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# **Fourth-Party Logistics**

– A study on modern logistics

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## **Abstract**

The business environment has changed tremendously in the last two decades. Corporations have been forced to realign their global strategies and in order to cut costs, they started to transfer activities which were previously performed in-house to the market (e.g. IT, manufacturing or logistics) focusing instead on their core competencies. Nowadays companies outsource several of their logistics activities to so-called third-party logistics (3PL) companies and thus from being centralized, vertically integrated and with single-sited manufacturing facilities, enterprises have their network of resources globally dispersed.

As a result corporate management has realized that the competitive vehicle is no longer the individual firm, with its own resources and competencies. Instead, in order to cope with shorter product life cycles and ever more demanding customers, both on industrial and consumer markets, individual firms need to strategically become part of 'extended enterprises'; that is, networks of specialist providers of resources and competencies.

However, because the capabilities to manage the entire network do not exist in any one organization, a new business organization was needed to provide the strategic knowledge and competence that will enable the complete integration of the supply chain. This new sort of firm, with core competencies on logistics processes and supply chain IT integration, besides offering consulting services on implementation and development of logistics and supply chain solutions, manages through the use of logistics control towers "the best of breed" 3PL specialists, integrating the end-to-end supply chain so that superior customer value is delivered in the most cost effective way.

But how does the use of a supply chain integrator help the supply chain as a whole to achieve competitive advantages that enhance end-customer service?

This paper aims to answer the above question. I felt that in order to be able to do that the most appropriate research strategy would be a qualitative study. Hence, a multi-case study was performed on three Swedish companies which differentiate themselves from the more traditional third-party logistics providers. The study was conducted by performing a set of semi-structured interviews with these companies. In order to give the study some sort of structure, I used an interview guide which was divided into three different themes; a) Organizational Design, b) Enterprise Logistics Integration and c) Logistics and Competitive advantages.

Once the interviews were transcribed and summarized, the empirical findings were then analyzed in light of a theoretical framework chosen previously. These theories, which in general terms relate to organizational design, supply chain management and finance, were also divided in the same themes as above.

Finally, conclusions were drawn by linking the results of the interviews with the theoretical framework. It became evident that the supply chain integrator can help the supply chain as a whole not only to reduce costs related to inventory holding but also to help its client to improve end-customer service.

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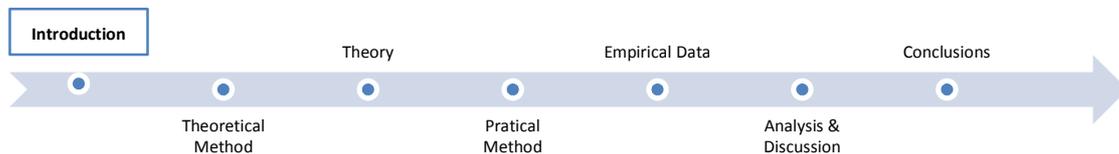
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# 1 Introduction

*In the chapter below, the reader will be introduced to the background that led to the choice of the study subject as well as to both the research question and purpose of the study. The chapter finishes with a section where the disposition of the thesis is presented.*



## 1.1 Problem Background

It is a broadly recognized fact that the business environment has changed tremendously in the last two decades. The political and the financial changes that have occurred in several of the world's economies (Allen, 2005), allied to sound technological advances, in particular the development of the Internet and applications using the internet (Ericsson, 2000) are having a major impact on the market and thus on logistics operations, my area of research.

Until the late 1970s, the corporate rationale paradigm was "bigger is better". Organizations grew by expanding their boundaries vertically. This, besides enabling economies of scale (through high volume strategy), gave the opportunity to secure suppliers and distribution channels (Harbhajan, 2006). However, during the early 1980s, increasing oil prices affected manufacturing companies forcing these to reduce costs in order to stay afloat. The world's largest economies, i.e., US, UK and Japan were facing severe economical recessions, showing a combination of low productivity, high unemployment and high inflation (stagflation). The above factors, led to the privatization revolution; first in US and UK and later spreading itself globally (Allen, 2005). The liberalization process brought the de-regulation of market sectors such as telecommunication, energy and financial services, which were previously dominated by single firms enjoying natural monopolies. With the fall of regulatory barriers new business opportunities were created motivating creative entrepreneurs and companies alike to seek for new business models, through restructuring and reshaping of their boundaries. The changes in the financial systems, on the other hand, besides establishing new legal requirements, leading to increased disclosure and transparency, it also accelerated the development of global financial markets and new ways for company financing (Weiss, 2007).

### 1.1.1 Moving towards a new organizational paradigm

The above factors created a radical u-turn in the way of thinking. Hence, in mid 1980s, academics and management gurus started to believe that the key to competitiveness is "small size and high value". The organizational paradigm shifted towards smaller and agile organizational forms capable of rapidly changing their cost structures (Harbhajan, 2006).

According to Stock et al. (1998) the changes in the business environment forced large-scale enterprises not only to realign their global strategies and manufacturing activities, but also to flatten their hierarchies in order to speed up information flows. Moreover, in order to cut costs, corporations started to use outsourcing to streamline operations, moving from being centralized, vertically integrated and with single-sited manufacturing facilities, to having their network of resources globally dispersed, thus creating the concept of "new manufacturing enterprise".

Currently, companies outsource everything from their data centers, payroll or receivables departments (Corbett, 2004), to subcomponents of their products, or even large parts of their lo-

logistics processes (Remko, 2002). When it concerns logistics, companies today outsource much more than the inbound (purchasing) and outbound (distribution) transport of goods. This logistics outsourcing trend has developed into what today is identified as third-party logistics (3PL). The 3PL service providers are firms that offer a wide range of logistic services; varying from inbound consolidation services (pick-up of material and components from suppliers using central hubs or cross-docking facilities for re-sorting and consolidating for final delivery), to other value adding activities such as, quality control and just-in-time deliveries to production lines, which implies the delivery of the required quantity at the right time (Aronsson et al., 2006). Furthermore, companies operating globally may outsource their logistics operations to several different 3PL service providers, who are specialized in different geographical markets (continents) or industries.

Naturally, the technological progress, in particular the World Wide Web (Internet) which created a standard global communication and information system, now present in nearly every city or village around the world, has enabled enterprises to completely new collaboration structures (Duening, 2005). From a logistics perspective, the development of the Internet and the applications using it, also implied a shift from supplier oriented (push) to customer oriented strategies (pull), causing this additional pressure on the need for an effective management of the supply chain (Ericsson, 2002). In fact, in order to frame this new concept, the author uses the term “demand chain management” to describe the concept of managing a truly market or customer driven supply chain.

Today’s global economy is characterized by continuous change and increasing turbulence. Technological development is unfolding at a growing pace, bringing forward new products and more efficient production methods. Competition is harder than ever and firms at a global level must provide high-quality and low-cost goods in order to retain their market share. Customers, on the other hand, besides being more informed, demand better service and have a much broader spectrum of needs, reaching from quality to corporate social responsibility and environmental awareness, in other words in this new business era customers are in the driving seat (Christopher, 2005). As a result companies have become market oriented; that is instead of focusing primarily on their internal functions (e.g. purchasing or manufacturing) and economies of scale, they have come to realize the importance of customer service as a strategic tool.

Moreover, the traditional business model was to a great extent transactional. Products and services were purchased and sold but little focus was put on long-term and mutually dependant relationships. However, as a result of some successful pioneering outsourcing activities, corporate management in general, has come to realize that the competitive vehicle is no longer the individual firm, with its own resources and competencies. Instead, in order to maintain the competitive edge, individual firms need to strategically become part of so called ‘extended enterprises’; that is, networks of specialist providers of resources and competencies (Christopher, 2005). The author points out that in order to achieve that it is required more than just a simple re-drawing of the organizational chart. It entails a cultural change in the principles that have traditionally guided organizations. According to Christopher (2005) in this new era of network competition, the path to sustainable advantage depends on the capacity to manage the complex mesh of relationships so that end-user requirements are delivered in a cost-effective and value-creating manner. Enterprises need to be able to co-operate with stakeholders and partners within the supply chain network in order to cope with shorter product life cycles and customers, who besides being extremely time-sensitive also demand high levels of delivery flexibility, both on industrial and consumer markets.

Christopher (2006 p.295) explains further that because “the capabilities to manage the network probably do not exist in any one organization” a new business organization is needed to provide

the strategic knowledge and competence that will enable the complete integration of the supply chain. According to the author this new sort of firm, with core competencies on logistics processes and supply chain IT integration, besides offering consulting services on implementation and development of logistics and supply chain solutions, would also manage through the use of logistics control towers “the best of breed” 3PL specialists, integrating the end-to-end supply chain so that superior customer value is delivered in the most cost effective way.

This study will focus on this new type of organization; the supply chain integrator (see appendix 1), a company which delivers network management capability.

## **1.2 Research subject choice**

When I first started to discuss with my fellow colleagues at the International Business Program, which areas each of them would research about, it became evident that only I was interested in studying logistics and supply chain management as a subject. Most likely this had to do with the fact that previous to my academic studies, I already had a long working career within logistics and supply chain management. Moreover, I started my professional career by working for a large IT manufacturer during the 1980s and have since then kept an interest on IT development and business solutions. Thus, the interest to study this new type of organization (the supply chain integrator) which combines logistics with information technology as the core-competence it was very much personal.

Moreover, I knew that companies have changed their views on the importance of logistics on the company’s overall performance; from being considered an uninteresting business overhead relating to warehouse and transport (Waters, 2003), logistics is today used by many companies as a strategic tool to achieve competitive advantages over their competitors (Aronsson et al., 2006). Hence, I felt that I wanted to explore how this new business organization can help the supply chain to achieve end-to-end integration that will lead to competitive advantages.

### **1.2.1 Research Question**

*How does a supply chain integrator help the supply chain as a whole to achieve competitive advantages that enhance end-customer service?*

### **1.2.2 Research Purpose**

In the conclusion of their study, Stock et al (1998) suggest that their conceptual framework should be used as basis for further empirical research. The authors recognize that the competitive environment forms a firm’s organizational design and thus affect its strategy and structure. Stock et al. connect a firm’s strategy, its structure and its logistics capacity with how the firm will perform, hence recognizing the increasing importance that logistics/supply chain management is having in being the link between new manufacturing strategies and organizational structures, which have emerged as a result of changes in the competitive environment. According to these authors, “enterprise-wide logistics integration” (both internal and external) is the key that provides the proper balance between strategy and structure within the supply chain.

The purpose of my study is to explore and understand if this recent business concept is here to satisfy the needs for enterprise-wide logistics integration mentioned by Stock et al. on their study, and if so how are these integrations bringing competitive advantages to the different partners within the supply chain.

## 1.3 Disposition

According to Johansson-Lindfors (1993), the use of summaries in the beginning or end of each chapter of a thesis is important because with a logical and clear disposition follows a better understanding. Hence this section is created to give the reader a clear outline of what lays ahead. Moreover, and according to the author above each chapter of this thesis will have a brief summary of its contents.

### ▪ **Chapter 1 – Introduction**

In this chapter the reader was introduced to the topics normally addressed on the introduction chapter of a thesis. Besides having introduced the problem background, I explained the reasons behind the choice of subject, formulated the research question and described the purpose of the study.

### ▪ **Chapter 2 –Theoretical Method**

This section is thought to give the reader an understanding of the author's background, his previous knowledge and preconceptions about the subject and how these may influence the study. Moreover, the reader will be introduced to the different theoretical views on how research should be pursued, concluding the author by establishing the research method that will be taken.

### ▪ **Chapter 3 – Theory**

This chapter provides the very essence, the fundamentals, of this thesis. During this chapter the author introduces the theoretical framework chosen for the consequent analysis of the empirical findings. The author introduces a set of theories relating to organizational design and its building blocks (e.g. strategy and structure), as well as logistics and supply chain management theory.

### ▪ **Chapter 4 –Practical Method**

Throughout this chapter the reader will have the opportunity to follow the description of the different steps taken in order to collect the required empirical data. Thus, this section is thought as to reflect the practical method used to conduct the research.

### ▪ **Chapter 5 – Empirical Data**

The empirical findings on the interviewed companies are presented within this chapter.

### ▪ **Chapter 6 – Analysis & Discussion**

What is the meaning of the results and how are these related to theory? On this chapter the author aims to analyze the findings on the lights of the theories chosen.

### ▪ **Chapter 7 – Conclusions**

In the final chapter the author will present his final thoughts on the study.

### ▪ **Appendix**

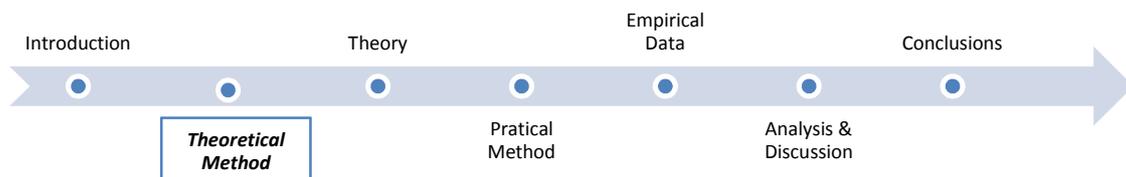
In the appendix section the reader will find the interview guide used to conduct the interviews as well as the description of the 4PL concept, develop by Accenture. Moreover, the reader will find some examples of organizational structural charts.

### ▪ **Reference List**

In this section the author lists the sources used during the conduction of the study, namely articles, books and websites.

## 2 Theoretical Method

According to Bryman & Bell (2005), the theoretical method used on the research links the way researchers visualize the connections between the nature of social reality and how it should be examined. Hence, in this chapter besides describing to the reader my epistemological and ontological standing points, I will unfold the preconceptions I have on the subject as well as will lay down the followed scientific approach.



### 2.1 Preconceptions

According to the majority of the business research methods literature, studies might be affected by the preconceptions researchers build upon over their life time. Preconceptions (both theoretical and practical) may affect not only the way the researcher conducts the study but also the conclusions he/she reaches (Johansson-Lindfors, 1993). After all an individual's preconceptions are based upon his/hers social background, ethnicity and religion as well as the practical experiences and the education that individual, respectively, lived and obtained during his/her life time (Johansson-Lindfors, 1993 and Holme & Solvang, 1997).

I was born in Lisbon, Portugal, where I was brought up. After having finished my upper secondary school education, I started my professional career (1982), as warehouse manager for an IT distributor company in Lisbon. I left the company (and Portugal) after seven years moving to Fort Lauderdale, Florida, in order to pursue an international career within the luxury cruise industry. Since then I have acquired a wide experience not only in global purchasing and logistics, but also on other business administration areas in a wide range of industries. During those approximately seven years I spent working onboard cruise ships I had the opportunity to travel around the globe, having visited over one hundred countries and all five continents. Moreover, I lived and worked in a few other countries besides Portugal; namely in US, England, Spain and now in Sweden, where I had the opportunity to gain a deeper understanding of these cultures and of my own.

Approximately five years ago I moved to Sweden due to personal reasons. That acted as a driving force to my decision of adding new theoretical knowledge to my already long professional career and thus starting a Bachelor's degree in International Business Administration and Economics at Umeå University. During this period I have studied, besides the Swedish language, areas such as; International Business Environment, Marketing, Finance and Accounting as well as Economics. Moreover, I studied Leadership and Project management at the university's Sociology Department as well as e-Logistics and e-Business via Skövde University. At bachelor's level (C-level), my choice was Organizational Design and Logistics/Supply Chain Management, however recognizing the fact that we live in a financial world, I have studied Corporate Finance and Investments at D-level. Naturally my preconceptions have been affected by all the above life and business experiences.

## 2.2 Views of knowledge and reality

### 2.2.1 Epistemology

Epistemology is the theory of knowledge and it is concerned with the nature of knowledge, its development, what is possible to know as well as understand and represent (Opie et al, 2004). According to the authors the motives for doing research, are often to obtain and communicate knowledge with the goal of informing either practice or policy and thereby make improvements.

But what is knowledge? According to Meyers (2006, p. 54), David Hume depicts knowledge as perception, memory and the instinct to connect ideas. According to the latter, *“The best we can do when experience leads us to believe something is to consider the issue in light of other things we believe from experience. This capacity distinguishes the wise from the vulgar, not an independent intellectual faculty.”*

Changes in the environment affect not only organizations and the agents operating within it, but also the intellectual environment in which scholars perform their research. As Hansson (2004) points out, the questions about what knowledge is, and how to develop that knowledge have been under discussion during the last two decades. This epistemological clash has been between the positions defended by the “positivists” and the “hermeneutics” (Bryman & Bell, p. 15). Until the 1980s, the theory of knowledge was very much dominated by the positivistic epistemological view (Hansson, 2004), which is closely connected to quantitative research methods, focusing on amounts and numbers when gathering and analyzing data to explain phenomena. This view, among other things, defends that only phenomena confirmed by the human senses should be considered as knowledge and that the purpose of theory is to generate hypotheses that can be tested (verification or falsification), using therefore a deductive principle (Bryman et al, 2003). The hermeneutics (interpretivism) views, on the other hand, have since the 1980s become to be seen as an alternative to the positivism orthodoxy. According to the latter, social- and natural sciences are different in fundament, hence requiring research procedures that mirror the differences between humans and the natural order. In other words, the social scientist is required to understand and interpret the subjective meaning of social action (Bryman & Bell, 2003, p.15-16).

After having reasoned quite extensively around these two different epistemological approaches, I felt that even though the study requires some objectivity which is provided by the positivistic view, it is also required an ‘interpretivistic’ approach. Opie et al. (2004) suggest that this feeling is quite usual as most people feel torn between these extreme views (positivism vs. interpretivism). I must admit I fall into this category of people; to me things are not black or white. First I do not believe a researcher is able to achieve neither an objective reality nor a complete objectivity, when it comes to business research studies. Organizations and networks are made of people and these bring with them a back-pack of preconceptions, values and knowledge that cannot be dissociated from them. Moreover, I feel that it is required a less linear approach than the one suggested by the positivism view (deductive), after all it is neither my intention to test hypotheses against the theory through the collection of quantitative data nor to generalize the findings through the use of statistical tools.

As previously mentioned, the purpose is to study the competitive advantages that can be achieved by the supply chain as whole, by using a 4PL service provider. Christopher (2005, p.8), explains that logistics competitive advantage is obtained through a combination of two factors, being these cost and value advantages. Cost advantages are provided by the effective (objective and factual) management of the supply chain, leading to increased efficiency and productivity and hence to cost reductions. Value advantages, on the other hand, can at times be intangible. For example, according to the author, it has been recognized for a long time within the market-

ing research area that “customer don’t buy products, they buy benefits.” The author means that the product is not just a physical thing, but it is also something that delivers benefits which are not possible to measure in a sense as the one defended by the positivistic theory, i.e. the social benefits for the customer or end-user.

### 2.2.2 Ontology

Studies the nature of reality and its characteristics (Creswell, 2007, p. 16). Creswell’s (2007, p. 19-22) introduces *Post-positivism*, *Social Constructivism*, *Advocacy/Participatory* and *Pragmatism* as four possible ontological paradigms or worldviews. According to *post-positivism*, those who are performing a qualitative research following this paradigm will take a scientific approach to research that is; it will have elements of reductionism, logic, emphasizes on empirical data collection, it is cause and effect oriented and deterministic. *Social constructivism*, in turn, defends that people are continuously trying to understand and make sense of the environment they are embedded in. According to this view, the research should depend as much as possible on the contributor’s views of the problem and rather than starting with a theory (the principles of deductive theory), this view defends that researchers inductively develop a theory, after having departed from a general research question. The third paradigm, ‘*advocacy/participatory*’, on the other hand, has as its ground belief that research should have an action agenda pursuing reforms that may change the realities of the contributors and the systems in which they either work or live in. Examples of areas of research are for example issues related to oppression, domination or alienation.

Once again, I must admit having mixed feelings from an ontological perspective. On one end the study focuses on organizational design, and traditionally organizations are associated with social order. There are hierarchies and people besides following standardized procedures apply rules and regulations. Thus requiring an objectivistic approach in order to understand the reality of the organization. On the other end, these same organizations operate in environments where the social order is in constant change, with agreements being continuously “established, renewed, reviewed, revoked, revised...” (Bryman & Bell 2003, p.20). Thus requiring also a constructionist approach in order to understand the everyday interaction between the actors working within these same organizations.

However, it is with the fourth ontological paradigm (pragmatism) that I feel most identified with. According to Rossman & Wilson (as cited in Creswell, 2007, p.22-23), pragmatism leads to the concentration on the underlying problem and the questions relating to it rather than focusing on the methods used. Creswell (2007) develops this concept further by putting forward a list of characteristics that originates from Cherryholmes (1992) and Murphy (1990). According to the latter, researchers sharing this view can choose rather freely on the methods and procedures when doing research, since they are not devoted to the use of a single approach to philosophy and reality. But most importantly (to me) pragmatists agree that research always occurs in social, historical, political and other contexts, a fact that is well noticed in this paper.

## 2.3 Scientific approach

Summarizing, logistic competitive advantage have two components; financial (facts) which are measurable and from where statistical inferences can be drawn, but also a value component which at times can be intangible and thus requiring understanding and interpretation of the reality.

Since the research question is to ascertain *“how does a supply chain integrator help the supply chain as a whole to achieve competitive advantages that enhance end-customer service”*, I believe that a qualitative study, as opposed to the more *“positivistic”* oriented quantitative study, is the most suitable method to be able to obtain the empirical data required to answer the study’s research question.

Moreover, according to the business research literature there are two theoretical approaches usually used when conducting research being these; the inductive and the deductive approaches. While the latter approach (deductive) is characterized by studies starting with the researcher based existent theories for a specific domain, formulating a hypotheses (or hypotheses) that later need to be subject to empirical scrutiny (Bryman & Bell, 2003); the inductive approach is characterized by the researcher formulating a theory based on the data collected.

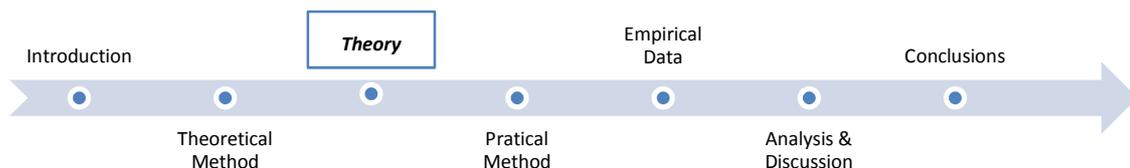
Even though qualitative research, more often than not, follows an inductive approach as opposed to the deductive which is often linked to quantitative researches, personally I believe this study follows an approach which is closer to deductive. There are a few reasons that explain my believe but perhaps the most important is that prior to conducting the study, I read several existing theories relating to both organizational design and supply chain management which value could not be ignored. Moreover, it was through the knowledge acquired that I was able to build up an interview guide which reflected relevant theories on the chosen fields. Finally, I used that same interview guide to collect empirical data which was later analyzed in light of theories previously chosen. However, as Bryman & Bell (2003, p.13) points out to a large degree the researcher should think about the deductive and inductive strategies more as tendencies rather than a *“hard-and-fast distinction”*

## 2.4 Secondary Sources

By definition secondary sources are documents (e.g. articles, books or internet) that relate or discuss issues addressed previously. Hence, the theories used in this thesis have all been found through the use of secondary sources. Moreover, the majority of the secondary sources used were primarily obtained by using the Umeå University Library as well as its database resources. Examples of these databases are Academic Search Elite, Business Source Premier (EBSCO), ebrary (e-books) or Web of Science. The reason behind this choice of secondary resources is that the articles included in the above mentioned databases are peer reviewed and thus assumed to have the quality required in a study of this kind.

