead-time information *Basic order procedure *Basic production	*Basic systems: EDI and STD systems *Common face-to-face *Common supplier development *Basic conflict management

	capacity *Basic production event information *Basic track & trace information *Common cost structure information *Common BOM and blueprint information sharing *Common KPI measurement	*Common risk management *Basic differentiation of clearance levels *Common 2-tier supplier awareness
Make	*Common inventory levels *Common WIP information *Advanced production planning *Common cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Common POS-data collection *Basic lead-time information *Basic production capacity information *Basic production event information *Common track & trace information *Common KPI measurement	*Basic systems: STD systems *Advanced face-to-face communication *Common service function *Basic direct communication between functions *Basic conflict management *Common differentiated clearance levels
Return	*Advanced traceability *Common rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Advanced return flow segmentation *Common direct communication *Common return flow improvement collaboration *Advanced return flow process *Basic node notification

The diagram above shows that company C is between basic and common in the planning process. Company C is faced with a volatile market, thus, making it hard to share viable forecasts. However, the suppliers are provided with forecasts and trends covering the entire industry, therefore they know what demand to expect (given that they interpreter the information). The plans are mostly shared by emails and at face-to-face meetings.

Company C is rated below average in the source process. Company C handles the sourcing with effective processes such as VMI. However, most communication is made by email (automatic generated), thus making the information flow rather rigid. There is also a limitation in visibility concerning events in the suppliers' production, sourcing and transportation which might affect the focal company.

The make process of company C has above average visibility. The make process is structured to allow compliance demand. However, the make process is not fully combined with the information concerning supply issues, thus limiting the visibility. The make process visibility is further limited by the lack of ability to trace goods within the factory and forward this information towards the delivery process.

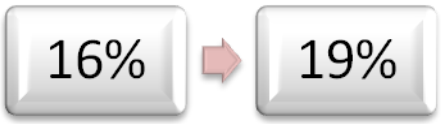
The deliver process has below average visibility. The process is both designed to deliver into stock (DC) and forward to customers, information towards DC is managed well, although it does, not allow visibility towards and from suppliers. The visibility is also limited by lack of information concerning production, sourcing and transportation events e.g. not updating lead times or delays in the system.

The return process is rated average in visibility. The information is handled in a structured process with traceability so that quality issues can be tracked to different batches and components. When a problem is detected, all products from the same batch (or components from a batch) can be locked down in the system. Thus, the products will not be spread to customers or components used in products. The information is spread with both systems and by more ad hoc traditional communication, thus the visibility is somewhat limited.

Finance

Company C is evaluated as one of the common companies in the study and, similar to the rest in that segment, they can distinguish cost savings as a result of higher visibility. The respondent estimates that if they could increase their visibility, they would cut approximately 1-2 percent of their purchase costs. They would also be able to reduce their inventory levels by 20 percent and the sales would increase by 1-2 percent.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.4 Company D

This is an interview with a company in the industry segment of the research, the company will be referred to as company D. Company D's value chain is fairly complex compared to other companies in this research. The sourcing is very conscious of costs and the suppliers are frequently replaced. They have more than 7000 customers and the ordinary customer is quite small. Company D does not have a direct flow to customers, thus, most product run through wholesalers. The season variations are rather large and make the product flow even more difficult, which sets the scene for the analysis. Detailed information about company D will be found in the appendix.

The following diagram shows company D's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company D is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company D can be found in the appendix.

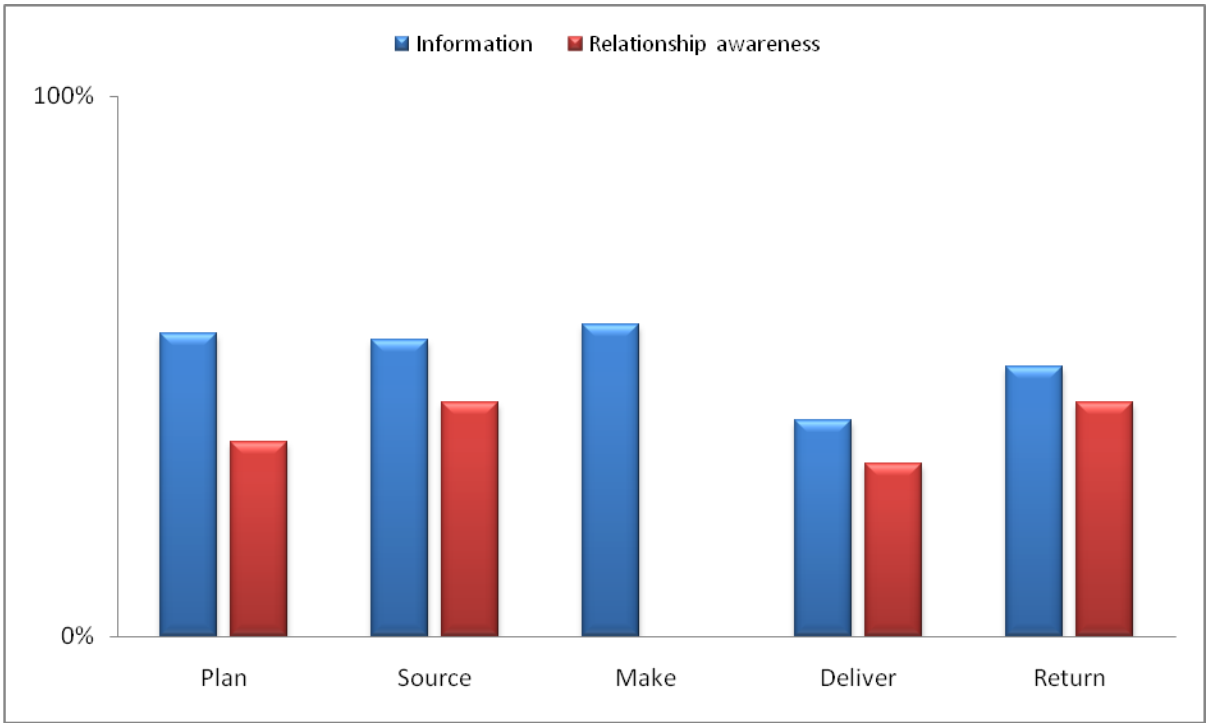


Figure 14 – Company D's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Common sharing of forecast & demand planning upstream: Rolling demand plan & production plan, timely, trustworthy *Basic sharing of forecast & demand planning downstream *Common sharing of future range and future production capacity	*Basic supplier segmentation *Common customer segmentation *Basic collaborative planning *Basic collaborative development

Source	*Basic inventory information *Basic POS-data sharing *Common lead-time information *Common order procedure *Basic production capacity *Basic production event information *Basic track & trace information *Advanced cost structure information *Common BOM and blueprint information sharing *Common KPI measurement	*Various systems: EDI, web solution and STD systems *Face-to-face *Basic supplier development *Basic conflict management *Basic risk management *Common differentiation of clearance levels *Common 2-tier supplier awareness
Make	*Common inventory levels *Common WIP information *Common production planning *Advanced cost structure	
Deliver	*Basic inventory information/ATP/delivery date *Basic POS-data collection *Basic lead-time information *Basic order procedure *Common production capacity information *Basic production event information *Basic track & trace information *Basic KPI measurement *Basic focal organization development information	*Basic systems: Web solution and STD systems *face-to-face communication *Common service function *Basic direct communication between functions *Common conflict management *Common differentiated clearance levels
Return	*Common traceability *Basic rational return information/specification *Common return information format *Common proactive response	*Basic return flow communication *Basic return flow segmentation *Common direct communication *Common return flow improvement collaboration *Common return flow process *Basic node notification

The diagram above shows that company D achieves common visibility in the planning process. Company D has the ambition to gather information from the sales channel (a specific system for planning sales activities), however, this is somewhat biased. Thus, the planning process becomes crippled by the forecast and planning procedure. Information concerning suppliers is covered by various systems, the short relations with suppliers and biased forecasts limit the visibility.

Company D is rated average in the source process. Company B helps suppliers with sourcing (second tier suppliers) of critical material. The suppliers also share information concerning cost structures, thus allowing an extended visibility into the BOM and actual component costs. The visibility is limited since there is no structured process for extended information sharing (besides orders). There is neither a track & trace function of material flows nor supplier event information.

The make process of company D has above average visibility. The make process visibility is enhanced by the ability to track goods through the production and track events in the production. However, the visibility is limited due to a poor ability to adapt to procurement issues.

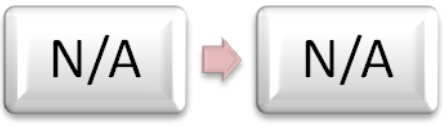
The deliver process has average visibility. Communication with the sales service is mainly through systems. The visibility is confined since information concerning ATP is biased, lead time information is not updated and there is no track & trace function. Information concerning customers (sales channel) is relayed by phone and fax machines. This makes the information reactive rather than proactive, thus further confining the visibility.

The return process is rated average in visibility. The information is handled in a structured process with traceability so that quality issues can be tracked to different batches and components. The information is spread with both systems and by more ad hoc traditional communication, thus the visibility is somewhat limited.

Finance

Company D distinguishes great potential for cutting costs by increasing the visibility in their supply chain. The respondents however, do not have any previous cases or experiences to base their estimations upon. Therefore, they consider it unfair to make any estimation and have chosen not to participate.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.5 Company E

This is an interview with a company in the automotive segment of the research, the company will be referred to as company E. Company E has between 500-1000 suppliers worldwide. Company E's value chain is fairly complex as a result of the production being run extremely tightly. Company E has very small stocks, which means that most components are delivered just-in-time to be assembled. Almost all production is MTO and the customers are in-house wholesalers, which sets the scene for the analysis. Detailed information about company E will be found in the appendix.

The following diagram shows company E's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company E is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company E can be found in the appendix.

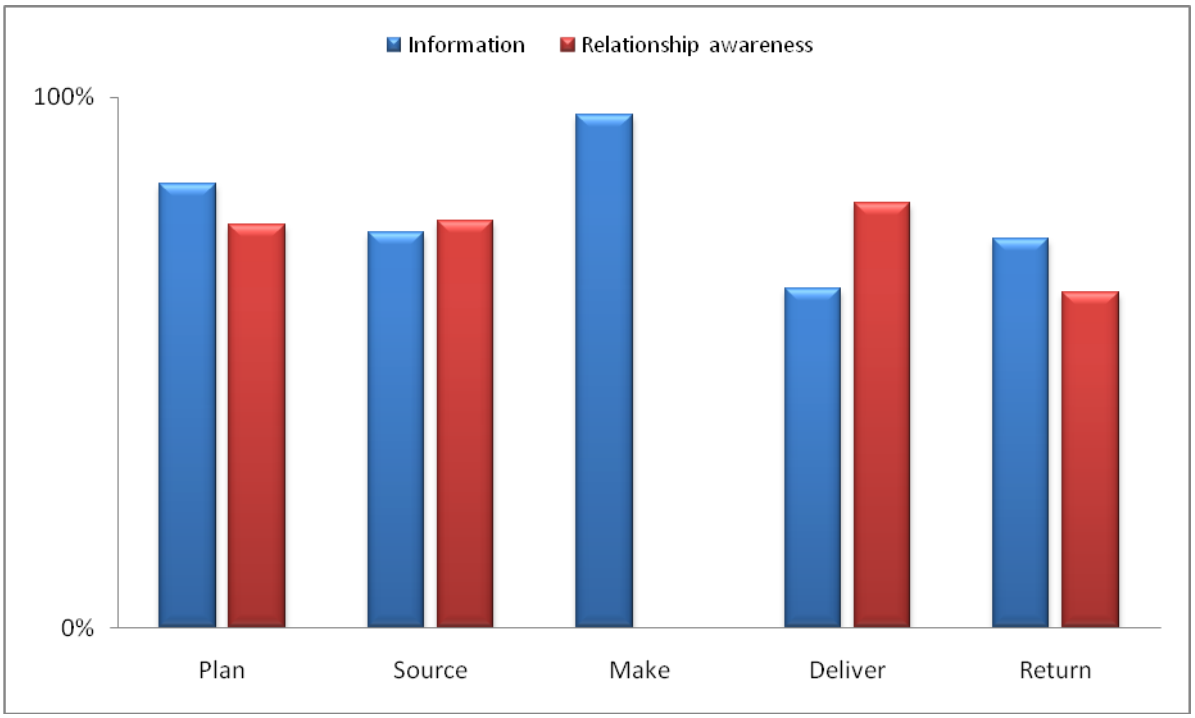


Figure 15 – Company E's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity	*Advanced supplier segmentation *Common customer segmentation *Advanced collaborative planning *Common collaborative development
Source	*Common inventory information *Common POS-data sharing *Advanced lead-time information *Advanced order	*Various systems: EDI, web portal, web solution and STD systems *Face-to-face *Advanced supplier development *Advanced

	procedure *Common production capacity *Common production event information *Common track & trace information *Advanced cost structure information *Advanced BOM and blueprint information sharing *Advanced KPI measurement	conflict management *Common risk management *Common differentiation of clearance levels *Common 2-tier supplier awareness
Make	*Advanced inventory levels *Advanced WIP information *Advanced production planning *Advanced cost structure *Advanced asset visibility	
Deliver	*Advanced inventory information/ATP/delivery date *Common lead-time information *Advanced order procedure *Basic production event information *Common track & trace information *Common KPI measurement *Basic focal organization development information	*Various systems: EDI and STD systems *face-to-face communication *Common service function *Common conflict management
Return	*Advanced traceability *Common rational return information/specification *Advanced return information format *Common proactive response	*Advanced return flow communication *Common direct communication *Common return flow improvement collaboration *Advanced return flow process *Advanced node notification

The diagram clearly shows that company E has an outstanding visibility of the planning process. The visibility is due to structured processes which details how to interpret information and also to share demand and forecasts every day on a rolling 84 week planning. The information goes into the suppliers planning system, thus, not allowing tempering with the demand figures (bullwhip). The visibility is to some extent limited by the lack of collaborative planning with suppliers.

Company E is also outstanding in the sourcing process. This is a result of using clear structures and systems for ordering and controlling the sourcing. Company E also helps the suppliers to improve by sharing KPI and sending out “consultants” to further help suppliers. The suppliers share all costs with company E in order to find collaborative ways of lowering every cost which strike the product. The lack of full sourcing event information (track & trace etc) slightly limits the visibility.

The make process is also “the best in class” for company E. The make process is highly structured and every flow is completely controlled both as processes and tracked in a system. All events in the make process are directly noticed and affected nodes are informed. In case of an event or crisis, the planning will be changed in order to reduce the impact of the event.

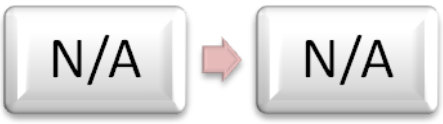
The deliver process is above average in visibility. The visibility is achieved by lead time information in the system, ordering from wholesales in the system straight into the planning, and full inventory visibility of the wholesales (each sales place access the inventory of other sales places within the region). The visibility is limited both due to a lack of transportation event information, and since the delivery service function is not fully organized.

The return process is rated as advanced visibility. The information is handled in a structured process with traceability so that quality issues can be tracked to different batches and components. The information is spread with both systems, and by a more traditional communication, although in a highly structured manner.

Finance

Company E has been evaluated as the corporation with the highest level of visibility. Although, the respondents are convinced that improvement areas and cost saving opportunities still exist and that it is important to be aware. Company E has chosen not to participate in the estimation as they feel that they not are qualified to make estimations.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.6 Company F

This is an interview with a company in the automotive segment of the research, the company will be referred to as company F. Company F has a wide range of suppliers worldwide. Company F´s production consist of components from in-house and extern suppliers. The sourcing focus is mostly price awareness, but also quality. The assembling procedure is rather fixed due to the MTO process. The customer base is global and handled by an international intern organization, which sets the scene for the analysis. Detailed information about company F will be found in the appendix.

The following diagram shows company F's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company F is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company F can be found in the appendix.

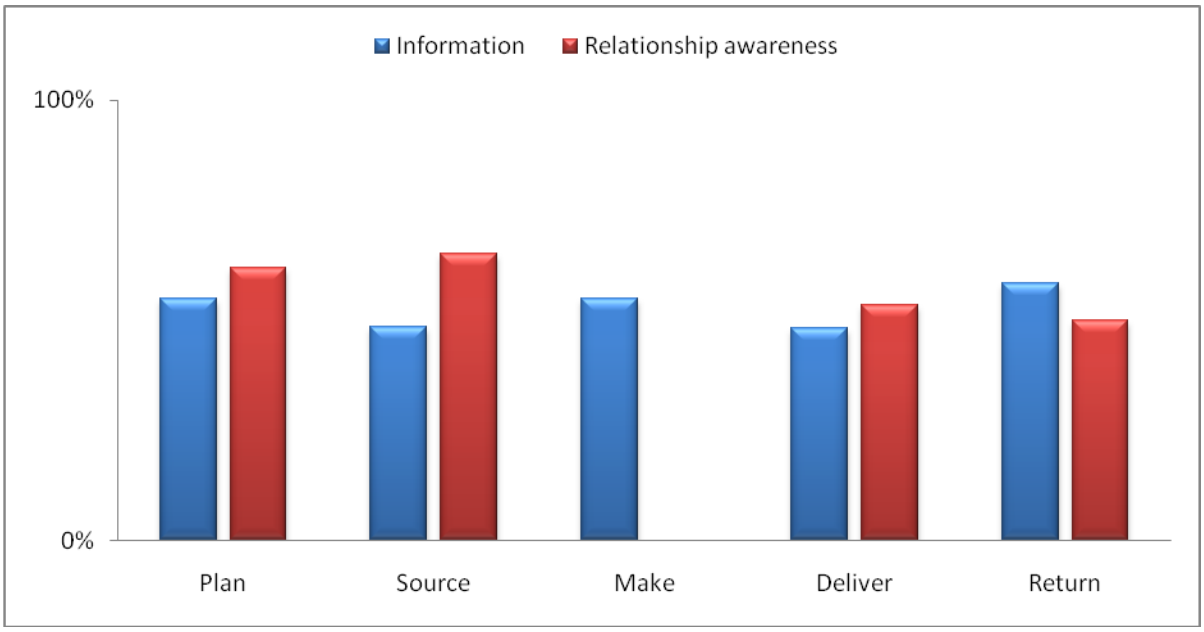


Figure 16 – Company F's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Common sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity	*Advanced supplier segmentation *Common customer segmentation *Common collaborative planning *Common collaborative development
Source	*Common inventory information *Common lead-time information *Common order procedure *Common production capacity *Basic production event information *Basic track & trace	*Various systems: EDI, web portals and STD systems *Face-to-face *Common supplier development *Common conflict management *Common risk management *Advanced differentiation of clearance levels

	information *Common cost structure information *Common BOM and blueprint information sharing *Common KPI measurement	*Basic 2-tier supplier awareness
Make	*Common inventory levels *Basic WIP information *Common production planning *Advanced cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Basic lead-time information *Common order procedure *Basic production event information *Basic track & trace information *Common KPI measurement *Basic focal organization development information	*Common systems: EDI and STD systems *face-to-face communication *Basic service function *Basic direct communication between functions *Common conflict management
Return	*Advanced traceability *Advanced rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Basic direct communication *Common return flow improvement collaboration *Common return flow process *Basic node notification

Company F scores about average on the plan process. Company F shares forecasts and future demand with most of the suppliers in a timely manner. The limitation in visibility is mostly linked to the lack of trust in the long range planning (forecasts). The visibility in the plan process is further limited by the lack of collaborative activity with suppliers, thus, not considering the capacity and production planning of the suppliers.

Company F is rated close to average in regards to perceived visibility in the sourcing process. Company F has a clear strategy and process concerning the sourcing. However, the lack of control of events at the suppliers' production or during transportation lowers the rating. It needs to be acknowledged that both the control and the visibility are far more extensive with internal suppliers. The company has had projects concerning information sharing with suppliers, such as a supplier portal. However, these projects are limited to projects, thus not leveraged across the supplier base.

The make process of company F is rated slightly above average in regards to perceived visibility. The make process in company F is similar to other companies, thus having control over goods in the make process partly by systems. As with other companies who have average perceived visibility company F lacks the proactive approach in the make process, thus, there is no structured process concerning event information in the upstream or downstream flow.

The company´s deliver process ranks about average in visibility. The ordering system feeds into production planning, thus makes the ordering process in the delivery section an integrated activity

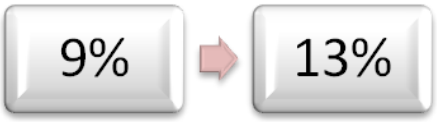
within the plan process. However company F lack a function which controls the transportation service and monitor delivery issues. A LCT function could help visibility and assure that penalties due to late deliveries are minimized and that different transportation demands are acknowledged (if a ship leaves a certain time etc.) so that production and delivery processes are further harmonized.

The return process is rated as common visibility. The information concerning the return process is highly structured and traced. However, the information is not shared in a timely manner through effective systems, but rather, handled by traditional communication processes. The visibility is further limited by the less structured information flow towards suppliers concerned by the return process.

Finance

Company F has been working with its visibility in the supply chain for quite awhile and yet many areas of improvement can be found as well based upon the evaluation, they are able to increase their level of visibility. The respondents agree that a higher level of visibility would generate cost savings. Based upon earlier experiences and cases, the respondents agree on an estimation of 15-20 percent cost saving through the entire corporation.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.7 Company G

This is an interview with a company in the automotive segment of the research, the company will be referred to as company G. Company G has a wide range of suppliers worldwide. Company G´s production consist of components from in-house and extern suppliers. The sourcing focus is mostly price awareness, but also quality. The assembling procedure is rather fixed due to the MTO process. The customer base is global and handled by an international intern organization, which sets the scene for the analysis. Detailed information about company G will be found in the appendix.

The following diagram shows company G's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company G is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company G can be found in the appendix.

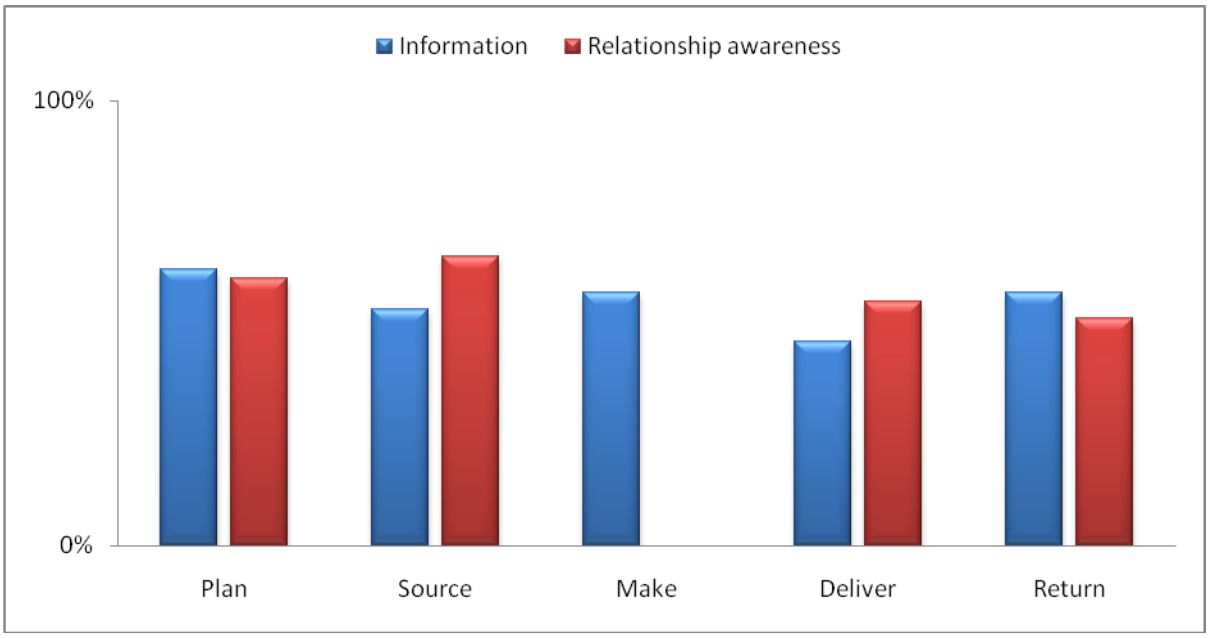


Figure 17 - Company G's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity	*Advanced supplier segmentation *Common customer segmentation *Basic collaborative planning *Common collaborative development
Source	*Common inventory information *Common lead-time information *Common order procedure *Common production capacity *Basic production event information *Basic track & trace	*Various systems: EDI, web portals and STD systems *Face-to-face *Advanced supplier development *Common conflict management *Common risk management *Advanced differentiation of clearance levels

	information *Advanced cost structure information *Common BOM and blueprint information sharing *Advanced KPI measurement	*Basic 2-tier supplier awareness
Make	*Common inventory levels *Basic WIP information *Common production planning *Advanced cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Basic lead-time information *Common order procedure *Basic production event information *Basic track & trace information *Common KPI measurement *Basic focal organization development information	*Common systems: EDI and STD systems *face-to-face communication *Basic service function *Basic direct communication between functions *Common conflict management
Return	*Advanced traceability *Advanced rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Basic direct communication *Common return flow improvement collaboration *Common return flow process *Basic node notification

Company G scores slightly above average on the plan process. Company G shares forecasts and future demand with most of the suppliers in a timely manner. The forecasts are shared daily on a twelve month horizon with the last five days locked. The forecasts are shared either by EDI or on a web portal. The visibility in the plan process is limited by the lack of collaborative activity with suppliers, thus, not considering the capacity and production planning of the suppliers.

Company G is rated about average in the sourcing process. Company G has a clear strategy and process concerning the sourcing. Company G uses a variety of sourcing methods. There is a supplier portal which is used to keep close contact with suppliers in terms of evaluations, sharing forecasts and blueprints etc. There are also suppliers who deliver according to VMI principles. Thus, these suppliers have a high visibility into demand data, inventory levels and production rates. The standard procedure is that orders are placed with EDI technology, the information is fed directly into the suppliers systems so that no one can temper with the orders, thus, not creating bullwhip effect or other problems. However, the lack of control of events at the suppliers' production or during transportation lowers the rating. Most suppliers lack the ability to track the inventory and understand the actual demand rate, thus, also limiting the visibility.

The make process of company G is rated as average in regards to perceived visibility. The make process in company G is similar to other companies, thus having control over goods in the make process partly by systems. As with other companies who have average perceived visibility company G

lacks the proactive approach in the make process, thus, there is no structured process concerning event information in the upstream or downstream flow.

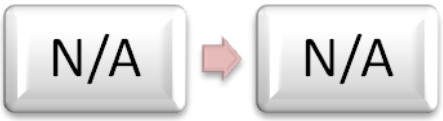
The company´s deliver process ranks slightly below average in visibility. Company G has little control over the delivery process. There is no function which supervises the deliveries and takes on responsibility for informing the customers. This responsibility is on the sales organization, which do not have access to all information needed to inform customers. A LCT function could help visibility and assure that penalties due to late deliveries are minimized and that different transportation demands are acknowledged (if a ship leaves a certain time etc.) so that production and delivery processes are further harmonized.

The return process is rated as common visibility. The information concerning the return process is highly structured and traceable. However, the information is not shared in a timely manner through effective systems, but rather, handled by traditional communication processes. The visibility is further limited by the unstructured information flow towards suppliers concerned by the return process.

Finance

Company K does not have any case to base possible future savings on and find it impossible to make estimations whatsoever. They see great potential in the segment, Furthermore the respondent does not consider himself qualified enough to make any estimation.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.8 Company H

This is an interview with a company in the retail segment of the research, the company will be referred to as company H. All products are sourced from suppliers to distribution centers. A part of the assortment consists of private labels, but the main part is purchased products. Company H owns their entire sales channels which makes it easy to control the product flow. It also makes it possible to control the business system used with wholesalers. Company H also has quite a large return flow to keep track of, which sets the scene for the analysis. Detailed information about company H will be found in the appendix.

The following diagram shows company H's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company H is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company H can be found in the appendix.

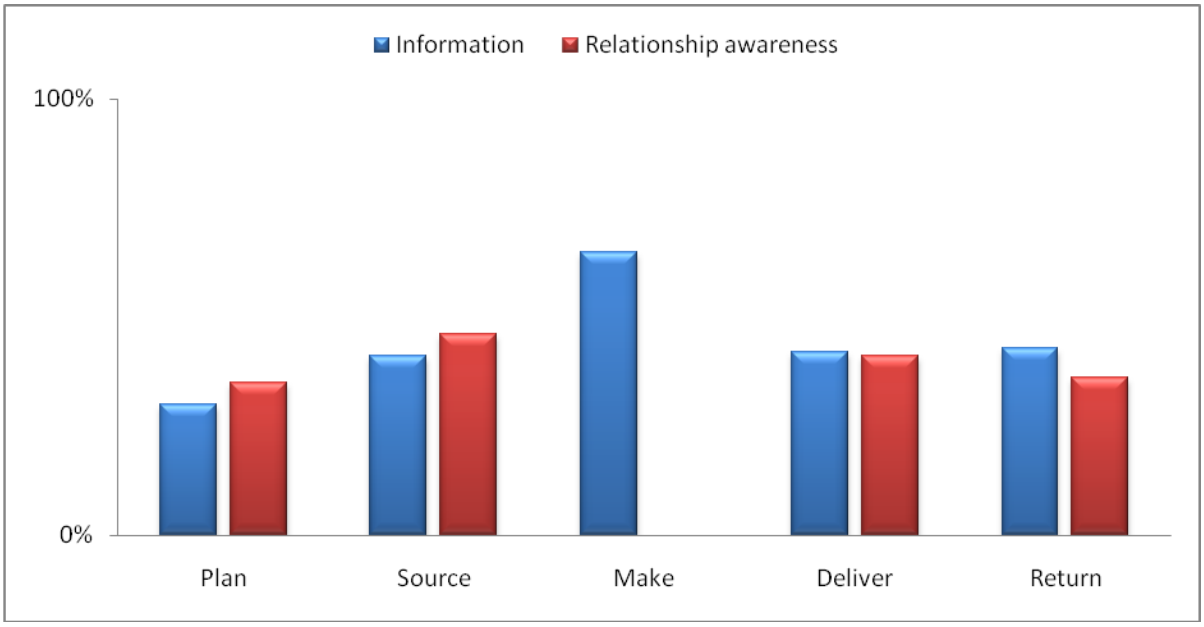


Figure 18 - Company G's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Basic sharing of forecast & demand planning *Common sharing of future range *Common future capacity information	*Basic segmentation of suppliers *Advanced segmentation of customers *Common collaborative planning *Basic collaborative development
Source	*Common inventory information *Basic POS-data sharing *Basic lead-time information *Common order procedure *Basic production event information *Basic track & trace information *Basic	*Various systems: EDI and standard systems *Face-to-face *Basic supplier development *Basic direct communication between functions *Basic conflict management *Common risk management *Basic

	cost structure information *Common KPI measurement *Common supplier development information	differentiation of clearance levels *Basic 2-tier supplier awareness
Make	*Advanced inventory levels *Common cost structure *Common asset visibility	
Deliver	*Common inventory information/ ATP/delivery date *Basic POS-data collection *Basic lead-time information *Advanced order procedure *Basic track & trace information *Basic KPI measurement *Basic focal organization development information	*Common systems: Business system & STD system *Face-to-face communication *Basic service function *Basic direct communication between functions
Return	*Common traceability *Common rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Common return flow segmentation *Basic direct communication *Basic return flow improvement collaboration *Common return flow process *Basic node notification

Company H´s has basic visibility in the plan process. The visibility is limited by many reasons. There is no effective process for forecasting or POS-data sharing. In addition, there is neither any clear structure for how to, eventual, share plans, forecasts and activities with suppliers. All nodes receiving information concerning the forecasts and activities add their own perception, which makes the information biased (causing ripples in the supply chain). On top of this there is also a lack of visibility within the focal organization. Thus, the different functions within company H are not aware of decisions and plans at other function.

In the source process company J is also perceived as reaching a rather low level of visibility. This is due to a multitude of reasons. Mainly there is no effective sharing of inventory levels with suppliers. There is a lack of visibility into suppliers' inventories and procurement status. The communication with suppliers is overall limited by lack of structure and processes. In addition there is lack of information sharing internally both at suppliers and at the focal organizations. Company H measure their suppliers performance with a set of KPI´s. Information concerning the KPI are supposed to be provided to suppliers but communication is handled in an ad hoc manner rather than by structured processes. The sourcing visibility is further limited because there is no event information taking place.

The make process is rated slightly above common level of visibility. Company H has a structured process for handling the internal flows and tracks all events taking place within the make process. The lack of visibility within the make process is mainly due to poor tracking of goods within the process. There is also an information gap between the different functions in the make flow (central

function – warehouse – sales channel). However, the manufacturing process is in line with the majority of the companies in the study.

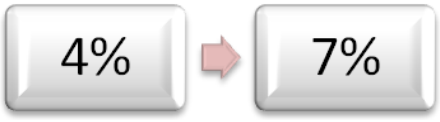
The deliver process is perceived as a basic, or close to common, level of visibility. The main reason is that there is a lack of information connectivity with the sales channel. The ordering process is effective and promotes visibility. However, the information is not aggregated at central level, thus, the information is not used. Moreover, there is no function which specifically monitors the delivery process, thus, events may not be revealed.

Company H has a basic or close to common perceived return visibility. The process is structured and different return flows are handled according to the specific needs. The visibility is increased by a special claims system which is used. The lack of visibility is rather due to the information going upstream (towards suppliers) which is handled ad hoc and with standard communication systems. Thus, it is not certain that information will reach all nodes which are actually affected by a return.

Finance

Company H believes that increased visibility in the supply chain is very important. The respondent finds it impossible to estimate the total savings of a higher level of supply chain visibility. Although, it can be based upon cases which create possibilities to make estimations about what effects certain improvement might have. The respondent believes that decreased inventory levels by using VMI solutions with the large suppliers will decrease their part of the stock by 30-50 percent. The respondent also estimates a 10 percent cost saving by the implementation of groupage traffic. The most important estimation is based upon increased service ration. The respondent believes that increased visibility will generate at least 2 percent higher service ration.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.9 Company I

This is an interview with a company in the retail segment of the research, the company will be referred to as company I. Almost all production is sourced to suppliers and delivered to global distribution centers. The entire production is MTS. Company I owns their entire sale channels which makes it easy to control the product flow. It also makes it possible to control the business system used towards wholesalers. Company I has a rather large return flow which is important to maintain satisfied customers, which sets the scene for the analysis. Detailed information about company I will be found in the appendix.

The following diagram shows company I's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company I is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company I can be found in the appendix .

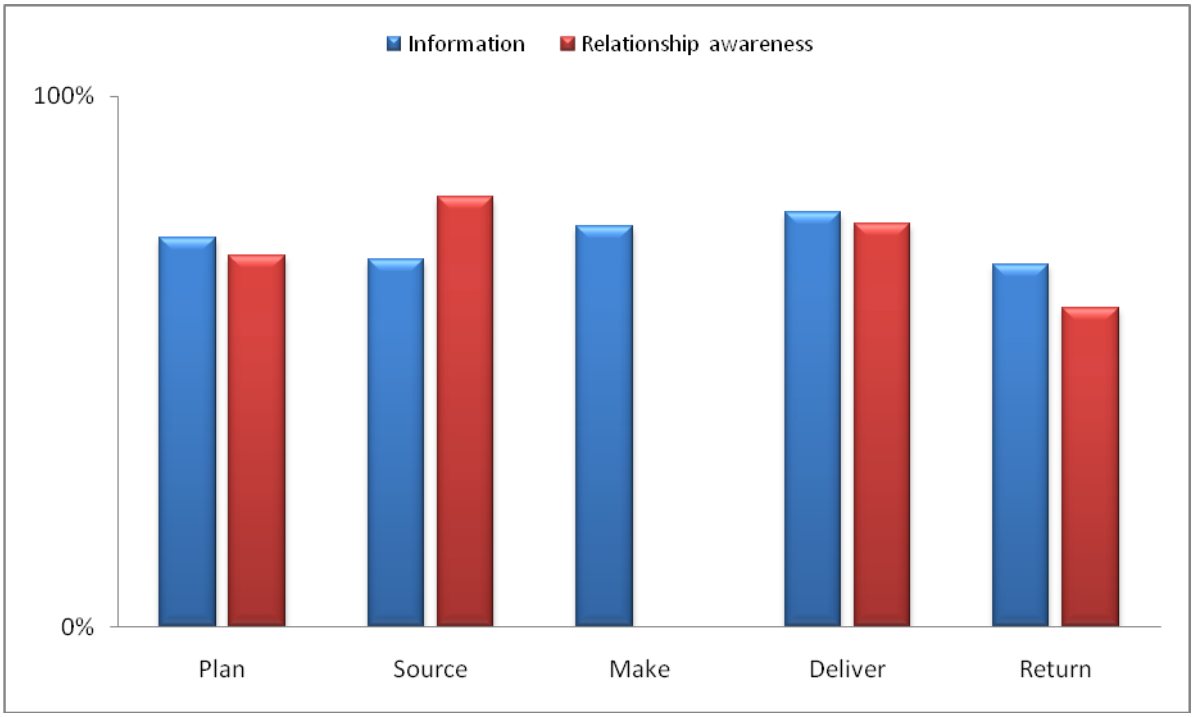


Figure 19 – Company I's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity upstream *Common sharing of future range and future production capacity downstream by	*Advanced supplier segmentation *Common customer segmentation *Advanced collaborative planning *Advanced collaborative development

	suppliers	
Source	*Common inventory information *Basic POS-data sharing *Common lead-time information *Advanced order procedure *Common production capacity *Basic production event information *Common track & trace information *Advanced cost structure information *Common BOM and blueprint information sharing *Advanced KPI measurement	*Various systems: EDI, XML, special developed solution and STD systems *Advanced Face-to-face *Advanced supplier development *Common conflict management *Common differentiation of clearance levels *Common 2-tier supplier awareness
Make	*Advanced inventory levels *Common cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Advanced POS-data collection *Advanced lead-time information *Advanced order procedure *Common track & trace information *Advanced KPI measurement	*Various systems: EDI, fully integrated business system and STD systems *Advanced service function *Common direct communication between functions
Return	*Advanced traceability *Common rational return information/specification *Advanced return information format *Advanced proactive response	*Common return flow communication *Common return flow segmentation *Common direct communication *Basic return flow improvement collaboration *Advanced return flow process *Basic node notification

Company I is perceived to be advanced in the plan process. Forecasts are based on POS data, extra sales, and marketing activities planned in each sales area. The forecasts have a fairly high accuracy rate and are shared with affected nodes through specially designed systems and at face-to-face meetings.

Company I is also perceived to have advanced visibility in the sourcing process. The visibility is a result of the transparency throughout the ordering process, event information sharing and collaborative approach. Company I gather information from the sales channel (warehouse) concerning sales rate and inventory levels. The information is automatically transferred into the planning system where the demand is matched with the suppliers' capacity and each supplier automatically receives order which is in line with their capacity. Thus, the plans are shared in a highly advanced manner. Some planning bypasses the focal organization, thus, the warehouses communicate directly with suppliers so that any unnecessary steps can be bypassed.

The make process of company I mainly consists of a DC and the sharing of design and blueprints. The visibility is perceived as high since the focal organization can access inventory levels in the sales

channel and track demand curves and needs in a timely manner. The visibility of the make process is further developed by an ability to act upon events which occur in the sourcing or delivery process.

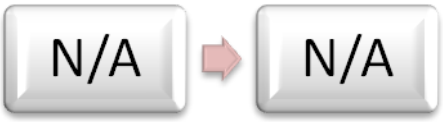
The delivery process is perceived as high visibility. The reason for this is partially described in the sourcing process. The visibility in the delivery process is further enhanced by a specific function which holds information concerning transportation of goods. The function informs nodes in a proactive manner in case of changes or events taking place during transportations. Thus the nodes have information concerning deliveries such as lead times, goods carriers, missing goods etc. All and all this contributes to a high visibility level.

The return flow process is ranked as having a slightly lower visibility level. The return flow still enjoys a high visibility level compared to the average company. The visibility is enhanced by a system where all information concerning returns is registered. The system also has a “panic” or “alert” function. This function is used if a return need top priority, by activating the “alert” function all concerned functions are notified (external relations, sourcing, quality etc.).

Finance

Company I is one of the two top companies in the evaluation and has been working with its visibility in the supply chain for many years. The respondent can still distinguish improvement areas that will generate a higher level of visibility and cost savings. Although, Company I has not chosen to participate in an estimation of future savings.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.10 Company J

This is an interview with a company in the retail segment of the research, the company will be referred to as company J. All products are sourced from suppliers to distribution centers. Company J owns their entire sales channels which makes it easy to control the product flow. It also makes it possible to control the business system used with wholesalers. Company J also has quite a large return flow to keep track of, which sets the scene for the analysis. Detailed information about company J will be found in the appendix.

The following diagram shows company J's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company J is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company J can be found in the appendix.

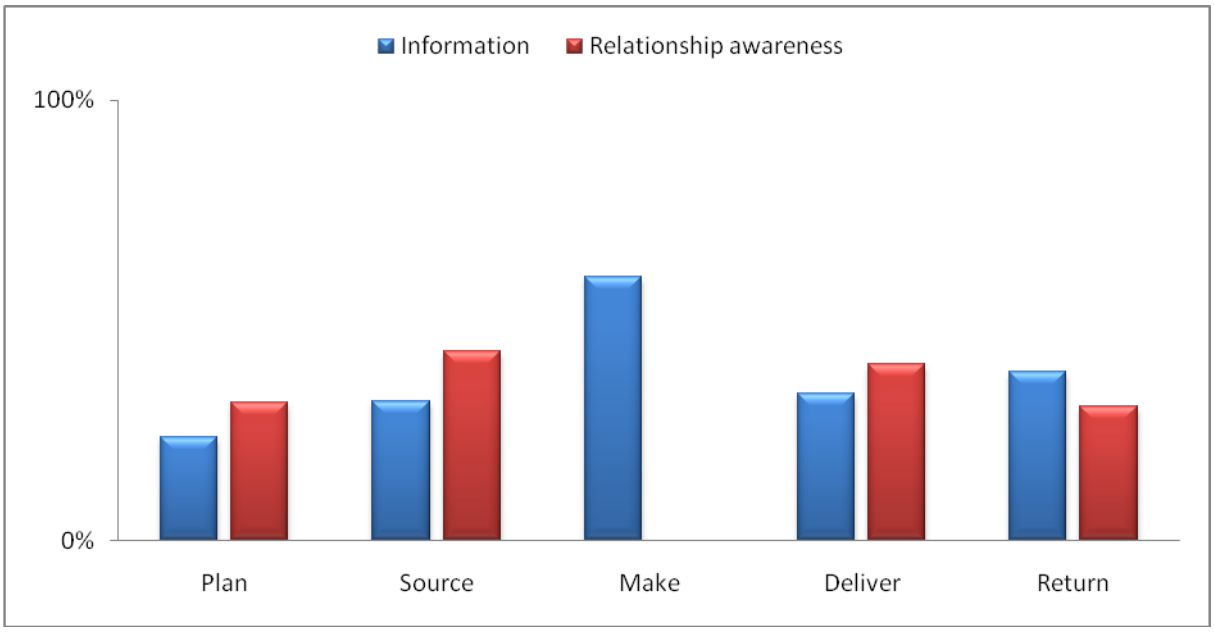


Figure 20 – Company J's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Basic sharing of forecast & demand planning *Basic sharing of future range *Common future capacity information	*Basic segmentation of suppliers *Advanced segmentation of customers *Basic collaborative planning *Basic collaborative development
Source	*Basic inventory information *Common POS-data sharing *Basic lead-time information *Basic order procedure *Basic production event information *Basic track & trace information *Basic cost structure information *Basic KPI measurement	*Various systems: EDI and standard systems *Face-to-face *Basic supplier development *Basic direct communication between functions *Basic conflict management *Basic risk management *Basic differentiation of clearance levels *Basic 2-tier supplier

	*Basic supplier development information	awareness
Make	*Common inventory levels *Common cost structure *Common asset visibility	
Deliver	*Basic inventory information/ATP/delivery date *Common POS-data collection *Basic lead-time information *Basic order procedure *Basic track & trace information *Basic KPI measurement *Basic focal organization development information	*Common systems: Business system & STD system *Face-to-face communication *Basic service function *Basic direct communication between functions
Return	*Common traceability *Common rational return information/specification *Basic return information format *Common proactive response	*Basic return flow communication *Common return flow segmentation *Basic direct communication *Basic return flow improvement collaboration *Common return flow process *Basic node notification

Company J´s visibility appears to be basic in the plan process. The visibility is limited by many reasons. There is no clear structure for how to share plans, forecasts and activities with suppliers. All nodes receiving information concerning the forecasts and activities add their own perception, which makes the information biased (causing ripples in the supply chain).

In the source process company J is also perceived as reaching a rather low level of visibility. The visibility is perceived as low because the ordering is conducted in a rather manual manner (though using EDI). The KPI measured is biased and communication is handled in an ad hoc manner rather than by structured processes. The sourcing visibility is also limited because there is no event information taking place.

The make process is perceived to have a common level of visibility. Company J has a structured process for handling the internal flows and tracks all events taking place within the make process. The lack of visibility within the make process is mainly due to unequipped system support and poor tracking of goods within the process. However, the manufacturing process is in line with the majority of the companies in the study.

The deliver process is perceived as a basic level of visibility. The main reason is that there is a lack of information connectivity with the sales channel. Thus, ordering and deliveries are made with a process which does not promote visibility process. Moreover, there is no function which specifically monitors the delivery process, thus, events may not be revealed.

Company J has a basic or close to common perceived return visibility. The process is structured and different return flows are handled according to the specific needs. However, there is still a lack of visibility since the communication concerning return flows is rather limited. Information is not shared downstream on a need to know basis downstream, thus creating work for nodes which are not affected by a return. The information going upstream is handled ad hoc and in with standard

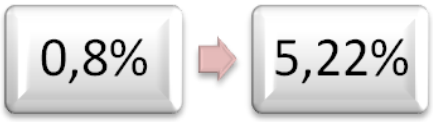
communication systems. Thus, it is not certain that information will reach all nodes which are actually affected by a return. Furthermore, the physical returns need to be manually registered in various systems when received by the focal organization, which causes manual work.

Finance

Company J has not worked with visibility in the supply chain in the past, but has recently begun to focus on this segment. They do, however, distinguish great potential, and, according to their level of visibility. They are one of the companies with the largest potential. The respondent sees great potential in most parts of the company and the supply chain. The possibilities to reduce the inventory levels at their distribution centers are high with a larger visibility. The respondent says that it would be possible to reduce the inventory levels by 50 percent. Even the logistic costs would be able to be reduced by 5-10 percent as the visibility increases.

The respondent considers the administrative costs to be widely connected to the level of visibility, due to the fact that manual labor handles most of their systems. Administrative staff is today working in multiple systems with the same job. The respondent estimates savings to be in the hundreds of millions. Company J also suffers with out of handling in the shelves of their wholesalers and large improvement areas is to be found.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.11 Company K

This is an interview with a company in the retail segment of the research, the company will be referred to as company K. Company K's value chain is fairly basic compared to other companies in this research. All production is sourced to suppliers by their capacity of their purchasing, which makes the downstream communication important. Company K owns all of their sales channels, which make it easy to control the product flow. It also makes it also possible to control the business system used with wholesalers. Company K is also growing a lot which makes flexibility important and sets the scene for the analysis. Detailed information about company K will be found in the appendix.

The following diagram shows company K's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company K is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company K can be found in the appendix.