### 3 Theory

*This chapter is thought to provide the reader with the insight over the theories used to analyze the empirical data. As the reader will notice, the theories have been grouped into three themes; Organizational Design, Enterprise Logistics Integration and Logistics & Competitive Advantages. These same themes will be also used to present the data collected as result of the interviews as well as for its analysis.*



As previously mentioned on the problem background, the competitive environment has changed tremendously in the last two decades. The political and financial developments occurred at global level, accompanied by relevant technological progresses; in particular the Internet and its applications have certainly contributed to this. Additionally, customers in these global markets demand cheaper and higher quality products, to be delivered yesterday, if possible. These factors acted as driving force for change, pushing companies to shift their boundaries, and hence moving from being vertically integrated, to having their resources horizontally dispersed in networks created with worldwide based strategic partners. Naturally, this in turn put extreme pressure on logistics due to the need for enterprise-wide logistics and strategic integration.

#### 3.1 Organizational Design

The modern industrial firm as a concept has been developing ever since it came to existence after the Industrial Revolution period. This concept was based on obtaining economies of scale and scope, hence compensating those firms which made the largest investments in production facilities, distribution channels and management competencies. While economies of scope result from producing several items at the same time (Weiss, 2007), economies of scale occur due to the spread of the fixed costs over a greater output volume (Christopher, 2005). The appearance of the industrial firm, characterized by its mass production system has motivated researchers to theorize about the reason for the existence of the firm.

Weiss (2007, p. 21) clarifies that characteristics normally linked with the concept of firm are for example; "...the long-term nature and ongoing relationship in contrast to the arm's length transactions;" the idea that "...firms allocate authority to some partners over others' power", and that team production occurs within the constraints of the firm.

Traditionally, firms have followed a function oriented division of labor. That is, employees were placed into different functions or departments where the different firm activities took place. Even though this concept enables the efficient uses of resources it often leads to 'silo' type department mentality which is a hindrance to future development. Enterprises (firms) expanded the value chain activities upwards by taking over purchasing or exploration of raw materials and downwards by taking control over the distribution of goods (Weiss, 2007). The author explains that besides investing in raw material extraction facilities as well as in production sites for intermediate goods, firms took over the transport between the various production sites. Moreover, the firms that achieved economies of scale and scope through the above investments had become large enough to take control over the distribution of goods themselves, and thus replacing intermediaries. This combination created substantial cost advantages. Developing on the above concepts, Chandler (1990), as cited by Weiss, suggested that in order for the modern in-

dustrial firm to succeed it was just as important to invest in management know-how and capabilities as it was to invest in production and distribution.

Weiss (2007, p.22-31) continues his explanation of the foundations of organizational design by introducing four different strands of the theory of the firm, these are; transaction cost theory, agency theory, incomplete contract theory and finally the firm as a knowledge-based entity.

The study will follow the knowledge-based view. The reason is that the knowledge or competence perspective of the firm is process oriented, and thus in line with the demands put on today's supply chain networks. Moreover, function oriented firms are often slow to react to changes in the competitive environment. Thus it is suggested that organizations should focus on key business processes, which are by definition cross-functional and market facing (Christopher, 2005). Finally, because the knowledge-based view of the firm takes influences from a wide spectrum of literature strands (i.e. strategic management, Austrian economics and sociology), it becomes more dynamic, particularly when compared with the other theories mentioned above (Weiss, 2007 p.32). Thus also in line with the characteristics required from today's supply chain networks, that is; they are required to be agile and with high levels of maneuverability in order to cope with nowadays turbulent and volatile markets (Christopher, 2005, p.33)

### **3.1.1 The building blocks of organizational design**

According to Weiss (2007, p. 167), there are four building blocks within the organizational design, being these Strategy, Boundaries, Internal Structure and Governance, each having different parameters.

Because it would be beyond the scope of the study to explain in depth each of the above buildings blocks, I will focus on the two blocks present in Stock et al. (1998) model (see next chapter), which links Logistics, Strategy and Structure. However, in order to give the reader a better understanding, below the reader will find a brief description of each of these concepts.

The Strategy, defines the purpose of the firm, its reason of existence. The firm strategy should describe which resources the organization will use in order to create value and hence generate economic rents. The same truth applies when referring to market positions and resources. According to Weiss (2007, p. 73) only a distinctive configuration of these themes will enable the creation of added value above the typical return on a perfectly competitive market.

The Boundaries of the firm on the other hand, reflect the scope of the firm, the setting and its business opportunities. The boundaries determine power (i.e. through the separation between those inside and outside the firm) and shape investment incentives. These incentives can be both good and suboptimal for those on the inside. Good if they have access and know-how to interpret others information, but also negative because they may rely too easily on others decisions and thus issues such as free-riding, rent-seeking or unprofitable investments may occur. Moreover, the complementary between the balance of incentives and power is affected by the configuration of a firm's boundaries and thus the right degree of permeability enables the flow of important resources across organization boundaries and markets where their value creation potential is enhanced (Weiss, 2007, p.90).

The Internal structure of an organization, besides establishing how processes are organized, sets the boundaries of a firm, both internally and externally, and supports the governance of the firm by ascertaining the decision rights and decision-making power, hence determining how the strategy translates into success or failure. According to Weiss (2007), the firm's investments in value-creating assets, market positions and resources depend on the information about such opportunities and on the decision-making power of those which hold the relevant information.

The author suggests that by matching information with decision rights and by setting incentives to use these wisely, value is created and surpluses are maximized.

Finally, the firm's *Governance* reflects how any success or failure is distributed amongst the firm's constituencies. According to Weiss (2007), the consistency between these different blocks is of the utmost importance in order to keep incentives for value-creating investments and the distribution of power in balance.

The table below summarizes the themes and parameters, included on the different building blocks of the organizational design theory (Weiss, 2007, p.166). As the reader will realize, some of these parameters have been touched upon in the introduction chapter of this study (i.e. vertical and horizontal integration, outsourcing, departments and divisions, etc.)

Building Blocks	Main Themes	Design Parameters
<b>Strategy</b>	Purpose	Vision and mission
	Activities	Integration and construction of the value chain
	Positions	Markets and Industries
	Resources	Leverage across business units
<b>Boundaries</b>	Setting	Vertical and horizontal integration
	Shifting	Outsourcing, deconstruction, disintermediation
	Blurring	Degree of permeability
<b>Internal structure</b>	Information	Tacitness, asymmetry, performance measurement
	Power	Degree of centralization, leadership
	Incentives	Reward structure, career concerns, internal markets
	Co-ordination	Departments and divisions, hierarchy, organizational culture
<b>Governance</b>	Constituencies	Relative importance of stakeholders
	Mechanisms	Complete or rational contracts, exit, voice, access, ownership
	Forms	Legal constructs

**Figure 3-1: Building blocks of organizational design (revised)**

### 3.1.2 Combining Logistics, Strategy and Structure

At this stage I would like to recall that the purpose of the study is to use Stock et al. (1998) conceptual framework as point of departure and study the concept of supply chain integrator as the player that provides the enterprise-wide logistics integration.

As it can be depicted from the figure below, Stock et al. (1998) suggest that a firm's (or network) overall performance is affected by the balance between strategy, structure and the organization's logistics capacity. The authors explain that in the context of their study, performance can be measured in two different categories; internal and external measures of performance. Moreover, Stock et al. clarify that the above mentioned internal measuring category reflect the single firm (or network) competencies in areas such as manufacturing and logistics (e.g., cost, delivery speed and reliability, quality, flexibility). The authors continue their explanation by clarifying that while internal performance measures aspects which are more often than not under the control of the firm, hence providing a clearer indication of the relationship effects between strategy, structure and logistics. External performance measures, on the other hand, reflect factors outside the firm's boundaries. Some of these later measurements could be; market share, return on investment or sales growth. Moreover, the authors point out that beside those measurements named before, firms (and networks) may even measure non-financial factors such as customer satisfaction for example.

The figure below gives a graphic representation of Stock et al. (1998, p.39), conceptual framework, this study point of departure.

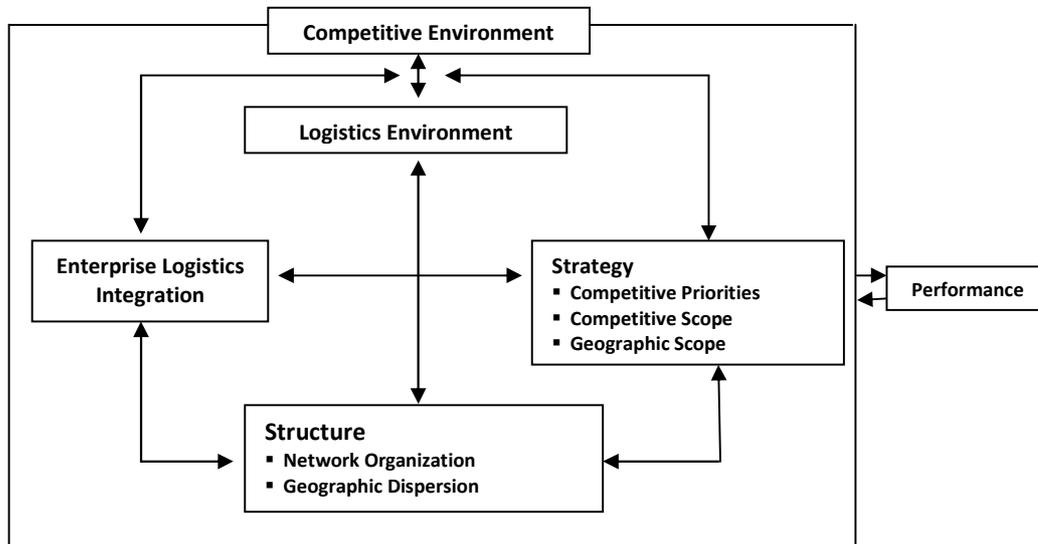


Figure 3-2: The Conceptual Framework (Stock et al., 1998)

Stock et al. suggest that the *competitive environment* besides reflecting economic and technological trends affecting the global market, it includes aspects such as the market demands; i.e. the variability and the location of demand or characteristics of the product like the price. Moreover, in their framework, Stock et al. (1998) treat logistics as one of the variables, or tools, an organization has at its disposal in order to gain competitive advantage. The authors mean that, like technology or management techniques capacity, the existence or not of effective logistics, which have become a primary mechanism for integration and coordination, may determine the achievement (or not) of these same competitive advantages. Furthermore, the authors' connect a firm's organizational design (its strategy and structure), with its logistics capacity and explain that the strategic choices made will affect the balance between the building blocks and hence determine how the company will perform. Hence, once the *logistics environment* is seen as a set of variables, logistics activities such as; transport, warehousing, procurement and so on, can be conceptualized. Thus, the competitive advantages to be gained will depend on the efficiencies each firm will achieve on these specific activities in relation to the others firms within the industry.

### 3.1.2.1 Strategy

Stock et al. (1998) explain that in the context of their study, strategy relates in first place to business strategy. While the *competitive scope* relates to the range of activities, in which the organization decides to excel, the *geographic scope* establishes the location of supply and demand and its spread. Because companies also purchase abroad, for the purpose of this study, the strategic geographic scope includes both, the supplier and the customer base. For instance, enterprises in order to achieve economies of scale may outsource part of their production to suppliers based in different countries, where manpower is cheaper. Once, the different modules are assembled into a product and hence adding value to it, organizations may then later distribute these products worldwide. Additionally, when it concerns logistics, companies may follow different strategic approaches, for inbound, internal and outbound logistics. The latter can in its turn be further divided into business to consumer (B2C) and business to business (B2B) which in turn more often than not imply the need for different logistic strategic approaches.

Stock et al. (1998) explain further that there are a number of possible strategic logistics activities where firms choose to excel in order to meet customer demand (competitive priorities). In general terms, firms compete on *cost*, *quality*, *flexibility (agility)* or *delivery*. The latter, in turn, includes components such as *stock availability*, *delivery frequency* and *reliability* or *order size constraints* (Christopher, 2005). Moreover, whereas firms competing on cost leadership will concentrate on achieving the lowest producing cost within its industry, firms competing on for example; quality, flexibility or speed, will focus on differentiation. Stock et al. (1998), suggest that both, quality and flexibility can be defined in several different ways. When it comes to the concept of quality, the authors divide the quality concept in; performance quality and conformance quality. While the former relates to the performance and features of a product, the latter addresses issues such as conformance to product specifications or the absence of defects.

Flexibility, as previously mentioned, also has several possible definitions, depending on the context in which it is used. However, for the purpose of this paper, and in accordance with the conceptual framework chosen as basis for this research, flexibility will refer respectively to design and volume flexibility (Stock et al., 1998). Miller and Roth (as cited in Stock et al. 1998, p. 41), suggest that while volume flexibility refers to the capacity to respond rapidly to changes in real demand, design flexibility, on the other hand, relates to the “capability to make rapid design changes and/or introduce new products quickly”. Parthasarthy and Sethi (1992), as cited by Stock et al. (1998), suggest that innovation both in product or process development can be seen as a part of flexibility.

Besides competing on the above competencies, firms compete on time. The importance of time as a competitive tool has been recognized for a while. Customers (both consumers and industrial) are increasingly more time-sensitive, thus demanding products to be delivered faster than ever before (Christopher, 2005). Moreover, and in accordance with the old say, ‘time is money’. Hence, the question is what is the cost of time? According to most of the business literature, the cost of time is the additional cost a customer is willing to bear whilst waiting for a delivery. Naturally these factors, together with shorter product life cycles, have put additional pressure on logistics management. Christopher (2005) points out that the risks attached with having lengthy and slow-moving logistics pipelines have become unsustainable in today’s competitive environment.

### **3.1.2.2 Structure**

According to Stock et al. (1998), there are several definitions and classifications have been given for the concept of organizational structure.

The authors explain that while Ghoshal et al. (1994) describe organizational structure as the dimension of centralization or decentralization different companies have, Habib and Victor (1991), on the other hand, categorized multinational corporations as “pure” structures. These included worldwide functional, international division, worldwide product division, geographic region and matrix (Appendix 2), hence introducing a relationship between the corporate head-office and the foreign operation. This view is shared by Daft (2007) who besides the above mentioned organizational structure forms (i.e. functional and functional with cross-functional teams and integrators) adds three other possible organizational structures; divisional, matrix and virtual networks. Daft explains that the concept of “virtual network structure” is an extension of the concept of horizontal coordination and collaboration, as it goes beyond traditional organization boundaries.

Daft (2007, p. 193-226), develops on Ghoshal’s et al. view and explains that vertically structured (centralized) organizations are designed for efficiency and stability, while horizontally structured (decentralized) organizations are most suitable for learning, innovation and flexibility. According

to the author, each firm has specific needs in what regards the degree of centralization/decentralization required and thus firms may have to experiment different combinations until they find the balance which best fits the company's needs. The author continues his explanation by clarifying that vertical linkages are first and foremost designed to control the organization and are used to coordinate organizational activities between the top and the bottom of the organization. Moreover, vertically structured firms have a wide range of structural tools (i.e. hierarchical referral, rules, plans or formal management information systems). Horizontal information linkages, on the other hand, refer to the amount of communication and coordination across organizational departments (or networks). Furthermore, Daft (2007) suggests that a relevant method to achieve horizontal linkage in organizations is through the use of cross-functional computerized information systems which enable managers or frontline employees to exchange information, on a regular basis, about problems, opportunities, activities or decisions, throughout the entire organization. According to the author, besides using *direct contact* through the creation of a *liaison role* (i.e. an employee placed in one department but with the responsibility to communicate and coordinate the activities with other department), horizontally structured firms may use other devices such as *temporary task forces* (representatives from each of the organizational units affected by a problem) or a *full-time integrator* in order to achieve horizontal linkages. Daft explains that unlike the liaison person, mentioned above, the integrator does not report to one single functional department. Instead the integrator, which could be a single position or even a department, is located outside the departments and has the responsibility to coordinate several departments. Additionally, full-time integrators may also be responsible for innovation or change projects (i.e. coordinating new product design, financing and marketing).

The table below describes the differences between these two organizational structure forms (Daft 2007, p.193).

Organizational Structure	
Vertical	Horizontal
Specialized tasks	Shared tasks, empowerment
Strict hierarchy, many rules	Relaxed hierarchy, few rules
Vertical communication and reporting systems	Horizontal communications, face-to-face
Few teams, task forces, or integrators	Many teams and task forces
Centralized decision making	Decentralized decision making

**Figure 3-3: The relationship of organizational design – Efficiency vs. learning outcomes (revised)**

An alternative to the traditional organization chart built of lines and boxes is Mintzberg's five-sector model as explained by Bolman & Deal (2003, p.73-77) (appendix 2). This model is composed by at the very top by the *strategic apex*. This includes the executive and the board of directors who focus on the competitive environment surrounding the firm and thus defining the strategy and shaping the grand design. Right below is the *middle management* who supervises, control and provide resources for the operations. At the bottom, one finds *the operating core*, i.e. those workers that produce products and/or services to customers/end-users. As one can depict from the picture two more components complete the model. These are the *techno-structure* and the *support staff*. The former relates to specialists and analysts who take care of standardization and of the measuring and inspection of outputs and processes. According to Bolman & Deal (2003) this could be for example accounting and quality control, departments within industry, or airlines technical support. The latter relates to support staff, these as the name implies perform support tasks that facilitates others' work. From this model Mintzberg

derived five structure configurations which have become to be named as *simple structure, machine bureaucracy, professional bureaucracy, divisionalized form and adhocracy*.

This study focuses on the *professional bureaucracy and divisionalized form* (appendix 2); the reason being the importance these give to the operating core, where the core competence lays. As one can see from the picture (same appendix as above) the operating core is much larger than the other structural parts in the model. Professional bureaucracy is characterized by having few managerial levels and thus is flat and decentralized by nature. The authors above explain further that even though there are benefits in enabling professionals to freely use their expertise and allowing for control to rely mainly on professional training and indoctrination, this organizational design creates problems related to co-ordination and quality control. On the other hand, the divisionalized form is categorized by the bulk of the work being done in quasi-autonomous groups. Within this structure each division serves a distinct market and supports its functional units. Division managers are responsible for business unit results as well as on its return on investment. As long as the results are positive the divisions run autonomously. The advantages with this structure are the economies of scale achieved, resources and responsiveness. One disadvantage, as pointed out by Bolman & Deal (2003, p.78), could be the “cat-and-mouse game between headquarters and divisions.”

Stock et al. (1998), also bring an important dimension to the concept of structure. The authors explain that their views on structure follows a framework of two constructs; the first relates to the extent to which the individual firm is part of a larger network (supply chain), the second aspect it relates to the geographic dispersion of the different partners within the supply chain (i.e. suppliers, the firm itself as well as distributors and customers).

### **3.1.2.3 Structure - Network organization**

Once the permeability and openness of the firm’s boundaries have changed (increased), firms are able to pursue different forms of hybrid cooperation with other companies. Examples of this are joint ventures, franchises or the strategic alliances that can be witnessed in today’s car manufacturing (Helper 1998) as mentioned by Weiss (2007).

Weiss (2007) introduces the concept of ‘clustering’ in relation to product research and development (R&D). The author explains that one of the main driving forces for R&D is the combination of knowledge and proximity to come up with innovative products. By placing their offices in strategic locations (clusters), i.e. Silicon Valley (USA) for information technology, but even Kista in Sweden, firms allow for ideas to be exchanged across the boundaries of the firm. The author explains that by having at their disposal a pool of knowledge (both external and internal) firms are able to leverage their positions and resources and thus gain advantage when introducing new products into the market. Finally, Weiss (2007) suggests that organizational designs based on a hub with a central coordinating management (i.e. in the case of a virtual company) or a network of interdependent companies working together for their own benefit and for the benefit of the network as a whole, are the most appropriate to be able to capture the returns of super-modularity.

Stock et al. (1998), in turn, suggest that even though ‘network structure’ is a concept that can be somewhat easy to grasp, is difficult to define, explaining further that there is not an absolute consensus on the definition of network. The authors who did a literature review on the subject could, however, identify three dimensions where network structure differentiates itself from other forms of organizational structure; vertical integration, flexibility and cooperation.

The first dimension, *vertical integration*, refers to the extent to which firms have ownership over the different stages of the supply chain (from raw material to distribution). The second, *flexibili-*

ty, refers to the ability to react to changes in customer demand. The final and third dimension, *cooperation or relationships between firms*, is according to Stock et al. (1998), both the most important characteristic of a network but also the most difficult to define.

Taking the above into account, one would expect hierarchies to show high levels of vertical integration, as opposed to networks and market firms which would show lower levels of vertical integration.

According to Stock et al. (1998), there are a number of attributes which characterizes the ‘cooperation or relationship’ dimension, these are;

- Control of power – it relates to the degree a firm has influence over the others.
- Information exchange – it relates to the level firms (in the relationship) share information about their production processes, technology or costs.
- Interdependence – Refers to the extent a firm is dependent on others to achieve success.
- Time-horizon – it relates to whether transactions are one-off or ongoing
- Goal consistency – it relates to the degree to which firms in the relationship align their objectives.
- Formality – it relates to how transactions are between firms (i.e. formal contracts vs. informal arrangements)

The table below describes the expected differences between three basic types of organization, being these; hierarchy, market and network (Stock et al. 1998, p.44).

	Hierarchy	Market Firm	Network
Vertical integration	High	Low	Low
Flexibility	Low	High	Medium
Relationships			
Control of power	High	Low	Medium to Low
Information exchange	Low	Low	High
Interdependence	Low	Low	High
Time horizon	Long	Short	Medium to Low
Goal consistency	Low	Low	High
Formality	High	High	Low

**Figure 3-4: Organizational structure differences**

Other studies such as those of Thorelli 1986; Powell 1990; Nohria and Eccles 1992, as cited by Boyce (2000), have tried to bring light into the concept of business networks. In general, one could say that networks, as opposed to bilateral agency relationships, are characterized by multilateral and co-operative relationships that rely on trust to provide governance, hence lacking a central coordinating power. According to these authors, networks members, which could either be individuals or firms, besides influencing one another in an interdependent manner, promote long-term relationships which enhances the possibility of mutual exchange of knowledge and mutual growth. Additionally because network members share risks, networks show some degree of exclusiveness which may guard them against opportunism.

As one can infer from the above, the concept of horizontally linked networks is highly correlated with the concept of the supply chain integrator, more so, when the trend for outsourcing has kept its initial popularity. With that I mean that as companies continue to contract out (out-source) non-strategic activities to other companies, which can perform these more efficiently;

the role of the supply chain integrator in these supply chains becomes more evident. Services such as accounting, manufacturing or logistics, for example, are outsourced to different companies being these connected electronically to a central office. According to Daft (2007), Accenture, for example, the consulting company that created the concept of 4PL, handles all aspects of information technology for the well known British food retailer J. Sainsbury's. The author suggests that virtual network organizations can be seen as a central hub surrounded by a network of outside specialists.

### **3.1.3 Strategic blueprints of the firm**

Developing his thoughts on organizational design and strategy Weiss (2007 p.73-85), explains that firms can follow different strategic blueprints; market-based and resource-based views are some of the possible examples. The author elucidates that each of these possible alternatives of strategy offer both different and complementary views on strategy.

#### **3.1.3.1 Market-based view**

This view has its grounds in economics and in the industrial organization field. There are several models, some of those using game-theory, analyzing aspects of the interface between the firms and the markets; however in general terms one could say that the market-based view is more concerned with aspects related to business level strategy than it is with issues relating to the distribution of economical rents or the internal allocation of power. This perspective's main concern is to understand the existing structure within the industry/market the firm is operating in; after all this structure will establish the competition rules within these same markets, and thus determining the performance of the firms in that industry. Because it focuses mostly on aspects related to business level strategy, the theory suggests different forms on how to reach unique market positions, where surpluses and the power associated with it can be achieved. By applying marketing and other instruments, such as *differentiation* or *market segmentation*, firms or individuals are able to increase their power and the surplus generated by a resource (or a bundle) over its rate of return in a perfectly competitive market (Weiss, 2007). According to the author, by differentiating themselves from competitors firms can obtain unique market positions; i.e. by investing in manufacturing products and services of higher quality. Moreover, if consumers perceive the firm's product as being better than those of the competitors, monopolistic advantages can be generated. Market segmentation, on the other hand can be applied as a strategic tool as long as it motivates more people to buy the product or service; otherwise the purpose loses most of its meaning. By differentiating consumers by age group or financial status, companies can charge higher prices and hence achieve additional surpluses. Hence, market segmentation and differentiation have somewhat similar effects.