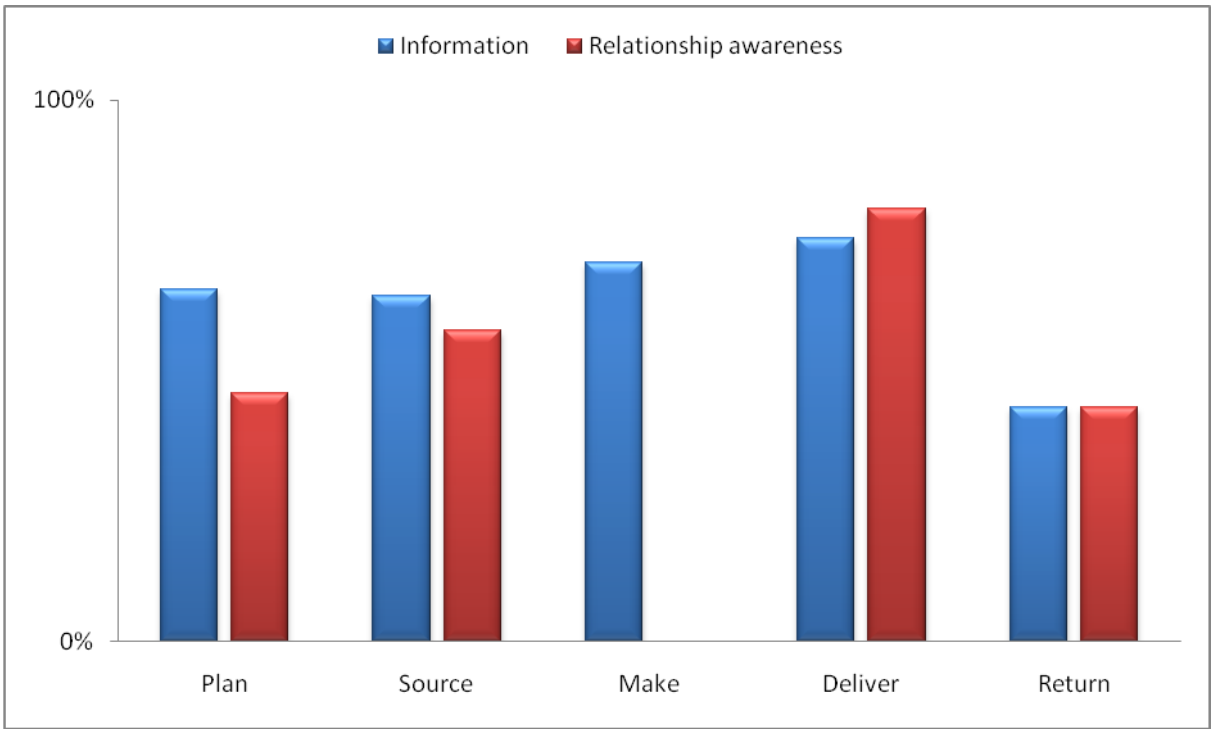


Figure 21 – Company K's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Common sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity downstream by suppliers	*Basic supplier segmentation *Common customer segmentation *Basic collaborative planning *Common collaborative development

Source	*Common lead-time information *Basic order procedure *Advanced production capacity *Common production event information *Common track & trace information *Common cost structure information *Common BOM and blueprint information sharing *Advanced KPI measurement	*Various systems: Business system and STD systems *Advanced Face-to-face *Common supplier development *Basic conflict management *Common differentiation of clearance levels *Basic 2-tier supplier awareness
Make	*Advanced inventory levels *Common cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Advanced POS-data collection *Common lead-time information *Advanced order procedure *Common track & trace information *Advanced KPI measurement	*Various systems: Business systems (EDI) and STD systems *Common service function *Common direct communication between functions
Return	*Basic traceability *Basic rational return information/specification *Common return information format *Basic proactive response	*Common return flow communication *Basic return flow segmentation *Common direct communication *Basic return flow improvement collaboration *Basic return flow process *Common node notification

The diagram above shows that company K is slightly better than common in the planning process. Company K has a relatively uncomplicated plan process because they purchase capacity from the suppliers. They do not sell many standard products and each produced product need to be explained to the supplier. No systems are used with suppliers. Personal contact is used because it has been proven to be the best.

Company K achieves advanced visibility in the source process. No direct system communication exists with suppliers, because personal contact has been proven to work the best. The system communication reaches the staff in contact with suppliers. Almost no products are purchased directly from suppliers, but capacity is purchased instead. This makes communication and control of the suppliers important. No CPFR system is appropriate either due to this fact.

The make process of company K mainly consists of a DC and the sharing of design and blueprints. The visibility is perceived as slightly above common. The focal organization can access inventory levels in the sales channel and track demand curves and needs timely.

The delivery process is perceived as advanced. The DC communicates with the customer through a system where they keep track of the inventory levels. Customers thereafter refill their own stocks when needed. All customers are measured with a certain amount of KPI's and benchmarked with

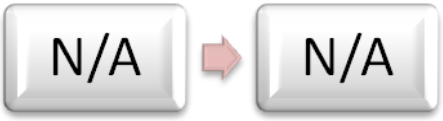
each other. The customers that are owned and a part of company K do not have any ability to affect the assortment, which is fully controlled by company K.

The return flow is very small and reaches a basic level. There are no standardized ways of handling the return flow, but each event is handled differently. The main way to handle return flow is a lowered price level at the customers.

Finance

Company K does not have any case to base possible future savings on and find it impossible to make estimations whatsoever. They see great potential in the segment, Furthermore the respondent does not consider himself qualified enough to make any estimation.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



6.4.12 Company L

This is an interview with a company in the retail segment of the research, the company will be referred to as company L. Company L's value chain is fairly basic compared to other companies in this research. All production is sourced to suppliers by their capacity of their purchasing, which makes the downstream communication important. Company L does however not manufacture all their products themselves at suppliers. They do also purchase complete products from other suppliers. Company L owns all of their sales channels, which make it easy to control the product flow. It also makes it also possible to control the business system used with wholesalers. Detailed information about company L will be found in the appendix.

The following diagram shows company L's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company L is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company L can be found in the appendix.

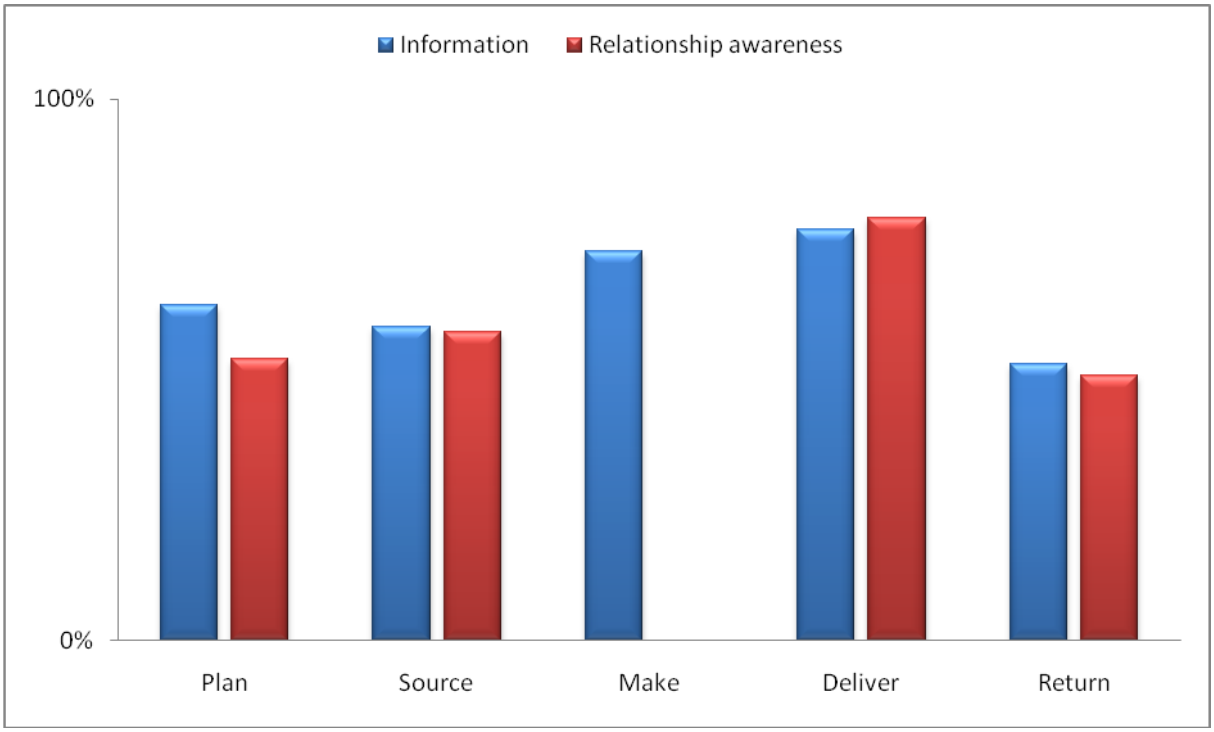


Figure 22 - Company L's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Common sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Common sharing of future range and future production capacity downstream by suppliers	*Common supplier segmentation *Advanced customer segmentation *Common collaborative planning *Common collaborative development

Source	*Common lead-time information *Basic order procedure *Common production capacity *Common production event information *Common track & trace information *Common cost structure information *Common BOM and blueprint information sharing *Common KPI measurement	*Various systems: Business system and STD systems *Advanced Face-to-face *Common supplier development *Basic conflict management *Common differentiation of clearance levels *Basic 2-tier supplier awareness
Make	*Advanced inventory levels *Common cost structure *Common asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Advanced POS-data collection *Common lead-time information *Advanced order procedure *Common track & trace information *Common KPI measurement	*Various systems: Business systems (EDI) and STD systems *Common service function *Common direct communication between functions
Return	*Basic traceability *Common rational return information/specification *Common return information format *Common proactive response	*Common return flow communication *Common return flow segmentation *Common direct communication *Basic return flow improvement collaboration *Basic return flow process *Common node notification

The diagram above shows that company L is slightly better than common in the planning process. The planning towards the sales channel is handled by fully integrated systems which allow a central control over POS-data and inventory levels. The visibility is limited since most information concerning the plans is shared face to face. Suppliers inform of sales activities and company L informs suppliers of different activities. However, there is no common activity planning process or system support. Suppliers of private label gods are not informed concerning any plans or future demands. The information is basically a booking of production capacity.

Company L handle two main types of suppliers. Firstly there are suppliers which produce company L´s own products. Secondly there are branded suppliers. The first type of suppliers is handled with basic tools and mainly face to face communication. The orders are places basically by purchasing production capacity. There is no CPFR process in place for this. This makes communication and control of the suppliers important. Company L handles this by having a high presence at the suppliers' plants and by having quality controls at different levels. All and all the visibility in this flow is limited. The second type of suppliers is more advanced but still attains a limited visibility. The visibility is limited since the actors do not share information which can provide value to the other nodes in the supply chain. However the visibility is improved by a supplier portal which is used for ordering, invoicing and other communication. The visibility can be improved by extensive sharing of

information with suppliers, thus, harmonizing the lot sizes, make the ordering more effective and work more proactive.

The make process of company L mainly consists of a DC and the sharing of design and blueprints. The visibility is perceived as above common. The focal organization can access inventory levels in the sales channel and track demand curves and needs timely.

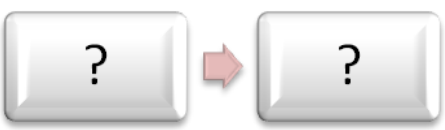
The delivery process is perceived as advanced. The DC communicates with the sales channel through a system where they keep track of the inventory levels and sales rates. Thus, there is a pull system from the DC to the sales channel. The visibility can be improved by fine tuning the system and gain an event better information level on the inventories and actual fill rates at the sales channel.

The return flow is at common level. There are different returns flows, either quality issues or excess inventory (out of date). The quality returns are sent back to the suppliers. There is no information process following the quality returns. The information is handled in exception mode e.g. depending on the situation and the people involved. The returns due to excess inventory are sent to an outlet which put the gods out for sales with reduced prices. These returns are not followed by a standard information system either.

Finance

Company L acknowledges different improvement areas with increased visibility. The main task for company L is to make use of information which is collected today. The main improvement areas are understood to be in the sales channel of the company rather than in the procurement phase. By using information concerning sales and inventory levels the service level can be increased, giving increased sales of about 50 million SEK. By using the information to optimize the inventory better the space savings accumulate to about 50 million SEK in terms of reduced rents. The cost for redistributing goods which have not been sold, or to put this goods on sales, correspond to cost savings of 100-300 million SEK. The smallest saving is made on reduced cost for handling of goods (no unnecessary handling) can reduce costs by approximately 25 million SEK. All these improvements and sales are estimations. The improvements are connected to improved visibility. In this case the visibility improvements are understood as being due mostly to better usage of available information.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor. An annual report of this certain corporation has been impossible to find. Normal calculations have therefore been impossible to complete.



6.4.13 Company M

This is an interview with a company in the Communication high tech segment of the research, the company will be referred to as company M. Company M is in a market where the demand rate on their products are changing fast. Some of the components are manufactured in-house and some are sourced and delivered as parts. The production must be flexible due to the fast product changes. Company M's customers are both global with a standardized purchase manner and local with a more diversified manner. This sets the scene for the analysis. Detailed information about company M will be found in the appendix.

The following diagram shows company M's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company M is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company M can be found in the appendix.

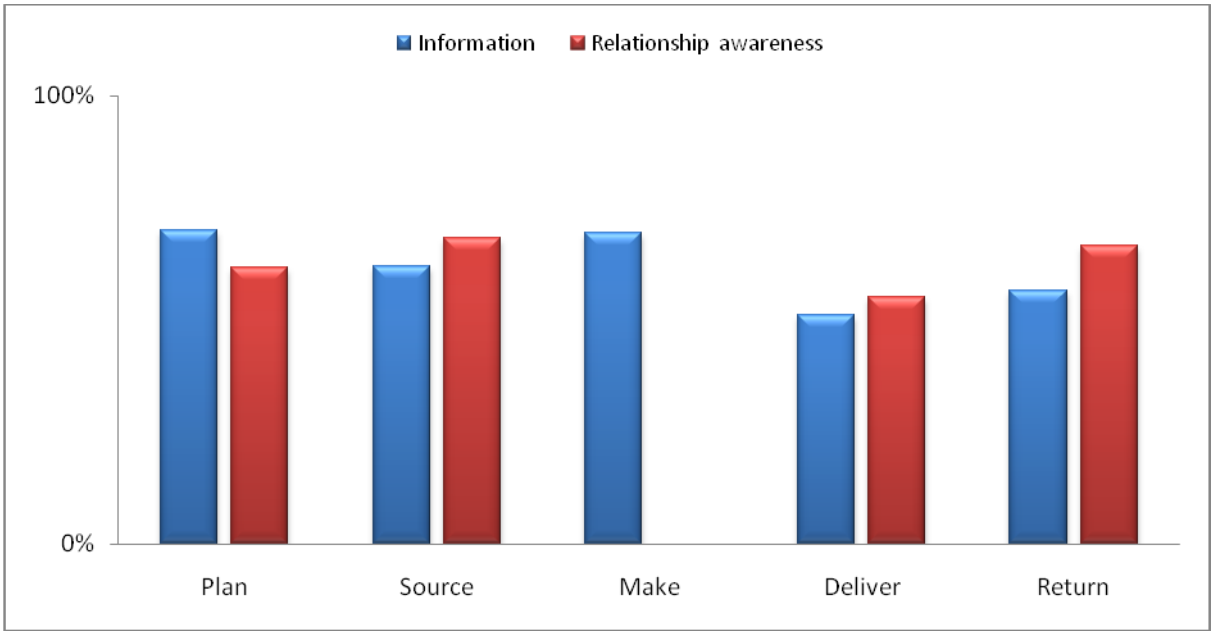


Figure 23 – Company M's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Advanced sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy with suppliers *Common sharing of forecast & demand planning with customers *Advanced sharing of future range and future production capacity	*Advanced supplier segmentation *Common customer segmentation *Common collaborative planning *Common collaborative development
Source	*Common inventory information *Common lead-time information	*Various systems: EDI, XML, web solution, RosettaNet and STD systems *Face-to-face

	*Advanced order procedure *Common production capacity *Common production event information *Basic track & trace information *Common cost structure information *Advanced BOM and blueprint information sharing *Common KPI measurement	*Common supplier development *Common conflict management *Advanced risk management *Advanced differentiation of clearance levels *Common 2-tier supplier awareness
Make	*Common inventory levels *Basic WIP information *Common production planning *Common cost structure *Advanced asset visibility	
Deliver	*Common inventory information/ATP/delivery date *Common POS-data collection *Basic lead-time information *Common order procedure *Basic production capacity information *Basic production event information *Basic track & trace information *Common KPI measurement *Basic focal organization development information	*Various systems: EDI, XML, web solution and STD systems *Face-to-face communication *Basic service function *Common direct communication between functions *Common conflict management *Common risk management *Common differentiated clearance levels
Return	*Common traceability *Advanced rational return information/specification *Basic return information format *Common proactive response	*Basic return flow communication *Common return flow segmentation *Basic direct communication *Common return flow improvement collaboration *Advanced return flow process *Common node notification

The diagram above shows that company M is advanced in the planning process. They use VMI suppliers when possible and have a variety of communication systems. A hub was also created to collect all the material to suppliers, this, in order to lower the purchase costs and gain economy of scale with 2-tier suppliers. Furthermore, A few global strategic customers are helping the planning and production procedure by a CPFR system.

Company M is rated above average in the source process. Company M separates component suppliers from suppliers who deliver parts. The communication and relation varies between these. It is easy for company M to control the parts suppliers Bill of Material (BOM), but harder with the suppliers of components who have to be benchmarked with each other. Company M cannot follow the flow of goods from suppliers by track and trace, but it is possible to get information about stops along the way.

The make process of company M is about average visibility. Company M cannot follow the product at work in their factories and are not interested. They are, however, interested and able to follow the stock levels at different points in the production, not only end stock. The flexibility in the production varies, but is very important to company M in order to change an application or color as the demand changes.

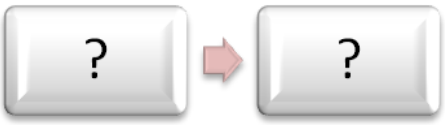
The deliver process reaches average visibility. The communication with customers is handled by a variety of systems. Some orders are submitted by VMI and the rest of them by an EDI or RosettaNet connection. The performance with customers is measured continually by the same KPI's as with suppliers, but deliveries will soon be measured by a system called perfect order.

The return process is rated above average in visibility. The information is handled in a structured process with traceability so that quality issues can be tracked to different batches and components. The information is spread with both systems and by more ad hoc traditional communication and the visibility is therefore somewhat limited.

Finance

Company M has been focusing on their visibility in the supply chain for quite awhile and has seen the benefits of high visibility. The respondent does, however, find it hard to make a complete future estimation on possible economic savings. However, they do see a great potential in always being able to fill the gaps of customers and having better predictions on what amount of the products they will be able to sell. An estimation of possible increased sales by 20% will definitely be in range as the level of visibility continues to rise. The respondent says that other estimations would not be accurate as they will not be as reinforced by case as the other respondents.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor. An annual report of this certain corporation has been impossible to find. Normal calculations have therefore been impossible to complete.



6.4.14 Company N

This is an interview with a company in the Communication high tech segment of the research, the company will be referred to as company N. Company N is in a market where the competition has increased in the last decade. They mainly deliver services, but also have a segment with distribution of products. The main focus for this company is therefore the delivery process. The customer base consists of a wide range of wholesalers which they do not control, which sets the scene for the analysis. Detailed information about company N will be found in the appendix.

The following diagram shows company N's visibility score in the different processes of the SCOR model. The evaluation of attributes (systems, processes and information sharing) used by company N is presented in a table below the diagram. The score in the diagram is deduced from the evaluation of the attributes. More information concerning the specific visibility attributes of company N can be found in the appendix.

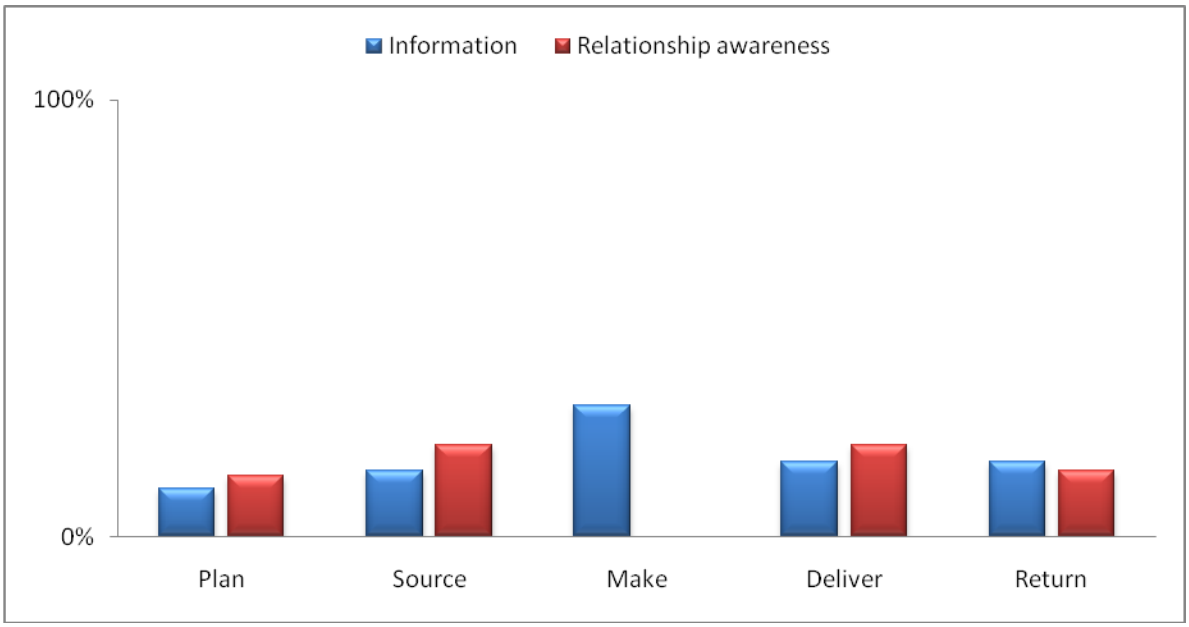


Figure 24 – Company N's level of visibility SCOR diagram

	Information	Relationship awareness
Plan	*Basic sharing of forecast & demand planning: Rolling demand plan & production plan, timely, trustworthy *Basic sharing of future range and future production capacity	*Basic supplier segmentation *Advanced customer segmentation *Basic collaborative planning *Basic collaborative development
Source	*Basic inventory information *Basic POS-data sharing *Basic lead-time information *Common order procedure *Basic production capacity *Basic production event information *Basic track & trace	*Various systems: EDI, XML, web solution and standard systems *Face-to-face *Basic supplier development *Basic conflict management *Basic risk management *Basic differentiation of clearance levels *Basic 2-

	information *Basic cost structure information *Basic BOM and blueprint information sharing *Basic KPI measurement	tier supplier awareness
Make	*Basic inventory levels *Basic asset visibility	
Deliver	*Basic inventory information/ATP/delivery date *Basic POS-data collection *Basic lead-time information *Basic order procedure *Basic production capacity information *Basic production event information *Basic track & trace information *Basic KPI measurement *Basic focal organization development information	*Various systems: VMI, EDI, XML, web solution and standard systems *Basic face-to-face communication *Basic service function *Basic direct communication between functions *Common conflict management *Basic risk management *Basic differentiated clearance levels
Return	*Basic traceability *Basic rational return information/specification *Basic return information format *Basic proactive response	*Basic return flow communication *Basic return flow segmentation *Basic direct communication *Basic return flow improvement collaboration *Basic return flow process *Basic node notification

The diagram above shows that company N has basic visibility in the planning process. There is no segmentation of suppliers today. The question is rather "which supplier can deliver according to these demands". There is a multitude of suppliers in some product categories, and single sourcing in some categories. Therefore the supplier base is large and the supply risk is high. The relationships with suppliers are generally short, 1-2 years. Therefore sourcing is a high cost and there are no extended relationships. The information shared with suppliers is highly limited. They do receive forecasts concerning the size of a "contract". However there is no information concerning the accuracy of the forecast (compared to actual orders), thus the forecast is not an effective communication tool.

Company N is rated as basic in the source process. There is no standardized system for how to place orders. Every country and entity use their way of ordering. In terms of tracking there are no possibilities to track the goods. The inventory levels at retailers are tracked with spreadsheets. The spreadsheets are the only system to track future demand, inventory levels and the sales rate of different items. Today company N purchases all goods with delivery terms included. Therefore it is impossible to track costs and understand which costs that can be reduced. There is no cost structure sharing besides competitive bidding. The transparency concerning the costs is zero. There are no KPI in use today in order to track performance and understand the capabilities of different suppliers. The measurement of suppliers is rather based on subjective perception from individuals within company N. The system used today is mainly Excel to support operations. Before a proper system can be

developed the processes must be better structured. Problems with suppliers are solved by terms in the contract. There is also a special consultant company which makes the purchases for the firm. Thus this consultant firm can play hard ball and company N have the ability to stay out of conflicts.

The make process of company N are rated as basic in terms of visibility. The make process is basically limited to warehouses and transportations, since company N do not produce any products. The visibility is basic since there is no structured processes for how to handle the product flow and track the events at warehouse levels. There is no tracking of inventory at central level. At local level inventories can be tracked with the help of the third party logistics provider which is used.

The deliver process is also rated as basic visibility. Company N has no segmentation of the sales channel. There is no KPI system for measuring performance towards the sales channel or ultimately the consumers. There is no tracking of inventory or transportations. Altogether this limit the visibility to basic visibility.

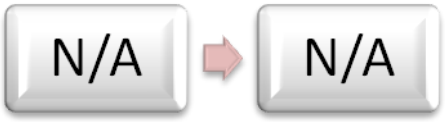
The return process, as the other processes, rated as basic in terms of visibility. There is no standardized process for how the return flow is handled. The return flow is handled with local solutions. Service flow, incorrect shipments etc. is all handled as exceptions. The systems used are the systems provided by the suppliers. Internal control is made by use of spreadsheets, or the return flow is not controlled at all.

Finance

Company N has not been focusing on its supply chain and its visibility in the past. Therefore, they have not applied any cases to this segment jet and find it hard to estimate a certain amount, or percent that they will be able to save. Company N, however, does not see a great amount of potential in the segment and has recently launched a new department and hired a new manager that will improve this segment.

When discussing the potential savings that other companies in the same segment have estimated based on cases, the respondent seem very eager to listen. The response indicates that the same amount, or percent, is likely, and they should aim even higher. Company J is not in the same industry, but evaluated in the same segment as company N. Company N, in fact has twice the level of visibility as company N.

An increased profitability based upon estimations above, DuPont-diagrams and annual reports have been calculated and are shown beneath. The calculations will not be found in this report due to the anonymity of the participating company. However, the calculation has been an iterative process with the respondent as well as inspected by the thesis supervisor.



7 Discussion & conclusion

In this chapter, the empirical findings are further extended by an elaboration upon the trends within supply chain visibility- The findings are further enhanced by a summarization of the results presented in a comprehensible manner under the fulfillment of purpose section. This chapter also positions the study more academically with earlier research carried out within the field of supply chain visibility. In addition, the authors will also present reflections of the results; the section will touch upon the greater implications of the results and any criticism of the result. The final section presents inspirations for further research within the topic, in other words, how the notion of supply chain visibility can be further explored.

7.1 Trends within supply chain visibility

In the previous chapters, it is clearly described how and why the companies within the study are widely spread across the supply chain visibility spectrum defined in chapter 6. There is a fundamental understanding concerning the importance of the supply chain, however, the more intrinsic attributes which drive visibility are not adopted by the bulk of the companies. This chapter focuses on exploring the trends within supply chain visibility. The trends are both what the responded companies see as potential improvement in the future and the different processes and attributes used today by the companies in the different visibility development stages. The companies are, as stated in the beginning of the analysis chapter, clearly divided into different development stages. The first stage is addressed as basic perceived visibility, the second stage as common perceived visibility and the third step as advanced perceived visibility.

In the first development stage, the trends are that the companies focus on the delivery flow rather than the entire supply chain. Company N and company J belong to this group. These companies segment their suppliers in a rather basic manner, thus not allowing strategic relationships to form and no segmentation of clearance levels to information is made. The trend is that these companies have the ambition to focus more on the supply chain rather than a logistical handling of different flows, meaning transportations rather than harmonization across nodes. The companies strive in the direction to share more information and data towards suppliers but also to work closer to customers to track demand and improve efficiency in ordering processes. A concrete example of this is company J which is structuring the processes within the company so that applicable support systems can be incorporated. One system they are concerning is an automated ordering process, where the customers' inventories are closely monitored and inventories are refilled without a formal order when reaching a certain level. Furthermore, company J is reviewing the possibilities to work closer with suppliers and share more data, an example is a project where they share POS data with a limited number of suppliers. Company N, on the other hand, has appointed a new function (a supply chain manager) to increase the visibility and structure of the supply chain.

In the second development stage, the trends are that the companies have a clear strategy for handling both upstream and downstream flow. The roadblocks facing these companies in the quest of increased supply chain visibility are varying from company to company. The clearest trends are that these companies are developing more advanced methods for sharing information upstream and downstream using supplier portals, integrated systems and special functions such as the LCT. The

companies, moreover, need to strengthen the internal information flow so that effected members of the focal organization are informed of events in a timely manner. These companies see the most potential in harmonizing the supply chain by improving the collaborations among the supply chain nodes. Concrete examples of this is company A which run projects concerning VMI with both customers and suppliers in order to improve collaboration and reduce ripples in the supply chain. The companies in the second development stage see no point of tracking goods in between nodes (track and trace functions), thus not realizing the potential of being in full control of the supply chain.

In the third development stage, the trends are that the companies make use of VMI systems upstream and downstream, have clear communication structures, have systems to share important data and information with suppliers and customers, allow direct communication between suppliers and customers (in cases where it is applicable) and take control over the transportation flows by functions such as the LCT. The information is spread, depending on the need of information, across different nodes in a way which minimizes risks. Information concerning issues is spread in an event based manner, thus informing only affected nodes concerning deviations. These companies see potential in improving the internal information flow so that the strategic, tactical and operational levels are interconnected information wise, thus improving the output of the information visibility across members of the supply chain. These companies also acknowledge a potential in an improved track & trace function of goods. A closer track & trace will not only allow better event tracking of transportations, but also improve inventory level accuracy, reduce loss (theft etc.) and harmonize the supply chain from one end to the other.

The trends in the different development stages clearly show that the further a company reaches on the ladder of visibility, the ways to increase the visibility becomes even more sophisticated. One example is the acknowledgement of the possibilities with the track & trace function.

7.1.1Supply chain visibility trends within different industries

The empirical findings clearly state that there are no clear differences in the level of visibility within different industries. There are retail companies with both high and low scores, there are also HTC companies with high and low scores. If one looks beyond the total visibility score by analyzing the scores on different processes in the SCOR model, a more balanced picture appears. The four industries examined in the study show specific trends and patterns of development.

The retail industry shows a far more developed delivery process than its sourcing process. This is concluded from the interviews and evaluations which show that the retail companies have above average results on the delivery process. The retail companies are ranked high in both the relationship awareness and the information aspect. This is most likely due to the fact that the retail industry has a close interrelation with the sales channel, in many cases the sales channel is even an integrated part of the retail company. The source process, on the other hand, is evaluated as below average for most of the retail companies. The reason to the question “why” the retail companies lack visibility in the sourcing process is most likely due to not just one, but a multitude of reasons. A clear trend is that the retail companies, which make more use of low cost country sourcing, hold a lower level of visibility within the source process. Thus, one of the reasons appears to be the low costs focus. Since the companies source with low cost focus, the cost for implementing and strengthening visibility in the source process cost more than it generates within the boundaries of the low-cost strategy.

Furthermore, the suppliers in low-cost countries are perceived by the respondents as underdeveloped. Thus, it is not possible to share information by the same means as in Western Europe. The poor visibility in the source process also affects the visibility in the plan process of the retail industry. Since the suppliers are not integrated in the plan process, the visibility is understood as reduced. A contributing factor is that the retail companies do not regard the suppliers as strategic since they are more focused on the sales and distribution channel. There are, however, examples of retail companies which do have focus on the suppliers as well as on the sales and distribution channel. The most telling example is Company I, which shows a high level of visibility throughout the evaluation model. The trend in the retail industry is that the companies have had focus on the sales and distribution channels rather than the suppliers. However, this will most likely change along with the macroeconomic environment. The more successful companies, in terms of visibility, are also the more successful companies, in terms of revenue, within the retail industry. Thus, the future trend will be an increased focus across the supply chain to promote more agile and cost efficient companies.

The HTC companies and the industrial companies share the same trends. This is because the companies act in very different industry climates. The HTC have a short "design to market" cycle. However, some of the industry companies act under the same premises. Companies acting in such an environment need full control over the sourcing and the manufacturing part. Both kinds of industries show a focus on the sourcing, the make and the planning process. The companies see potential in VMI with suppliers and further collaboration to harmonize the demand over the supply chain. Most companies also develop strategic relationships with important suppliers and have different systems in place to allow communication and information flow with suppliers. On the delivery side, however, a common trend is that these companies have not taken control over the sales and distribution channels. In some cases, the companies use a MTO strategy which allows full control over demand. However, the study show that most of the companies can do much more to strengthen the delivery process and the planning process by developing better relations within the sales and distribution channel. The clearest trend is that the companies on the frontier are developing strategic relations with customers to make use of VMI solutions, they establish special functions to track the delivery flow (LCT) and they run projects to further understand and segment the customer base. All of this is part of the quest of taking control over demand and reach a more harmonized supply chain.

The automotive industry shows a wide spread in the level of visibility. The most distinctive trend in the automotive industry is control over costs. In no other industry is the cost transparency with suppliers and second tier suppliers so high. The respondents believe that this is due to the pressure in the business and because the suppliers are not just raw material suppliers, but rather, subsystem suppliers. The suppliers' impact on costs, performance and quality, shapes an environment where control is important. The control and visibility of suppliers (source process) is somewhat higher than the companies in the industry. The trends in the automotive industry are to support the highly structured processes with feasible systems. Examples are the implementation of supplier portals for easier communication. There is also a trend to strengthen the total visibility by improving collaboration between functions within the focal organizations. Thus, the greatest trend in the automotive industry lies within the increased internal visibility rather than extended visibility into suppliers and customers.

7.2 The academic positioning of the study

Many studies have focused on the relationship between information sharing and performance within the supply chain, or the importance of relationships within the supply chain (see table of articles chapter four). A few earlier studies have gone beyond the link between performance and relationship, or information. Such research explores how information sharing can be turned into visibility (Hartiala H. et al. 2006; Fosso Wamba S. et al. 2007; M. & Oke A. 2007; Moberg et al. 2002). Many of the studies miss the connection between information sharing and relationship awareness. Thus, the missing link in most studies has been how relationship awareness can improve information sharing in order to gain visibility. This thesis further elaborates on previous research by empirically showing the linkage between relationship awareness and information sharing. Furthermore, the empirical findings also support that increased visibility leads to improved performance throughout the supply chain, measured in quantified financial figures.

The conceptualization of visibility is proven to be a tool to measure visibility. The tool is conceptual, however, it is capable of indicating the next steps for companies, depending on their level of visibility.

Finally, it is argued that an organization can be involved in many different linkages. Therefore, visibility must be endorsed in every node. The empirical findings show that this can be done by using a palette of technology enablers, processes, face to face meetings and different involvement levels in relationships. Thus, a company does not necessarily gain visibility by using cutting edge technology and focusing fully on every relationship. The visibility is rather based on acknowledging differences in suppliers, customers and other members of the supply chain in order to handle each explicit link in the most efficient way.

7.3 Fulfillment of purpose

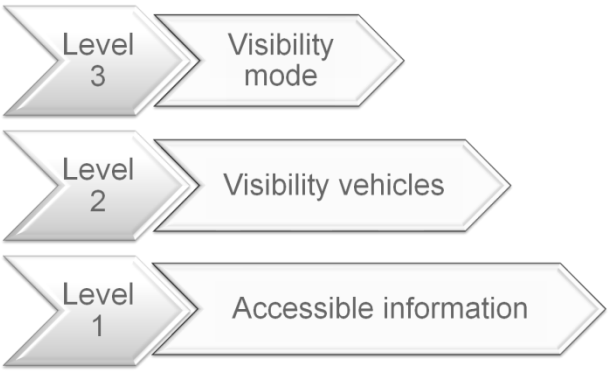
This section answers the research questions which constitute the foundation of the thesis. The "Measure of supply chain visibility" concerns the initial question of how supply chain visibility can be measured. "The Development stages of supply chain visibility" concern the question of how visibility develops within supply chains and the financial implications of supply chain visibility.

7.3.1 Definition of visibility and how it is achieved

Supply chain visibility is *"Lean and streamlined information with the right quality, at the right time, in the right format, at the right node of the supply network. True visibility allows detection of deviation in an easy and comprehensive manner to the addressed nodes in the supply chain network".*

This definition is taken from the research article review in chapter 4. It is a summarization of the research made within the field. The study is based upon this definition, which is crucial to the evaluation model used. The definition incorporates the importance of relationship awareness along with the need of information and effective carriers of information. Thus, the definition is the starting point and the outcome of the thesis. During the writing of this thesis one thing has become very clear. Information is nothing but an activity, visibility is when the information is interpreted and used in a proactive way. In the words of Barratt and Oke (2007), "*Information sharing is an activity, visibility is the potential outcome of such activity*"

The definition of supply chain visibility is the starting point of this thesis, the question of "how visibility is achieved" is more complex. The study does not provide the blueprint of how to structure the supply chain in order to achieve supply chain visibility. However, the study points at some general levels of how to achieve supply chain visibility. The figure below shows the three levels which are identified as basic steps to achieve visibility.



Visiblity is basically build through three levels. Each level consists of specific activities which provide one key to reach supply chain visiblity. The first level is to collect information, the second level is to share the information and the third level concerns how to make use the informaiton so it provides true value to the organization.

Level one is to collect the right information which is needed. Example of such information is:

*KPI *Inventory levels *Demand data *Point of Sales-data (POS) *Forecasts *Marketing/sale activities *Product information *Batch size information *Production event information	*Transportation event information *Track & trace information *List of command (who to contact "in case of").

Level two is to find the right communication tools for sharing the information, collected in level one, with actors in the supply chain. Examples of visibility vehicles are:

*Web portal *System solutions *Logistic Control Tower (LCT) *Communication processes *Communication plans *Physical restructuring	(HUBS, joint inventories, etc) *Track & Trace (RFID).

Level three concerns the ability to use the information to make actual improvements in the supply chain. This is the level which generates value as an effect of increased visibility. Level three is to deploy processes and make configurations of the supply chain, so that the information improves the operations. Examples of processes or configurations which are considered as visibility mode are:

*Web portal *System solutions *Logistic Control Tower (LCT) *Communication processes *Communication plans	*Physical restructuring (HUBS, joint inventories, etc) *Track & Trace (RFID)

These three levels, together with the conceptualization of supply chain visibility, are considered to provide a partial answer to “how visibility is achieved”. During the thesis writing, it has however, become clear that there are no easy answers to the billion dollar question of “how to share information in a way that allows full visibility”. The conceptualization, as well as the three general levels of how to construct visibility, brings us one step closer to full understanding. However, this is only one step. Thus, the question of “how visibility is achieved” remains unanswered. Although, the confidence remains that this thesis brings the research community one step closer to the blueprint of how a supply chain with full end-to-end visibility.

7.3.2 Measure of supply chain visibility

This study is based on the research model constructed from earlier research within the field of supply chain visibility. The research model is thoroughly described in chapter 5. From the results presented in the Analysis chapter, it is viable to conclude that the research model is a feasible instrument to measure level of visibility. The majority of the companies show a close correlation between information and relational awareness. This relation is in line with the common literature concerning the relational impact of informational exchange, which is described in chapter 4.1. The close correlation between information and relational awareness is an acknowledgment to the research model; information and relational awareness are the pillars of supply chain visibility. The relation between level of visibility and potential financial improvements indicates that the companies perceived as advanced level of visibility essentially perform better from a supply chain perspective than those companies with a perceived basic level of visibility. This is also in line with the literature which stresses the relation between information sharing and profitability presented in chapter 4.1. Thus, the supply chain visibility research model presented in this thesis appears to measure the information exchange and the interrelation among the nodes of the supply chain, which is understood as the level of visibility.

The research model, as constructed today, does not attempt to be used as a tool describing the exact visibility and the improvement areas of different companies. The model rather indicates the general status of visibility and the overall direction the focal organization should evolve in to enhance the level of visibility. The findings indicate that the research model is feasible and that supply chain visibility is constructed by the information exchange and the relational awareness. This, since the findings imply a close relation between these attributes to improve information transparency throughout the supply chain.

The research notion of supply chain visibility is extended by findings that support the relation between relational awareness, informational exchange and the financial performance. The extension of the research improves the total understanding of the entirety of the concept of supply chain visibility.

7.3.3 Development stages of supply chain visibility

Supply chain visibility clearly develops differently within companies. This is shown in the first part of the analysis. Five clusters representing how different corporations develop their visibility are visualized. When comparing the levels of visibility at the different respondents with each other four archetypes are distinguished as visualized by the figure below:

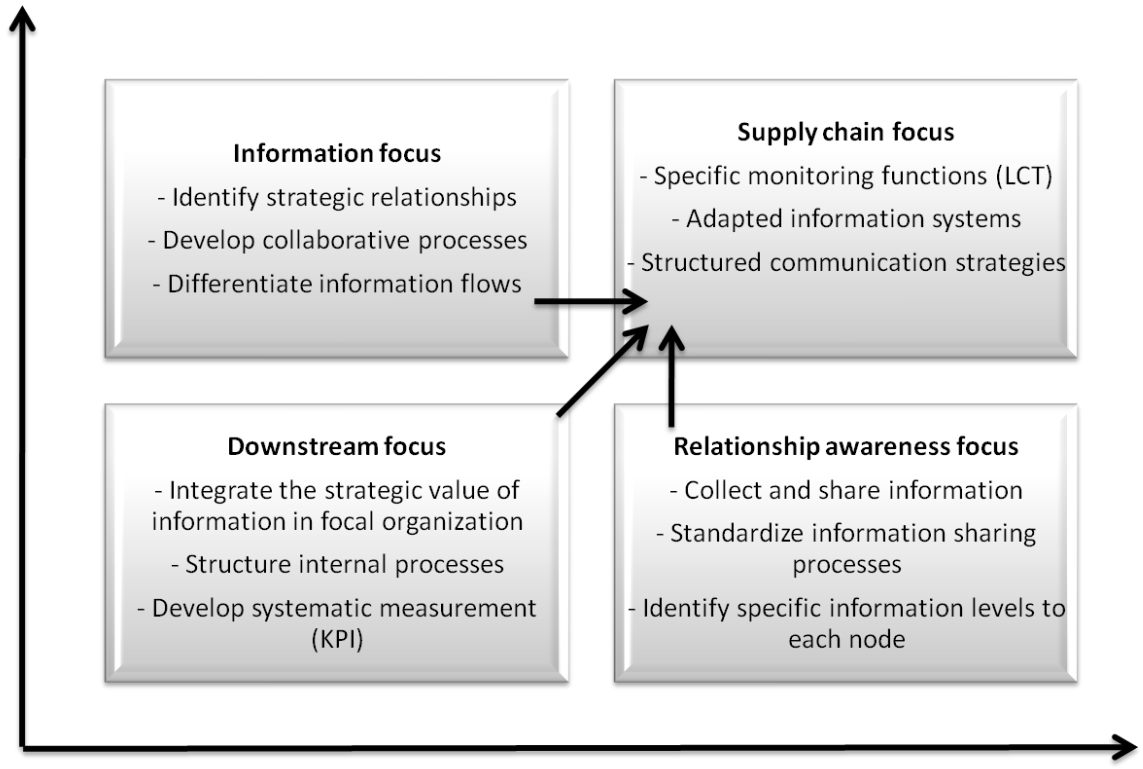


Figure 25 – Archetypes of visibility

Distinguished examples of how to continue to develop the corporations supply chain visibility are explained beneath. As described earlier, it is easier to distinguish improvement areas when belonging to the lower archetypes. Although, it is important to remember that improvement areas always exist even though visibility may already be high.

Supply chain focus

The supply chain focused archetype has the following characteristics. The archetype shows extensive qualities that have clear strategies and controlled processes for information sharing. They support their processes with various systems to allow timely and exact information sharing across different nodes of the supply chain. The concrete examples beneath are methods used by archetypes in this segment:

PLAN	SOURCE	MAKE	DELIVER	RETURN
VMI/VMR	Full cost structure	Total production awareness	LCT	Alert system
Daily updated yearlong forecasts	Share KPI's in system	Direct information sharing across nodes	Integrate sales channel	Full traceability
Collaborative production plan	2-tier supplier awareness	Full inventory visibility		

Table 6 – Characteristics of supply chain focus

Information focus

The information focus archetype has the following characteristics. The archetype show extensive qualities that gather and share information concerning most part of the supply chain, such as KPI's, demand and forecast data, etc. The archetype shows problems of sharing this information in a structured manner, because all nodes receive the same information irrespective of if they need it. Relationships are swapped frequently and information becomes difficult to interpret. The concrete examples beneath are methods used by archetypes in this segment:

PLAN	SOURCE	MAKE	DELIVER	RETURN
Extensive sharing of plan and forecast	Consult suppliers	Full cost structure tracking	Manual orders	
Basic segmentation of suppliers/customers	Ordering according to production plan		Static information concerning deliveries	Store, but not share information regarding returns
Customer information gathering, not used	Focus on low cost			

Table 7 – Characteristics of information focus

Relationship awareness focus

The relationship awareness focused archetype has the following characteristics. The archetype show extensive qualities of sharing information, both through systems, and through face-to-face meetings. The archetype shows difficulties of gathering and sharing information concerning most parts of the supply chain. The archetype knows what node to inform, but the communication is not transferred at

the right time containing the right information. The concrete examples beneath are methods used by archetypes in this segment:

PLAN	SOURCE	MAKE	DELIVER	RETURN
Close supplier relation in beginning of PLC	VMI with larger suppliers (inventory shared by email)		Logistic improvement projects with sales organization	Return issues handled with sales organization
Share information through e-mail	Improvement plans with suppliers		Share fixed lead-times	

Table 8 – Characteristics of relationship awareness focus

Downstream focus

The downstream focused archetype has the following characteristics. The archetype shows difficulties integrating the information approach, also the supply chain is fragmented as well as the information between customers, and focal organization and suppliers is based on orders and deliveries. They rarely use various systems and mainly stick to standard systems. The concrete examples beneath are methods used by archetypes in this segment:

PLAN	SOURCE	MAKE	DELIVER	RETURN
Basic segmentation of suppliers/customers	Supplier meetings to share information		No tracking of goods during delivery	Manual information sharing
No standardized process for sharing plans & activities	Code of conduct agreement		Time controlled deliveries	Ad hoc storage of information
Basic sharing of POS-data	Manual order system		Few KPI's	

Table 9 – Characteristics of downstream focus

The empirical study and analysis distinguish clear economic aspects of developing a high level of visibility. The average corporations estimate profitability increases between 20-30 percent. Not only do the companies with a low level of visibility have economic aspects to gain, but even companies with a clear supply chain focus estimate that there are economic aspects to gain by aiming at an even higher visibility level.

7.4 Reflections of the result

The result of this thesis is in line with studies conducted concerning the importance of supply chain management which have been conducted in the past, in that sense the results are not ground braking. However, this research has the focus of supply chain visibility and its importance in order to improve companies acting in the world of outsourcing. Therefore, the results are more of a discovery rather than a verification of previous studies. This is a report covering the general antecedents of visibility as well as a cross industry benchmark verifying the validity of the research model. The result holds intrinsic value for both the industry and the field of research. The industry can now realize the full potential of supply chain visibility with the benchmark serving as the starting point in building a business case. The research community receives results which are pushing the frontier of knowledge concerning supply chain visibility. The build-up of theory concerning the pillars of supply chain visibility supplies a foundation for further studies within the research area.