### 3.1.3.2 Resource-based & Core-competencies view

This relatively recent view in economics focuses on competitive advantage aspects for the organization as a whole rather than on strategic positions of a specific business unit (market-based view). The resource-based view enhances the importance of a firm's resources, competencies and capabilities and suggests that if a company has either better resources or has developed better competencies (or both) than the competing firms, the company has a competitive advantage (Weiss, 2007 p.80-81). The author introduces Porter's (1996, p.64) explanation of competitive strategy. According to the later, "Competitive strategy is about being different. It means...choosing a different set of activities to deliver a unique mix of value".

Moreover, Weiss (2007) elucidates that there are several possible explanations for the concepts of resources, competences and capabilities. However, it seems that has mainly to do with the way different authors describe the concepts rather than has got to do with the content in itself. Weiss continues his explanation by clarifying that what distinguishes the views, described below, is that the 'core competences and capabilities' perspective is more process oriented than the resource-based view is. In common these views have the fact that they share the notion that uniqueness through the leveraging of resources, competencies or capabilities across business units and product markets, translates into competitive advantages. Amit and Schoemaker (1993), as cited by Weiss (2007, p.81) defined resources as "stocks of available factors that are owned or controlled by the firm", i.e. property, plants, equipment or tradable know-how in form of patents or licenses, as well as knowledge embedded in human capital. The authors explain that the capabilities of a firm are shown by the firm's capacity to manage resources in combination with organizational processes so that the pre-established goals and objectives are achieved and that a firm's capabilities are information based and are built on the long run. Prahalad and Hamel (1990), in turn, define core-competences as the "organizational capability to combine and renew the firm's assets and capabilities in such a way that the firm obtains and sustains a competitive advantage" (as cited by Weiss, p. 81) and suggest that competitiveness emerges on the long run through the ability a firm acquires in manufacturing more cost effectively and faster than its competitors. Furthermore, the resourced-based view establishes that resources (i.e. knowledge) can be of strategic importance to a company, after all the scarcer the resource is, the larger the surplus it will generate.

Weiss (2007) explains that if these specific resources or competencies are needed for efficient production, then those companies who either own or have access to those resources have a competitive advantage over the other contenders in the market. The author explains further that there are several views on which conditions a resource must have in order to be considered of strategically importance for the firm. The amount of criteria used varies amongst researchers; while Amit and Schoemaker used eight others use less. Weiss (citing Peteraf 1993), introduces a list of four conditions that a resource has to hold to be considered as ground for a firm's sustainable competitive advantage. These are;

- Resources must be heterogeneous, scarce or unique (only these generate surpluses)
- Difficult to imitate in order to maintain sustainable competitive advantage
- The resource should not be fully mobile, that is some barriers should exist in order to restrict entry/exit so that the rent generating resource is hold within the boundaries of the firm
- The resource must not be tradable.

### **3.2 The Value Chain – Shifting the boundaries (Outsourcing / Deconstruction/ Disintermediation)**

According to Weiss (2007), while the value chain concept is the result of the integration of different assets and activities into a single organization; deconstruction of the value chain, as the name suggest, refers to the process of splitting apart the value chain but at the same time preserving the identity of its individual parts. The author explains that the increasing confidence on industry-wide standards has motivated firms to transfer activities which were previously performed in-house to the market (e.g. IT, manufacturing or logistics) focusing the firm instead on their core competences (principle of outsourcing). Moreover, according to Weiss (2007) “the manufacturing activity for a mature product or service is best performed when the costs of production are lowest” (p.87). Thus in order to take advantage of this fact companies outsource modules of their own production to specialized companies who bundle the production requirements for many other companies and thus enabling creating this benefits from economies of scale.

Deconstruction takes the concept of outsourcing a step forward. The deconstruction of the whole value chain implies, not only, the slicing of the value chain into small distinct modules, but also and perhaps more importantly “the shifting of a set of resources or assets previously employed or owned by one firm to another firm on a grand scale” (Weiss 2007 p.96).

The concept of disintermediation is intrinsically connected with the principle of modularization of systems (i.e. information technology) which reduces complexity and costs. By creating links between all the supply chain activities, the organization (network) can modularize the whole value (supply) chain and thus create competitive advantages (Weiss, 2007). The coordination of logistics is one good example of this concept where efficiency can be increased by bundling the logistic needs for many firms operating within many industries together into just one firm in the value chain that is a specialist in that activity, for example a 4PL service provider. Moreover, disintermediation implies the elimination of a level within the supply chain. By eliminating a series of intermediaries (i.e. wholesalers, warehouses and retailers) which in less perfect markets appear between the producer and customer and thus inflating the value chain (Weiss, 2007). From a logistics perspective Christopher (2005) suggests that synchronous supply chains are able to reduce end-to-end pipeline times, increase market responsiveness and lower total costs considerably.

### 3.3 Enterprise Logistics Integration

Despite the central role logistics has in the overall economic activity, where logistics' total costs as a percentage of the gross domestic product (GDP) is estimated to be in average ten per cent in US as well as in other highly industrialized countries (Christopher, 2005), traditionally organizations have paid little attention to their logistics function. This was due to misaligned accounting procedures, ad-doc approaches and the apparent lack of underlying systematic ideology, the whole area of logistics costing was clouded and misleading (Waters, 2003). This approach has however changed considerably and from being considered an uninteresting business overhead, relating to warehouse and transport, logistics is today used by many companies as a strategic tool to achieve competitive advantages over their competitors (Aronsson et al., 2006).

#### 3.3.1 Logistics & Supply Chain Management Theory

There are several possible definitions for the concept of logistics, however I believe the definition below describes this concept quite comprehensively:

*“Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfillment of orders.”* (Christopher, 2005, p.4)

According to Christopher (2005), supply chain management is a wider concept than logistics; it builds upon it and aims to achieve integration and co-ordination between the processes of the different entities in the logistics pipeline (i.e. suppliers, intermediaries, 3PL providers and customers), so that superior customer value is delivered at less cost to the supply chain as a whole.

Traditionally, firms have been organizing themselves (vertically) around functions such as; procurement, purchasing, production, marketing, sales and distribution. The movement and storage of materials was considered an unavoidable overhead, companies knew that logistics was expensive; however few could precise how expensive it actually was.

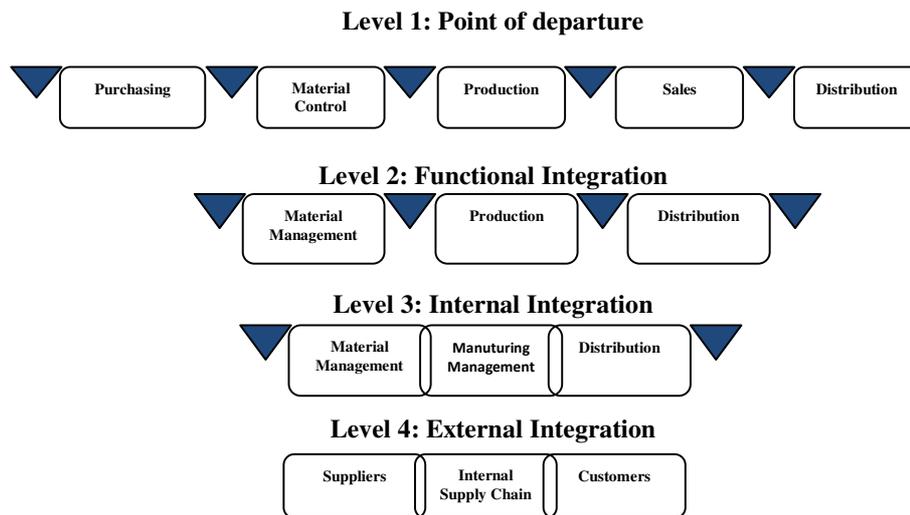
Companies having been working (wrongly) with complete functional independence. That is, each function did its own thing and was little concerned with the other functions or even the business as a whole. Purchasing, for example, would be more interested in buying large quantities in order to obtain lower purchasing and transport costs, than they perhaps would be concerned with quality. This quite often created conflicts of interest between purchasing and manufacturing departments. Manufacturing concern, on the other hand, would be to obtain long production runs in order to achieve large economies of scale (low cost per unit). Unfortunately, both of these approaches create inventory build-up on the warehouses (raw materials and finished goods respectively), hence neglecting costs relating to inventory holding. Waters (2003) explains that the problem with this management approach is that it focuses inwards, putting emphasis on the use of resources rather than on the creation of outputs which achieve customer satisfaction at a profit.

There were several reasons behind the need for change; firstly, rising oil prices were affecting tremendously manufacturing costs. Secondly, advancements had been made both in management theory and in information systems. Hence, with market conditions changing, companies started to recognize that it was required some sort of internal integration.

According to Stock et al. (1998), internal integration reflects the degree to which logistics activities interrelate with other functional areas within the firm, as well as by the extent to which logistics is seen or not a separate functional unit. According to these authors, companies with high levels of internal integration will show coordination of logistics activities with other de-

partments within the firm, increased communication, both electronic and interpersonal, between logistics and other departments and finally the recognition of the importance of logistics in the overall business strategy followed by a blurring of the formal distinction between logistics and other areas of the firm.

The figure below, which is an extract from Aronsson et al. (2006, p.26), represents the stages of evolution from functional to process orientation.



**Figure 3-5: The stages of evolution; functional to process orientation (revised)**

Level 1, is characterized by lack of integration within the different functions of the company. Departments have ‘silo’ type mentality, own management and information systems. Due to this there are several storerooms, represented in the figure by the colored triangles, creating this as a consequence extremely high inventory holding costs. Christopher (2005, p.102) explains that inventory costs can be divided into several different items i.e. the weighted cost of capital, management costs, storage and handling costs as well as costs related to obsolescence, pilferage or shrinkage and last but not least insurance costs. Moreover, at level 1, planning is made for the short-run only and companies react upon impulse. According to Aronsson (2006, p.27), several small and medium size companies are still today operating at this level.

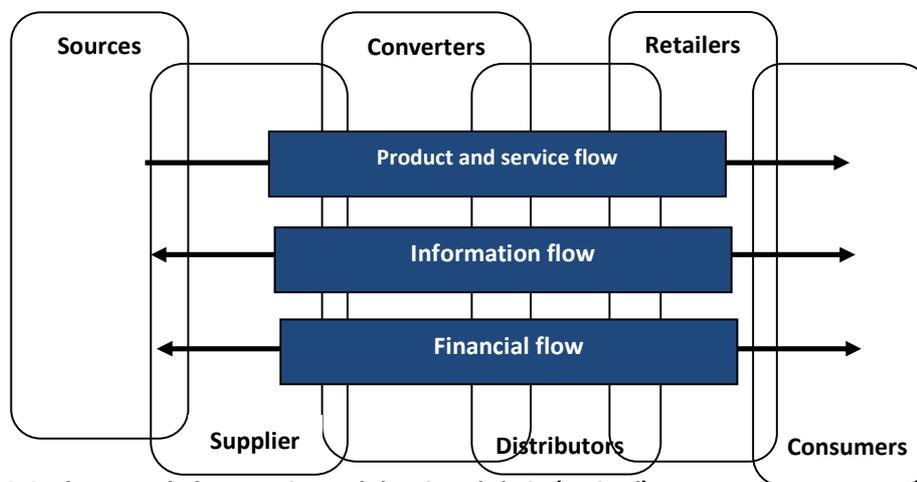
At level 2, even though the number of inventory buffers have been reduced, the problems relating to communication persist and has a result customer demand is still not visible across the entire supply chain. In other words, the firm functions still concentrate very much on themselves rather than on the whole business picture (Aronsson et al. 2006). As the figure demonstrates, some of the functions have been integrated. For example, purchasing and material control were integrated into a process (Material management), while Sales and Distribution were integrated into Distribution (Christopher, 2005).

With level 3, comes the need for the establishment and implementation of an ‘end-to-end’ planning framework. The amount of inventory buffers is reduced even further and although the different functions still exist, they now work with an overall perspective. Internal information systems are standardized and thus communication flow between functions becomes much more efficient (Christopher, 2005).

Finally, the external integration (level 4) is directly related to the area of this study, the concept of supply chain integrator (see appendix 1), as it refers to the integration of logistics activities across firm boundaries. The degree of external integration is reflected by the extent to which

logistics activities of a firm are integrated with the logistics activities of the firm suppliers, customers and other relevant actors operating within the supply chain. At this integration level important information is shared amongst the different actors within a supply chain and more often than not, companies have information systems that are standardized and integrated across company boundaries and hence information and communication flow besides being faster is much more cost effective. For example, companies using 'just-in-time' delivery strategy have created dedicated 'inter-firm logistics' relationships that link their manufacturing functions with specific suppliers of components (Christopher, 2005).

The figure below depicts the concept of extended enterprise and virtual supply chain, which is "based upon the value-added exchange of information" (Christopher 2005, p.179). The picture aims to show that it is through the use of shared information between the different partners within the supply chain that cross-functional, horizontal management becomes possible.



**Figure 3-6: The extended enterprise and the virtual chain (revised)**

The above author suggests that the supply chain becomes then a network of organizations which share common goals and thus bringing strengths to the overall value creation and its delivery system. Most importantly, in the context of this study, the author points out that this process of external integration is moving forward rapidly in line with the continuous trend of outsourcing and that at times the best way to describe what is happening to called it 'insourcing', particularly when one refers to the concept of partnering that virtual supply chain requires.

### 3.3.2 The supply chain integrator

In order to pursue this study, I felt that I needed to know more about this new sort of business organization that acts as the integrator between the different partners within the supply chain (e.g. suppliers, 3PL companies and the client company). During my literature research on the subject, I came across many different theories as to what will be the next generation of logistics. Frazelle (2001, p.11), for example, explains that some logistics gurus believe that “collaborative logistics” (logistics models built with continuous and real-time optimization and communication between all supply chain partners) will be the next step. Dawe (2001), on the other hand describes this new type of organization as “Total Service Providers” (TSP). The author explains that TSPs arise from the development of e-business technology and assemble the competencies of Logistics Service Providers (LSP), plus those of Application Service Providers (ASP) e.g. IBM, Microsoft etc., as well as consulting, contract manufacturing and procurement services through e-business utilities called portals. Living examples of TSP are the alliances of Federal Express with SAP and the alliance of Ryder Integrated Logistics with both i2 and IBM. Finally, Christopher (2005) suggests that the next phase will be virtual logistics or fourth-party logistics (4PL). This latter view suggests that logistics activities will be outsourced to 3PL service providers who in turn will be supervised by a logistics control tower mastering or 4PL contractor. The author clarifies that the 4PL concept was originally coined by the consulting company Accenture (please refer to **appendix 1** for a more complete view of the four key components of a 4PL service provider), and explains that regardless of the 4PL is a joint venture or some other organizational form there are four components that this new business must provide being these (Christopher, 2005 p.296);

- Systems architecture and integration skills
- A supply chain ‘control room’
- Ability to capture and utilize information and knowledge across the network
- Access to ‘best of breed’ asset providers

As the reader certainly understands from the above, the concepts do not vary so much in content. In common they share the view that this new sort of organization brings together the core competencies within logistics and IT solutions, so that end-to-end connectivity within the supply chain is improved, resulting reduced costs through operational efficiencies and process improvement which in turn hopefully will lead to competitive and enhanced end-customer service.

For the purpose of this thesis, I will use the 4PL concept when referring to the concept of supply chain integrator. According to Christopher (2005), the 4PL is often a hybrid organization, formed as a joint venture or a long-term contract, by several different entities in order to assume the responsibility for the management and operation of the entire supply chain as well as its related information flow.

Moreover, according to Richardson (2005), Reed Carr did a study on logistics professionals who had used 4PL companies, and found that successful relationships between the 4PL and the client company often included companies or business units that did not have the logistics know-how or the assets in house. According to the researcher it could be that these companies did not have either the IT or the physical infrastructure, and did not want to invest in these either. On the other hand, companies which had all the capabilities in-house and who view supply chain as a competitive asset were less likely to find the 4PL model desirable. Another issue brought up by the author is that the client company needs to be willing to give up some of the control over the supply chain operations. An issue previously addressed in the introduction chapter, as Christopher (2005) also suggests that in this new era of network competition it is required more than a re-drawing of the organization chapter.

### 3.3.3 Information and the synchronous supply chain

Christopher (2005) points out that the importance of an effective information system has been recognized for a long time by top leading organizations as a key element in successful supply chain management. However, information allied to the developments in the use of information technology, the Internet and its applications are having a major impact on how organizations communicate nowadays and thus are acting as a driving force for competitive logistics strategy. The author explains that the term *marketspace* was first used in 1994 by Rayport and Sviokla to describe the new era of the internet, electronic commerce and virtual supply chains. In this so called *marketspace*, besides supply chain members being able to communicate cost-effectively, it also enables manufacturers to capture data on demand direct from the point-of-sale (POS). Additionally, customers are able to reduce dramatically search time and transaction costs. The use of some of the IT solutions now existent enable companies to respond to real demand rather than having to forecast demand through the use of historical data.

Moreover, the concept of 'Extranet' and virtual supply chain starts to take form; enabling organizations with rather different internal information systems to access customers' data on sales or product usage for example, and use that same information to manage replenishment, while simultaneously warn suppliers of near future requirements.

In the fast moving consumer goods sector there are several examples of supply chain synchronization; Tesco, for example, one of Britain's largest retailers is using an extranet link (Tesco Information Exchange) with its suppliers to share point-of sale data. By being able to capture customer demand earlier, firms besides being able to improve customer responsiveness are able to plan and schedule both production and transport capacity better and hence more cost-effectively. Additionally, by partnering with suppliers firms can reduce in-bound lead times significantly, for example by adopting Vendor Managed Inventory (VMI) practices. In VMI or Co-managed Inventory systems (CMI), customers no longer place orders in the traditional way, instead customers share previously considered firm exclusively owned information with vendors. Examples of the information shared could be; actual usage, product sales, inventory on-hand or the upper and lower limits of inventory they want to hold on-hand (Christopher, 2005). This creates advantages for both, the customer and the supplier. For the customer the advantages are significant. Besides being able to reduce the inventory levels and hence cut costs (i.e. cost of capital, pilferage, obsolescence, etc), more often than not customers will not have to pay for the inventory until it has been sold or used, which evidently creates cash flow benefits. The supplier, on the other hand, will gain because by having direct access to real demand, via Electronic Data Interchange (EDI) or web-based systems, they are able to improve capacity utilization while at the same time reduce their own safety inventory levels.

Information goes both ways thus bringing in both supplier and customer perspectives. There has to be a balance between what the customer demands and what the supplier can offer. One important aspect is that information about the order should be assembled and sent to the customer. This could be information about perhaps delays and quantity related issues. Today, two-way information exchange has made possible automatic control of all operative activities (Aronsson et al., 2006)

Christopher (2005, p.177) continues his explanation of synchronous supply chains by pointing out that supply chain partners need a high level of collaboration for the network to be truly agile.

Below, you will find some of the key processes that need to be linked (both upstream and downstream) so that the foundation for supply chain synchronization is achieved.

- **Planning and scheduling:** Material positioning/visibility, advanced planning, scheduling, forecasting, capacity management.
- **Design:** Mechanical and electrical as well as supply chain design.
- **New product introduction:** Bill of materials management, prototyping, design validation, testing, production validation, transfer to volume.
- **Product content management:** Change generation, change impact assessment, product change release, change cut-in/phase-out.
- **Order management:** Order capture/configuration, available to promise, order tracking, exception management.
- **Sourcing and procurement:** Approved vendor management, strategic sourcing, supplier and component selection.

Furthermore, Christopher (2005) suggests that in today's competitive environment where supply chains compete against other supply chain chains, agility cannot be seen as a concept that only concerns the individual firm. Instead, agility as a concept should extend itself from one end of the supply chain to the other. According to the author the different partners within a supply chain network need to synchronize their activities through shared information and process alignment so that a single schedule for the entire supply chain is achieved. Moreover, supply chain networks need to work smarter so that 'non-value adding' processes within the supply chain are eliminated or reduced. It has been established that a large proportion of the time spent in the processes that together form the end-to-end a supply chain pipeline is 'non-value-adding', thus these processes that instead of creating customer benefits only create costs (i.e. time in inventory). Aronsson et al. (2006) explain that by re-engineering business processes some of the activities can for example be eliminated, simplified, integrated or even done simultaneously (instead for linear), so that the total lead time (end-to-end) can be reduced.

According to Christopher (2005) another way of achieving agility within a supply chain is by reducing complexity (i.e. different packing sizes, great differences between the Bills of Material for each product within a product family etc). Hence, supply chain networks should ask themselves if the level of product variety is greater than customer demand actually requires. The author suggests that more often product proliferation is driven by the sales or marketing departments and that in actual fact the total sales volume does not increase; instead the same total demand is just spread over a larger number of SKUs. Moreover, supply chains should manage processes not just functions. Even though function oriented organizations may be able to efficiently use their resources, they are often focused inwards which causes this type of organizations to become slow in reacting to market changes. Processes, on the other hand, are cross-functional by definition both across the organization itself but even across a wider supply chain, thus creating higher value for customers. According to the author processes such as innovation, supplier and customer relationship management are good examples of the critical business processes that most likely would cut across the organization. From a supply chain perspective, process management is vital to agility because the verticality of the function oriented organizations slows down the speed and the quality of the information. Hence, because processes are horizontal, process alignment amongst the different supplier chain's partners is clearly facilitated.

## 3.4 Logistics and Competitive Advantages

### 3.4.1 Delivering customer value

The main goal of a market-driven logistics strategy is to achieve 'service excellence' in a cost-effective manner. However, this has not always been the case, because as the reader may recall from the previous chapters, traditionally "supply chains were designed to optimize the internal operations of the supplying company" Christopher (2005, p.56). The new perspective does not any longer see the customer at the end of the supply chain pipeline, but at its start. Moreover, it is noticeable that successful companies have gradually recognized the importance of customer service to the point of using it as a tool to achieve competitive advantages over competitors. This goes in line with the above author's view which suggests that a possible way to define competitive advantage is that "successful companies will generally be those that deliver more customer value than their competitors" Christopher (2005, p.47).

The increasing number of 'commodity' type markets, where there is no significant technological differences between products (e.g. cars, personal computers) has reduced the power of the brand. Nowadays customers are willing to accept substitute products e.g. in situations such as out-stock (Christopher, 2005). The author explains that a recent study on the impact of out of stock has showed that both manufacturers and retailers suffer significant cost penalties when a stock-out occurs on the shelf. According to the study, when customers are faced with a stock-out, over 25 per cent admitted that they would buy a different brand, while 31 per cent of the interviewees said they would purchase the product elsewhere. Naturally, continuous stock outs will eventually drive customers not only away from the product brand but eventually from the store altogether.

Customer service can be divided into three categories, *before*, during and *after* delivery. When these integrate the concept of customer service starts to take form. *Before delivery* is about taking customer needs into consideration, during *delivery* is about keeping what has been promised to the customer and in the event of lags give the proper information to the customer without haste. The third category, *after delivery*, is about the handling of spare parts, guaranties, complaints etc. in good manner.

As introduced by Aronsson et al. (2006, p.40-41) presented in 1996 seven elements of delivery service; *lead time*, *delivery reliability*, *delivery security*, *information*, *customer adjustment*, *flexibility* and *stock availability*. Below I will develop on some of these elements, namely on those that have not been addressed yet on the document.