The results do not stand unchallenged. There are many sources of concern which blacken the results. The results are drawn from a qualitative study, thus there can be concerns raised regarding interpretations and influences caused by the researchers. The bulk of data originates from interviews, thus, there might be misunderstandings between the interviewer and respondent affecting the results. This criticism is legitimate. Criticism concerning the research approach is alleviated by the structured method used throughout the research. In general, the concern is still reasonable since the research is carried out by Master students and not professionals.

This thesis only covers the view of the focal organization, thus not covering an entire supply chain. Therefore, it is questionable whether the focal organizations view is correct or not. A closer study of the nodes in a supply chain would also give a more relevant understanding of the elements in the interrelation which would actually improve the visibility, as perceived of all members of the supply chain. However, that is not the focus of this thesis, which aims rather, at being a foundation for future research to lean on. It is although questionable how other members of the studied supply chain regard the relationship and the information sharing with the focal organizations which have been subjects to the study.

Further criticism can be raised concerning the respondents. It is a fact that the respondents might be mistaken in their answers, which might make the study biased. To prevent incorrect information, the study is based on interviews with mainly logistic managers and supply chain managers. Thus, the information is drawn from the utmost experienced professionals within the Swedish industry. Since the thesis covers a wide area, the information maybe questionable. In order to fully cover the research area, specialists within each segment of research should be quoted. Such an ambitious approach, however, does not fit into the time frame of a D-level thesis. However, it shows the importance of further research to validate the results and reach deeper into the antecedents of visibility and its possibilities.

7.5 Further studies

This study is based on case studies which present some very obvious limitations, such as the issue of generalizability. Also the data is mainly based on interviews which present even further limitations. However this thesis is based on analytical generalization (Yin, 2003). The study is exploratory and aims at identifying different linkages between nodes in the supply chain. In future studies the

linkages also need to be investigated with support of other data sources and with other theoretical perspectives. It would also present a great value to the research to investigate the visibility in the internal linkages further. This study shows that the organizations need to improve visibility in both internal linkages as well as external linkages. Thus, it presents a great opportunity to investigate the internal visibility from a organizational perspective rather than from a supply chain perspective.

As a benchmark study of supply chain visibility this thesis only scratches the surface of the studied companies. The notion of supply chain visibility can be studied from various angles and with different theoretical approaches. Something noticed during this study is that complete supply chain visibility studies of separate companies would provide a deeper understanding of that specific company. It would, in these cases, be possible to interview and study a number of customers and suppliers in the companies supply chain, which has been impossible due to time limitations during this study.

Participating companies are very interesting to benchmark themselves with other companies in their industry. A deeper study of companies in one industry would be project that many companies would find very interesting. Providing a framework for the future of visibility along with a financial rational is appealing to the industry, but also to the research community. The value of research is ultimately the value it brings to the future organizations.

This study is a first step of investigating visibility in the supply chain and many steps still remain. Visibility in the supply chain is an area that will be highly acknowledged in the future. This since new technology brings new opportunities to increase the visibility, and visibility present cost saving opportunities. A few examples of further study areas have been mentioned above and many more exist.

Acronyms

ASCS – Advanced supply chain synchronization	POS – Point of sales
BAM – Business activity monitoring	RBT – Resource-based theory
BMS – Business management systems	RFID – Radio frequency identification
BPEL – Business process execution language	ROI – Return on investment
BPO – Business process optimization	SCE – Supply chain execution
CGS – Computer generated solutions	SCEM – Supply chain event management
CPFR – Collaborative planning, forecasting and replenishment	SCOR – Supply chain operations reference-model
CRM – Customer relationship management	SCP – Supply chain planning
CTP – Control tower platform	SCPM – Supply chain process management
DC – Distribution center	SCRC – Supply chain resource consortium
EAI – Enterprise application integration	SKU´s – Stock keeping units
ECR – Efficient consumer response	TMS – Transportation management system
EDI – Electronic data interchange	VMI – Vendor managed inventory
EPC – Electronic product code	WMS – Warehouse management system
ERP – Enterprise recourse planning	
KPI – Key performance indicator	
LCT – Logistic control tower	
MIS – Management information system	
MTD – Make to deliver	
MTO – Make to order	
MTS – Make to stock	
MRP – Material resource planning	
PDM – Product data management	
PLM – Product lifecycle management	

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Interviews

Company	Date	Number of respondents	Occupation of respondents
A	2007-10-18	1	Global Supply Chain Manager
B	2007-11-19	1	Global Supply Chain Manager
C	2007-10-31	1	Global Supply Chain Manager
D	2007-11-01	2	Nordic Sales Manager & Supply Chain Manager
E	2007-11-26	3	Material Director, Nordic Logistic Manager & Material Planning Director
F	2007-10-29	2	Global Supply Chain Manager & Logistic Development
G	2007-11-06	2	Intern consultant
H	2008-01-15	1	Supply Chain Manager
I	2007-11-29	2	Supply Chain & IT Manager
J	2007-10-17	1	Supply Chain Manager
K	2007-11-08	1	Global Supply Chain Manager
L	2007-12-13	2	Director IT & Logistics & Chief of inbound logistics
M	2007-11-20	1	Global Supply Chain Manager
N	2007-11-23	1	Supply Chain Manager

Table 10 – Interview information

Appendix

Appendix A - Interview guide

Plan

How are suppliers or customers grouped or evaluated is a specific structure or model used?

- Suppliers
  - All treated the same?
  - Is suppliers evaluated due to size of purchase, profitability?
  - Consideration of strategic value?
- Customers
  - All treated the same?
  - Is suppliers evaluated due to size of purchase, profitability?
  - Consideration of strategic value?

To what extension are your suppliers confiding with future marketing- and sale- activities and other planning?

- Scheduled demand of components/products
- Scheduled changes of ex. production capacity/stores
- Marketing- and Sale- activities
- Production planning

  - Is such information important?
  - Is the information trustworthy?
  - Is the information confided in time to affect/plan?
  - Confide through systems, contact, email etc.?

To what extension are your customers confiding with future marketing- and sale- activities and other planning?

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  - Is the information confided in time to affect/plan?
  - Confide through systems, contact, email etc.?

To what extension are your customers confiding you with future marketing- and sale- activities and other planning?

- Future demand of products
- Schedules changes in assortment or product mix

- Marketing- and sale- activities

    - Is such information important?
    - Is the information trustworthy?
    - Is the information confided in time to affect/plan?
    - Confide through systems, contact, email etc.?

To what extend are suppliers/customers helping with planning

- Suppliers
    - Are suppliers adding value?
    - Confidence problems?
    - No common planning or through ex. CPFR?
- Customers
    - Are suppliers adding value?
    - Confidence problems?
    - No common planning or through ex. CPFR?
- When significant difference occurs, how is it solved?
    - What level of understanding exists?
    - Can it be reduced?
    - Do you calculate with significant difference?

What kind of support exists from the management to develop collaboration with strategic suppliers and customers?

- Is the management applying a ”network perspective” or does each part of the value chain speak for themselves?
    - Does a support for continually develop of relations exists?
    - Does a “network perspective” imbue the entire organization?
    - Is the management active in relation and information development?

Source/Deliver

At what level can you track the product flow from your suppliers, in terms of inventories, production, transportation and goods receiving?

- Inventory status at suppliers
    - At what level (finished goods, components etc.)?
    - Is the information trustworthy?
    - How is the information communicated (system, email, face-to-face)
- Supplier production in case of events
    - Is different events reported to you (implications for you)?
    - Is information communicated so that you can act up on it?
    - Is such information spread by systems, email, or by other contact?
- Delivery and transportation
    - At what level can you track goods during transportation (lot size, item level etc.)?
    - At what geographical locations?

- Is this made in systems or by contact?

At what level can you track the product flow from you to the customers?

- Inventory status at customers
  - At what level (component, status, update frequency)?
  - Is the information reliable?
  - How is the information communicated (systems, email, and contact)?
- Your inventory status, production events, sourcing events etc.
  - Is the customer notified of implications due to such events?
  - Is the information communicated so that the customer can act on it?
  - Is such information spread by systems, email, or by other contact?
- Delivery and transportation
  - At what level can you track goods during transportation (lot size, item level etc.)?
  - At what geographical locations?
  - Is such information spread by systems, email, or by other contact?
- Inter layers (ports, distribution channels, cross docking)
  - At what level (container, lot size, item)?
  - Is the information reliable?
  - Is such information spread by systems, email, or by other contact?
- How is information communicated (systems, face-to-face, contact, email)

At what level can you track the suppliers cost structure?

- Contracts, competitive bidding?
- Production costs?
- Inventory costs?
- Logistics and transportation cost (3PL)?
- Which benefits do you see with such information?
  - At what level is it traceable, is the information updated?
  - Is the information accessible in a timely manner?
  - Is the information accessible in systems or only at purchase meetings?

To what extent do you share your cost structure with customers?

- Logistics costs
- Internal cost structures (inventory, production, development etc)
- Purchase agreements with suppliers
- Which benefits do you see with such information?
  - At what level is it traceable, is the information updated?
  - Is the information accessible in a timely manner?
  - Is the information accessible in systems or only at purchase meetings?

At what level do you have information concerning suppliers' access to material and components?

- Supply risk
- Dual sourcing
- Access to material and components (costs)

    - All components and material which is important for your products?
    - In time to intervene in case of procurement issues, help reducing prices?
    - Is such information spread by systems, email, or by other contact?

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    - All components and material which is important for your products?
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    - Is such information spread by systems, email, or by other contact?

In which ways do you measure your suppliers' performance, Key Performance Indicators?

- Service level
- Delivery precision
- Total asset turnover, continues improvements
- Lead times
- Cost
- Quality

    - Measured by carefully selected processes and systems?
    - At what frequency?
    - By common system, language, documents etc.?

How do you measure your performance towards customers?

- Service level
- Delivery precision
- Total asset turnover, continues improvements
- Lead time
- Cost
- quality
    - Measured by carefully selected processes and systems?
    - At what frequency?
    - By common system, language, documents etc.?

At which levels do you communicate with your suppliers?

- Which systems are used?
  - Are the systems compatible?
  - Manual?
  - Examples: Portals, EDI, are the solutions differentiated to fit different suppliers?
- Is there any perceived risk with sharing information?
  - Trust issues?
  - Are the systems perceived as secure?
- Is there any extended communication?
  - Communication except orders and price issues in order to develop the relationship?
  - Is all communication carried out in standardized processes and channels?
- Is the communication straight ahead?
  - Is information concerning plans, order stock, markets etc. secret?
  - Do you reckon that the suppliers feel that information is used "against" them?
  - Are there systems to support the communication?

At which levels do you communicate with your customers?

- Which systems are used?
  - Are the systems compatible?
  - Manual?
  - Examples: Portals, EDI, are the solutions differentiated to fit different suppliers?
- What kind of information do you think that the customer should share?
  - Is the collaboration helped by extensive information sharing?
- Is the communication straight ahead?
  - Is information concerning plans, order stock, markets etc. secret?
  - Are there systems to support the communication?
- Is there any extended communication?
  - Communication except orders and price issues in order to develop the relationship?
  - Is all communication carried out in standardized processes and channels?

How are conflicts with suppliers solved or tackled?

- In case of delivery changes?
  - Is there mutual understanding and possibilities to make compromises for the greater good? Minskar förtroendet?

    - Används juridisk representation/används kontrakt?
    - Dras lärdom för framtiden
- In case of problems with a delivery?
    - Are such issues regulated in contracts?
    - Do you work collaboratively to solve problems?
    - When are problems discovered (proactive vs. Reactive)?
- To what extent do you think that the suppliers fulfill their undertakings?
    - Do they stretch to continuously improve their services?
    - Do they have communication systems do support information sharing?

How are conflicts with customers solved or tackled?

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    - Do they stretch to continuously improve their services?
    - Do they have communication systems do support information sharing?

To which extent do you collaborate with suppliers?

- In order to optimize inventories, production and lead times etc?
    - Every node has to take their responsibility?
    - Do you acknowledge the entire supply chain?
    - Is each node regarded as being on its own or interlinked?
    - Is there any collaborative improvement projects?
- In order to cut costs, purchase costs, logistical costs and to secure procurement?
    - Every node has to take their responsibility?
    - Do you acknowledge the entire supply chain?
    - Is each node regarded as being on its own or interlinked?
    - Is there any collaborative improvement projects?

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  - Do you acknowledge the entire supply chain?
  - Is each node regarded as being on its own or interlinked?
  - Is there any collaborative improvement projects?

Make

To what extend do you have information concerning the production and intern flow of material?

- Products in work
- Inventory levels
- Production stop
  - At the "right" level, product, article, component?
  - Continually updated to be applicable?
  - Are all interested informed?
  - What plans, processes exist?
- Production planning (flexibility in planning)
  - Does flexibility toward changes in deliveries exist?
- Cost structure (production cost, stock-keeping cost, etc.)
  - Structured calculation?
  - Updated and precise information?
  - Available for everyone or only through the economy function?

At what level are occupancy of assets such as machines and staff available?

- Staff
- Forklifts, machines, etc
- Trucks
- Stock surface
  - The right level and quality that is capacity or number, etc.?
  - Updated and precise information?
  - At a structured and documented way, via systems or via manual contact?

Does a set process exist to use information in purpose to keep flow of material, products and production in a steady pace?

- Information is used in purpose to adjust production, goods receive?
- The focus is on "putting out fires" rather than working proactive

Return

What information exists and how is it confided regarding the return flow? That is information gathered from customer and sent back to suppliers?

- Imperfect goods
- Damaged goods

- Delivery problems
    - Precise information regarding cuss of problem, quantity?
    - Immediately reported to prevent continual problems?
    - Via systems, via packing slip or due to a warning immediately detected by supplier

How is the return flow handled with suppliers and customers?

- How is it communicated?
    - Is there a value in communicating the return flow?
    - Is the flexibility increased by communicating the return flow?
    - What systems are used, are they structured?
- What communication area exists towards the actors in the return flow?
    - Does a common aspiration towards improvement exist?
    - Who is blamed responsible when a problem occurs?
    - Can common problems prevent future problems?
    - Does collaborative project with actors in the return flow exist?
- Is it traceable?

Appendix B - Company transliterations

This part of the appendix will provide the reader with more detailed transliterations of the interviews. All transliterations are made in the tidiness as the interviews were conducted.

Company A

Plan

Suppliers are firstly divided by sales channel, direct sales or indirect sales. Secondly they are divided by purchasing size i.e. importance. By defining the suppliers by the same process worldwide it is possible to track suppliers and make internally benchmarks of different suppliers.

Suppliers are involved in the planning process in the beginning and at the end of the PLC, the rest of the life cycle the demand is stable and do not cause the need of further involvement. During the bulk of the PLC the suppliers are provided POS data every fourth week, in order to track the demand.

Most plan and demand data is transferred by EDI solutions, however company A also uses XML and web based solutions. To suppliers who can´t handle EDI or other solutions basic emails are used to pass information. There is a VMI project running where one supplier is fully integrated into the system and have full access to real time POS data, inventory levels and order status. This is a project which will be leveraged into other suppliers in the future.

There is a great support from the management to further improve visibility and supplier relations. The future is to further integrate the suppliers into the ordering and planning system.

On the customer side, there are both VMI solutions and more basic order and delivery systems. However since prognostic calculation work well the visibility into customers' usage is not that important. Thus the customer is not so important in order to make effective planning.

Source

Company A uses different ordering processes with different suppliers. In many cases it is a matter of putting down an order and receives the goods. However company A work strategic with a few suppliers or explicit flows of material. An example is:

When an order is planned for production a signal goes straight to the supplier. The suppliers deliver the demanded material over night and it arrives at the plant in time for production. If there is a problem the supplier will send a signal back to the plant immediately and the plant can reschedule the production.

Suppliers who are neither apart of the production notice system nor integrated to the system cannot see any information regarding the demand, POS and production planning. However this information is distributed by email if they cannot access it by other means.

Company A has a limited visibility into their suppliers' structures. The cost structure is based on competitive bidding. The company with the lowest price has the most effective cost structure. The

bidding is complemented by a risk assessment of the supplier. The risk assessment is made in order to assure a reliable sourcing of material.

Company A cannot track any goods on the way between their suppliers and their plants. The goods are registered when it is delivered to the plant. The internal deliveries is tracked when the goods leaves one facility and also registered when it enters the next facility. There is no track and trace function on the road, however this is not understood as important since the deliveries are time based.

All suppliers are assessed according to the KPI´s. The suppliers are informed of their performance at supplier meetings.

Company A understands a certain measure of risk to share information with suppliers as well as with customers. However company A sees the potential benefits of sharing information as more important than the potential risk. Every supplier and customer is also assessed before given any clearance to systems and information.

If conflicts occur with suppliers it is handled differently depending on the supplier size. However most often it is solved, sometimes it has to be regulated by the contract and sometimes we stop use a supplier.

Make

Company A has good information and visibility through systems within production. However they lack this transpiration between different functions. The logistical flows are fractionated between different functions such as purchase, production, distribution.

Since company A has asset visibility in one sense. They use plans to have the right capacity at distribution and in trucks. In the production there is both capacity planning and everyday planning to keep production running in case of material problems.

Deliver

Customers are provided with different alternatives of how to communicate. They can either use EDI, XML or Web based solution for communication. In the near future a Web portal will be developed to provide even more diversified solutions. Over 50 percent of the customers use the systems for communication the remaining customers use email, fax or phone to handle the communication. The information each customer have is depending on how integrated they are. Basically they can have information concerning orders, status and financial activities. The customer can track their deliveries on the web portal if they have the tracking number. They can only see the geographical status when the order is started, produced or in a warehouse. Company A recognizes a great potential to further develop the integration with customers, then company A can take an active part in helping the customers.

Traditionally company A is very good at standardized products. However customer specific products are not as effectively managed. The lead time and the supply risk are communicated to customers by the electronic gateways. Thus the customer will be aware of deviations from standard lead times at

the point of order, we offer visibility into our supply. If there is a supply risk and we cannot get the right material in time this will also be notified in real time (at point of order) the customer will receive a new lead time directly. However this information normally holds a low quality, meaning that the communicated lead time is incorrect. The new lead time is communicated when the product was due to delivery, which is very late. If the customer is “online”, meaning integrated, the communication will be by the systems but sometimes it is by fax machine or phone since the customer is not technically advanced to receive the information electronically.

Since there is no possibility to track goods when being transported Company A is depending on the fact that transportations work according to plan. Since company A only have one delivery a day the flow is quite easy. There is one truck that arrives at the central warehouse every day. Thus the flow will not be helped by further information. If a truck miss a ferry or is stuck in traffic, information concerning the event will not help the warehouse since this is the only truckload that they need to handle. However it would help to have visibility (RFID) when a truck is approaching the warehouse, a signal that the truck only has 10 k left. Then it would help to both prepare the docking crew but also to keep better performance measures on the deliveries.

Company A uses KPI to keep track on their performance to customers (stock availability, ship on time, transportation precision). The KPI is measured by the system and in some cases by manually interceptions. The transports are measured by the transporters, here only deviation is measured. The KPI are presented every day and every four weeks. When a logistics provider informs company B of a deviation this information is not forwarded to the customer (only as a miss in the KPI). In the future this will be one way to improve customer satisfaction, inform of deviations in real time. Feedback concerning KPI is communicated to suppliers on meetings and if a supplier has problems there will be more frequent contact.

Company A work very much with customers to help them make better usage of their products. This is a part of their service but it also strengthens their relationship with customers, it also helps them to make use of the visibility which company A is providing to their customers. Conflicts with customer are never due to delivery problems. The only risk is quality problems.

Return

Information concerning quality problems are registered in a complaint system which lock other products from the same batch (web system, customer inform local representative and the local representative put it into the system). The physical return flow goes straight back to the quality unit in Sweden.

Normal returns without quality problems are handled by a web solution where the customer can book a return flow directly to the central warehouse. The return flow is handled just as a normal ingoing delivery.

Company B

Plan

Company B groups their suppliers depending on a number of factors. The first factor is if the suppliers are global or local e.g. only supporting the local market or used by the entire company no matter the geographical location. This grouping is to confirm if the suppliers will be handled by the global supply office or by a local supply office. The second factor is if the suppliers are regarded as strategic or not. The strategic suppliers are important to work closely with in order to ensure delivery.

Company B normally produces make-to-order products, thus they do not have of the shelf products. To keep the MTO strategy efficient company B divides their customers depending on the product group they buy and if they are OEM, distributors or end customer. This distinction allows strategies and processes to be used in every specific case rather than a general approach towards every order and every customer.

The OEM customers provides forecasts and production plans which allows a longer production horizon. However the other customers place and order when they realize the need, thus they cannot provide a forecast or any type of plan. The forecasts comes from the different segments, however this is not reliable information. The cooperation with the sales and the different segments need to be improved in order to provide better forecast information.

All suppliers receive a forecast each month with a twelve month horizon. This is the ambition, however all suppliers do not get the forecast with this discipline. The forecast is only a number of the total procurement need in the coming twelve months, it is this basic since the suppliers do not have the ability to handle too much information. It is only a limited number of suppliers that has the true ability to use a forecast which is more detailed. This since they do not have the processes or the technology to use the information. In addition the suppliers also have other customers to whom they deliver, thus the information need to be understandable and easy to handle. This forecast is in use where there is no VMI solution in place.

The forecast is based on historical data and then different factors is added e.g. sales activities. From this the excess inventory is deducted so that the suppliers will have the purchase forecast rather than the total production forecast. The suppliers also get their KPI in this system. Company B wishes to develop a VMI system with the OEM customers in order to track the demand closer and enable a more leveled out production.

Source

Company B has no ability to follow the goods flow upstream the supply chain. The process consists of a purchase order a confirmation and delivery date. In between the order confirmation and the actual delivery there is no information exchanged. In the cases where a VMI solution is in place information transparency is higher. The VMI suppliers report when they deliver goods and that delivery notification is put directly in to company B system.

In case of delivery deviation due to different reasons, e.g. production problem, information is passed on to company B by the purchaser in charge of the relation with the supplier. The suppliers are supposed to notify by some kind of contact, however this is not a standardized process thus the information is passed on an ad hoc basis. Company B notices this as an improvement area whereas to gain visibility into the delivery deviation so that the manual work can be reduced and the production handled in a more proactive manner.

Goods going down stream in the supply chain are traceable in a far more detailed way than the upstream flow. Company B has a logistic control tower (LCT) which is in charge of all flows. The LCT has full visibility of all goods flows going down stream in the supply chain, different logistic providers are used and they all report to the LCT. The LCT place information in the system and if a problem occurs somewhere along the way a “red light” is on and the sales organization and other affected nodes are notified by the system. In the future company B hopes to allow customers to log on to the system and gain this visibility without contacting the sales organization.

Company B has no visibility into the suppliers cost structure. This since the suppliers simply does not pass on such information and since company B do not have the barging power it takes to make use of such information. However when suppliers are involved in product development projects there is more transparency into the cost structure during the development and designing phase.

Company B has no structured process for how to track which second tier suppliers which are used and how information is passed on them. The visibility towards the second ties suppliers are limited to a reasoning concerning the second tier suppliers, the prices and the supply risk when having meetings and visiting the suppliers. However company B has in a few occasions assisted their suppliers in the procurement process in order to assure competitive price and availability. It should be acknowledged that this is not a common practice in company B.

Company B have Deliver – On – Time (DOT), lead times and quality as their prioritized performance indicators. On the VMI suppliers the DOT is exchanged to availability in stock, the VMI suppliers are also subject to measures concerning the maximum inventory levels, number of days in stock etc. to assure affective management of the inventories. The KPI´s are automatically registered in the system every month and then published on the VIS system which is the system used to communicate with the suppliers. The VMI suppliers are measured with more measures than the other suppliers, thus keeping the inventory efficient.

Company B has implemented specific software to communicate with the suppliers. The software is consisting of both web based solution and EDI solutions. The VMI suppliers use the web system to keep track on inventories and orders etc. they also use the web system to create purchasing orders on behalf of company B.

Company B acknowledges a certain risk with sharing information with the suppliers. The risk is reduced by assessing each supplier and grant different clearance levels depending on the risk involved. Thus some suppliers have full visibility into the blueprints, the bill of materials, inventory levels and order stock while other suppliers only get the most crucial information. There is no problem in west Europe however the risk is more noticeable in Asia where more and more suppliers operate.