Lead time concerns the time from order to delivery; transmitting and handling of the order, stocktaking, packaging, transporting and finally the receiving of the order. Examples have shown that over 90 percent of the time to delivery is connected to non-productive time i.e. unnecessary costs which prolong capital binding.

Delivery reliability is about having reliability in the lead time. Increasingly, the adaption to JIT-delivery has increased the demands for reliable deliveries at the cost of higher lead times. It has become important that the product is delivered on time thus actually disregarding if the product is delivered quickly or not. The rate of delivery reliability is monitored throughout the supply chain with the use of electronic surveillance. In this process bar codes are often used. This way high reliability is achieved and the need for holding stocks is reduced.

Delivery security is having "the right product in the right amount and with the right quality" (Aronsson et al. 2006, p.40, own translation). According to these authors most customers take this for granted. Aronsson et al. point out some of the reasons that might affect delivery security.

ty, these are; administrative wrongdoings, mistakes in the delivery, product damages during storing or transporting as well as using the wrong packaging.

Customer adjustment concerns fulfilling the slightest requests from the customer; this could include decreasing lead time, express transports and deliveries, re-packing or perhaps branding of the different products. (Aronsson et al., 2006)

Stock availability, also known as service level, is “the probability that the product is in stock when it is requested.” In other words, stock availability refers to if products can be delivered straight away (from the shelf) and thus has nothing to do with products that need to be produced when ordered. (Aronsson et al. 2006)

### **3.4.2 Customer service objectives and priorities**

According to Christopher (2005) the easiest way to understand the idea of customer service objectives is by using the “perfect order” concept. As the name indicates, the perfect order is achieved when the customer’s service requirements are fully met. The author explains that by grouping customers into different requirement segments the company can define and evaluate the level of service delivered on each specific segment (age, country or distribution centre) and adds that by definition the measure of service is the percentage of instances on which the customer requirements are met in full; this is normally measured over a period of time.

Moreover, the author above elucidates that an often used measure of the perfect order concept is ‘on-time, in-full’ (OTIF), having this measure been upgraded more recently with the ‘error-free’ factor which includes elements such as documentation, labeling and damage to the product or its packing. Hence, if for example the customer service performance for an organization/network across all orders is; On-time 90%, In-full 80% and Error-free 70%, the actual perfect order achievement is equal to the product of the above three factors (90x80x70), that is 50,4% (Christopher 2005, p.66).

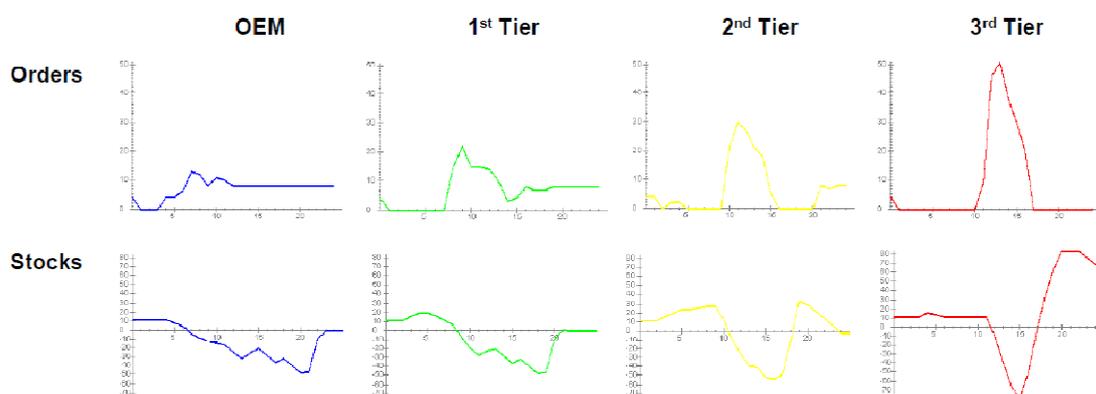
Even if organizations would like to be able to provide excellent customer service to all clients that is not be possible due to the high cost involved with that type of service. Hence, companies have to sort out the weight of the customers in the overall operation. By using for example profitability as the variable that distinguishes customers and the so-called Pareto Law and its 80/20 rule, which says that in general 80 per cent of the profits of the business, come from 20 per cent of the customers. Furthermore, it is also true that 80 per cent of the total costs to serve the totality of the customers are generated by 20 per cent of the customers, however these are probably not the same, adds Christopher (2005). The author makes clear that the challenge to customer service management is to not only to be able to identify the real profitability of the customers but even to continuously develop services strategies that will improve the profitability of all customers.

### 3.5 The bullwhip effect

The negative impact of the ‘Bullwhip effect’ on supply chains has been under scrutiny for a long time. Christopher (2005) explains that the bullwhip syndrome is also called “Forrester effect”, because of the name of its founder, Jay Forrester. The latter developed a set of techniques that become known as Industrial Dynamics. The researcher used a specially developed computer simulation language named Dynamo to build a production/distribution system which involved three echelons (levels) in the distribution channel; that is a retailer’s inventory, a distributor’s inventory and the factory inventory. By using a model based on real world data and relationships, where these levels are interconnected through information and goods flows, management is able to examine the effects that changes (i.e. prices changes, production levels or policy) have on the overall system. According to Christopher (2005) what becomes noticeable from using modeling is that small disturbances in one part of the system are very quickly spread and magnified throughout the supply chain.

Nienhaus et al. (2003) go further and suggest that the bullwhip effect is one of the major reasons for inefficiencies in supply chains. The authors, who did a study on how the human behavior amplifies this effect, explain that the bullwhip effect describes “the phenomenon that the variation of demand increases up the supply chain from customer to supplier”. The authors mean that the misperceptions about information cause humans to over-react. In other words, the further away a supplier company is from the end customer, measured in terms of lead time, the larger the variation will be.

In the example represented in the figure below (Nienhaus et al. 2003, p.2), the supply chain consists of a so called ‘original equipment manufacturer’ or OEM, and suppliers ranged from 1<sup>st</sup> tier to 3<sup>rd</sup> tier. As shown on the graph, while the OEM has the lowest variance, the 3<sup>rd</sup> tier supplier, as expected, has the largest.



**Figure 3-7: The bullwhip effect – Increasing demand variation in a supply chain**

The authors above identify the lead time of information and material as the primary reasons for the existence of the bullwhip effect. Moreover, they explain that the reasons why supply chains reactions to changes in real end-customer demand can be delayed is due to the time it takes for the information to move across the supply chain (i.e. from OEM to 3<sup>rd</sup> tier supplier) and secondly because the different suppliers need to adjust their capacities and deliveries and that takes time. Nienhaus et al. (2003) continue by clarifying that the bullwhip affects supply chains negatively in three different aspects (logistics capacity, variation in inventory levels and safety stock levels), leading this to increased logistics costs and reduced competitiveness. The first aspect relates to the dilemma companies face when dimensioning their logistic capacity. Because variation in demand affects capacity usage, if companies dimension capacity based upon average

demand, they will most likely face delivery difficulties when there is an abrupt upward change in demand.

For example, assuming that the human behavior misperceptions about information causes over reaction (Sterman 1989, as cited by Svensson 2001), one can depict from the picture above, by looking at bottom part that a peak in real demand (top part- orders) is not perceived as high by the OEM as it is further down the supply chain (i.e. 3<sup>rd</sup> tier). However, if the OEM forecasts production (and its preceding orders of materials and components) based on historical data rather than real demand, there is a risk that it would face logistic capacity problems, leading this in turn to stock-outs and to what that implies. In case this would happen, the bullwhip effect would also be seen across the supply chain. Meaning that the 3<sup>rd</sup> tier supplier would even face larger stock out because of the time it takes to react and adjust capacity to real demand. This can be depicted on the bottom part of the picture (stocks).

The second aspect affected by the bullwhip effect is the variation in inventory levels within the supply chain. According to Nienhaus et al. (2003), if a company delivers more than the next tier passes on, inventory levels within the supply chain raise. Contrarily, inventory levels are reduced when a company delivers less quantity than the next tier passes on. As per the above authors, while high levels of inventory increase the costs of capital employed; low inventory levels increase the risk for unreliable deliveries, hence affecting customer service.

The third aspect affected by the bullwhip effect is the level of safety stock. Nienhaus et al. (2003) explain that safety stocks (or inventory) are required to ensure specific levels of demand, hence when variation in demand increases so it does the levels of safety stock required which as previously explained, brings additional capital costs.

Svensson (2001) referring to several different researchers points out possible ways which either help to minimize or to fully eliminate the negative impact of the bullwhip effect. Below the reader will find a summary of these different alternatives.

- reduce lead times
- limit price fluctuations (i.e. through marketing campaigns)
- align planning with suppliers and co-ordinate pricing, transportation, inventory planning, and ownership between the upstream and downstream actors in the supply chain
- review re-ordering procedures
- allow for sharing of knowledge with suppliers and customers to better capture real-demand (instead for ordering on forecast)
- co-operate with supply chain partners to establish what factors are causing disturbances within the supply chain and thus act upon it
- Use the Internet and its applications to speed up communication and thus reduce transaction- and administrative costs

The bullwhip effect and its impact on the supply chain's total operating costs and competitiveness (reduced), is naturally very relevant to this study. In fact by reading the above listed lines of action, one can understand why there is a market demand for companies with core competencies within the logistics and supply chain management and IT integration (i.e. 4PL).

### 3.6 Logistics and the Return on Investment

In today's financial-oriented business environment there are three financial dimensions behind the decision making process, being these; firstly the so-called 'bottom line', secondly strong positive cash flows and thirdly the efficient resource utilization particularly the use of fixed and working capital (Christopher, 2005). The author alerts that in some cases the extreme focus on the bottom line, often determining the direction of the company, as led companies to potentially dangerous short-term focus, curtailing investment in brands, R&D and capacity as these do not give immediate payback.

Christopher (2005, p.85 ) continues his explanation on how logistics affects the financial performance of the organization by first introducing a variation of the Du-Pont model in order to describe the effects logistics have on 'return on investment' (ROI), and secondly by sharing his views on the effect that logistics and supply chain strategy have on shareholder value. For those not familiar with the model, the model has its origins in 1910s, having been created by a business controller employed by DuPont Powder Company in USA. Despite its 'age' the model is still very much used today (Aronsson et al., 2006). The authors explain that the model is built in two parts as it can be depicted from the figure below. The top part leads to the net profit with accounting data obtained from the income statement, while the bottom part of the model gets its information from the company's balance sheet.

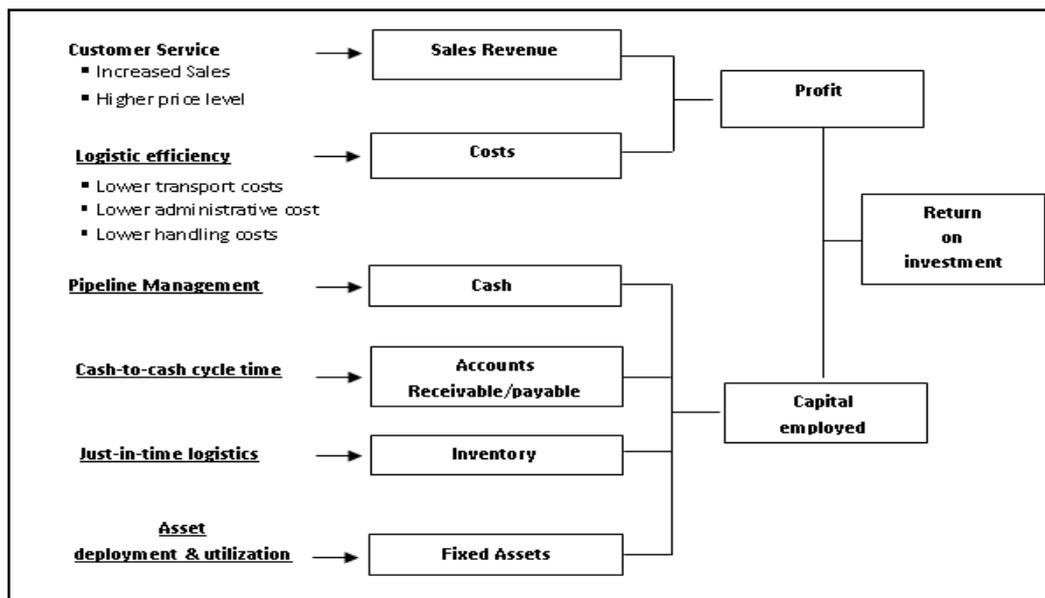


Figure 3-8: The Du-Pont model revised; return on investment (ROI)

Christopher (2005) explains that return on investment is the ratio between the net profit and the capital employed to obtain that same profit. The author continues by introducing the expansion of the above formula where;  $ROI = (Profit / Sales) \times (Sales / Capital\ employed)$ . Hence, in order to improve ROI it is necessary that one or both of the above ratios increase.

Moreover, even if traditionally companies have placed their main attention on increasing the margin (Profit/Sales) as they attempt to raise the return on investment, often it is actually more effective to use the leverage of improved capital turnover to achieve that (Christopher, 2005). According to this author several successful retailers have since long recognized that even very small net margins can lead to attractive ROI if the productivity of capital is high. For that it is required that for example premises are leased rather than owned, that inventories are kept to a minimum and finally that sales are high per square foot/meter.

Again, as it can be depicted from the figure introduced above, besides affecting the operating income that is, revenues minus the costs, logistics also has an impact on a company's balance sheet. Below you will find some examples of this impact.

Cash and receivables - The shorter the order cycle time the sooner the customer's payment will be made. There are at least two other very important aspects affecting the inflow of cash, the first is the order completion rate, concept which has been introduced on the previous chapter and as the reader may recall it relates to the perfect order concept and its on-time, in-full and error-free. The second aspect is the accuracy of how invoices are done. If these are made incorrectly, more time will be spent until the customer finally makes the payment (Christopher, 2005).

Inventories - As previously explained on this paper, the levels of inventory are one of the major concerns of logistics. One should bear in mind that inventory does not only refer to raw material or finished goods but also the subassembly or work-in-progress inventory buffers. Christopher (2005) points out that it is not unusual that companies tie up approximately fifty per cent of their current assets in inventories.

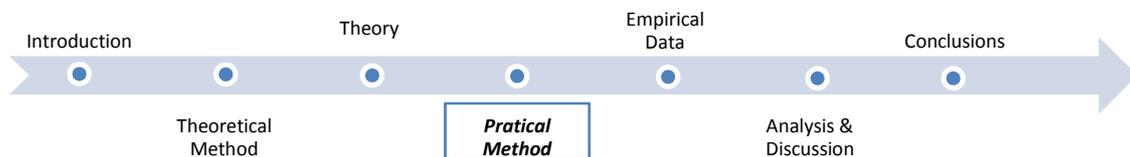
Property, plant and equipment - Christopher (2005) clarifies that more often than not businesses' logistics systems are responsible for the use of large part of fixed assets. It ranges from the network plants, depots and warehouses (when not leased or rented) to the materials handling equipment, vehicles as well as other equipments used in storage and handling. Moreover, transport or the cost of the fleet can also be considered to the total sum of fixed assets. As previously mentioned many companies have outsourced the physical distribution of their goods to third party logistic providers, partly to take off fixed assets away from their balance sheet as well as all other costs incurred by running their own fleet (maintenance, personnel, insurance etc.) Warehousing is another good example of the processes that have been outsourced.

Current liabilities - From a logistics perspective, the current liabilities refer to the accounts payable and the debts that must be paid due to the purchasing of bought-in materials, components etc. Christopher (2005) points out that this is an area where through a greater integration between purchasing and operations management, networks can yield significant dividends. According to the author the problem is that the economic order quantity (EOQ) concept often used leads to excessive levels of inventory. The main reason being the fact that these economic order quantities are prognoses of historical data rather than based on real demand.

Debt/Equity - Even though the balance between debt and equity has many ramifications for financial corporate management (and thus not part of this study) is still interesting to look at it from a logistics strategy perspective. The author means that as the trend for the outsourcing of different logistic activities to 3PL companies (and more recently to 4PLs) continues, and allied to that the fact that ever more companies are leasing plant facilities and equipment instead of owning them, is naturally changing the funding requirements of the business and consequently the capital structure chosen by the organization, i.e. debt instead for equity. Christopher explains that the ratio of debt to equity, usually referred to as 'gearing' or 'leverage', not only influences the return on equity but also influences cash flow in terms of interest payments and debt repayment.

## 4 Practical Method

In this chapter the reader will find a description of the different steps taken in order to select the sites leading to the method of data collection and the interview guide. I will finish the chapter with an evaluation of the research.



### 4.1 Initial steps

After having decided that I wanted to research on logistics and supply chain management latest developments, and while doing the initial literature review, I came across the concept of fourth-party logistics. Simultaneously, I had started to talk with different people, trying to get information and access to companies in Sweden providing this type of service.

During one of these conversations, with Sverker Brännström, a friend and CEO of SSC Öhns Snickeri (a joinery), he told me that one of his old-friends from school worked for Aditro Logistics AB, a logistics service provider to Volvo, here in Umeå. At this stage, I was not sure if this would be the type of company I was looking for (a 4PL), but I was certain that it would give me an excellent opportunity to get in contact with some of the concepts I have studied about. It was the kick-off of the study, an opportunity I could not deny.

After questioning Sverker a bit more about the company, I understood that he could not answer if, Aditro Logistics was or not a 4PL service provider. Nevertheless, Sverker called his old-friend from school, Harry Uddståhl, a Key Account Manager for Aditro Logistics, Umeå and arranged for a meeting. At that time I was naturally very eager to be able to get in contact with the logistics environment and to explore this new organizational paradigm which recent supply chain management literature have been referring as the “next generation” of logistics. I was very well received by Harry Uddståhl, who promptly enabled himself to show us around their facilities. Mr. Uddståhl explained that they were a 3PL provider, and that their main customers, in the region, were Volvo Trucks, Ålö and Komatsu Forest. During my visit at Aditro, Mr. Uddståhl described during two hours their operations and talked about concepts such as Procurement and Material Planning, Pre-assembling and JIT deliveries (i.e. knitting and sequential) to the assembly lines. Moreover, Mr. Uddståhl briefly talked about other aspects such as Vendor Management Inventory and relationships between them and their clients.

The above mentioned informal interview provided new insights into the area of research. For instance, enough information was obtained to come to the conclusion that Aditro Logistics is a 3PL provider, and thus not comparable to a 4PL. According to Opie et al. (2004 p. 12), business research besides requiring hard work and commitment, is time consuming and problematic, thus requiring careful planning. It was understood that for future research and selecting of companies, I needed to have some sort of overview of the four key components of a 4PL. That way I would be able to start looking for companies that fit the description and that way is able to decide whether to pursue a deeper case study with that company.

This interview had also been fruitful in a sense that helped me to realize the importance of access. This goes in line with Opie (2004, p.27-28) views who suggest that one needs to reflect upon what under common terminology is identified as *access*. A significant factor to consider is

how the first contact is going to be made and under what assumptions. The author argues that the ideas one has about the different procedures of data collection needs to be well reflected upon. For example, one should look critically at the questions one is planning to place and ask oneself; are these questions relevant? Why? Would I like to answer these questions myself? Meaning, 'don't do to others what you don't like others to do to you'. Furthermore, the author above presents a code of conduct for scientists that originates from Milgram (1963). This code includes the importance of presenting all information as well as making the information understandable to those involved in the research, and giving them the possibility to decline the offer to participate. Thus, access is about having the right to use data and/or information (Johansson-Lindfors, 1993, p.135-137). The author suggests that it is vital to prepare a thorough explanation of the research, be honest about the estimated time that is needed as well as be clear about how helpful their participation would be. Moreover, Bryman & Bell (2003, p.317) state that the formal process of gaining access to selected sites can be lengthy and one of the hardest steps the researcher takes. The reason for this is that it is not easy to get access into companies, either because they are not willing to release company data or because they feel that they do not have the time or the willingness to participate. Hence if possible, the use of an internal link is always recommendable as it may work as a bridge to the insides of the organization.

I took the above in consideration while approaching the potential 4PL companies. After a initial contact made by phone, and once directed to the right person, I sent that employee an e-mail where besides presenting myself and the purpose of the study, I forwarded an attached file which described the four key components of a 4PL (appendix 1). The idea was not that the company needed to fulfill all of the principles, instead was to give the guide line of the concept, and at the same time help me to establish how close the interviewed companies are to the concept.

## **4.2 The selection of sites**

As previously established in the theoretical method chapter, this study will follow the pragmatic view. For the researcher the underlying problem is of more importance than the method one uses. This implies that the researcher used the research method that best would solve the research question.

While doing my literature research I come across Dag Ericsson's (2000) article on e-logistics, where the author introduced Sonat (a Swedish company) as being "the first company to offer high growth European companies a comprehensive e-logistics solution, assuming responsibility for the entire extended demand chain" (p.10) I knew then what I was looking for. According to Ericsson (2000) in order to facilitate integration, Sonat has formed diverse partnerships with market leaders within IT and information flow. The following are examples of some of these partnerships; with Oracle for applications and data-warehousing, SEMA Group for operations, communication and security and finally with Viewlocity, a global provider of B2B integration and online trading community solutions for integration of systems and information. Viewlocity's flagship product, AMTriX, is used to ensure a seamless flow of information across enterprise boundaries, connecting Sonat's customers with their suppliers and distributors, so that end-to-end e-logistics solutions are achieved.

Initially, I was considering doing a single-case study based on the 'modus operandi', of Sonat. However, during one of the meetings with my thesis supervisor, I was given advice about the risks for the lack of trustworthiness which may occur when one interviews just one company within the network and try to draw inferences about the supply chain as a whole. This advice was obviously very important, and made me reconsider. Moreover, a single-case study would imply that I would have to spend more time near the company and thus the distance factor would have to be considered.

Hence, rather than performing a case study based on a single location or a person (biographical approach), I decided to proceed by performing a multiple case study (Bryman & Bell, 2003). By performing a multiple case study, I would be able to gain a broader understanding of the 4PL companies operating in Sweden, their different strategies and structures. But most importantly I would hopefully find an answer to the research question and understand how these companies believe they can provide competitive advantages not only to their customers but to the supply chain as a whole while enhancing end-customer service. As per Bryman & Bell (2003), when conducting a multi-case study research, one should bear in mind that it is required for the researcher to have some sort of structure, as this will enable easier cross-case comparability. This aspect was taken also taken into consideration; themes were created to structurally connect the theories chosen with the interview guide, the respective empirical data and the consequent analysis.

I proceeded by using Umeå university electronic library resources to gain access to the database *Affärsdata*, which provides information and a registry of the number of companies per sector registered in Sweden. After I searched for fourth-party logistics companies by using the respective Swedish word (fjärdepartslastlogistik), so that I would establish how many companies were registered in Sweden under this category. Result: none.

I found however a link to an article about the company and consequently to a link within the database with information on the company. Sonat is registered under the code 70220 which relates to consulting companies within process organization (konsultverksamhet avseende företags organisation). After obtaining the required information about the company, i.e. telephone number, the first contact was established.

While browsing through the database *Affärsdata* using the same search word (fjärdepartslastlogistik), I saw also a link to the well known logistics company DHL and decided to find out where that link would take me. I looked at DHL's home page and learned about UAE Logistics, a company which part of the DHL group and that is they introduced as being a 4PL company. However, when accessing *Affärsdata*, I found out that UAE Logistics is registered under the code 52290 which relates to other support services to transport (övriga stödtjänster till transport). The previous procedure that had worked well with Sonat was initiated, and consequently I initiated telephonic contact with UAE Logistics.

I needed however at least one more company as this would help me to increase the study's trustworthiness. I believe is worthwhile to explain that when I searched the database for third party logistics companies, I also did not find any companies registered under that code. Moreover, when searching for companies registered under 'logistics', I found 484. Obviously, I had to choose a more practical way of finding a company providing consulting services within logistics without being a traditional third party logistics company, which as previously explained are more related to just-in-time deliveries (JIT), cross-docking, etc. At that point Aditro came to my mind, and I questioned myself, if Aditro is a 3PL supplier to Volvo Trucks here in Umeå, and there is more than one (3PL) here in Umeå doing the same, then the chances would be that Volvo Group would have a supply chain integrator company within (or outside) the group that would control the entire supply chain. I then browsed through Volvo's Group webpage and noticed that there was a company within the group called Volvo Logistics as well as another called Volvo IT. Somehow this sounded familiar, a combination of logistics and IT operating across the group. It seemed evident to me that Volvo Group had in some way deconstructed and the value chain into different companies operating within different core competencies. Once again, I accessed the above mentioned database and confirmed when searched for Volvo Logistics that the company was also registered under the same code as UAE Logistics, i.e. 52290. Interesting I thought.

### 4.3 Method of collecting data

The concept of access has also been addressed earlier in the document Bryman & Bell (2003, p.318) argue that one should attempt to gain support from an employee within the organization and that way gain access to top management executives. Hence, with this in mind the first contact was established via a phone call to the company's head-office (i.e. Sonat, UAE Logistics and Volvo Logistics) and from there try to get connected with the person who could answer the questions I had. These phone conversations started naturally with a short introduction of the researcher and of the purpose of the study; this was then followed up by email and correspondence that led to the final interview. The interviews with Sonat, UAE Logistics and Volvo Logistics were conducted using Skype as means of communication. This besides being a cost effective way of conducting the interviews (lengthy), enabled to save the conversation into MP3- audio format. This prove to be right choice as I was able to access the saved information whenever it was required to better understand the different companies operating mode. After all the amount of information received is such that needs to be worked upon during several hours.

I chose to adopt a semi-structured style of interviewing since it allows for more flexibility than the normally structured interview. Rather than just touching the surface, it enabled me to probe the interviewee's responses and in real-time allow me to deviate from the established questions This is in accordance with both Opie (2004) and Bryman & Bell (2003, p.343), who believes that this method of interviewing enables the researcher to have an interview guide with topics that at the researchers discretion can be alternated. Moreover, what is identified as *interviewer-administrated interviews* brings advantages to the research; the ability to obtain detailed answers on open-ended questions, adjust misunderstood questions as well as the ability to provide a brief explanation in real-time, if any uncertainty about the question asked exists. This also puts pressure on the interviewer to be able to, if needed, clarify the meaning of the questions asked. It is however equally important that the respondent does not get encouraged to answer in any particular way because of the interference just explained. The interviewer-administrated interviews can be applied to both face-to-face and telephone interviews (Brace, 2004, p.24).

Regardless of where the interview takes place, it is important to reflect on the implications that the milieu can have on the interview. Bryman & Bell (2003) alert for the fact that it can be difficult to find a quiet place to conduct the interview, being this naturally important as it otherwise may affect the quality of the data collected. Again this aspect was also taken into account, by giving enough time to the interviewee to schedule the interview himself upon his/her own schedule. That way commitment from both parts was achieved. Hence noise disturbances were never an issue during the interview process.

### 4.4 Method of analyzing data

As the reader certainly notice the theory chapter was divided into three different themes; Organization design, Enterprise Logistics Integration and finally Logistics and Competitive advantages. These same themes were also applied to build the interview guide used to collect the empirical data. Once the data was collected, was then coded into the above mentioned themes, so that one could analyze the empirical data in light of the themes chosen for theoretical background. This is in line with Bryman & Bell (2003) explanation of grounded theory and its tools.

#### 4.4.1 Interview guide

In relation to the interview, it is important to have prepared questions that will provide a sound basis for the analysis. According to Bryman & Bell (2003) qualitative interviews are characterized by having a high variability in the way questions are formed. Some examples would be those listed by the authors above (p.350) when citing Kvale (1996) e.g. introducing questions, follow-up questions as well as direct and indirect questions.

As above mentioned, the interview guide was divided into three different sections: Organizational Design, Enterprise Logistics Integration and Logistics and Competitive advantage. The organizational design section has some introductory questions, as well as questions which are related to the structure and the strategy of the individual firm (i.e. Sonat, UAE Logistics and Volvo Logistics). The second section, enterprise logistics integration, it has questions relating to the company's role within the different supply chains, it touches aspects such as the virtual supply chain, information flows, integration and advantages. Finally, *Logistics and Competitive advantage*, concerns topics such as costs, customer service and lead-time analysis, and questions that will enable the interpretation how these can later produce financial benefits not only for the 4PL customer, but even to other actors within the supply chain.

The three sections complemented each other well, giving an overall sound balance to the interview guide. Nonetheless, the answers of interview questions often went in to long outlays, thereby answering many questions at the same time. This gives the impression that the interview guide was adequate and well structured. After all, the semi-structured questionnaire became more of a checklist. The focus was put on the interviewee, hence the researcher tried not to be leading, instead because the interview guide had been provided in advance, the researcher could take more of a listening role, naturally prompting or giving feed back when required.

#### 4.4.2 Presentation of the interviews

The figure below provides an overview of the interviews conducted with Sonat, UAE Logistics and Volvo Logistics.

Company	Employee	Position	Date	Interview length	Method	Language
Sonat	Jan Conradson	VP Sales	3-Jun-08	0 hrs 35 min	Semi-structured interview Skype-to-phone (problems with recording)	Swedish
UAE Logistics	Henrik Höglund	Consulting Manager	22-Sep-08	1 hrs 42 min	Semi-structured interview Skype-to-phone	English
Volvo Logistics	Henrik Erkfeldt	Project Manager/Global Logistics Development	15-Oct-08	1 hrs	Semi-structured interview Skype-to-phone	Swedish

Figure 4-1: Interview table

## 4.5 Evaluating the research

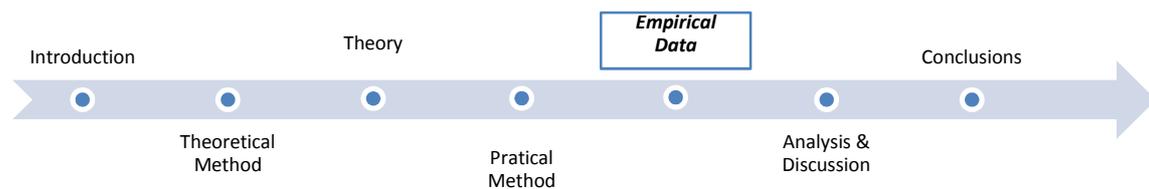
Qualitative, as opposed to quantitative, research is not interested in finding results that can be quantified and generalized and thus it does not make sense to talk about external validity (Bryman & Bell 2003, p. 288). Trustworthiness, on the other hand, refers to the combination of factors such as *credibility*, *transferability*, *dependability* and *confirmability*. According to Bryman & Bell (2003), this alternative stance for evaluating qualitative research defends that qualitative studies should follow a different valuation criteria than those used when quantitative studies are performed. In the context of quantitative studies, researchers are concerned with aspects such as internal and external reliability and validity.

*Credibility* is seen as a parallel to internal validity. It relates to how the study is carried out, checking for aspects such as good practice and submitting. The latter would imply that research findings should be submitted to those studied for confirmation that the ethnographer understood the social world researched (Bryman & Bell, 2003). This view is shared by other academics such as Creswell (2007, p. 208-209) or Stake, who in 1995, stated that research study would gain if participants would “play a major role directing as well as acting in case study”. *Transferability*, in turn, relates to the possibility of relating the findings of the study to other areas than the particular area studied. This becomes particularly important in qualitative studies because these concern much smaller samples than quantitative studies. The *dependability* factor, which parallels the reliability in quantitative research, is also very important. Access to information becomes a very important aspect in order to be able to review all phases of the performed research. Therefore, to increase the dependability of this study, the process on how the research participant was selected as well as how the transcription was processed was included (Bryman et al, 2003, p.81 & 289). Opie (2004, p.5) shares this view; that the dependability is of more importance than being able to generalize. *Confirmability* concerns the aspects in which the interviewer might have influenced the research and the importance of awareness that complete objectivity is not achievable (Bryman & Bell 2003, p.289).

From a credibility perspective, I believe the study has followed good practices and even submitting. The author, as previously explained, has tried to keep in mind during the important aspects such as the accurate interpretation of the empirical data, for example. In order to do this, the interviews recordings were saved into an audio file, which were accessed whenever was required. Worthwhile to point out that during the interview with Sonat there were some technical problems with the recording of the interview. Furthermore, the transcription of interviews as well as the audio files from where the transcriptions originated were sent to the interviewees for validation. The aim of this study was never to achieve transferability; however I am convinced that parts of the findings could probably be used in other social settings. When it concerns the dependability factor, this study has tried to follow the requirements of good practice. All the documentation (e.g. interview guides, audio and transcription files) relating to the different phases of the research have been kept and are available for peer review. Finally from a confirmability perspective, even though I had previous preconceptions on the subject, I have tried to keep neutrality an open mind, so that I would not allow personal values or theoretical inclinations to overly affect the research.

## 5 Empirical Data

In this chapter I introduce the reader to the summary of the interviews conducted with the selected companies. As previously explained the semi-structured interview guide was divided into three different themes. Being these; a) the single firm (4PL) organizational design, from a structural and strategy perspective, b) the enterprise logistics integration, which relates to the role of the firm within the supply chain, and c) logistics and competitive advantages.



### 5.1 Sonat

The interview with Jan Conradson, VP Sales at Sonat took place on the 3<sup>rd</sup> of June. Mr. Conradson has a degree in engineering from KTH (Royal Institute of Technology) in Stockholm. Moreover, he has several years of working experience within sales, logistics business process development and was one of the pioneers of knowledge based outsourcing within SCM in Sweden. The interview was held in Swedish and the text below summarizes what was discussed.

#### 5.1.1 The single firm

Sonat was established in 1999, aiming to provide high quality logistics solutions to its customers. The company, with offices in Stockholm, Örebro and Norrköping, has a very clear strategy in that they aim to supply “high quality, value creating service” to their customers based on six guiding values; co-operation, professionalism, integrity, humanism, customer focus and development (Sonat, 2008). By taking responsibility for the customers’ logistics processes, Sonat aims to cut costs as well as to provide increased business value.

Conradson explained that since Sonat’s establishment the company has been growing steadily, both concerning the number of employees and turnover. Conradson continued by telling us, very proudly, that Sonat had been nominated by the Swedish daily newspaper *Dagens Industri*, in November 2007, as one of the *Gazelle companies* of the year. In fact, the company employed 12 people in 1999, between the years of 2003 and 2006 Sonat have developed significantly and in 2007 the company employed 52 people, while the turnover was 67.5 MSEK.

According to Conradsson, Sonat works with more or less all varieties of companies that have large flows of goods. He explained that the company concentrates, however, on businesses that have most of their logistics activities in Sweden, i.e. *Apoteket*, *Lantmännen* and *Svenska Retur-system* whom have 90 percent of their logistics flows concentrated in Sweden. However, Conradson emphasized that whenever their clients need to expand globally, for instance during the ordering or distribution process, Sonat will provide them with the know-how and guiding needed in order to complete that process. At that stage Conradson gave *Sandvik* as an example of a situation where they follow a customer in their global operations. According to him Sonat controls Sandvik’s purchasing of machinery, equipment and tools for rock-excavation.

According to Sonat’s VP Sales, the company has a large competence within its 75 employees. Conradson stressed that somewhere around 15 of them are former logistics managers and many have been in the branch for quite some time and have had high positions before starting to work at Sonat. Conradson said as logistics is their core competence they are continuously trying to develop and improve their competence. Sonat’s management team is composed by the CEO,

the VP Sales, a Development Manager, a Quality and Environment Manager as well as five key-accounts managers which are responsible for the main customers accounts, above mentioned.

The fact that Sonat is in business with many companies within different industries makes our expertise and know-how well established within the market, said Conradson. Sonat works a lot towards the transport industry and handle for instance cargo freights today worth 1.2-1.3 MSEK. This has a positive impact not only in the achievement of substantial economies of scale at operation level but also economies of scale in regards to competence.

### **5.1.2 Enterprise Logistics Integration**

According to Jan Conradson, what differentiates them from their competitors is that Sonat works closely with their customer base and thereby fading organizational boundaries. In fact, and using Mr. Conradson's words, they consider themselves an "insourced" logistics department rather than an outsourced one. When asked about what type of services Sonat offers to their customers, Conradson answered that Sonat provides a long-term logistics partner that offers logistics functionality and development. Furthermore, Conradson explained that the supply chains that Sonat takes control over varies a lot between the different companies/clients. Altogether, Sonat can work over a broad spectrum of services; for example, within Operations the services offered are Replenishment (planning and stock management, transport booking and monitoring), Order fulfillment (receipt and order planning, customer service and capacity planning) and Distribution (transport booking and documentation, customs processing and daily problem-solving). More simply, one could say that we provide everything from the most operative functions, like for example, printing shipping documents to performing strategic supply chain changes, resumed Conradson.

While discussing the different ways of establishing a new cooperation with a firm, Conradsson said that "once an agreement is reached between us and the customer that we will take responsibility over a logistics function or a logistics platform, an implementation project group is set up." When speaking about the implementation process, Conradson believed that it traditionally was a lengthy one. Moreover, Conradson believed that sometimes it is hard for their new customers to understand and thus take full advantage of the "knowledge database" (using Conradson's words) that they have at their disposal. Conradson pointed out, however, that Sonat had developed a few uncomplicated services with the purpose of quickly establishing collaboration in that way starting with the small things and later deal with the larger issues at hand. Sometimes, pre-studies are conducted. When discussing the advantages of long-term partnerships, Conradson said that their competence increases every day and thus new firms that Sonat establish partnerships with will eventually, to some extent, benefit from this. According to Sonat's VP Sales, they work with their customers as if they were their employees; Conradson admitted that they tend to be regarded as that company's logistics function entirely or to a certain extent. It is not uncommon that Sonat reports to the logistics or purchasing managers, he said, and that they are viewed as a section of their customer company. For instance, Sonat is known as the "Transport unit" at Apoteket and thereby it could be assumed that most of the employees at Apoteket are unaware that an external company provides that function.

According to Conradson, Sonat are experts at logistics and by outsourcing to them, companies will be able focus on their core competencies while Sonat do what they do best: "What someone else can do better than us one should not continue doing." Conradson went on and explained the classical arguments about outsourcing, that it should lower costs, liberate time and enable the possibility to focus on the core competencies. This will create flexibility in the sense that one should be able to increase or decrease production more rapidly, to become more efficient and naturally secure/safeguard competence. When talking about outsourcing, in accor-

dance with Conradson, this implies that companies give away a process to another company, hand over the responsibility. At Sonat this is instead called in-sourcing since they believe that something is added; Conradsson explained “you add something to the company, add competence and resources to a company and the way they do things” Once the implementation stage is finished, the project passes on into a so called, management phase. To quote Conradson: “At that stage, we form a group that will specifically manage the needs of that particular company.”

### **5.1.3 Logistics & Competitive advantage**

According to the company their plan of action varies according to the specific customer needs. As previously mentioned, Sonat helps customers to change and develop their logistics processes, so that they for example improve their IT-systems for the effective follow-up over their inbound or outbound logistics or both. Moreover, Sonat achieves better control over often decentralized logistics which lack cost control, improve quality, as well as assist customers to better structure their operating procedures. Thus, they help customers to reduce operational costs, but also to increase their delivery reliability. For example by having a better and more structured transport schedule Sonat can help customers to reduce the amount of suppliers as well as to reduce transport- as well as administrative costs substantially. Furthermore, through process re-engineering adequate platforms are created so that the customer can increase its sales capacity and thus become more profitable. Another important aspect is the quality of end-customer service. Through improved information flow Sonat is able to help reducing lead times, an extremely important factor, as well as increased delivery reliability and security.

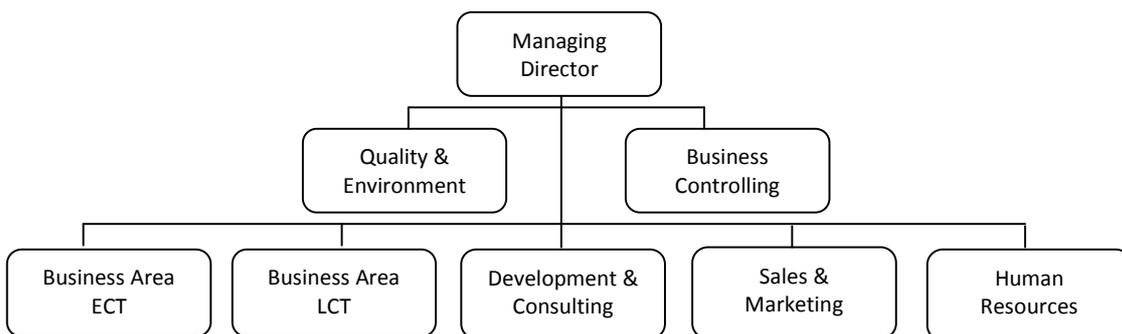
## 5.2 UAE Logistics

During the study of UAE Logistics, I had contact with three different employees, each of them very helpful, professional and eager to help, which culminated in a very fruitful two hour long interview, on September 22<sup>nd</sup> with Henrik Höglund, Consulting Manager. Mr. Höglund has a Master of Science degree from Chalmers University of Technology in Industrial Engineering and Management. Höglund has a broad international working experience having worked previously not only in Europe but also in the United States. Höglund has been working with UAE Logistics since 2003 and according to him it was then he first came in contact with the concept of fourth party logistics (4PL).

### 5.2.1 The single firm

UAE Logistics is a company specialized in logistics services. The company offers a wide range of services varying from logistics consulting, development as well as administration of Logistics Control Towers (LCT). The latter, in turn, is divided into two business units; a) Ericsson's Control Tower ECT (picture below) which as the name indicates, handles the administration of Ericsson's logistics and b) Logistics Control Towers (LCT) which manages the logistics processes of customers such as SAAB or Alfa Laval, for example. The other main business area of services within logistics is Developing & Consulting.

Below you will find the organizational chart of the company (Berg & Choroszynski, 2008).



**Figure 5-1: UAE logistics organizational chart (revised)**

According to Höglund, UAE Logistics vision is "to be recognized as the best logistics partner in the Nordics". Currently UAE Logistics has offices in Stockholm, Helsingborg, Linköping, Dubai and Dallas. According to the interviewee, UAE Logistics was bought by Air Express International, which was one of the largest American freight forwarders. Later, AEI was bought by Danzas which then merged with DHL. Today, UAE Logistics is a subsidiary and fully owned by DHL, which in turn is a part of the Deutsche Post Group.

Höglund continued by explaining that it was actually customer demand that was the reason behind the creation of UAE Logistics as a fourth party logistics provider. The history is that UAE was one of the biggest air forwarders in the Nordics and in Europe during the 1990s. At that point they got a contract with a customer (Ericsson) who requested that they would not only manage their own freight forwarding agencies and so on, but also to manage the customer's complete supply chain. According to Höglund, what differentiates them from the more traditional logistics service providers (i.e. third party logistics companies) is that they are neutral and that they are a non-asset provider.

When asked about how much the company has developed in terms of the number of employees as well as in terms of turnover Höglund answered that since the establishment of the company in 1999, they have increased to about 130 employees. When it comes to the turnover of UAE Logistics, he believed that it was around 1.6 billion SEK. Furthermore, when I prompted and asked if he believed that there is a market demand for this type of services, he said he definitely feel that there is. Höglund explained that *“what we try to see is where the challenges are and what the demands are and if we have a fit, if we have a business case, then we can make life easier for the customer.”*

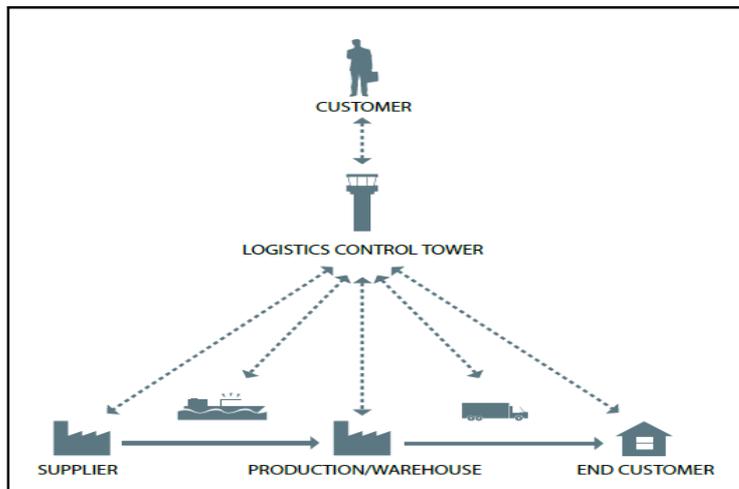
Höglund continued by explaining that traditionally distribution and export have had a larger weight on the total services provided. However, this trend has been changing and *“these days I believe that importing of raw materials is growing at a fast pace”*, thus requiring their services to expand into this area. Höglund explained that one reason for this occurring could be the paradigm shift, i.e. customers have realized that if they can control more of the supply chain then they have better abilities also to control costs, income- and balance sheets. The customers of UAE Logistics operate at a global market, and thus UAE Logistics controls supply chains both exporting from and importing to Sweden, but also importing to other countries, like cross-flows Höglund added.

When I asked Henrik Höglund if he considered UAE Logistics to be a 4PL company, he answered affirmatively. However, he pointed out that one should be careful when using expressions with three characters (abbreviations). According to him the academic world see the 4PL concept more as a management fad rather than a new management paradigm. In his words, for the academics, the 4PL concept is more like a marketing thing. At that point I explained to him that I only use the term 4PL because it is simpler to use this jargon word than it would be to use the expression *supply chain integrator* all the time, as we believed this would make the reading of the thesis tedious. Moreover, I explained to him that during the research I had come across other definitions for somewhat similar concepts (i.e. demand chain integrator or total service provider) and that in order to avoid confusion to the readers these different concepts had been explained in thesis.

Höglund added that UAE Logistics as a company very seldom uses that terminology (4PL) when they introduce themselves to customers; instead they use the concept of *“Logistics Control Tower”*. At that stage Höglund provided me with a graphic presentation of the LCT concept which the reader can find below. However, he added, when comparing the services that UAE provides with the overview of the four key components of a 4PL that was previously sent to him, then yes, he believed that UAE Logistics is a fourth party logistics company.

### **5.2.2 Enterprise Logistics Integration**

In accordance with Höglund what differentiates the *Logistics Control Tower (LCT)*, depicted in the figure below, from the *Consulting Services* is that the *LCT* puts more focus on UAE Logistics to be proactive and to have the driving force to constantly evaluate the customer and come with new recommendations. The *Consulting Services* on the other hand focuses on the customer and what they want help with, i.e. the service originates from the customer. It was also stressed that both new and existing customers need help to monitor and measure existing suppliers.



**Figure 5-2: Logistics Control Tower (courtesy of UAE Logistics, revised)**

According to UAE, they take operational responsibility for the entire supply chain through the use of LCTs. Höglund explained that LCTs primarily focus on the administration but also on the continuous development of both inbound and outbound deliveries. This includes providing expert services in areas such as; *planning and call off* (consolidation, direct deliveries and route optimization), *document handling* (both transport and other logistics related documents), *customs handling* (both on import and export), as well as monitor and handle information so that visibility is increased within the supply chain. When prompted about the influence UAE have on their customer internal logistics (e.g. manufacturing processes), Höglund explained that, because they work very much with Exception Management together with their customers, if an internal process is creating problems on the efficiency of the LCT then, together with the customer they will analyze the process so that is corrected.