Company B has no clear communication strategy for how to communicate with their suppliers except for the information which is spread through the systems. The inter-personnel communication is depending on the human factor rather than on a clear communication strategy. Company B understands a potential in implementing a clear communication strategy. Such strategy would allow a closer bond to the suppliers and be a foundation for further cooperation. A communication strategy would also allow a closer tracking of the suppliers and their whereabouts e.g. production plans, order stock, financial situation etc.

Company B communicates with their suppliers on operational, tactical and strategic level. The operational levels of company B and their suppliers handle the everyday work such as delivery problems, order tracking and order placing. The tactical level is the purchasing which has supplier meetings a number of times a year to keep the cooperation run smoothly. The strategic level is involved in special cases such as to secure procurement of raw material and engaging in more deep relations with suppliers.

Supplier problems or supplier issues are handled differently depending on the nature of the issue. One time problems are normally handled on the operational level (understood as putting out the fire). A problem which holds consequences for company B cause the need of the tactical level or ultimately the strategic level to involve in solving the problem. Most problems are solved with the suppliers in order to keep the relationship and the performance of the relationship intact. The measures (KPI) show when a supplier starts slipping, in case of poor results on the KPI´s the supplier development tool kit is used to help the supplier back on track. The tool kit helps analyzing where the problems lie and how to fix the problem. If the problem is understood as un-repairable the supplier will be exchanged for another supplier, ultimately there can also be legal consequences for the supplier. (The tool kit should work in a proactive manner – where a problem might occur).

Company B helps their supplier to develop by running different projects with them. The projects are normally connected to an extended relationship where the supplier get new products or a more strategic role, suppliers can also be engaged in projects to improve performance in areas where they have not kept up the standard. The engagement with the suppliers is also depending on their geographical location it is easier to engage with a supplier close by than a supplier in India.

Make

Company B has different systems in different plants to track their products at work. All systems keep a close track of the product flow both to keep track on locked up capital and also the lead times within the plant. The systems also keep a close track in the inventories. The products are registered manually in the inventory, thus it is depending on the human factor whether the inventory is correct or not. This is however a reality facing the business the only way around is an RFID system which would probably not be possible to use today.

When a problem occurs in the production it is supposed to be reported into the system so that the order is rescheduled. However this is not always done as intended and company B does not regard this as perfect but rather an improvement area. There is no standardized process for how affected functions and nodes should be notified when such a problem occur, thus the information transparency can be regarded as fairly moderate in terms of production problems.

Company B use information in a proactive way to keep the production running at steady level. The information exchange is a powerful tool to keep the production flowing. Company B has visibility into the costs associated with the production. In order to track costs a standard cost estimate is used the cost estimate includes purchasing, inventory and production. The standard cost estimate is adjusted and verified with the use of ABC calculations.

The asset visibility, the information concerning the usage of different assets such as inventory or machines, varies widely between different manufacturing plants. In general company B is better at material planning and control than asset planning and control since there are no support systems to use for the asset planning. The capacity planning is rather handled in excel sheets and in an ad hoc manner than the material planning and control which is handled in the structured system and with regulated processes.

Deliver

KPI used is delivery on time, quality and business intelligence. Measure the same KPI after source make and deliver in order to track where the problems actually occur. Depending on the delivery terms the delivery on time measure gets biased or not. The sales organization can follow the product flow from an order starts until it is delivered. The bulk of information is spread through the LCT. The sales organization is responsible for notifying the customer if a deviation from the order date occurs.

When conflicts occur with customers the different problems that might occur is regulated in the contract. Thus the conflict is basically solved by penalties decided upon prior to the delivery. Orders with high penalties tend to be favored in the production so it will be produced on time and at the right quality.

Return

The information in the return flow is a standardized process. Return flows going from focal organization towards suppliers are either detected when the goods arrive or when it is supposed to be used. The process for how to return this goods and the information which should be passed along with the goods is regulated within the ISO 9000 standardization.

When goods go from customers towards the focal organization the information process is slightly different. The traceability is regulated by EU standards, thus most of the products are fully traceable. When a problem is detected the information is passed on to the suppliers by documents. If the problem is urgent and information needs to be spread to prevent further problems the suppliers are notified by phone. However the process for return flow and return information is closely documented.

There is about 25 to 30 plants that needs implementation of the new information system. Today only about 25-50% of the plants have the systems implemented. Most plants have a basic level of information visibility, thus not having the supplier system in place (VIS) or the LCT in place to track the goods and events in the supply chain. There is also a need to further standardize the processes to allow atomization of the processes.

Company C

Plan

The suppliers are divided into different segments. The segmentation is based on repurchase rate, the purchase size and the strategic importance of the suppliers. Some suppliers deliver finished system while other delivers nuts and bolts. The ten biggest suppliers is favored in terms of logistic development, this is where most money can be saved.

The customers are structured homogenously. However, some customers are treated as projects, this is common if a special designed tool or fixture is build. There is no basic process for this. Since the common flow is handled in a more standardized way there is enough assets left in the organization to handle these projects.

Marketing activities are not communicated specially. However when a marketing activity is planned it is also put into the system, thus the suppliers can see the increase in demand. The suppliers also get information of how the business is growing. The information is more general and not product specific since the sales is volatile.

There is no production plans that can be communicated to suppliers since the production plant get the production plans on daily basis. However, the suppliers receive a forecast for covering the coming year. Customers are not interested in the plans and production since this is of the shelf products. Thus, the customers do not need information concerning future products or capacity. However, the sales service entity gets the information concerning future product range and capacity in order to keep track on which products to push sales for, and which products to phase out etc.

Customers never communicate their demand information since this is of the shelf products. The only customers who have forecasts are the ones who are building new plants or restoring other. However they cannot give a specification since the tools are one of the last things they decide, thus there is not enough time to act on the information.

Source

VMI is used by 20 suppliers in Tiarp and four suppliers at DC level (about 40 % of the purchase value).

Company C has a very limited visibility into supplier plants, production and inventories. There is no information shared concerning production problems, inventory levels or transportation. However if a big problem occur the supplier will most likely pick up the phone in order to inform company C regarding the problems. There is no track and trace function on when goods is moving from suppliers to company C either. The deliveries are only controlled in a time based manner. First when the goods are unloaded at the plant or the DC they will be registered into company C system. There is no standardized process or order of conduct for how to inform of delays and delivery problems. Some suppliers might pick up the phone some suppliers might not do so.

There is a black hole since there is no tracking on transports. The suppliers think that they delivered on time, company C argues that they missed and the truth is that the actual transport is the hold up. Thus track and trace would be an effective way to control deviations and find better solutions.

There is a constant work with developing the suppliers cost structures and sourcing. This work is mainly carried out by the strategic purchaser who handles the supplier. The work is not based on visibility into suppliers cost structures but rather by settings new targets to meet for the suppliers However, there is an understanding and knowledge for the different cost drivers at the suppliers. It is mostly up to the suppliers how they work to reach the new targets, however company C welcome them to benchmark processes with them in order to find effective ways to work. Company C do not act as a consultant for the suppliers but are happy the help them with the analysis. The connection with suppliers are strongest when developing a new product and in the beginning of the PLC. Then strategic suppliers are closely involved to find a smart design that help both the product performance but also keeps the cost down. Thus the bulk of information and cooperation is in the beginning of the PLC and after that the visibility is less clear.

There is a measure of cooperation in order to assure supply. E.g. for electronic components it is common to work together to assure supply. If a supplier has repeated problems with a specific product or component they will be asked to do an analysis of the situation and come up with a turnaround plan.

A few of the suppliers have EDI solutions but mostly the information is shared by mail or fax. They share forecasts and inventory levels.

Company C does not see any risks with sharing information with suppliers, given that the supplier is not a competitor (producing private label).

There is not a great need for deciding what kind of information should be shared with suppliers. It is understood that all suppliers need basically the same information. Most important is the positioning at the supplier. If company C is big it causes a greater need of information and collaboration. This since the supplier most likely has a bigger interest in information if we are a big part of their business.

Today suppliers are measured on cost reduction, inbound delivery efficiency, inventory levels (VMI) and outbound delivery efficiency (VMI). The KPI is communicated to the suppliers by automatic generated email every month. Suppliers that do not reach the targets have to setup an action plan. A problem with the KPI is that delivery precision is measured when it arrives at the plant. Thus it is unclear if it is because of transportation problems or due to late shipping.

When problems occur with suppliers there is no standardized process for handling the problem. The strategic suppliers are important and therefore problems with these suppliers are dealt with immediately. With the suppliers who have a VMI solution there are meetings every sixth week to keep track on the performance and find improvement areas, at least twice a year the meetings are held face to face.

There is transparency into the tier two suppliers, this since the material is important to uphold the quality, thus the suppliers cannot change their suppliers without letting company C know about it.

The visibility into suppliers cost structures and purchasing agreements is limited.

Company C does not have any visibility into their supplier plants, inventory or production plans. First when the goods are unloaded at the plant or the DC they will be registered into the system. In the future such information (T&T) would help the company to plan and understand delivery problems. However company C does not see any value in having visibility into the supplier plants and inventories. They rather see that the customer mind their business and just make it work.

Make

The production is based on the inventory levels at the DC. The list is updated every night. There are no production plans that are used for the planning; it is all based on information concerning the inventory levels.

The asset visibility is highly limited. Company C does know how much inventory space they have, the number of employees and number of machines. However this does not provide visibility. At the DC level the system has true visibility into the inventory e.g. type of space and where it is put.

In order to get the material into the production on time there is a lot of effort that goes into tracking down material. This means that the company works in an exception mode at the procurement level with putting out fires rather than in a proactive mode. Even though the material is not always on time the production rarely stands still. This since the production is highly flexible. Thus the production of other products can start instead and people are moved to the line where there is highest capacity need.

Information can help. VMI or information concerning the inventory levels would help in this volatile business since that would allow the suppliers to replenish the inventory in time. When an order goes out it normally takes too long time to get the components, thus an out of stock situation will occur.

There is a camera ban in place today for procurement of the small products such as nuts and bolt. This is a VMI solution with a camera that keeps the inventory under surveillance. When inventory run low the supplier send a new batch.

System wise, company C uses a SAP system. The SAP system is the main tool of information sharing within the company. Information is logged in the system when a production or order change occurs, production stars, delivery, receiving and shipping goods. More information is shared by the use of external suppliers systems, such as the tracking of trucks on the logistics provider home page.

Deliver

The flow from Tiarp to the DC is tracked at fixed points such as, loading and shipping at the plant and when receiving the goods at the DC. On the way in between these fixed points some distributors offer track and trace functions of their trucks. There is no problem to lack this tracking since the transportation time is always the same and there is no deviation from the schedule.

Production disruptions that might cause delivery problems are not notified to the sales force, therefore neither to the customer. Such information will reach the market function when the goods cannot be delivered. In that situation the market function needs to make decision on which customers to favor and which customers who will have to wait for the products. Normally the

products are not business critical for the customers, thus they do not need to be notified of delivery problems.

The sales force is not involved in the forecast planning the forecast is basically constructed from historical data which is uncertain in such a volatile market. The sales force have information to inventory levels (real time), available to promise, fixed lead times (no notifications if disturbance occur) and also the work flow of their order (in the SAP system) and also the transportation to customers by the logistic providers track and trace functions.

Company C measures their efficiency by a number of KPI´s. The measures are when a customer order arrives is the product available in stock. DC measures more variables such as picking and packing, transportation efficiency etc. These KPI are collected in the system and then put into a graph in excel which is distributed to all people who are affected.

Some of the sales force is incorporated in logistic solutions in order to find effective ways in every area. These are mostly special cases.

The system support today is too complex to handle. The users need education of the system in order to use it. The system might also need a touch up.

Return

Information concerning the return flow is registered in a system (lotus notes) where the information concerning the problem and the batch number is put in. If the failure is understood as a danger or widespread every tool with the failing component will be locked in the DC and thus not delivered. The lock down is in the SAP system.

The work flow is that the quality engineers take the product and examine the problem. The claims are then communicated within the company. Very seldom the information is provided to suppliers in order to make them aware of the problem. The products move back chain to the plant or the supplier who provided the failing product or component.

Return flow which is not due to quality problems follow the flow of normal problems back to the DC. To keep visibility high all return flow goes back to the DC in order to track the actual inventory levels at all time. The transportation of return flow is not really traced in any way.

Company D

Plan

Company D has a local supplier organization as well as a general commodity organization. A global supplier organization also exists. The suppliers are not grouped in a certain standardized way, but more handled from what of the three supplier organization they belong to. A model might exist, but it is not out spoken in the whole organization.

A 52 weeks forecast are given to the suppliers and all information possible is sent to the suppliers through an EDI system. Sometimes the suppliers feel that it is unnecessary to have 52 weeks forecast and the forecast is in these cases different. Information about future sales and market activities are not sent to the suppliers, but when registered in the system added to the forecast. The credibility in the forecast is relative high. The large and strategic suppliers are accessory in the future capacity planning with some kind of a CPFR system. A lot of the suppliers are changed continually and a great relationship is therefore not developed.

The customers are not differentiated according to a certain standard. The customers who are direct customers are prioritized compared to wholesalers. Company D does also have customers who are a part of the own company. These customers are first prioritized every time due to the highest margins.

Company D have an intern system were all campaign are registered. Here are the campaign volumes and agreed products explained. The customers are informed of the campaigns orally or through emails. Most campaigns are designed with the customers.

The customers have started to understand that they can be sponsored by company D when launching a campaign on their own and does therefore inform company D most of the times. A campaign must be registered at least 4 weeks before it is launched. The campaign will not be accepted if it is not registered enough in advance. The sales staff will add the activity in the campaign database and an email will automatically be sent to the factor to check that the products will be available. The campaign will be approved if the factory accepts. All campaigns are although not checked meaning that the smaller once slip through without being checked and accepted.

A message or alert will automatically be sent to the customers when a new product is launched to keep them informed and updated.

Source

Most of the goods sent from the suppliers are owned by the supplier and company D will have to call the supplier to find out where the goods are at the moment. It is also impossible to see the stock level at the suppliers. The suppliers cannot se company D’s stock either. The suppliers although have information about when production will occur so they can deliver a few days ahead.

When the suppliers cannot deliver most of them will inform company D, but it does not happen every time and is therefore not totally trustworthy. The factories have something that reminds of a VMI system with their sale offices this makes it possible to replenish the stock when needed.

The cost structure at the suppliers is open book for company D. They also own most of the suppliers material used in production. This is due to the fact that the material is hard and expensive to find. Company D purchases most material and the suppliers reserve what they need.

Quality and delivery performance is used to measure and evaluate the suppliers. The suppliers will be categorized into different categories. A “c” or “d” suppliers are prohibited to use as supplier and these suppliers have 3 months to improve themselves. If they do not improve themselves they will be phased out.

Main systems used to communicate with suppliers are EDI systems and web portals, but also telephone and email are used. How much information shared depends on how deep the relationship is with the supplier, but not after a standardized model. The communication with the suppliers is direct, meaning that operational staff communicates with operational staff.

When conflicts occur with the suppliers is a contract used if possible if not an agreement with the suppliers is the next step and the final step is to take it to court.

Make

The production flow is possible to follow because the products are scanned through the steps of the production. The stock levels of completed product are available in a system. The system makes it possible to follow stock levels during the process and when completed. There is no flagging in the system if a production stop occurs. The possibility to change the production order is very high, flexibility is very important in this industry. The cost structure of all production is very deep all the way to every penny.

The produced quantity is not allocated to a certain district. It is therefore not possible to get information in the system about how many units that is available for each department. It is however possible to spot the total amount of units.

Deliver

In an intern system is it possible to get information about the product flow, such as when the product was shipped, stock status, etc. It is impossible to track and trace the information when it is transported from factory to customer. Company D has a few distribution centers worldwide. It is with the system possible to get that stock information, which means that the products are registered at certain points during the transportation to customers. So far is it only a few factories that get automatically register information when a product is shipped. It is a weakness that all factories and distribution centers do not have the same system. This so it automatically is flagged when something happens. Company D will get information from the distribution centers when a shipment is delayed. It does however not happen automatically jet. Company D is looking into a new business system that will flag and inform automatically. It is however possible to log into the system manual and get this information.

Company D do not have a large amount of KPI’s to measure themselves with. The customers do not measure company D either. There is no system or information that takes care or measures the performance in the value chain.

A system used globally called ESF is used besides the ordinary business system. The business system is also used to handle the order communication with customers. Customers will contact the sales office manually when needed. All communication with customers is handled by phone. A web portal is available to customers, but is not used in a wide range. Customers are very loyal and are often compensated when a mistake is made or a shipment is incorrect.

Company D does not have any stated processes to develop logistic costs or other possible areas. This is mainly since the main shipments are very small. Company base their production and future demand on sold products to customers, not end customer data. This is information that company D would like to have and that would help according to the respondent.

It is impossible to get information about the customer's stock status with one exception. VMI solutions are discussed with this exception, but will be complicated due to the constant variety of products.

Return

The customer will contact the sales office by phone when a shipment is incorrect. A standardized system is formed with the distributors. Pick up information is printed and the distributors pick up misplaced units. A target is never to bring the products back to the distribution center, but rather find a customer who needs them.

The other return flow is when a product is broken. The customer will in these cases contact the service organization instead. A system is used to take care of the information and forward it back in the organization. Information interested for other customers such as a repeated problem with a product will be sent to them as well. All return flow information is handled manually.

The final return flow is when a product is damaged. The customer will in these cases contact the logistic organization. A system is used in the same way as before. The products are when they are broken and unable to use brought back and analyzed.

All information collected is very well stored in a system called QES. This information will be forwarded to the suppliers to improve and take care of occurred problems.

Company E

Plan

Suppliers are organized differently depending on if they are of strategic value or not. Strategic suppliers are separated from generic suppliers. The generic once are organized after purchased value, but also separated from each other depending on if they might be strategic or not. A commodity manager will look into a generic supplier if this supplier has the potential to become a future strategic supplier. The commodity managers have continuous meetings with these suppliers to help develop them. The strategic suppliers are those who reach the goals, such as quality, delivery precision, etc.

The suppliers receive information every day about the future six months demand. The suppliers also receive forecasts during the stockpile. All this communicated by an EDI solution. Of the six month demand is the closest 10 days looked and impossible to change, which makes the information the supplier receive trustworthy. The difference between the forecast and the ten looked days is almost none. This since most material is sent in the exact order it is suppose to be assembled and changes would make the production planning impossible.

The complete products are organized after three different parameters. The first is order sold products, the second is reseller sold products and the final is products produced for stock. Also the resellers are organized every 3 months by a separate organization. The resellers are mainly organized after turn over.

Customers or resellers have complete information about production capacity, etc at the factory. Resellers will be informed when normal speed is increased or decreased. All campaigns that resellers deploys must be accepted and added into the systems and the before agreed. All different departments such as finance, market, etc must accept the request before it will be accepted.

The transparency in the organization about working with visibility questions and developing strategic suppliers etc is massive.

Source

A supplier must contact company E if they have a production stop or cannot deliver. It is otherwise received as criminal behavior and the supplier will be phased out. It is although a fact that all suppliers do not contact immediately. The better supplier is the faster contact. Company E will also receive an automatic warning in the system if the delivery is not sent an hour after it is suppose to be sent. They only work with management by exception, meaning that they receive no warning if everything is as planned. The three measured KPI's is in this case time, quality and quantity.

Suppliers have a time slot of 15 minutes to deliver their goods. This means that company C do not have a large stock of anything. They get the products delivered just-in-time for when they need them. Stock levels have been decreased four times since the new system was applied. This means that they turn over their stock approximately 144 times per year. Company E does not have any possibilities to track and trace the deliveries. This means that the distributors carry the responsibility to inform if they cannot deliver within the half hour agreed.

The cost structure of the suppliers is extremely detailed from all suppliers. All suppliers accepted to deliver have to provide company E with the entire cost structure and they are not welcome to the negotiation if not. The same cost structure is available when it comes to the logistic costs of the third part logistic corporation.

Suppliers who have become “red” in the system are not allowed to supply until they have been green flagged again. A certain manager will help the supplier to reach green status again. All suppliers are measured after PPM (products per million) and will sometimes automatically receive green status as the time passes. All suppliers are extremely detailed measured with different KPI’s and this information is available for all suppliers on a web portal. All suppliers are responsible to check this web portal for new information at least once a day.

Systems and other ways used to communicate with suppliers are EDI, web portals, supplier meetings, etc. All suppliers agreed must have these systems to be agreed as suppliers. Company E does not see any problems with sharing information with suppliers. The more information the easier is it for the supplier to understand their failures and improve.

When a conflict occurs is the first alternative to try to solve the conflict after a standardized model with three different approaches. The conflict will be solved by a contract or law court if impossible to solve by communication. The communication with suppliers is very forward meaning that operational level communicate with supplier’s operational level. Company E does also work close to their suppliers in order to improve processes and lower costs. It occurs in different ways, but one might be to help suppliers purchase cheaper raw material.

Make

When the product is being produced is it possible to follow the entire production flow in a system. Company E can in the same system follow the stock levels. The stock levels are totally correct does not deviate at all. The system will also register if the line stops or something else happens. This information will be available for everyone that needs it.

The production flexibility is a little weaker. It is almost not possible to change the ten frozen days, but the next 26 weeks is possible to change if needed. Important to remember is that the stock levels only are 2 days and a change require that suppliers can supply with needed components. The entire production is very complex since components are supplied just-in-time for when they are needed and a change requires the delivery phase to work.

Company E has total awareness of the asset visibility meaning how their forklifts are being used or their labor or stocks for that sake. All the assets at company E are very controlled since the production schedule is very tight.

Deliver

When the product is shipped to resellers is it impossible to track and trace it in exact detail. It is although possible to get information about what docking stations the product has passed. It is possible for a reseller to contact another reseller to find a product needed. This can either be done by using a system, but telephone contact is the main method.

Return

Supplier quality is in charge of the quality of the components. The suppliers are required to respond within 24 hours on quality question report. All information regarding the components are logged and saved in a system. This is the same system as before which means that all suppliers log on at least once a day to check for information. The supplier needs information about if there have been any production delays so that they have to change their deliveries, etc. This is why company E can trust that all suppliers continually check the system. The suppliers will also get a message when they have new information to collect.

It is also possible to check what batch that has been assembled to each single car. This means that all cars within a certain period do not have to be called back, but nor a few cars.

Company F

Plan

It's a pain to have large internal suppliers. Cause it never get as sharp as with external suppliers. Internal suppliers are a part of company F and do not therefore feel the same pressure as the external suppliers. All the suppliers are divided according to the Kraljic matrix after the selection they provide. They are also divided within the matrix. Every supplier has a certain status reviling there capacity, history, quality, etc.

LRP – Long range plan, updated once a year and have plans for the following three years. All suppliers have access to the LRP if they not are about to be faced out. The actual volume does not always correspond to the LRP volume. They are at this moment already using components from the volume of 2009. Weaknesses in the industry system are therefore a fact. Suppliers have lead-times as well as any other actor and might therefore have problems to deliver. A system for the reality is absolutely missing. There is no interface between the LRP and the reality. A delivery plan is sent to suppliers through an EDI-system. A quarterly forecast called M is also sent to the suppliers to make it even more complicated. The M-lap is also divided into a P-lap which is a monthly forecast communicated to the suppliers. Especially the internal suppliers within the family can follow the changes in production on a larger level than the external suppliers. The problem ends up in the communication to all the different suppliers. Company A also provides the suppliers with forecast information on a web portal. An answer from the supplier whether they can deliver the changes is expected.

A few suppliers also have access to a CMI system. The CMI system provides the suppliers with the inventory levels of their products in company F´s stock. These suppliers do not get any orders sent to them from company F. They provide company F with components by themselves and can chose what amount to deliver as long as they keep the stock within certain levels. The system provides the suppliers with an example of what amount they should deliver to make the choice even easier for the suppliers.

Customers are divided after region, Europe, International, Asia and the US. The regions are also divided into subcategories. The largest and best paying customer isn't necessary the first choice when shipping a product. The customer with the largest fine for late delivery is normally favored however the company must also seek to have a balance between different geographical markets. This is due to conjunction dips and it is therefore important to keep clients in Africa when the dips in the European market are a fact. There are therefore no standardizations; the problems are handled as they come, due to penalties, etc. Customers are therefore not divided into A, B or C customers. In most part of the world are distributors the main customers. The distributors do however have total control over the end customer.

Company F are making a system change, but it is today impossible for customers to follow the production or get a red flag automatically when something is about to be delayed. The new system will make it possible for customers to see the information they have access to. Forecasts from each distribution center considering the costumers needs are provided to company F.

The main focus today when discussing the supply chain is on putting out fires not preventing them.

Source

Company F does not have the opportunity to see what is going on at the suppliers at all. A separate company in the corporate group is in charge of all the transportation from suppliers to company F. Company F cannot see stock status at the suppliers with a few exceptions when it comes to the internal suppliers. The communications with the internal suppliers is continues on operational level when a situation demands it. When something like a production stop happens at the internal suppliers will company F be a warned. The communication with the external suppliers is not as good, but communication is high when needed. Company F cannot follow the transportations from suppliers until the shipments arrive at the docks. A Track and trace system is missing.

Company F can follow their supplier's costs for material rather good. They even help them to purchases material in some cases, by using economy of scale. It is impossible to help all suppliers, due to small volumes. It is possible to help the suppliers who need materials that company A purchase in large volumes. It is not of interest to study and claim certain actions of suppliers, nor was to ask suppliers to keep a certain safety stock company F´s purchased volumes differ.

Company F uses a template to evaluate suppliers in collaboration with the suppliers themselves. The templates are communicated by email and personal contacts. Company F also uses a web portal to communicate this template to the suppliers.

Edi and portals are used to communicate with suppliers. At least 90 percent of the suppliers are connected to these systems. Company F adjusts what information each supplier can follow and do not therefore see any security problems. The communication is relative direct and escalates to a higher level when impossible to deal with on concerned level.

The system will notice company F when a supplier is a problem supplier. Certain actions will be applied to test these suppliers. These escalate actions will reveal whether the suppliers will be banned or not. A ban status will notice the purchasers that this supplier is not to be trusted. The acceptance towards the suppliers is based on how strategic they are.

A system is used to develop relations with suppliers, especially the strategic once. The main focus is although to fight fires. The relations with suppliers is however great. Company F work with different projects to develop these relations.

Make

Company F can very well follow the production and inventory levels through a system. The precision of these facts is at the moment doubtful. There is a production manager with full control on products in work, thus this information is not accessible to anyone (must ask production manager). A control function will in the future be necessary. The possibilities to change the production differ. Detail production is flexible, while assembling is less flexible, but should not be a problem. The cost structure is visible through a system, but only on a higher level, could and will be better checked in the future.

The asset visibility is good on machines and tools, but not through a system and not on detail level. It should be visible on an hour base. Company F is more reactive then proactive when it comes to changing production, due to available material and components.

Deliver

The shipments from company F to customer is the separate company's responsibility. Company F only wishes to be warned when something is wrong with the shipments. It is otherwise not of interest to spend resources to follow a purchased service.

Respondents believe, but are not sure that the customer centers can get the same information with the similar systems as used with suppliers.

Return

When it comes to damaged good is it mainly quality problems. A report is written and sent to actual supplier. The grad of the problem is the base for how fast the supplier is informed. The same business system as before is used, but there is no faster and better way than the telephone in serious matters. Company F sends people to control quality at the suppliers when suppliers' quality is questionable.

It is possible for company F to trace what batch each component originates from. The product development is urgent to gather the information of the problem to be able to develop the component. The product development will visit and investigate the problem. It is very important to gather information about the problem so it does not occur again. The information is also gathered by company F in a system and sent to relevant receiver. Product development does not however collaborate with logistic enough to develop products that are easy to handle.

Company G

Plan

Company G has a structured process for how to classify different suppliers. The suppliers are basically divided depending on which segment they belong to (what type of product they deliver) and the strategic importance of the supplier. The suppliers are closely followed with a evaluation model which acknowledge financial situation, quality performance, delivery performance etc.

The suppliers can access all information concerning their score in a supplier portal (web based solution).

The customers are grouped depending on different geographical areas.

The suppliers receive a forecast with a twelve month horizon. The last five days are locked e.g. these volumes are the actual ordering volume. Some suppliers are sequential supplier. The sequential suppliers need to deliver "just – in – time", this implies that the suppliers need to deliver within 3 hours when demand occur. The orders are placed either with EDI contacts or by the usage of the supplier portal. All procurement is handled by orders, thus there is no VMI solutions in place to secure procurement.

Source

Company G has no visibility concerning the geographical locations of the goods when moving from upstream nodes in the supply chain. The respondent claims that such information is not needed since the trucks are fairly reliable regarding timing. The information concerning what every truckload carry is send electronically to the plant prior the delivery, the delivered goods is checked against the list when the goods arrive at the plant. This is the basic visibility concerning the goods flow coming from upstream suppliers.

Rather than relying on information concerning the transports company G demands that every supplier should be able to deliver within three days of an order. This implies that suppliers need to have safety stocks (finished goods inventory) to deliver from in order to allow these lead-times.

Company G does not have explicit processes for how suppliers should pass information concerning supply problems. It is in the interest of the suppliers to inform the focal organization concerning problems that might affect the nodes downstream the supply chain. If suppliers neglect to pass information (phone or email) they will most likely get poor evaluations (KPI measures) and might even suffer a phase out from the focal organizations potential supplier list.

Company G closely monitors the cost structure of its suppliers. It is stated in all contracts with suppliers that they accept to present valid cost structures so that proper cost analysis can be made. Company G passes information concerning costs of their suppliers, giving them a benchmark for the supplier. Thus the supplier can cut costs in both procurement and by process improvement with the help of company G and their benchmark with other suppliers.

Company G enjoys a limited visibility into the suppliers procurement. In cases where it is needed company G advice their suppliers on which suppliers they should use (second tier). This involvement

and information concerning second tier suppliers is more common in projects where the supplier is involved in the development process of new products (parts). However it also occurs when the supplier is unfamiliar with sourcing a component or product. Information concerning the second tier suppliers is only passed on in the start up phase of a new relation or a new procurement cycle. Most often the focal suppliers cannot help the suppliers to reduce prices on procurement, this is due to two reasons firstly company G is not big enough to enjoy better prices and secondly it takes to much energy from the organization.

The suppliers are asses by a number of key performance indicators (KPI). The most important KPI´s concerns the quality, the on time delivery and the price. The KPI´s are followed up once a month and published on the supplier web portal. Thus the suppliers can follow their development concerning the KPI´s and the trend they have concerning the KPI´s. Poor performing suppliers are put on a list and will be kept under close surveillance. Suppliers which are put on the list will need to improve their performance, first by presenting a plan for how to solve the problem and then in a project together with the focal organization.

The communication with suppliers are handled in two ways, firstly all suppliers need to accept orders by EDI and all other information is put on the supplier portal (forecast, KPI, etc.). All EDI plans need to go straight into the suppliers system without manual handling, this since company G do not want any risk that the numbers are tempered with.

Company G acknowledges a certain risk with sharing information with suppliers. However company G also sees that the performance is increased with sharing of information. The risk with information sharing is reduced by sharing information across “safe” communication ways such as the supplier portal. The suppliers and company G sign confidential agreements, this also not only the focal organization to feel safe but also the suppliers to be sure their information is not used against them (inventions, design, etc).

The communication with suppliers are regarded as “straight” the different functions address each other directly. The operational levels have contact with operational level etc. An example is that when suppliers are involved in product development they may have engineers in house the focal organization.

When problems occur with suppliers these are most often solved by interaction and support. It is always important to keep a good relationship with suppliers since they might be important in the future (or spread bad rumors). However it is also clear that more energy goes into the strategic important suppliers rather than the small suppliers which might even be on a phase out list. On rare occasions the issue might be referred to by the contract, thus solving the issue with the help of legal constraints.

Company G work as consultant to their suppliers, thus they take active part in developing the performance of their suppliers. On rare occasions company G has even made investments on behalf of the suppliers. However this is not a generally used approach.

Make

The plant work in exception mode and are hunting goods on regular bases. This since the control of suppliers and deliveries do not work as intended. The suppliers basically cannot deliver the right quantity at the right time. The information concerning delivery deviations need to be handled by quicker deliveries, by sending smaller batches or by re-planning the production. This information is handled by the material planning and the logistic function.

The asset visibility is good on machines and tools, but not through a system and not on detail level. It should be visible on an hour base. Company G is more reactive then proactive when it comes to changing production, due to available material and components.

Deliver

Company G does not have extended relations with the end customer, this since the products are "one time" purchases. Therefore, the relation with the customer is the responsibility of the sales function. The only information which is important is to know the priorities of different customers so that the total cost of late deliveries can be reduced. The actual shipment of the products is the responsibility of a separate company. Thus, there is a limited visibility into the delivery phase concerning delivery issues, tracking of goods, delivery status and changes.

Return

The return flow of company G consists of two parts. Firstly there are returns from the plant towards the suppliers. These returns are due to wrong deliveries or due to quality issues. The returns are handled by exception mode. Thus, every return is entered as a claim at the suppliers and then sends back or scraped directly by company G. Information concerning the returns is logged at the portal used to communicate with suppliers. Company G sends people to control quality at the suppliers when suppliers' quality is questionable

The second return flow is the returns from customers back to the focal organization. This return flow is mainly consisting of information. The products delivered are capital goods, therefore, problems concerning the product are fixed by the service organization. However, information concerning problems are carefully collected. The information is forwarded to the construction engineers so that the same problems will not occur in the next generation of products.

It is possible for company G to trace what batch each component originates from. The product development is urgent to gather the information of the problem to be able to develop the component. The product development will visit and investigate the problem. It is very important to gather information about the problem so it does not occur again. The information is also gathered by company G in a system and sent to relevant receiver. Product development does not however collaborate with logistic enough to develop products that are easy to handle.

Company H

Plan

Company H uses basic supplier segmentation depending on the type of product they supply. There is no segmentation of suppliers within the product categories. Thus, the supplier segmentation is on a basic level. In the future company H will segment the suppliers on a more advanced level.

The customers (distribution channel) are differentiated depending on size, which qualify them for different product ranges. The larger actors retain more attention in terms of collaboration and development.

Company H shares information concerning future demand, forecasts and sales with suppliers when it is possible. However the information sharing is limited by the fact that there are no effective forecast processes and no effective way of sharing POS data. Company H notifies suppliers when they will have an increased need of their products, however, the information concerning quantities are not reliable. There is a contact with suppliers when planning the need of products. Information problems concerning the plan process is mostly due to internal communication problems rather than inter-organizational communication issues. These problems are understood as obvious both within company H but also within its suppliers. The information is spread by face to face communication, there are no systems which support the communication.

The sales channel get information concerning activities on different levels. There is an overall plan which is made on yearly basis. The suppliers are very careful to inform company H of changes they make to products or within their product range. This since company H has economy of scale, thus, they are very important to the suppliers. Information concerning changes is mostly made on meetings.

When the activity is in execution phase more information goes out to the sales channel. The information is specific and is spread both trough the ordering system, which alerts of activities and trough other information channels.

Source

Company H does not have access to the suppliers' inventory levels. Some suppliers provide a order notification which specify if they can deliver the requested items and quantities. This provides a general overview of the suppliers' status, however, this is in a reactive manner rather than in a proactive manner. At special occasions the availability information is more proactive. This is common prior holidays or special sales activities. The information is spread by direct contact with the suppliers.

Company H has no visibility into the suppliers cost structures. This is concerning both the suppliers of goods and services (logistics etc.). Even though there is no sharing of cost structure information company H have a good perception of what the costs should be. The perception or estimations are based on experience and competitive bidding. Thus, the costs structure visibility is low but the understanding of fair costs is high.

Company H has supply risk within a few product categories. In some cases the supply risk is reduced by using multiple suppliers. In other cases company H use their barging power to source for the suppliers, thus, reducing costs and assuring the supply. Company H whishes do further reduce the risk by strengthening the communication with suppliers and find new ways to cooperate to assure supply.

Company H sees potential to make use of synergy effects with external actors. This includes warehousing and sourcing with the help of external partners (such as other companies operating in the same industry). This can increase the distribution frequency, thus, reducing the stocks and improving the service level.

In the past company H has tried to make use VMI with a few large suppliers. This did not turn out as well as company H had hoped. However VMI might be a feasible solution in the future. New technology and better understanding for how to organize such cooperation might allow better efficiency.

Company H measures a number of KPI on their suppliers. The most important is availability or service level. In addition there is also measuring of quality and delivery precision etc. Information concerning the KPI is forwarded to the suppliers. The information is passes on by emails or direct communication. There is a heap of suppliers to communicate with and all the suppliers have different setups in their organization. Therefore, it is a challenge to communicate efficiently with the suppliers. The day to day communication provides an everyday challenge and is constantly improved. This included both communication concerning operational issues such as orders, delivery notifications and information concerning exceptions. However, the communication also includes a more strategic part. The strategic communication is concerning the sales activates, new product launches etc. This communication is not always running smoothly and there are basically no support systems to handle the information flow. This information is shared at meetings but also need to have structured processes so that the information always is forwarded to the right person and in the right way.

The information is both direct between the sales in the focal organization and the production in the suppliers' organization. The information is also between the planning & purchase function in the focal organization and the sales organization in the suppliers' organization. The information glitch is not always in the inter-organizational linkage but also between the functions within each organization. Therefore, the communication processes needs to be improved across all linkages.

The communication is made by use of email, EDI, phone and fax. The orders are placed with EDI and the notifications are returned with EDI. Other information is shared mainly by email or other communication tools. There are a few suppliers which are provided with extra information such as forecasts. The forecasts are basically spreadsheets send by email. There is a intranet where the suppliers can log on to reach some information. This is however a system which is not effective and therefore not used in a great extent.

There are mainly two types of conflicts which occur with suppliers. There is either a conflict concerning the price or a conflict concerning service level. In case of a price conflict the supplier is blocked from all activities and ultimately the supplier is phased out. The conflicts concerning service levels are regulated in contracts and are simply a question of penalties.

In the future company H hopes to provide the suppliers with better conditions for the suppliers to retain a high service level. This ambition includes providing forecasts, sharing inventory levels and increases the information transparency over all.

Make

The make flow is limited to the purchase, warehousing and distribution of goods. Company H has full visibility into the inventories of the different warehouses. All inventory information is fed in to the warehouse management system which provides full control over the inventories. There is no possibility to track the goods when it is moving, however, many products have full traceability. The traceability means that the product can be traced back to a supplier, a batch and a delivery/production date.

Company H have a limited asset visibility overall. There is however a few projects that show the ambition of how the asset visibility is increased. There is a new warehouse in place which is fully automated. This specific warehouse provides a full asset visibility concerning the usage of the equipment, the fill rates of the warehouse etc. The company also has information concerning the usage of trucks. This information is based on the usage in previous time periods. The usage information is not in real time, however, this is not understood as providing a substantial improvement anyhow.

Company H understands a potential to increase the track and trace function with technology such as RFID. The main area to use RFID is to track the cargo carriers. That will allow better usage of the cargo carriers and make the control of cargo carriers easier. In the future RFID might be a feasible solution to track every item. However, such usage of RFID demands an extensive investment and is only possible if RFID is used as a standard by many suppliers.

Deliver

Company H does not have access to inventory status in the distribution channel. The distribution channel has an automatic ordering system which is designed to reduce out of stock situations. The systems accumulate information concerning the sales rate, inventory levels and miss calculations. However, this information is not aggregated on a central level. Thus, there is an information glitch where the central functions cannot track the sales in the sales channel or the inventory levels. This provides a problem to track the actual demand and cause a need for safety stocks at different nodes of the supply chain.

Company H understands a potential to make use of collaboration with other actors within the industry. This can include cooperation in the distribution in order to increase the distribution frequency, lower the inventories and increase the service level.

The sales channel put their orders with an automatic ordering system. This reduces the human factor and increases the central control. It also makes the handling more efficient. In the future the system can also be used to further increase the visibility on a central level, however, this is not in place today.

Return

There are different types of return flow. Either from the distribution channel back to central level, or from central level back to suppliers. The returns towards suppliers are either due to wrong deliveries or quality issues. The information concerning the returns is made by the common information routs (phone, email and EDI).

Returns from the sales channel back to the central organization consist of a few different flows. Firstly the cargo carriers go on return, other return flows are wrong deliveries, quality returns, viable returns and excess inventory. The sales channel use a claim system to report returns. In the claim system they report the reason why they want to return the products and which products they want to return. The physical flow is handled in the normal delivery flow. This means that the truck which deliver the goods also pick up returns when it needs to go back. Since the information is handled mainly by the claims system the time spend on the return flow is reduced. Some of the return flows are handled by the suppliers. About 80 percent is handled by the focal organization and 20 percent by the suppliers.

Company I

Plan

Company I understand them self as a production oriented company, the implication for the business model is that company I work closely with their suppliers. The suppliers are segmented depending on which range they belong to e.g. wood, metal or plastic. This segmentation is mainly made in order to structure the organization and which purchase division that owns the relationship with a specific supplier. The suppliers are divided within each range from partners which are of great strategic values to the spot market suppliers which are used occasionally. Thus the level of involvement with each supplier is based on a structured evaluation concerning the strategic value and purchase value each supplier.

The sales channels are classified depending on the size of the warehouse and the turnaround of the warehouse. The larger warehouses have more articles in stock while the smaller once only facilitate the most popular products in the range.

The suppliers which are used over a longer time period receive forecasts trough a system which is specifically developed for company I and its suppliers. About 1000 of the suppliers are connected with the system, spot suppliers are not linked with a system they are handled in a manually manner. Some suppliers have ability to receive EDI messages, these are the larger suppliers which have big systems in place and want to receive the information in a readily usable format.

In the forecast all information concerning the marketing and sales activities are included thus there is no need for specific information concerning such activities. The actual orders are sent every day to suppliers along with the forecast for the coming 84 weeks. Thus the suppliers know the actual orders and the coming demand in close to real time. The forecast precision is about 80 percent thus the suppliers know that the forecast is not a 100 percent accurate. The problem with the forecast is not that the model is unreliable but rather that all nodes (market areas) can put in their specific demand. Thus the accumulated errors give a significant deviation between the forecast and the actual demand.

There is a centrally organized demand planning system. Demand and forecast information from all sales areas is put into the system. The suppliers' capacity is then matched against the forecast information. Thus orders will only be put on suppliers which have capacity levels to phase the demand and the lead time. The basic idea to match capacity and demand is working satisfactory. However it does not give one hundred percent accuracy since it is depending on many factors such as the updates of the suppliers capacity and that the capacity will be according to plan etc.

Source/Deliver

Company I do not have the ability to follow the products geographically when the products are shipped. However there are fixed points when the goods is registered thus giving a track and trace function in an untimely manner. The approach to delivery problems is management by exception meaning that only if a problem occurs the information concerning its whereabouts is needed. Company I have two three types of product flows to acknowledge one from suppliers to distribution

center, one from suppliers directly to warehouses and the third from distribution centers to warehouses. Company I acknowledges the possible value of using RFID technology to keep better track on goods. Such tracking would not only allow better delivery notification but also speed up the process for receiving goods and less loss of goods during transports etc.

The inventory levels are kept under close surveillance. The inventories at the DC and all the warehouses inventories are registered in a system. The inventory levels and the POS data is used when producing the forecast and demand planning for each warehouse.

Company I has information concerning the suppliers cost structures. All suppliers need to use open books in order to make business with company I. Company I stresses its production orientation which is why company I want to be a part of the production at its suppliers. Company I also have cost structure visibility into the logistic providers its uses. However this cost structure is not as detailed as the one used on suppliers.

Company I has no formal visibility into second tier suppliers and the procurement of its first tier suppliers. They have had an initiative to take control over the second tier suppliers. However the company and its supplier did not accept this control at the time, thus this level of visibility is put on hold. In some cases company I chose the suppliers in order to get competitive prices from second tier suppliers, this is however not formal but rather up to the purchaser during the negotiation. In a few cases company I use their own subsidiary which control the whole chain from raw materials to components or products.

If a problem occurs at the suppliers which will have an impact on the delivery to company I this is supposed to be communicated. This communication is made by phone or email from the suppliers to the purchasers and then entered into the system with the new delivery date. Thus the warehouses have the information in the system and can inform end consumers of delivery date etc.

Company I follows up on their suppliers with a number of KPI´s. The KPI´s are both concerning the delivery performance, the quality and the price. In addition to these KPI´s they also supervise the code of conduct in order to make sure that they suppliers obey laws and regulations.

Company I also measures its performance with a set of KPI measures. The most important measure is availability which is measured on the products at each warehouse.

The communication between suppliers and the focal organization is understood as direct meaning that the operational level contact the operational level etc. However there is also an escalation scale in case of problems etc.

On occasions a conflict with the suppliers occurs. The ways of dealing with a conflict depends on the underlying reason to the conflict as well as the importance of the supplier. In most cases the conflict is handled in a “creative” way so that the situation is handled in the most appropriate and non-disturbing way. If the conflict includes loss of revenue etc. it might be regulated in the contract thus solved by legal means. The most common way to solve a temporary or occasional conflict is however to collaborate to prevent damage.

Company I works closely with their suppliers in order to develop their suppliers. They have their own "consultants" who help making the production more efficient etc. Therefore in a way the suppliers become an integrated part of the focal organization and the other way around.

Make

The inventory levels and the sales data in the warehouse are available to all functions in the company which have the need to see such data. Thus it is always possible to rearrange the distribution in order to keep the availability as high as possible.

The assets are understood as being monitored closely meaning that the warehouses and the DC keep track on the usage of space, machines and personnel. However if this is done in a manual manner or by a system is more than the respondent know of.

Return

All return flows are registered in a IT system. These return flows can be due to quality issues, delivery issues etc. The information is passed on to suppliers if it is needed, however this is communicated in a rather manual way. If the problem is severe the return will be "red flagged" and every affected node in the company will be notified immediately.

All products are batched thus company I know where the specific products are located and from which suppliers it comes etc.

The physical return flow is handled by the logistical partners.

Company J

PLAN

Company J work with all suppliers according to the same process. Using one process for all suppliers makes it easier to structure the internal flows and makes the workflow more comprehensible. There is a basic segmentation of the suppliers depending on the goods they supply (product category). In the future company J will also look at different models to differentiate the suppliers within the colonial and non-colonial segments as well, however this is not done today.

There is no systematic or standardized process in place to communicate forecasts, planning and different activities. However there is a dialogue between the purchasing department and the customers concerning these issues, thus the information is spread in the supply chain. The same procedure is used when transferring information from the suppliers to company J as well. The suppliers communicate their marketing activities and their forecasts at these meetings, however this is not a standardized process thus the information transparency is highly depending on the person in charge of the contact. The problem with this information sharing procedure is that the information becomes biased e.g. manipulated. Each node in the supply chain adds their knowledge and perception to the information, the sales channel have their view, the category mangers their view, logistic function their view and the suppliers' ad their view and perception to the information. Since each node adds their knowledge they also cause a bullwhip effect.

Traditionally the purchasing function has been the only contact with the suppliers. This is changing since the logistic function will take more responsibility to minimize the "holes in the shelf". The logistic function will engage in projects in order to reach future improvements of efficiency, however it is a long way there.

A number of suppliers (36) have access to point of sales data (POS). The data is shared as "raw-data" meaning that it is not a standardized format. In the future the data will become more standardized thus allowing a greater sharing of the POS.

Company J sees a great value of using the customer in order to validate forecasts. Today there is no suitable system in use to support such activities. There are projects concerning POS data and forecasting and also Automatic Ordering Systems (AOS). AOS is a system which automatically generates orders depending on the stock level and sales rate of each item.

Source

Company J has a very limited visibility towards the suppliers. This is both in the planning process but also in the inventory and transportation aspect. Today there is no transparency into suppliers stocks neither do the suppliers have transparency into company J's stocks. All goods need to be ordered "manually" (using EDI systems but need to put in orders). There is no extended visibility into suppliers cost structure, in many cases that is also regarded as point less (e.g. too much information). Most cost structure analysis are based on competitive bidding, this is understood by company J as enough in most cases.