Moreover UAE deals with invoice handling. According to Höglund, *“this is a big thing”*. UAE provides automated control and consolidation of logistics services invoices into one invoice. Höglund continued his explanation by saying: *“imagine if you have a company with thirty or forty different distribution service providers and you get different invoice formats from all of these that you need to match and you need to ensure that these are correct...”* This is an important aspect because companies need to match the costs of the transport against a specific order so that the cost price of each individual product reflects the transport costs for that same product. Finally, UAE Logistics help customers minimizing their overall logistic costs by using BI applications, by generating different types of statistics as well as different *key performance indicators* (KPIs), added Höglund.

Höglund went on by explaining the *Developing and Consulting Services* business which is turn divided into four different categories: a) process & system development, b) supply chain development, c) supplier development and d) outsourcing.

Höglund explained this business area is autonomous, and is not used as a marketing tool in order to lead customers to sign a LCT contract, however if there is a fit, that UAE will obviously suggest to the customer a LCT type solution. Moreover, Höglund explained that the idea of having a business is to always prioritize the customer i.e. to not sell *Logistics Control Towers* by selling *Consulting Services*. It was explained that some customers may not benefit from having a LCT because 1) they might not benefit from outsourcing and 2) because of strategic choices not to outsource business processes. Therefore, UAE Logistics best option in these cases would be to provide *Consulting Services*, emphasizing the importance of *“having a joint trust”*, Höglund add-

ed. Thus, UAE Logistics conducts pre-studies where they analyze and identify areas that could be improved within logistics and then make recommendations either based on Consulting Services solutions or if needed, suggestions which will imply LCT-solutions. According to Höglund, UAE Logistics can manage projects related to for instance outsourcing across the entire supply chain.

*Process and System Development* is like his baby, said Höglund and laughed. It relates to the analysis, design and implementation of both logistic processes and system solutions within logistics administration. Moreover, UAE's consulting manager explained that the services provided within supply chain development are for example the optimization and implementation of distribution structures (i.e. delivery setups). He explained that in order to do that, UAE uses a powerful software tool that enables them to make simulations which then leads them to the optimization of the resources. Höglund explained that first of all UAE maps out what the customer operation currently looks like. After that and through the use of the above mentioned simulation tool they will create different scenarios to measure the changes. For example, he continued: *"If you have a company with multiple warehouse structures or ERP system set-ups or triple organizations in place, what happens if we cut down this into one for the whole organization? What happens if we would like to go into a new market like Russia? What are the implications of that and so on?"* Moreover, Höglund said that UAE Logistics can map out both costs (warehouse, transportation, labor) and measure current environmentally hazardous emissions. To quote Höglund: *"So we can actually both analyze the costs, the environmental impact and the lead time impact today"*, this way UAE can find the aspects that can be improved. Thus, the simulation tool previously explained helps UAE Logistics to set-up different scenarios that can later be used as basis for discussions with their customer and the final decision-making.

Developing on the concept of supplier development Höglund went on by explaining: *"UAE follows a methodology, you can say, it starts with the analyses of the market and of the customers' demands as well as their logistics requirements."* Based on this UAE Logistics may help customers to design so-called *request for quotation* (RFQ) if they do not already have one. A RFQ is a document (standard) normally used by companies to ask suppliers or potential suppliers information about prices of the product or other relevant aspect about the purchasing contract (e.g. Incoterms). Sometimes customers might already have an RFQ on their hand, requiring different sorts of supplier information. UAE helps them to gather all the answers. Moreover, UAE also has a database with all the different supplier ratings, costs and other relevant information that has been used for previous customers. According to Höglund, UAE analyzes this information in two different ways.

One way is *cost analysis*, where UAE uses the customers' historic information, for example facts related to previous shipments, individual shipments or orders or something that symbolizes where they have traffic, from where UAE can draw statistical inferences. Another type of information UAE uses is the *price lists*, or the response in the RFQ from the different suppliers. Höglund explains *"...we try to price each and every row here in statistics, to find out which suppliers that have the best costs for different markets, for different products, different transport methods and so on. That's the first thing that we do, we make a cost analysis."*

Another thing UAE does, Höglund explained, is a quality analysis. UAE may question suppliers if they are ISO 9000 or ISO 14000 certified and what kind of IT-systems they use so that UAE can establish how to connect themselves to these same suppliers, i.e. can they use EDI or XML or if suppliers can report via different IT platforms. There are also organizational aspects that UAE is interested in, i.e. local presence. The fourth thing could be laws and regulations, how do suppliers follow up on that and so on.

Once UAE Logistics has performed both cost- and quality analysis the company weights between the most important quality factors and those that relate to costs. Based on the findings, UAE will then make a recommendation to their customer, suggesting a smaller list of suppliers that they believe are the most suitable to satisfy the customer requirements. After having visited on-site this smaller group of suppliers, UAE picks perhaps one after negotiations and then set the pilot.

Höglund explains, *"...we start with one or several flows and then together with this we also document standard operational procedures (SOP's) which serves as a quality manual between the customer and the supplier and if we have a Control Tower in place..."*, it will also serve the Control Tower. According to Höglund, these SOP manuals establishes all the rules that must be followed within the supply chain, i.e. how follow up is done, and how invoices, reporting and meetings should be handled and so on. Höglund stressed that the company focuses a lot more on continuous improvements than the ISO 9000 standard requires; that UAE *"need to understand the how and also the why we do things, because...then we can also improve it."* To have continuous improvements or Kaizen as Höglund puts it; *"built into the Control Tower that's our bread and butter, that's what we live with...but what we also see is that we can have the ability not only to sell Control Towers but we can also sell stand alone consulting services."*

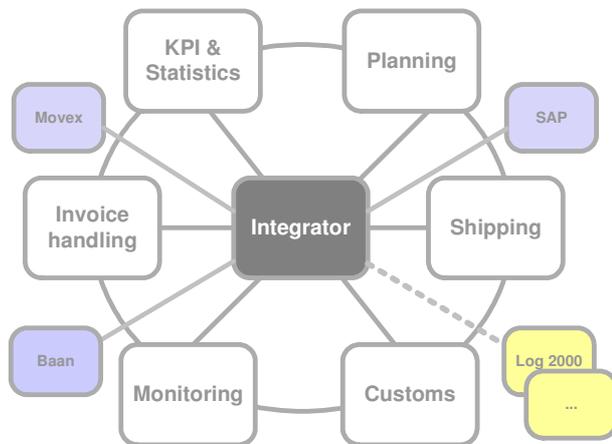
Outsourcing refers firstly to the implementation of a LCT, the other thing adds Höglund, is *"that we can also manage projects of outsourcing of anything else within the supply chain, meaning the different logistics activities (warehousing, transportation, but even supplier assessment).*

Höglund said that the main impediment for UAE Logistics when implementing 4PL service for a new customer is *"change management."* The Consulting Manager explained that *"the customer must have the resources in place, dedicated budget, IT experience, they have to have a mind-set that this is going to be a change, they have to realize the benefits and they have to work with us and to be on the same side as us. I think in order to do that it is really important to work with change management."* That is, the customer needs to realign their strategy in a sense to fit into the service; otherwise they will not be able to take the full advantage of the service. Höglund added that the customer should not outsource everything. Instead, one reason they should keep qualified competence in-house is so that requirements on UAE Logistics can be set. After the implementation phase UAE Logistics educate the key personnel for the customer, i.e. the personnel that are going to work with them on a daily basis. Höglund said that everything is written down in SOPs (standard operating procedures) that *"...are continuously revised, so it's not a document that we develop in 1995 and then we don't do anything about it."* Whenever there are improvements or changes the SOPs will be updated, *"so we live after our SOP's"* Höglund added.

When I asked Höglund if he could describe the network IT system integration, he answered that UAE Logistics work both with standardized systems and with their own systems. He continued by explaining that UAE can build a solution based on modules rather than for example an *"European system that carries out everything but is not very flexible to set up different customers"*.

UAE's Consulting Manager explained the customer should not have to worry about what system to use. In essence they should have the benefit to have all information at their disposal at any given time. Höglund went on and explained that this means that their customers should work with their own SAPs, when they update their order lines from 'pick to pack' then an EDI file should be sent to the LCT for further processing. To quote Höglund: *"If they need to have documents...they should find that in their SAP system created by the Control Tower."* Since different actors in the supply chain might work with different applications, continuous improvement is an important aspect at UAE Logistics. Moreover, the diversity of standards or even the lack of it puts additional pressure on the LCT. The LCT is considered as the integrator, which according to Höglund has the big challenge of translating *"...different types of messages and the contents of the message...but also to make sure that we can transfer it all in the supply chain."*

The figure below depicts UAE's role as the integrator.



**Figure 5-3: System platform Worldgate (courtesy of UAE Logistics)**

I then asked if customers can capture information in real-time. To that he answered, “it must be more often than daily”, in fact continued Höglund sometimes “we talk rather about minutes than hours and never talk about days.”

When it comes to the information flow UAE Logistics measure how fast they are at reporting. However, Höglund added that “it depends on the requirements on each individual customer but when it comes to sending back information then we talk about minutes... we are a non-asset provider so we are dependent on reporting back from our suppliers and if they are bad in reporting then we are bad in reporting, so we need to set the requirement not only ourselves but also on our suppliers.”

Another example, provided by Höglund, of the importance of time was at times of delivery. UAE Logistics might have service technicians at the customer site “ready to start working as soon as the shipment arrives, then we have requirements not only to be there on a Tuesday, and not only to be there at twelve a clock, but twelve plus or minus 15-30 minutes...” Höglund said that depending on the supply chain those kinds of solutions might be too expensive. To quote: “You don’t say that we only use that the whole time because that would cost enormous amounts. We need to have an optimized mix between cost, lead time and service.”

As per Höglund the advantage with having long-term partnerships is that due to the transparency that exists, UAE is able to support their customers in their investment decisions when it relates for example the development of logistics operations or processes.

On the other hand, the disadvantages with having long-term partnerships are trust related issues. This could be, quoting Höglund: “obstacles to go in to an outsourcing...you have to have an understanding with the customer.” Höglund said that it is always easier to conduct improvements in the beginning of a process; “in the beginning it is easy to pick the low hanging fruits.” However, it becomes more difficult to measure improvements at later stages because “it take more to realize the benefits...it takes a lot of creativity and skills to manage a long-term partnership with the customer”, added Höglund.

The Consulting Manager of UAE Logistics said that when talking with 4PL companies or logistics providers most likely “most of them will say...that they want to climb in the value chain, they don’t only want to ship goods for the companies, they want to have an effect on the logistics strategy...” However, Höglund added, “...if you want to climb in the value chain then you need to have more trust and you need to really show the customer that we are a very skilled and compe-

*tent player here, we can form alliances together.” Once climbing up the value chain UAE Logistics would be able to offer different Consulting Services such as supply chain development. Höglund continued by saying: “The more dependent a supplier is of its customers, the more influence the customer will have on the suppliers processes, mindset and business idea.”*

### **5.2.3 Logistics & Competitive advantage**

When asked what, in UAE’s perspective, is the best way to reduce cash-to-cash cycles, reduce capital binding or increase customer service levels, Höglund answered that UAE Logistics uses a common project methodology on structure within DHL that is called *First Choice*. To quote: *“The whole idea with First Choice is that the customer should choose DHL as number one, and within First Choice which is based on lean production, kaizen and continuous improvements we have a specific tool that we use”, called DMAIC* which has the following phases:

Define (to define the problem, to set the scope), Measure (to start to measure everything within this process, with statistics, with surveys etc). The third step is the Analysis phase where the problem is sorted out. During the Improvement phase, as the name indicates, UAE tries to put in place improvements in order to gain efficiencies, to put it differently: *“we try to do things better”,* Höglund added. Finally, in the Control phase UAE puts in place the *Standard Operation Procedures* (SOP), train people and make sure that bottlenecks are not going to happen or re-occur in the future. Höglund believed this way of working, using models like DMAIC, simplifies procedures since it provides clear steps to follow, makes it easier to know in what phase one is, as well as it lays down the actions that need to be implemented. A plus is that their customers will be able to follow the different steps, have a good perception of the work that has been taken and in the process learn and obviously in the end help UAE Logistics do their job.

When it comes to increased growth profits Höglund said that *lead time* and *logistics integrations* are the two major things; to shorten the lead time to the market as well as decreasing the variance of the lead time. One customer service in relation to this is that when dealing with the LCT, the customer does not need to talk to the different suppliers, instead UAE Logistics takes care of that. Höglund explained that emphasis is on lowering the cost of goods sold and that the above *“...has an implication on the increased growth profits in the DuPont-Schedule.”* To lower the operating costs, then, to quote: *“you need to find a optimized mix of service costs and lead time, it is a lot about IT and processes...increased share of consolidated shipments, improved handling of customer returns and claims, accurate freight charging, invoicing of customer orders...continuous identification and elimination of bottlenecks, improved physical distribution and supply chain monitoring...track-and-trace.”*

Höglund said that there is nothing like real-time in logistics since everything has to pass a milestone in order to be ordered. However, if UAE Logistics can be on top of the information, to *“take action before the flight is canceled or the ship has sunk”* then according to Höglund *“...when it comes down to reduced working capital then...the cure is to be transparent to reduce inventory through improved reliability.”* Höglund added that focus should be on having *“less warehouse facilities, shorter cash-to-cash cycles, focus on payables and then of course finally to focus on the core competence.”* Examples to clarify this were the companies Kellogg’s and Dell, *“world leaders that have become so successful because they have realized what is my bread and butter, what do the customers expect from me?”*

## 5.3 Volvo Logistics

The interview with Volvo Logistics occurred on October 15<sup>th</sup>. The interviewee as previously mentioned was the Project Manager at Global Logistics Development, Henrik Erkfeldt who has been working for Volvo Logistics during the past six years. His previous working experience includes working for another division within the Volvo Group, as well as for other companies, for instance a supplier to Volvo Cars, and a consulting company.

### 5.3.1 The single firm

Volvo Logistics is a wholly owned subsidiary of the Volvo Group. At the Volvo Logistics webpage ([www.volvologistics.com](http://www.volvologistics.com)) it is stated that; *“Volvo Logistics designs, handles and develops comprehensive business logistics systems for the automotive industry worldwide.”* Moreover, according to Mr. Henrik Erkfeldt, Volvo Logistics vision is *“to be recognized as the leading partner within the automotive commercial transport industry.”* The company is active in the different areas of inbound, outbound and emballage (packing).

Within Volvo Logistics each of the divisions, i.e. inbound, outbound and emballage (packing), have their very own logistic development group. Erkfeldt explained that previously Global Logistics Development had belonged to Inbound but nowadays is considered to *“stand on its own legs”* so to speak. What this division of Volvo Logistics does is that they handle support functions such as logistics development of different supply chains in regards to for instance environment, purchasing, insurances and IT. Thus, the idea with this group is that they should handle large projects, projects that could include both inbound, outbound and emballage (packing). Moreover, the division works with key areas within the Volvo Group; areas such as optimizing, network analyzes, geographical information systems i.e. programs and systems that can be connected to different logistic services. Thus within the above mentioned area Volvo Logistics is the competence centre and not Volvo IT.

As mentioned above, Volvo Logistics vision is according to Erkfeldt; *“To be recognized as the leading partner within the automotive commercial transport industry.”* Moreover, this implies the underline and the reason why they have no customers outside the automotive industry. It was believed that commercial industries reflect the task they perform for Volvo Aero; handling spare parts for their customers, e.g. Boeing and Airbus. So what Volvo Logistics did was that they bought stocks of used spare parts. Moreover, within the Volvo Group there is a division called Volvo Construction Equipment that manufacture excavators, wheel loaders, pavers and so on, and the division is thus also seen as part of the commercial industry. To be recognized as the leading partner stands for the ambition to be logistics provider to at least one more automotive company. However, as the large automotive companies already have established strong relations it has been proven to be quite difficult to enter this market.

Since the start of Volvo Logistics the company has gone from being a company based in Gothenburg, Sweden, primarily for Volvo Cars and Volvo Trucks, to a company situated all over Sweden, for example in Umeå. According to Erkfeldt the company has during the last six years grown approximately 40 percent. When Erkfeldt started to work at the company, 2002-2003, an agent logistics division that belonged to Volvo Cars was reorganized to Volvo Logistics, and it was not until then that the company became a big player in Europe. At this stage the company had offices in the US, but still considered themselves as being a very Swedish company.

During the last four to six years Volvo Logistics have established offices at many locations, primarily those that traditionally were not as strong; North America, South America, Asia and even Southern Europe. Erkfeldt stated that; *“We are at Renault in France, we are at Volvo Trucks in USA, Boeing in USA, Volvo Trucks in South America, the car manufacturers in Peru, Asia and so*

on.” Still the different offices are quite small with the exception of USA, thus, perhaps offices located by the clients consists of three to five people. Having this expansion in mind, still most of their employees are located in Gothenburg, Sweden (Volvo Logistics Corporation) and Gent, Belgium (Volvo Logistics Europe). There are also quite a lot of people located throughout North America at two-three locations. “Out of roughly 1,000 people, 350 are located in Gothenburg, 200 in the US, 150-200 in Gent, and the rest in South America, Asia, locations in Sweden (Umeå, Skövde, Arvika, Fredriksberg) and so on.”

The company handles multiple customer relationships, although rather many of them belong to the Volvo Group in one way or another, such as subsidiaries. A few of their customers have been provided to them via Volvo Cars. As Erkfeldt previously explained, their vision “...*within the automotive...industry.*” effectively reduces the segments that their clients are operating in. All their different customers have a connection to the automotive industry and thus have not so much to do with the building or retail trade. Volvo Logistics has customers both importing raw materials and exporting finished goods. Inbound logistics deal with all the material that goes into the factories i.e. the raw material and different components. The turnover from inbound is larger than that from outbound and the reason for this is that they do not have control over the distribution of vehicles in the USA. So, the penetration is better within inbound where Volvo Logistics have approximately 100 customers, covering from the steel going in to the manufacturing in Umeå to the final distribution of cars. Volvo Logistics both own and rent warehouses. The fact that they own warehouses is more or less a tradition according to Erkfeldt as those warehouses are located in Gothenburg. Thus Volvo Logistics almost does not own any transport assets by themselves apart from the occasional warehouse and cross-docking facilities that they do own. The company has had manufacturing but due to the historical turning towards outsourcing within their branch, the automotive industry, today it is limited to small scale operations. During more recent years the trend has become something more like in-sourcing, he added.

Erkfeldt had obviously heard about such as *supply chain integrator* and *control tower*, *supply chain engineering*, *business process analyzing*, *development of activities* and also recognized the pressure towards IT and business development. However, the interviewee felt that the concept of fourth party logistics (4PL) is yet not as well-known as the concept of third party logistics (3PL). After having looked into the file with the “four key components of a 4PL”, which was previously sent to him, Erkfeldt believed that even though Volvo Logistics Corporation has the ambition to become something in the frame of a 4PL, there are some areas where they still are not there yet. Erkfeldt suggested that one of these areas would be the transparency i.e. that Volvo Logistics do not have yet the transparency that he believed a 4PL should have. To quote; “*We do not have the overview of the entire supply chain, all the different supply chain activities, and we are short of this firstly because we do not have the systems for it and secondly because of our clients requests; they already possess a lot of the functions one could say and do not want us to have that responsibility.*”

Volvo Logistics handles not only transport procurement but also provides long-distance warehousing for different global suppliers; for instance providing the suppliers located in China with warehouses in Europe. Volvo Logistics purchase all the different transport and warehousing solutions and later packages this in different packages that are located closely to the different Volvo factories.

### 5.3.2 Enterprise Logistics Integration

According to Erkfeldt, the company has better integration in outbound logistics than in inbound, being this very much due to the application for distribution (A4D) system. This system gives updated information about the order-production-distribution sequence. For instance, all the different Volvo cars come with A4D. Moreover, Erkfeldt said that when it comes to inbound their base system is not as good. Perhaps when the new system ATLAS is in place things will change, he said. ATLAS is an application that they are currently developing currently and will eventually be used as a transport-management system. For example, it will enable new services that factories and suppliers will be able to use. Today, parts of the system are in use more or less with the purpose of conducting pilot studies and only as a booking and planning system. On the other hand, there are examples where they are very connected (on inbound) with their customers. For example, in certain countries trade on behalf of customers is invoiced to Volvo Logistics. In this aspect, Erkfeldt believed that they had gone very far. Continuous innovation lay within the responsibilities, their projects and developments, of Volvo Logistics.

The problem that Volvo Logistics is having with the current set-up is that globally they are using three different systems, i.e. in Sweden, in Europe and in the US. Moreover, they use yet another system as a few of their clients are using a fourth system. Thus, even though the different systems are noteworthy by themselves, Volvo Logistics, according to our interviewee, has a problem with sharing information between these different platforms. Implementing ATLAS will bring them to the next level; to quote Erkfeldt: *"the consolidating step."* The ambition is that the new system will replace the four systems currently in use. Different customers have different demands. At outbound, as above mentioned, Volvo Logistics is using A4D which in turn, if required, can be connected to GPS-functions, i.e. providing the possibility to follow every truck in real-time. Using so called milestones is also common, e.g. when the goods come into a harbor signals might be sent to a controlling entity within the supply chain.

There is a difference when it comes to the handling of information between inbound and outbound. While at outbound the A4D system allows for track-and-trace, taking the system care of the flow of information, at inbound it works in the opposite way; everything that is not reported is regarded as on-track. As a consequence, only information about what is reported as out-of-track is shared throughout the supply chain; information about congestions, incidents or strikes. Erkfeldt willingly admits that this puts pressure on the different transport providers, that they *"...conduct transports the likelihood of them doing that is higher than vice versa. It builds a lot on established relations"*. Volvo Logistics thus suffers from not having the different service portals up and running. Instead flows of information many times circulate throughout the supply chain (service department via the customer and the customers' counterpart) with use of Excel spreadsheets. The company has a lot of back office functions and service functions that their clients can make use of at an operational level to achieve a track-and-trace, however as pointed out by Erkfeld, things are still done half manually.

Erkfeldt said that Volvo Logistics has a budget responsibility (transport and logistics wise) within a number of companies, towards a number of clients, where the company conducts all follow-up of transports but they do not do for example Warehouse data mining and that kind of follow-ups that the clients do themselves. Within the Volvo Group, Volvo Logistics has procurement services of the purchasing of all transport and logistics services. Thus, per definition, Volvo Logistics clients whether belonging to the Volvo Group or not are not allowed to procure transports on their own.

One of the services that Volvo Logistics offer their customers is insurances. According to Erkfeldt insurances are a very big business. One of the examples mentioned was the insurances that Volvo Logistics had saved the Volvo Group when a cargo ship sunk in the English Channel. Furthermore, Volvo Logistics have customs handling. Their expertise in this area functions as a competence center within the Volvo Group; that is, the handling of customs, value added tax and so on. As one can realize from the above areas there are a lot of money involved and the insurances are covered by different insurance companies.

When asked about the barriers that might occur when Volvo Logistics implement services for a new customer the answer was *“politics”*. First and foremost because there is often need for radical changes. Volvo Logistics take over a lot of people from the customers and that in turn naturally have a large effect on both the ones that are being transferred and those that are left at the company. From Erkfeldt’s experience it was generally hard to say if there is certain resentment against changes. Though, what was distinguishable was that it differs depending on where in the world one conducts business. When talking about Europe and the company Renault they have had some struggles, whereas Erkfeldt’s colleagues in the USA have been very successful. Generally speaking, he believed that the markets in Europe are more difficult than the markets in the USA, Brazil and the so-called new world.

Volvo Logistics often work within different projects and have well established methods for doing so. The projects duty is to deliver improvements or solutions for new development, as well as to integrate themselves with new customers. The interviewee said that personally he only works in project form. If a customer would like to cooperate with Volvo Logistics the first step is almost always to map that customer’s recent activity. For instance, which different areas can be transferred to Volvo Logistics, what is their KPI (Key Performance Indicators) today, and which current suppliers are they using? This leads to the establishment of a road map which in turn is expanded as the different products comes in. To quote: *“Is it inbound, outbound or emballage (packing) that goes in first, or what is to be carried out? This is followed by different sub-projects.”*

Erkfeldt explained that naturally it is easier to grasp what needs to be changed in the beginning of a project, those are the big changes. After the implementation is done, Volvo Logistics lets the project roll for a couple years, and then already at operational level, they go back and start working with continuous improvements. Erkfeldt explained that Volvo Logistics is currently running the integration for Nissan in Japan with the purpose of taking over the logistics companies, a lot of warehouse companies that Nissan owns today. In essence it is about giving Nissan adequate support. Suppliers such as Volvo Powertrain will establish themselves in Japan and thus Volvo Logistics will support the logistics structure. Erkfeldt said that *“one project will be to support Volvo Powertrain, another to support Nissan with European suppliers which have nothing to do with Volvo Powertrain, and another project is for example dealing with the distribution of Nissan stuff in the USA. That is, some sort of Control Tower for this client will be established as an initial phase and later it will be phased out.”* Moreover, a project such as this would perhaps last for five years with most of its activities executed during the initial phase.

When it comes to formulating deals Erkfeldt said that they affect the different supplier at an operative level; that Volvo Logistics decides when they should deliver, however, this is the only thing that they could have an influence on. Thus, the impact that Volvo Logistics has have nothing to do with production planning, instead what the company can shape is how the deliveries should be packaged (emballage). When talking about the logistics pipeline Erkfeldt said that Volvo Logistics chooses the transport and logistics providers but never the suppliers of material. What Volvo Logistics does is that they evaluate transport and logistics costs and later it is the purchasing department that decides, that handle the order process. However, Volvo Logistics

would sometimes make a recommendation to switch between different suppliers. For instance, if the purchasing department is wondering how much the costs would be effected if the production was placed in China instead of the one here in Sweden, Volvo Logistics would evaluate that and perhaps come to the solution that a hub in China needs to be set-up. Thus, that would be the recommendation. When it comes to the extended enterprise and the virtual supply chain, the project manager said that Volvo Logistics see it as if they widen the scope; *“the ordinary Volvo companies are very focused on the three Islands (so to speak) of manufacturing, selling and purchasing. What Volvo Logistics does it that we integrate these three different aspects.”* Erkfeldt admits that the integration with their customers could be better in order to really succeed with the virtual supply chain and even the extended enterprise, that the customers would see the consequences throughout the chain.

Volvo Logistics position themselves as being neutral because as Erkfeldt puts it himself; *“We buy 100 percent of our transport capacity and as stated almost 100 percent of the warehousing capacity. We do not have any proprietary interests in anything and we use I do not know how many different transport providers and 3PLs.”*

After briefly introducing the different concepts Vendor Managed Inventory (VMI) and Co-managed Inventory (CMI), Erkfeldt said that they are leaning more towards CMI, Especially Volvo Powertrain (the world’s largest producer of heavy diesel engines). Although Volvo Powertrain identifies it as VMR, vendor-managed replenishment, it is similar to VMI; the difference is that Volvo Powertrain owns the material. A few key suppliers have been selected where they work with CMI, which they also do quite often when it comes to large flows of goods. On the other hand, a normal supplier would be using VMI, e.g. an ordinary supplier somewhere in a small region where development is not part of the operations.

When discussing the selection process of the customers’ suppliers, the response was that if talking about suppliers of material then Volvo Logistics do not check for their quality and/or quality of products. However, when it comes to transport and logistics companies then they actually do these things. As supply chains are becoming more global, Volvo Logistics have for instance started to work with insurances. Erkfeldt said that the company works with knowledge, i.e. they try to attend to upcoming strikes and that sort of things. However, financial risks are not part of Volvo Logistics operation as it is the purchasing department’s liability. What Volvo Logistics do is that they work with set solutions so that they in for example China can set up hubs and logistics solutions with the goal to support and minimize certain risks. These risks could be transport risks, that the suppliers provide the transportation the whole way. What this comes down to is that Volvo Logistics at an earlier stage in the supply chain will create control.

Volvo Logistics see advantages with having long-term partnerships with their suppliers because then they will be able to build relationships, and thus ensure capacity if they ever should fall short of it. Erkfeldt explained further that *“it is about system and relation integration with their suppliers. Towards the customers it is very much about confidence, long-term relationships; we build confidence so that we get these inquiries of supporting them with supply chain development, an area which is not under our ordinary operations”*. Moreover, the interviewee saw the need for their customers to grasp the ideas that Volvo Logistics brings in from other customers, i.e. that Volvo Logistics becomes a sort of bridge of knowledge. Lastly, Volvo Logistics establish a rigid system for invoice handling, customer relationships, and so on. When discussing the possible disadvantages with having long-term partnerships the immediate response was that one could get lazy. According to Erkfeldt *“there are a number of examples showing perhaps that we do not develop, are sufficiently quick, and thereby our customers drive us because we do not really see the market due to focusing too much on the customer. Many times it might be that the customer sees the market better than us, i.e. the logistics market.”*

### 5.3.3 Logistics & Competitive advantage

When asked if Volvo Logistics provides competitive advantages to their customers Erkfeldt replied; *“We hope so, that is the whole idea.”* One competitive advantage, he said, is “naturally when we do procurement we have the benefit of being a large actor because we cover so many factories”. Due to their purchasing power Volvo Logistics are able to achieve economies of scale. Another competitive advantage is that the company can have an influence over especially transporters or the market in a certain direction. Volvo Logistics also has exchange of competence between different clients. An example of which is that Volvo Cars affects Volvo Logistics which in turn affects others. Volvo Logistics have observed that the smaller companies within the Volvo Group have an immense benefit from them, being able to acquire competence that they otherwise would not obtain.

The company’s supply chain knowledge provides their customers with high service levels. For instance, Erkfeldt said that quite often when they have discussions with their smaller clients they are given requirement specifications. The reply from Volvo Logistics could be: *“it is very good that you have done this, but we can deliver 20 percent better on everything except this which we actually can deliver 30 percent better.”* This implies that the smaller clients cannot really contribute i.e. they are not in the game. Because of this Volvo Logistics will be able to have a dialogue from a totally different perspective than what a normal supplier would be able to. Erkfeldt said that since they are not going to be profitable it implies that Volvo Logistics can be more transparent. Volvo Logistics will be able to work a lot with the customer’s development, the logistics functions and so on.

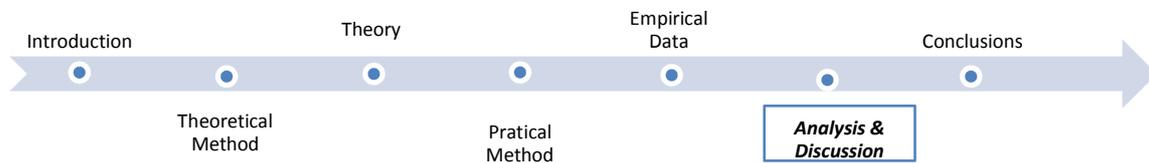
In Volvo Logistics’ perspective the best way to reduce cash-to-cash cycles is all sorts of lead time, i.e. both transport lead time and administrative lead time. Erkfeldt said; *“Terms of payment and stuff like that is after all only tricking oneself. Only lead time can provide additional savings.”* When talking about capital binding, once again a lot of it is connected to lead time, to reduce lead time and first and foremost ensure that it is stability in that lead time. When it comes to this, Volvo Logistics has proven to be quite tough. Sometimes they might have systems that are not connected to lead time but instead have the highest stability, i.e. if it is two days then it is two days. Volvo Logistics has undergone radical changes to create robust systems. There are always ways to improve, for instance the cost that their transporters and logistics providers bill them for, how can that be reduced? What if Volvo Logistics set-up something differently, what would happen then?

In order to achieve reduced cash-to-cash cycles and capital binding Volvo Logistics admits that they do not work so much with lead times. Quite frankly, they have certain contracts and set-ups and accordingly, their clients should deliver the lead times that are stipulated in the different contracts. Then, Erkfeldt states that one way of achieving the above is to look at the market and see if there is anyone that is better. The main lead times of Volvo Logistics are the administrative ones, and that is where they have things that can be improved.

Moreover, Volvo Logistics conducts ABC-analyses. Erkfeldt believed that the key is to conduct mapping of flows, to find working standards. Volvo has VPS (Volvo Production System) and according to our interviewee, Volvo Logistics need to implement this in their administrative processes; this way a production process throughout the entire organization (the Volvo Group) will be created.

## 6 Analysis & Discussion

In this chapter I will analyze and discuss the empirical data obtained through the interviews. In order to do that, I will use three different themes being these; Organizational Design, Enterprise Logistics Integration and Logistics and Competitive advantages.



### 6.1 Theme 1 – The single firm

In order to analyze this theme, I will be using the theories that relate to organizational design and its building blocks, in particular the strategy and structure perspectives, which were those mentioned in Stock et al. (1998) conceptual framework. Moreover, I will analyze the single firms from the market-base and the resource-base views of the firm.

#### 6.1.1 Sonat

When analyzing Sonat from the *market-based perspective of the firm* (Weiss, 2007), one notices that the company uses both differentiation and market segmentation techniques, being these two aspects in line with Weiss's presentation of the above theory. Sonat differentiate themselves strategically from their competitors by marketing themselves as an 'in-sourced' logistics department rather than an outsourced one. Furthermore, by emphasizing that they are a non-asset provider, Sonat also differentiate themselves from the traditional 3PL companies. Additionally Sonat give emphasis to the importance of a close daily co-operation with their customers and on each customer specific demands, going to the extent of sharing office spaces with the most important partners within the supply chain. An example of this is the office Sonat shares with Posten and Apoteket in Örebro, which can be related to the concepts of blurred firm boundaries and clusters introduced in the theory chapter (Weiss, 2007). Thus co-operation platforms are tailored to meet customers' predefined conditions, needs and demands. The other relevant aspect when analyzing Sonat from the *market-based perspective of the firm* is the clear evidence of market segmentation. This is confirmed by the fact that Sonat's customers have 90 percent of their logistics flows within Sweden.

Moreover, because the company's core-competencies are within logistics and supply chain management it is evident that Sonat, even though a non-asset provider, emphasizes the importance of the firm's resources, competences and capabilities, particularly when it refers to the knowledge embedded in the human capital of the firm (e.g. the firm employees and their logistics know-how). This fact can be related to the *resource-based view of the firm* (Weiss, 2007), which as the reader may recall from the theory chapter, suggests that if a firm has either better resources or has developed better competencies (or both) than competitors, the company has a competitive advantage.

When analyzing the single firm (Sonat) strategy from Stock et al. (1998) conceptual framework perspective, which includes aspects such as the firm's competitive priorities as well as its geographic and competitive scopes; the fact that 90 percent of the logistics flows controlled by Sonat are in Sweden gives a clear evidence of the firm's geographic scope. However, it was not as obvious to establish the firm's competitive priorities and scope. The reason for this it might be that as a supply chain integrator or 4PL, Sonat has to align their strategy with that of their client (s) and thus depends very much on which strategic logistic activities the client company chooses to be best at (e.g. cost, quality, flexibility or delivery). For example, even though there were no

indications that the Sonat aims to be the cheapest 4PL service provider, Sonat helps customers to gain a better control over their logistic processes and thus reduce costs substantially.

From an organizational structure perspective, I would say the company resembles both Mintzberg's professional bureaucracy and divisionalized form (appendix 2). As the reader may recall, the former organizational structure is characterized by a much larger operating core than the other structural parts, few managerial levels and is flat by nature (horizontal). However, Sonat is also divisionalized as it has different autonomous business units (e.g. Apoteket, Lantmännen and Svenska Retursystem), with own business unit managers.

Moreover, when analyzing Sonat's organizational structure from the perspective of Stock et al. (1998) framework, namely regarding the firm geographic dispersion, one would say that they are within Sweden, after all the company does not have offices abroad. Finally, when looking at Sonat's roll on the network structure (e.g. cooperation or relationships between firms), using for that Stock et al. (1998) third dimension of organizational structure, I would say the company shows high levels of information exchange, interdependence and goal consistency. However, when it concerns aspects such as 'control of power', 'time horizon' and 'formality', these are medium to low, thus in line with the authors view on organizational structure differences, introduced earlier in the theory chapter (figure 3:4).

### **6.1.2 UAE Logistics**

When analyzing UAE Logistics from the market-based perspective of the firm, one finds evidence of both market differentiation and segmentation (Weiss, 2007). UAE Logistics differentiate themselves from their competitors by selling the concept of logistics control tower (LCT), offering to its customers the total administration of their logistic activities. In fact, as per the interviewee it was customer demand the reason behind the creation of the company. Moreover, and still according to Höglund, UAE also differentiate themselves from the more traditional logistics services providers (e.g. 3PL) by maintaining neutrality and by being a non-asset provider. The company's goal is "to be recognized as the best logistics partner in the Nordics". When it comes to market segmentation, the company does not operate in any specific industry or market. However, besides offering customers the complete administration of their logistic activities, UAE Logistics also offers logistics and supply chain management development and consulting services, as a form of reaching other segments of the market. As Höglund pointed out himself, a) LCTs may not be appropriate to all customers, and b) there are companies that do not want to outsource the totality of their logistic function to another company. UAE Logistics core-competencies are also within logistics and supply chain management, and thus it is within this business area the company has decided to make the difference. Being this is in line with the resource-based and core-competence views of the firm.

Looking at UAE from a strategy perspective, one can infer from the empirical data presented in the previous chapter that UAE Logistics not only controls global logistics flows, but also has offices in Dubai and Dallas, determining these factors the company's geographic scope. Moreover, and as expected it was difficult to ascertain the single firm's competitive priorities and scope. This, as previously explained, most certainly has to do with the fact that while acting as supply chain integrator within different supply chains, UAE has the responsibility to assist their clients in achieving the competitive priorities (cost, quality, flexibility or delivery) that these aspire (Stock et al. 1998).

From an internal structural perspective, UAE shows similarities with Mintzberg's divisionalized form. This can be confirmed by looking at the company's organizational chart which was presented on the previous chapter (empirical data). The geographic dispersion of the firm's structure, is shown by the fact that UAE has offices outside Sweden, namely in Dubai and in US.

Finally, when looking at the firm's roll on the network structure and its cooperation or relationship with the other partners within the supply chain, I believe the company shows high levels of information exchange, interdependence, goal consistency but even formality. As the reader may recall from the empirical data, the well functioning of a LCT is very much based on standard operating procedures, which should be followed from both UAE's customers but also by the customer's suppliers. When it concerns aspects such as 'control of power' and 'time horizon', these are medium to low, and thus in line with the Stock et al. organizational structure differences table (figure 3:4).

### **6.1.3 Volvo Logistics**

From the market-based perspective of the firm, Volvo Logistics differentiate themselves from their competitors by having specialized themselves in logistics solutions for the automotive industry (inbound, outbound and packaging). Although a large part of the customers come from within the Volvo Group, the company stands on its "own legs" and thus many of the automotive suppliers are part of their customer base. Moreover, as stated above, the company's core-competency is within logistics and supply chain management, and thus is within this business area the company has decided to make the difference, with the particularity that their core-competence is within the automotive industry which even more difficult to imitate. Again, this is in line with the resource-based and core-competence views of the firm (see page 26).

Strategically, Volvo Logistics with its ca. 1000 employees and offices spread worldwide, namely in Europe (Sweden, Belgium, France and UK), US, Brazil, China and Australia for example, is of the three interviewed companies the one which has the widest geographic scope. Moreover, due to its close relation to the Volvo Group, the company's competitive priorities and scope are to a certain degree dependant on the group goals, however as pointed by the Volvo Logistics respondent because they are a large actor, they take can advantage of their purchasing power when doing procurement and thus are able to achieve economies of scale.

From a structure perspective, Volvo Logistics as a single firm can be compared to Mintzberg divisionalized structural form. The company, as previously mentioned in the empirical data chapter, has three well indentified divisions (inbound, outbound and packaging), having each of these divisions own business units managers and own logistics developing groups. However, one need to bear in mind that Volvo Logistics is a company that perhaps because is fully owned by the Volvo Group operates primarily within the group. Thus in relation to the group, Volvo Logistics is part of a matrix structure (Daft 2007), taking the logistics function across the different business areas of the group and integrating these in terms of logistics operations. As the reader may recall from the theory chapter, Habib and Victor (1991), as cited by Stock et al., categorized multinational corporations as pure structures, which include worldwide functional, international division, worldwide product division, geographic region and matrix. This can be confirmed by looking at Volvo Group organizational chart (appendix 3). Moreover, when analyzing the firm's roll on the network structure and its cooperation or relationship with the other partners within the supply chain, and here I mean not only those within the Volvo Group, I believe the company shows high levels of information exchange, interdependence, goal consistency but even formality. When it concerns aspects such as 'control of power' and 'time horizon' and 'formality', these are medium to low, and thus in line with the Stock et al. organizational structure differences table.

#### **6.1.4 Theme discussion**

As explained above, when analyzing Sonat, UAE Logistics and Volvo Logistics strategic blueprints, namely from the market-based view of the firm, all these three companies show signs of using market differentiation and segmentation techniques. First of all these companies differentiate themselves from traditional 3PL companies in that they do not own any transport assets. Volvo Logistics, on the other hand, differs from Sonat and UAE in that they own, although not many, some warehouse and cross-docking facilities, which according with the respondent (Erkfeldt) is closer to the concept of 3PL. In fact, it seemed to me that Volvo Logistics is in somewhat a transition period; the company aims to become something in the frame of a 4PL but is still not there yet, as Erkfeldt explained himself.

Moreover, from a resource-based view of the firm, which according to Weiss (2007) offers either a different or complementary view on a firm strategy, one can infer that all these companies put emphasis on logistics and supply chain management know-how as the core competency as well as on the knowledge embedded on the firm's human capital.

All three interviewed companies have well defined geographic scopes. While Sonat have as clients companies which have the majority of their logistic flows within Sweden, Sonat and Volvo, on the other hand, have wider geographic scopes in that they operate globally. Furthermore, as previously explained it was difficult to establish each of these companies' competitive priorities (e.g. cost, quality, flexibility or delivery) because their role as supply chain integrators is to assist their clients in achieving these competitive priorities, which may vary between different clients. Most likely one would find a mix of the above mentioned competitive priorities.

From an organizational structure perspective, as single firms Sonat, UAE Logistics and Volvo Logistics do not vary so much. These companies' organizational structure, as previously mentioned, can be compared to Mintzberg divisionalized form. However, Volvo Logistics besides being significantly larger and having a much wider geographic dispersion play a total different role within the network organization. One needs to bear in mind that Volvo Logistics primarily functions within the group taking the logistics function across the different business areas of the group and integrating these in terms of logistics operations. In fact Volvo Logistics is perhaps of the three companies the one that is closer to Stock et al. concept of manufacturing enterprise, where the logistic function creates the balance between the enterprise structure and strategy. Sonat and UAE Logistics, on the other hand, are companies that have emerged on the market as a result of the outsourcing trend. As companies started to outsource different parts of their logistics activities (warehouse, transport etc.) to different 3PL service providers, they lost the logistic knowledge and thus the competence not only to integrate the different activities but even the capacity for continuous development.

## 6.2 Theme 2 – Enterprise Logistics Integration

*In order to analyze this theme, I will be using the theories that relate to logistics and supply chain management as well as the concept of 4PL, which the reader may find in appendix 1.*

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### 6.2.1 Sonat

Sonat, as previously established in the empirical data operates as though they were an in-sourced logistics function. Moreover, Sonat offers a wide range of logistics services within supply chain development, and management and operation of costumers' logistics activities. Examples of these are; *replenishment*, which includes activities such as planning and inventory management, *order fulfillment* (e.g. receipt and planning of orders, customer service and capacity planning), and finally *distribution* and its related activities such as transport booking, respective documentation, customs related issues and daily problem solving, as pointed out by Conradson. These activities in turn can be linked to the concept of synchronous supply chains introduced during the theory chapter (3.3.3), where Christopher (2005) introduces some of the key processes that supply chain partners need to link (both upstream and downstream) so that supply chain synchronization is achieved. One can recognize some of these processes (e.g. planning and scheduling, order management, sourcing and procurement etc).

When comparing Sonat's structure and the services the company provides against the concept of 4PL (appendix 1) and its four key components, the company satisfies many of these requirements. For example, Sonat acts sometimes, if not always, as the supply chain visionary. By working in close contact with their client company, in project form as described during the empirical data section, Sonat assists their clients in the re-engineering of their logistic processes as well as its continuous innovation and development. This aspect can in turn be related to the theory chapter and Aronsson et al. (2006) explanation on the re-engineering of business processes. Where the authors explain that by eliminating, simplifying, integrating or by performing activities or processes simultaneously the total lead time can be substantially reduced. This in other words is the same to say that a large part of the non-value adding time existent in the value chain will disappear. Furthermore, Sonat employees are in general experienced logisticians and by maintaining neutral positioning they are able to manage multiple 3PL service providers. The company is however a non-asset provider in a sense that they do own assets such as transportation, warehouse or cross-docking facilities, manufacturing outsourcing or co-packing services, these are instead outsourced to 3PL logistic companies which, as explained above, are supervised by the company in name of their customers. Meaning Sonat has access to the 'best of breed' of service providers (Christopher, 2005). This can also be related to the empirical data; according to Conradson, the fact that Sonat is in business with many companies within different industries makes their expertise and know-how well established in the market. From this one can perhaps infer that the company is able to achieve economies of scale for example on out-bound logistics.

Moreover, when it comes to be the supply chain intermediary (Christopher, 2005), as previously mentioned, Sonat has formed diverse partnerships with market leaders within IT and information flow (e.g. Oracle for applications and data-warehousing, and with Viewlocity, a global provider of B2B integration and online trading community solutions for integration of systems and information (page 37). Thus the company assists their clients in achieving IT system integration, as well as in converting data into information that can later be used to support managerial decisions. Moreover, the IT integration is intrinsically related to aspects of supply chain management which were addressed during the theory chapter, e.g. Vendor Managed Inventory (VMI) practices, point of sales (POS) systems or electronic data interchange (EDI/EDIFACT) which can be used for electronic invoicing (Christopher, 2005).

## 6.2.2 UAE Logistics

UAE Logistics, as previously explained in the empirical data section, also offers logistic services which range from the complete administration of a customer's logistic operations through the use of so-called logistics control towers (LCT), to supply chain developing and consulting. The latter is in turn divided into four different areas; namely Process and System Development, Supply Chain Development, Supplier Development and Outsourcing. The logistics services that UAE provides are in many ways similar to those offered by Sonat; as per the empirical data these may vary from procurement, inbound and outbound logistics (e.g. planning and call off, transport planning and booking as well as documentation and customs handling), invoicing etc. Furthermore UAE also performs logistics diagnoses as well as assists customers minimizing their overall costs by using Business Intelligence applications in order to draw statistical inferences as well as different KPIs as explained by UAE respondent.

Once again these activities can be linked to the concept of synchronous supply chains introduced during the theory chapter (3.3.3) and some of the key processes that supply chain partners need to link (both upstream and downstream) so that supply chain synchronization is achieved (Christopher, 2005). Namely, planning and scheduling, order management and sourcing and procurement, but even to the concept of reduced non-value adding time and the points brought up by Aronsson et al. (2006) which lead to reduced lead times (e.g. elimination, simplification and synchronization).

When analyzing UAE Logistics in light of the 4PL concept (appendix 1) and its four key components, one can infer that the company satisfies several aspects of the criteria. For example, competencies are within logistics and supply chain management and thus the core of its personal is formed by experienced logisticians. Moreover although UAE Logistics is a non-asset provider (physical) they have access to the best-of-breed of service providers, where the relation to DHL and Deutsche Post World Net cannot be ignored. An example of this connection could be given by the fact that UAE Logistics uses a common project methodology within DHL, called First Choice and that is based according to the respondent on lean production, kaizen or continuous improvements (see section 5.2.3).