Company J is undertaking a change where the company is improving the connection to suppliers. The communication between operational functions at company J and the operational functions at suppliers is a great improvement area. By integrating this connectivity into the structure company J believe that the information flow can become much more effective, thus creating more effective physical flows. There is a great involvement with a few suppliers to develop the logistical flows, this since these suppliers products need to be passed on to consumers within a short time frame.

Suppliers are measured with different KPI´s, some KPI´s measure the physical state of goods and other measure the delivery performance in terms of delivery on time, service level etc. The physical KPI's are working well, however the KPI´s measuring the service provided by suppliers are worse off. These KPI´s do not work as intended. An example is the service level; the service level is close to 100% this since if suppliers cannot deliver on time the delivery date and order will be changed so that a high service level will be maintained, thus the measures are biased. It has been common that suppliers do not deliver the quantities which have been agreed about in the contract. In order audit this behavior the industry has established a control organization which makes random checks of supplier quantities. This is expensive but also efficient in order to reduce the delivery evasion. The suppliers will be informed of the performance at supplier meetings. Some suppliers are subscribing on their KPI deviations. There is a clear connection between continues improvements and KPI deviations subscriptions.

Company J has a limited visibility into the geographical whereabouts of the goods when transported from suppliers to distribution centers. Goods are generally untraceable when being transported. The goods is entered into the system (EAN coding) when delivered to the distribution center. Goods from Asia can be tracked from the dock (loading to vessel) and at fixed places on its way to the distribution center (unloading from vessel, loading to trucks etc.). The traceability is at order level, thus leaving a "black hole" since items cannot be traced.

Orders are generally generated by EDI systems. The EDI system is only used at top level of the logistic flow. Delivery notifications are manually and all goods need to be scanned into the system at delivery.

To summarize, company J have no geographical tracking of goods. Neither does company J have any visibility into suppliers stocks, production or cost structure. The suppliers cannot access company J's inventory levels thus they cannot make use of VMI solutions. The visibility is highly limited however there is an aspiration to improve the visibility in a number of areas.

MAKE

Company J has no traditionally production. The make flow rather consists of internal logistical flows. This flow is understood by company J as structured and with a high level of visibility. The visibility consists of registration into the system when the goods are received at the distribution center. It is registered in the system to where the goods are transported (e.g. customer). However there is no tracking of the goods at individual level, this can be understood as too much information.

If a product is out of stock or for some other reason cannot be delivered this is not notified to customers in the system. The customer are notified when the other goods arrives. Thus there is a certain lack of information, if such information is understood as value creating.

Company J has suppliers which are producing “private label” goods. At these plants company J has full cost structure visibility and also code of conduct agreements. Company J has visibility into its assets in the warehouse (distribution center) and in delivery systems (trucks). The only weakness in the system is that if the personnel do not enter the data as intended there will be deviations in the system.

Deliver

Company J owns the delivery flow since the distribution channel is a part of company J. The track and trace visibility is limited to the actual delivery of goods, when the goods is delivered it is no longer visible in the system. Thus the inventory levels at different nodes cannot be tracked, and the distribution is based on each sales channels orders rather than actual sales.

The logistic flow in the delivery process is carried out by trucks. Each truckload is optimized and adapted for the rout it will deliver on. The loading and unloading of trucks is time controlled, thus there is no event tracking on the trucks nor the distribution center nor the sales channels is aware of deviations. However this is not understood as a big issue today since the deliveries are quite timely and the logistic would be too complex if each truck where to be tracked (even with event tracking).

The service levels to customers and sales channels are uphold by different KPI´s. The KPI´s is measured on the outgoing deliveries from the distribution center. Thus the impact of poor deliveries and the sales channels handling of goods is not considered as an impacting factor on KPI´s. This makes the KPI´s somewhat biased and not a perfect measure of performance. The service level according to KPI is much better than actual service level in sales channel.

Return

Company J has a great return flow to handle. The return flow can be divided into a few different areas; empty carriers, viable returns, out of date and quality.

The empty carriers must be returned to the distribution center or even further so it can be reused. This flow is not controlled by a system or information transparency. A few times a week a truck is sent out to handle the return flow. The truck driver basically loads all empty carriers and brings it back to the distribution center,

Viable returns are products which go back even though there are no issues with the products. Examples of viable returns are products which are only attractive during a specific season such as or products that can be considered as “fresh products”. The return flow is 30 – 50 percent in one specific return flow, thus it is an expensive and important flow to handle. The products in this return flow is normally redistributed into a secondary market, thus the return flow is also a redistribution flow (with repackaging). This makes the flow extremely difficult to handle. These products are returned and registered in the system so that they can be controlled all throughout the flow. However the tracking is made in a reactive manner, when products are returned not in a proactive

manner meaning that the quantities are known in advance. This return flow is handled as a normal product flow since it is so common, the returns are handled on time basis and not information basis.

Returns due to quality issues are exceptions and are handled as exceptions. The goods are physically returned with normal returns. The information however is handled with the intranet. If a certain product is faced with quality issues the information is put on the intranet, every sales channel (store) is asked to return the products from the specific batch, if they have any of the products. The products are not locked down meaning that they can be sold if the personnel do not notice the warning on the intranet. In the internal systems the exact information is available it is at the store level this information is not accessible. The suppliers are notified or notifies directly by phone or email when a problem occur (depending on the nature of the quality issue), thus this type of information towards suppliers are transparent and high on the agenda.

To summarize the return flow is an important and large flow for company J. The return flow is handled in a semiautomatic manner meaning that every product which goes on return need to be registered into the system again. The return flow demands a lot of assets for handling, the work force on return flows are twice as big as the workforce working with the daily deliveries. Since all return products need to be registered into the system it also takes a lot of administration to handle the return flow.

Company K

Plan

The supplier base consists of approximately 700 companies. The requirements on all suppliers are the same on subjects like social compliance, environmental compliance, code of conduct, code of ethics etc. and are all treated the same. A large supplier will however at least reach an informal higher relationship than the smaller which only is used in certain circumstances. There is nonetheless no agreed standardization to treat them differently.

When a marketing or sales campaign is planed it is important to choose from the suppliers in the elite division. This since it is a very strategic choice due to the fact that everything needs to proceed as planned. A lot of information is shared with the suppliers to make it possible for them to fulfill their commitments. This is also applied when it comes to production planning, etc. The information is not shared with the suppliers through a common system. The information is instead shared through oral conversations from the company staff.

Company K does not use a CPFR system when planning the future. Instead they book production capacity in advance with their suppliers. Any system are not used towards the suppliers, they are not connected to company K. They are instead communicating with the suppliers by personal contact this is due to the fact that it has been proven the best. Mainly since company K do not sell many standard products and each produced product need to be explained to the supplier.

The customers are definitely more segmented than the suppliers, due to the fact that they are of different size and geographically placed. Customers geographically placed in an expensive city center are of more strategic marketing value than a customer in the suburbs. A formal standardization with different categories that the customers are divided into also exists.

Information about future marketing and sales campaigns and such are well shared with all customers. The information they get do however not reach as far back as what is going on at the suppliers. Customers are allowed to launch own sale and marketing activities, but the campaigns are mainly structured by company K. These activities must be brought up with responsible office in that certain county.

Source/ Deliver

Company K is present during the production and can follow the product until it is shipped. They do not have the same possibilities to follow the product while its transported to the distribution centrals (DC´s), but rely on that there partners will inform them if something is incorrect with the transportation. The customer's cash register is trigging the refill from the DC´s.

Since a person from company K is present during the production is it possible to get quick information about quality problems, production stops and such. There is no standard for how problems are handled. They are instead handled on a case to case base. Company K base their activities on "no information is good information", meaning that they only will receive information if something is wrong. The suppliers are not connected to the system so they are not in fact flagging

using a system when something is wrong. Company K's present employees are instead flagging using the system.

The suppliers cost structure information is not great. Company K does however in some cases work together with second tier suppliers to help suppliers to reduce material costs. The information about third part logistics different cost is not great either. The information about different suppliers cost structure is not therefore great.

All suppliers are measured with a certain amount of key performance indicators (KPI's). All suppliers are benchmarked towards each other. The KPI's are communicated back to the suppliers to help them improve. Communication and flexibility is very important when a conflict occurs. There is no standardized process when it comes to conflicts.

The entire supply chain is connected using a system. The only part of the supply chain that not is connected directly to the system is the suppliers. However representatives from company K update information concerning the suppliers and production in the system. The service providers who are arranging the cargo flow to company K have EDI connections to company K. They also, to some extent, have EDI connections to the suppliers, i.e. in a way the shipping information is handled in an automated manner.

Company K is using both a push and a pull system to provide the customers with products. First the products are pushed out to the customers. Different customers sell a lot of a certain product and it is therefore important to use a pull system. To make it possible for the customer to pull products from the DC's or another customer who cannot sell the product as effective.

Make

Company K do not have that much activities when it comes to the make flow. It is although important to notice that they have good knowledge of their inventory levels at their refill distribution centers. There is a system that handles all this information.

Return

The return flow is very small this is due to the fact that sale is very effective. Acknowledged must however the return flows from the DC's. Company K's has a small return flow between different countries DC. This is due to the fact that some products sell better in one country than another. There is no standardized way of handling the products that is totally impossible to sell. These products will be handled from case to case.

As for the return flow of impossible to sell products is there no standardized way of dealing with damaged products. Those products are also handled on a case to case basis. Certain products are important and expensive enough to deal with and certain products are not. Investigated and confirmed mistakes from suppliers are important to follow up and this information is definitely forwarded to responsible supplier using current systems.

Company L

Plan

The suppliers are mainly structured in two different ways. They are either supplier´s, which supply company L with complete products. The second alternative is the suppliers who company L purchase capacity from. This means that company L develops the blueprints and owns the brands and the suppliers are thus, only produce the products. The suppliers are also classified into an A, B or C category. The suppliers are however treated the same and the classification is thus intern information.

The customers are also divided into three categories with specified names. The level of assortment the customer carries decides what level they belong to. What assortment the customers have possibilities to reach is decided be their geographic position. This means that a central store in a large city have greater possibilities to reach a higher level than a smaller in a suburb. Important to specify is also that certain conceptual stores exist. These customers are focused on a part of the assortment and therefore divided into separate segments.

The level of information about sale and marketing activities and such that suppliers receive is different regarding if it is the own brands or products purchased. The own produced brands suppliers do not receive any information about activities, but nor history such as this product received high sales. The suppliers that distribute complete products receive much more information regarding activities and such and are also able to affect the activities. The communication is although still handled by face-to-face rather than using a system.

The customers receive a large range on information about sale and marketing activities and such, both by face-to-face communication and an existing system. The system makes it possible for the customer to log on and always be aware of the coming events. The customers themselves do not have the possibilities to launch larger activities, but smaller activities are allowed as long as it is on a smaller scale. The customer does not have to contact company L or inform them when launching this small event.

A CPFR system does not exist, but company L work together with suppliers when planning the future sales. Larger suppliers do in these cases have possibilities to affect how and what that will be sold and displayed at customers. A system with suppliers does not exist. Blueprints and other documents will be shipped or sent through email to suppliers. A system to communicate with suppliers does therefore no exist. Company L allocate products to customers both through push and pull systems. They also have collect POS-data from customers to be able to plan volumes for the future. All this data is collected by a common system and directly sent back to company L. This data also provides company L with information about when to sent more products.

Source/ Deliver

Company L does not have the possibilities to see stock levels or other details when discussing the suppliers they purchase capacity from. As long as the supplier is manufacturing the product is it impossible for them to follow it. It will although be possible for them to follow the products as soon

as the third part logistic company receive the shipment. To follow the products means that it is possible to receive information about when it reach a destination and still impossible to track and trace the units. The purchase department is responsible in keeping a face-to-face contact with the suppliers as long as they store the products and the logistic department will take over the responsibility when it reaches the docks.

When discussing the suppliers who company L only purchases products from is the information different. They do not have any inventory information and will receive information earliest as the suppliers send the goods. A face-to-face contact or email contact is does however exist continually. No information exists concerning the production. Company L trusts that the suppliers will contact them in time if they are unable to fulfill the agreement.

Information concerning costs is not great when it comes to the suppliers. The suppliers do not share cost structures, but company L feel that they have okay information regarding this since they can compare the costs with each other. All suppliers have to sign a code of conduct agreement, but can thereafter choose their own suppliers. All suppliers are measured by KPI´s. The KPI´s are forwarded to suppliers, but not through a system. It is instead presented to suppliers during meetings. The information is however stored in the business system. All employees can therefore follow these KPI´s all the time.

Orders are sent through a web portal. The web portal is a full reflection of company L´s business system. The supplier has possibilities to change the order and confirm it when satisfied. This system so far only exists with these kinds of suppliers. All invoices and such are also handled by this web portal and have generated large cost savings. When discussion risk management is company L very aware of existing risks. They do not have any larger problems of sharing information with suppliers or customers. Each specific event is handled when it occurs. Their suppliers are more discreet and careful with information due to risk of plagiarism.

Make

The inventory levels and similar information are visible through the business system and all the cost structure of the DC is totally clear. The costs are very detailed in costs in to the DC´s, cost handling at the DC´s and costs out from the DC´s.

The asset visibility is quite clear at the DC´s. The information about the stock places is not totally clear, but able to find when needed. Also information about the forklifts exists, but it does not exist in the business system. Company L does have information about their assets, but not detailed and automatically calculated within a system.

Return

How company L handle the return flow varies depending on the reason. Products that are imperfect or carry some other fault will be sent back to the DC´s and their after sent to suppliers. Products that remain unsold will be realized at customers or sent to outlet stores. When a fault occurs with a problem is an email or calling sent from customer to company L who informs all customers about the problem by an email. It is although not possible for the customers to lock the products in the business system.

Company M

Plan

The suppliers are organized differently according to if they are strategic or not. The generic suppliers are also organized depending on their status, on other words if they are about to be phased out or if company M want to help them become strategic. The suppliers are also organized in different commodities depending on what they are supplier of. The level of information shared with suppliers varies on the relation and the communication system with these suppliers. VMI suppliers receive future demand information by the VMI system. Strategic suppliers which mainly are VMI suppliers receive most information possible either through a system or during the monthly meetings. Company M finds it very important to share this type of information with strategic suppliers to expand the relationship. Lower prioritized suppliers and generic suppliers do not receive this type of information. A large amount of the suppliers are however VMI committed to company M. These suppliers also own the stocks and are paid as products are being used.

A few global strategic customers are helping the planning and production procedure by a CPFR system. These companies are also connected by a VMI solution so company A can refill their stocks when needed. They are thereafter separated depending on where on the globe they are located. The CPFR customers receive a lot of information about production planning and possible or future sale and marketing activities. They receive this information during the weekly meetings and are also able to affect what activities company M will focus on. Most customers are all though not receiving this much information, but are sending information about their forecasts and receive information by communication with the sales offices. The main contact with customers is handled manually by the sale offices and no system is developed to share this information. Almost all information shared with CPFR customers are shared with a module in SAP.

Orders that not are submitted by VMI are submitted using an EDI or RosettaNet connection, even email or telephone are used in some cases. Since the whole idea with VMI is to share information is company A is trying to share as much information as possible due to help suppliers to get total control of their chain and optimize their production, etc. Company M has a large support from the management to develop the relation and the visibility in their supply chain.

Source

Company M separates component suppliers from suppliers who deliver parts. Each article is not marked with a serial number, but is traceable by batch. It is not possible to track and trace the shipments from suppliers by exact destination. It is although possible to get information about certain stops along the way. An email has to be sent to the distributor to find out this information, it is therefore not possible to log on to a webpage and follow the shipments.

All suppliers are responsible to inform company M if they cannot deliver or if a problem that affects company M has occurred. It is also the supplier’s responsibility to find out how to solve the problem and come up with a backup plan. According to company M this works satisfactory.

Information about the suppliers cost structure varies. The part-suppliers share their full Bill of material (BOM), but other suppliers are more restrictive. The commodity buyers try to keep track on these suppliers and benchmark them towards each other, thus, gaining an understanding concerning the costs. Company M does not have any interest and possibilities to trace stock levels of material at suppliers. Company M tries to spread their risks by not being a too large actor at each supplier.

Suppliers are measured continually by different KPI's, mainly deliver precision and quality. The most important measure is price and the suppliers' ability to continually cut costs. Suppliers will receive this information during monthly meetings. Suppliers will get the chance to improve and thereafter evaluated and helped by company M if needed.

Company M find risk management very serious and share information very differently. Trusted partners receive a lot of information and generic suppliers do not receive as much since they might be phased out if they cannot complete the agreement.

The communication in the value chain is very direct. Operational levels communicate with operational levels in the same way as strategic communicate with each other. By that they mean logically the higher level the higher matter. Company M tries to improve and develop costs and production at their suppliers and factories. This is done by floor managers. The level is not as high at suppliers as in factories due to the easiness.

Company M have recently implemented a hub were information about all material purchased to all factories are collected. By using this hub and allocate material will they purchase larger volumes and gain better prices. There is a strategy where to allocate the material and strategists work with it continually. Only one hub exist today, but a few more will be built in the future.

Make

Company M cannot follow the products at work in their factories and are not interested. They are however interested in the stock levels at different points in the production, not only end stock. A production stop never passes by without all relevant staff being informed.

The flexibility in the factories varies. The products are module based, thus, there is a certain level of flexibility incorporated in the design. This provides the production with certain flexibility, but it is not spread throughout the whole production. The production costs are very detailed in all factories, this since every penny saved make a large difference in profit.

The knowledge on the asset visibility is wide and all this information is stored in a system. Company M finds it important to keep track of all assets due to the fact that it will cost a few extra penny's per end product not to.

Deliver

It is possible to get information about certain stops along the way of the shipments, but not possible to follow the shipment in detail. Point of delivery (POD) data is measured continually. The distributor will have to search for the shipment if it has not reached the customer. Company M do not have this

option themselves. Company M do not share their production cost with any customers or companies who have the interest.

Company M measures their own performance towards customers continually, by the same KPI's as towards suppliers. All orders will soon be measured by a method called perfect order. This means that every order will be evaluated and judged as failed if only one parameter is incorrect.

Company M has a standardization that defines what to do when a conflict occurs in both directions, both towards suppliers and customers. The written contracts are not used very often, but are rather the final step.

Return

Company a separates the return flow in claims and business returns, were claims are products that are incorrect and business returns are products the customer do not want anymore. They have worked very hard with this process since it is a rather large one and it has become superior.

Standardized models tell all involved how to handle the customer and how to collect the information and forward it to suppliers. Suppliers get information as soon as company M knows there is no lead-time, but telephone communication is used. A system to inform suppliers do not exist, the information is instead stored and evaluated within company M. Information detected will of cause be forwarded to suppliers it is although used by manual communication.

Company N

Plan

There is no segmentation of suppliers today. The question is rather “which supplier can deliver according to these demands”. There is a multitude of suppliers in some product categories, and single sourcing in some categories. Therefore the supplier base is large and the supply risk is high. The relationships with suppliers are generally short, 1-2 years. Therefore sourcing is a high cost and there are no extended relationships.

The information shared with suppliers is highly limited. They do receive forecasts concerning the size of a “contract”. However there is no information concerning the accuracy of the forecast (compared to actual orders), thus the forecast is not an effective communication tool.

Source

There is no standardized system for how to place orders. Every country and entity use their way of ordering. In terms of tracking there are no possibilities to track the goods. The inventory levels at retailers are tracked with spreadsheets. The spreadsheets are the only system to track future demand, inventory levels and the sales rate of different items.

Today company N purchases all goods with delivery terms included. Therefore it is impossible to track costs and understand which costs that can be reduced. There is no cost structure sharing besides competitive bidding. The transparency concerning the costs is zero.

There are no KPI in use today in order to track performance and understand the capabilities of different suppliers. The measurement of suppliers is rather based on subjective perception from individuals within company N. The system used today is mainly Excel to support operations. Before a proper system can be developed the processes must be better structured.

Problems with suppliers are solved by terms in the contract. There is also a special consultant company which makes the purchases for the firm. Thus this consultant firm can play hard ball and company N have the ability to stay out of conflicts.

Make

There is no tracking of inventory at central level. At local level inventories can be tracked with the help of the third party logistics provider which is used.

Deliver

Company N has no segmentation of the sales channel. There is no KPI system for measuring performance towards the sales channel or ultimately the consumers.

Return

There is no standardized process for how the return flow is handled. The return flow is handled with local solutions. Service flow, incorrect shipments etc. is all handled as exceptions. The systems used are the systems provided by the suppliers. Internal control is made by used of spreadsheets, or the return flow is not controlled at all.

Appendix C – Article in press by Johansson and Melin

Bättre informationsflöde kan ge svenskt näringsliv miljarder

Företag i logistikintensiva branscher kan öka sin lönsamhet med 3,4 procentenheter genom att förbättra informationsflödet i sina logistikprocesser. Detta motsvarar 150 miljarder kronor i sänkt kapitalbindning för svenskt näringsliv enligt uppskattningar gjorda av management- och IT-konsultbolaget Connecta.

Dagens teknik gör det möjligt att samla in mycket information om produktion och varor i företags logistikprocesser, men den är svår att hantera på ett effektivt sätt. Risken finns att information går förlorad och därmed också viktiga åtgärder för effektivisering. En studie gjord på uppdrag av Connecta av två studenter vi Kungliga Tekniska Högskolan visar att detta är ett återkommande problem hos många företag i Sverige och att grunden många gånger ligger i en ineffektiv kommunikation.

– Vi blev nästan överraskade av hur tydliga resultaten var. Det finns stora vinster att hämta för många företag, säger Christer Björk som är ansvarig för konsulttjänsterna inom logistik och inköp på Connecta. Han påtalar att företagen bör titta på informationsflödet både inom det egna bolaget, och i relationen till leverantörer för att hitta problemområdena.

Stora vinster att hämta

– Internt har information en tendens att stanna inom enskilda delar i organisationen vilket begränsar informationsflödet. Externt så försvåras kommunikationen ofta av bristfälliga system. Mycket information överförs till leverantörer med hjälp av för enkla verktyg. Dessutom är det ofta oklart vem som ska ta emot information i de externa kontakterna, säger Christer Björk.

Studien från Connecta visar att kritisk information "fastnar" i det dagliga arbetet och aldrig används som underlag till förbättringar. Därför finns stora vinster med att förbättra sitt arbete. Enligt studien kan företag öka sin lönsamhet med så mycket som 3,4 procentenheter vilket skulle kunna motsvara 150 miljarder kronor i sänkt kapitalbindning för hela det svenska näringslivet vilket med en kapitalkostnad på 10% innebär 15 miljarder i ökade vinster. Siffran är ett medeltal för de undersökta företagen och baseras på antaganden som företagen själva har uttryckt i studien.

> Information ska användas till att undvika situationer och inte endast förklara uppkomsten.

Christer Björk, Connecta.

Effektivisera information

För att nå dit menar Christer Björk att det krävs ett antal åtgärder. Till allra störst del handlar det om ta ett fast grepp om sin "Supply Chain Visability", det vill säga att inom sina logistikprocesser arbeta med ökad effektivisering av information, kartläggning av kommunikation och strukturering av proaktiv problemlösning.

– Information ska användas till att undvika situationer och inte endast förklara uppkomsten, säger han.

Kontinuerligt lärande

Ett av de studerade företagen är Alfa Laval som just nu arbetar med att förbättra sina informationsflöden. All kontakt med leverantörer sker via en central, ett "vendor information system". Där fångas relevant information upp och kommuniceras vidare via system eller manuell kontakt beroende på vilket som är mest lämpligt. Samtliga godsflöden kontrolleras av ett "logistic control tower". Där sker kontakterna med produktion, tull, speditör, godshantering och kund. Funktionen skapar ett proaktivt arbete där berörda parter snabbt blir informerade vid oväntade händelser.

– Alfa Lavals aktiviteter är exempel på hur informationsflödet kan förbättras så att rätt information när rätt person, vid rätt tillfälle och rätt plats. När det sker har företaget skapat förutsättningar för att ett kontinuerligt lärande och förbättringsarbete – som i ett större perspektiv innebär nya miljarder att dela ut till aktieägare eller återinvestera i verksamheten, avslutar Christer Björk. ■