Moreover, UAE Logistics and their concept of Logistics Control Towers LCT is very close to the idea of 'Supply chain infomediary' (see appendix 1) introduced in the theory chapter (Christopher, 2005). I found particularly interesting that both suppliers and customers can log themselves in into the company website. Customers, in turn can use Worldgate portals, track-and-trace and web-order services.

Finally, as in the previous case, the IT integration is closely related to other supply chain management techniques which were addressed during the theory chapter, e.g. Vendor Managed Inventory (VMI) practices, point of sales (POS) systems or electronic data interchange (EDI/EDIFACT) (Christopher, 2005). Aspects such EDI and electronic invoicing were aspects which were brought up by Höglund during the interview.

## 6.2.3 Volvo Logistics

Volvo Logistics, which as the reader understands not only from the empirical data but even from the analyze made on the firm from an organizational design perspective, both using Weiss and Stock et al. theories, has a very different structure within the network organization. This was actually one of the reasons why the company was studied. I wanted to analyze the concept of 4PL from a different perspective, meaning one where the interpretation of the 4PL may take another perspective. This is also in line with Christopher's (2005) description of the concept of 4PL and his suggestion that the 4PL can take different structural formats

As the reader may recall from the theory chapter, Carr suggests that “companies with all in place...were less likely to find the 4PL model desirable” (Richardsson, 2005). However, in the same article there are examples of companies that because they had in-house all the resources required to become a 4PL, instead of outsourcing the logistics function to another company, the company becomes the 4PL for its customers instead. This thought can in turn be linked to the introduction section of this theme, particularly to the example given of deconstruction of the value chain. And with this I mean, by transferring assets as well as the know-how embedded in the human capital to Volvo Logistics, Volvo Group may have created its own model of 4PL. As it can be understood from the empirical data, Volvo Logistics does not only have costumers from within the group but even from outside the group, namely suppliers from within the automotive industry. This way Volvo Logistics brings competitive advantages to the Group, but even to other partners within the supply chain.

Furthermore the company is specialized and has its origins within the automotive manufacturing industry. That in my opinion makes Volvo Logistics a good example of the concept of enterprise-logistics integration which Stock et al. (1998) introduces in their study. As the reader may recall, the authors suggest that logistics, like any other activity that provides competitive advantages (e.g. technology or manufacturing), is the key to achieve a proper balance between the structure and the strategy chosen by the enterprise. This can be confirmed by looking at appendix 3, where the process oriented role played by Volvo Logistics is very clear. However, the company in my opinion is still changing or perhaps adjusting to the continuous changes in the competitive environment.

The company has several aspects that can be related to the concept of 4PL and its characteristics. Erkfeldt himself is the project manager for the global logistics development group, with all that means...

As Erkfeldt explained, Volvo Logistics works continuously to reduce lead times and thus costs, aspects which can be linked to the concept of synchronous supply chains (Christopher 2005 and Aronsson et al. 2006). Moreover Volvo Logistics works actively with inbound, outbound and packing logistics and without doubt has access to the best-of-breed of service providers within the automotive shipping industry.

From an IT perspective, as the reader could understand from the empirical data, Volvo Logistics as a better controlling system on the outbound (A4D) than on inbound logistics, however realizing the importance of inbound logistics, the company is working intensively to achieve the standardization and integration level desired, which hopefully will happen when the company will implement the system ATLAS. These integrations problems can in part be justified by the fast growth rate of the company (40percent in the last six years) as well as by the sheer size of the company with several offices dispersed worldwide. Moreover Volvo Logistics work with the concept of Co-managed inventory introduced on the theory chapter, as explained by Erkfeldt.

#### 6.2.4 Theme discussion

As previously mentioned in the theory chapter, whereas the value chain concept is the result of the integration of different assets and activities into a single organization, deconstruction on the other end, refers to the dismantling of the value chain while maintaining the identity of its individual parts (Weiss, 2007). Once companies have dismantled their value chains, which were vertical by nature, they started to outsource some of these activities to the market, focusing instead on their core-competencies. The result is that the value chains become dispersed and thus difficult to control.

The above is in my understanding what created the need for enterprise logistics integration. And here logistics should be seen not only as the flow of products and services, but also from the perspective of information and financial flow. Moreover, enterprise logistics integration can be looked upon from two different dimensions; deconstruction and disintermediation. These aspects which as the reader may recall were brought up during the theory chapter (3.2) are in my opinion directly related to the structure of the interviewed companies, explaining in my opinion the differences between Sonat and UAE Logistics on one hand, and Volvo Logistics on the other.

Sonat and UAE Logistics are in my opinion two typical examples of companies that have appeared on the market to satisfy the need of companies that either have decided to outsource their logistics and supply chain management function or the staff that these client companies employ simply do not have the sufficient logistics know-how (Richardsson, 2005). Even though as pointed out by Höglund (UAE), it is required that the client company keeps some level of logistics knowledge in-house in order to be able to take full advantage of the services provided by the 4PL. Moreover, and linking to the previous theme Sonat and UAE Logistics role in the network structure, it seems to me that can also be related to the concept of disintermediation, which as the reader may recall from the theory chapter, is intrinsically connected to the principle of modularization of systems, which reduces complexity and costs (Weiss 2007). As explained, the coordination of logistics is a good example of this concept; "...efficiency can be increased by bundling the logistic needs for many firms operating within many industries together into just one firm in the value chain that is a specialist in that activity...". Both Sonat and UAE Logistics handle different logistics activities to client companies which in turn operate within different industries.

Finally Volvo Logistics, on the other end, resembles more an example of a deconstruction of a value chain, which has the reader, may recall from the theory chapter, "it implies the slicing of the value chain into small distinct modules", as well as "the shifting of a set of resources or assets previously employed or owned by one firm to another firm on a grand scale" (Weiss, 2007). This aspect can be linked to the empirical data collected during the interview with Erkfeldt in what regards the position of Volvo Logistics as an independent company but also as part of the Volvo Group.

The above mentioned difference between Sonat and UAE on one end and Volvo Logistics on the other can in turn be linked to Christopher's (2005) description of the 4PL in that the author suggests that the concept of 4PL can take different formats for different supply chains, meaning the formats may vary from a joint ventures, to long-contracts or some other hybrid formats (Christopher, 2005). Having said that, one can perhaps infer that when analyzing the concept of 4PL perhaps is not as important to look at the structural format but more on its content, and by that I mean the cornerstones that Christopher (2005) brings up in the presentation of the model (i.e. a) systems architecture and integration skills, b) a supply chain 'control room', c) ability to capture and utilize information and knowledge across the network and d) access to 'best of breed' asset providers. Which in my understanding all three companies do.

### 6.3 Theme 3 – Logistics and Competitive advantages

*In order to analyze this theme, I will use a slightly different approach. The motivation is that the companies have now been analyzed from two different themes and thus it is clear by now that the services they provide are somewhat alike. Hence instead of analyzing each company individually, I will pursue a more generalist analyze, where I will use examples from the three interviewed companies.*

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In general terms, one could say that a 4PL company by providing customers with integrated or standardized IT applications applied to logistics and business operations (e.g. Transport Management, Warehouse Management or Enterprise Resource Planning, see appendix 5) helps the supply chain to achieve integration and thus reduce the risks of the bullwhip effect syndrome (Nienhaus et al., 2003), which as previously mentioned creates a very negative impact on the performance of the supply chain as a whole.

For example, as previously established in the empirical data as well as in the previous analyze section, all three companies (Sonat, UAE and Volvo Logistics) provide services such as; sourcing and procurement, planning and scheduling with suppliers (i.e. capacity management), coordinate pricing and transportation, order management (e.g. order tracking, exception management) inventory planning and ownership between the upstream and downstream actors in the supply chain. Moreover, Sonat, UAE and Volvo Logistics are able not only to speed up the communication flow but also to improve inventory visibility (e.g. by using VMI or CMI techniques) and thus enable for inventory reduction. This in turn will free capital which can be used in a more profitable manner. As a result, the different actors within the supply chain (suppliers, 3PL and the client company) are able to not only reduce transaction- and administrative costs (Svensson, 2001), but also the costs related to inventory holding (e.g. cost of capital, storage and handling, obsolescence, damage and deterioration, pilferage/shrinkage and last but not least management costs) which as previously explained are quite significant (Christopher, 2005).

Furthermore, as explained on chapter 3.1.2.1 Strategy, firms compete for example on cost, quality, flexibility (or agility) and delivery, which includes some of the aspects that are closely related to the concept of customer service e.g. stock availability, delivery frequency and reliability etc. (Aronsson et al. 2006). When it comes to cost advantages one could say, for example, that Volvo Logistics as explained by Erkfeldt, due to its transport purchasing power is able to achieve economies of scale that result in extremely competitive prices. Moreover, by possibly assembling the transport needs of Volvo Cars suppliers with their own, Volvo Logistics not only is able to achieve economies of scale for themselves but also to the suppliers which if would purchase transport on their own would pay a much higher price. Moreover these companies often perform supplier evaluation, measuring aspects such as ‘on-time’, ‘in-full’ and ‘error-free’ (Christopher, 2005); meaning that there will be a guarantee that the suppliers, regardless if they are suppliers of materials and components, transport or warehousing suppliers they need to have higher quality. Hence, there will be a positive synergy within the supply chain. Additionally, and on the same token by providing warehousing or managing warehousing through the use of 3PL specialists, Volvo Logistics but also Sonat and UAE are able to achieve economies of scale which also leads to cost reductions.

UAE Logistics as explained by Höglund in order to reduce costs or lead time, they first map out how the customer operations looks like, and after they use a powerful software simulation tool which will enable them to reach conclusions on the best way to use resources. When it comes to increased growth profits Höglund said “*lead time and logistics integrations* are the two major things; to shorten the lead time to the market as well as decreasing the variance of the lead time”. The respondent as the reader may recall added that focus should be on having “*less*

*warehouse facilities, shorter cash-to-cash cycles, focus on payables and then of course finally to focus on the core competence.”* These aspects can be related to the Du-pont Model theory as well as to the section on Logistics and the return on Investment.

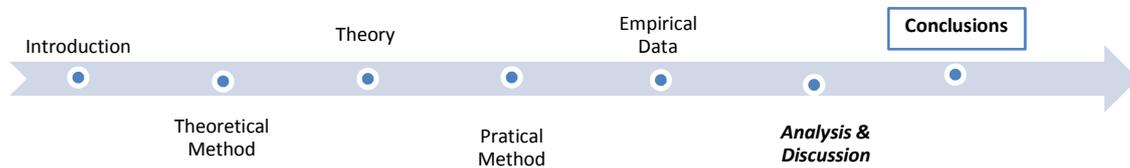
The other factor that leads to competitive advantages is time. As the reader may recall from the theory chapter, Christopher (2005) suggests that customers (both consumers and industrial) are increasingly more time sensitive, demanding products to be delivered yesterday if possible. Naturally by providing consulting in supply chain management and business processes, all three interviewed companies help their customers to reduce the already mentioned non-value adding activities which besides adding to the total end-to-end lead time, increases cost substantially. As the reader may recall the importance of time and the constant fight to reduce lead-time was an aspect touched by all three respondents.

The final aspect that leads to competitive advantages is customer service and customer retention. As previously stated, the main goal of a market-driven logistics strategy is to achieve ‘service excellence’ in a cost-effective manner. All of the interviewed companies assist their clients in reducing order lead times, as well as to achieve higher delivery reliability and security (Aronson, 2004). Not only on inbound logistics through supplier evaluation and supervision, as explained above, but also on outbound logistics where factors such as delivery reliability, delivery security or stock availability, for example, are also present. Moreover, an efficient distribution and high customer service levels may in turn lead to customer retention and increased sales revenue.

Hence, the combination of reduced operating costs and increased sales will hopefully lead to increased profits as explained through the Du-pont model theory (Christopher, 2005). Moreover, by increasing visibility within the supply chain, inventories levels as previously explained can be reduced significantly. As a result firms are able to reduce their warehouse facilities, as explained by Höglund. Moreover, through efficient pipeline management and reduced cash-to-cash cycles, 4PL companies are able to assist their clients in receiving end-customer payments sooner rather than later, thus reducing the risk for liquidity problems. This together with reduced inventories and asset deployment (e.g. property, plants and equipment) will lead to lower levels of capital employed and thus to increased return on investment (Christopher, 2005).

## 7 Conclusions

*In this chapter the author presents his final thoughts on the research.*



The purpose of my study was to depart from Stock et al. (1998) framework which recognizes that the competitive environment forms a firm's organizational design and thus affecting its strategy and structure. Moreover, the authors connect a firm's strategy, its structure and its logistics capacity with how the firm will perform; hence recognizing the increasing importance that logistics/supply chain management is having in being the link between new manufacturing strategies and organizational structures, which have emerged as a result of changes in the competitive environment.

Furthermore, I was interested in exploring and understand if the recent business concept, the 4PL, is here to satisfy the needs for enterprise-wide logistics integration mentioned by Stock et al. on their study, and if so how are these integrations bringing competitive advantages for the different partners within the supply chain.

In order to accomplish the above it was necessary to find 4PL companies operating in Sweden, which was not an easy task as explained during the practical method chapter. This difficulty could be due to the fact that there are different terminologies used to describe this new business organizational concept; e.g. total service providers (TSP), supply chain integrators or 4PL as adopted in this study. Additionally, these concepts allow for a certain degree of flexibility in its form, which in the case of a 4PL for example and as previously explained, can take the form of a hybrid organization formed from a number of different entities, often establishing joint-ventures or long-term contracts. Thus perhaps difficult to precisely pin-point what is a 4PL or not.

Nevertheless, I knew that there were companies operating in the field of logistics and supply chain management which differentiated themselves from the traditional 3PL service providers and the idea that logistics besides the manufacturing of goods was very much about transportation and warehousing. Today, as one could observe through the study, inbound logistics is seen to be just as critical factor as outbound logistics. These companies were offering a different type of service, something more in line with logistics and supply management consulting, where processes and information flows are more in focus as opposed to traditional logistics which have been very much about material things.

When comparing the interviewed companies against the concept of 4PL originally created by Accenture, one can infer that the interviewee companies satisfy several of the cornerstones required to be considered a 4PL that is; a) systems architecture and integration skills, b) a supply chain 'control room', c) ability to capture and utilize information and knowledge across the network, and d) access to 'best of breed' of asset providers. Demonstrating however the interviewed companies slightly different interpretations of the concept.

Sonat, for example, it seemed to enroll in some sort of long-contract with their clients, positioning themselves as an in-sourced company. The concept of Logistics Control Towers (LCT) provided by UAE Logistics is in my opinion very close to the concept of control room intelligence introduced by Accenture, something which was not as strongly emphasized on the other studied companies.

Moreover, it seemed to me that Sonat and UAE are examples of companies that have emerged on the market to provide logistics services and business process consulting to firms (or networks of firms) that do not have the logistics and IT-integration competence within the network. Thus providing these companies, in my opinion, the logistics integration across the network and consequently to a certain degree the balance between the structure and the strategy of that same network. In turn and as a result of transferring the coordination of logistics to specialized companies, the client firms are able to take advantage from the knowledge and the economies of scale obtained by these specialized companies. These facts can be related not only to Stock et al. model (1998), but also to Weiss (2007) and the concept of disintermediation previously mentioned (p.24), as well as to Christopher (2005) and the idea of 'extended-enterprises', which according to the author firms need to become part of networks of specialist providers of resources and competencies (p.7). Meaning that, firms with other core-competencies rather than logistics and IT-integration, outsource these services to specialized companies within these fields (e.g. Sonat and UAE).

Finally, Volvo Logistics is an example of a company that emerges from within the group in order to provide logistics integration (inbound, outbound and packaging) and development within the different product lines of the group as demonstrated by the matrix organizational structure provided by the company (appendix 3). As previously discussed in the analysis section, Volvo Logistics it seems to me to be a good example of a deconstruction of a value-chain (p.24), but also closely related to the Stock et al. (1998) conceptual framework in that, logistics (but also IT nowadays) makes the bridge between new manufacturing strategies and organizational structures now globally dispersed. Moreover, one gets the impression that Volvo Group had the logistics and the IT competencies in-house and thus did not need to outsource (in-source?) these competencies. Instead Volvo Group created small distinct modules which not only help the group to achieve integration and thus competitive advantages, but also by enabling these different modules or firms (e.g. Volvo Logistics or Volvo IT) to specialize themselves, these are able to independently sell their competence and services outside the group.

Perhaps more important than concentrating on how much the interviewed companies fully fit or not the concept of 4P, is the fact that that companies are realizing the importance of logistics as a tool to achieve competitive advantages. As previously mentioned, I found that the interviewed companies provide logistics services such as procurement, planning and inventory management, order fulfillment and capacity planning as well as other logistic activities related to the control of distribution. Hence, by assisting their customers to take control of the different stages of the supply chain from Inbound to Outbound, these companies are able to increase the visibility within the supply chain, leading this to substantial cost reductions, shorter time to market and hopefully improved customer service which in turn may lead to increased sales.

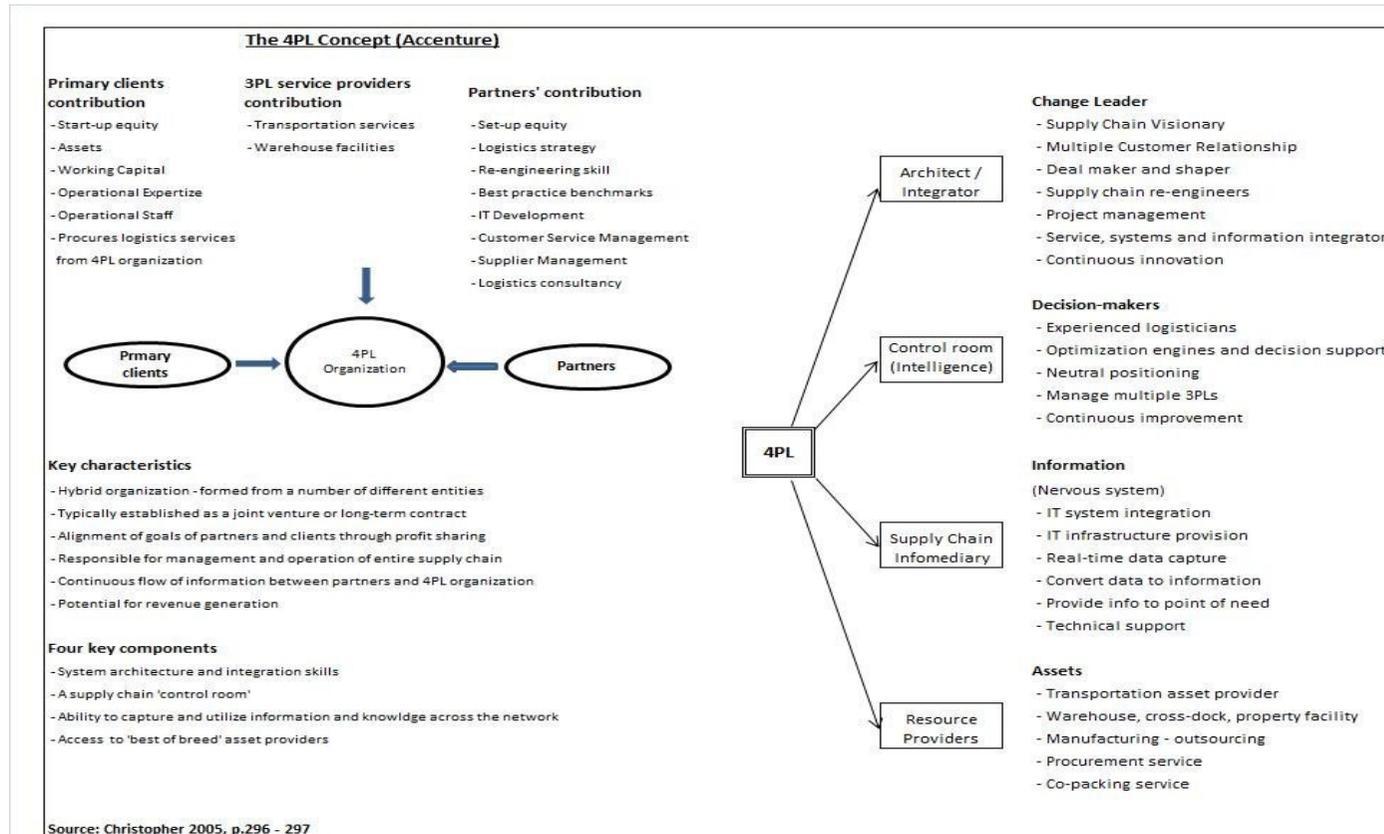
One should however bear in mind that the use of a 4PL is not on its own the solution for all the logistics problems a firm or a network may have. There may be situations where the 4PL concept is not the most adequate, an issue which was touched upon by the UAE respondent. One of the reasons could be that the client companies have reduced the logistics personnel so much, or the employed staff does not have the required competence, that the client companies have difficulty to take full advantage of the knowledge embedded on the outsourced company. Another important aspect that at times may hinder the success of the relationship 4PL/Client is that for the concept to work the client company needs to be willing to give up some of the visibility into the daily activity. This issue was brought up by Richardson (2005) on her article "What are you willing to give up?" According to the author, a 4PL relationship can make the client company more competitive however the firm needs to accept that they will not have full control over the supply chain.

Summarizing, I believe that one can infer that as the result of the outsourcing trend, firms have realized that they can no longer compete alone. Instead, in order to remain competitive and afloat, firms need to become part of interdependent networks of specialist providers of resources and competencies, which compete against other networks. Moreover, technology is unfolding at a growing pace thus making it very difficult to individual firms to keep up with the development and to continuously invest not only in new equipment and software but also in highly trained personnel. As a consequence of this, firms or networks have started to share joint strategies, aligning their processes and sharing open communication and transparency. Moreover, there was evidence that firms are leaving behind the traditional view of buyer/supplier relationships, which has been somewhat adversarial, in order to embrace a more win-win approach characterized by co-operation between network partners leading this to improved performance across the supply chain. Other relevant aspect present during the study was the overall concern in increasing supply chain visibility so that both inventory levels and cash-to-cash cycle are reduced.

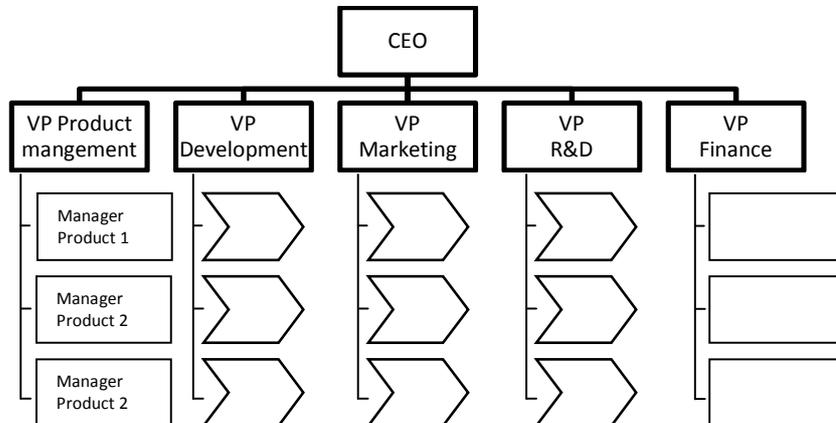
As a final remark, I noticed that all the interviewees mentioned during the interviews environmental issues such as emissions for example, and they work they do on those areas. Perhaps would be interesting to do further research in order to understand if the 4PL integrator can help the supply chain network to become more environmental friendly, taking into account the manufacturing and transportation that is continuously occurring.

## 8 Appendices

### 8.1 Appendix 1 – The 4PL concept (Accenture)



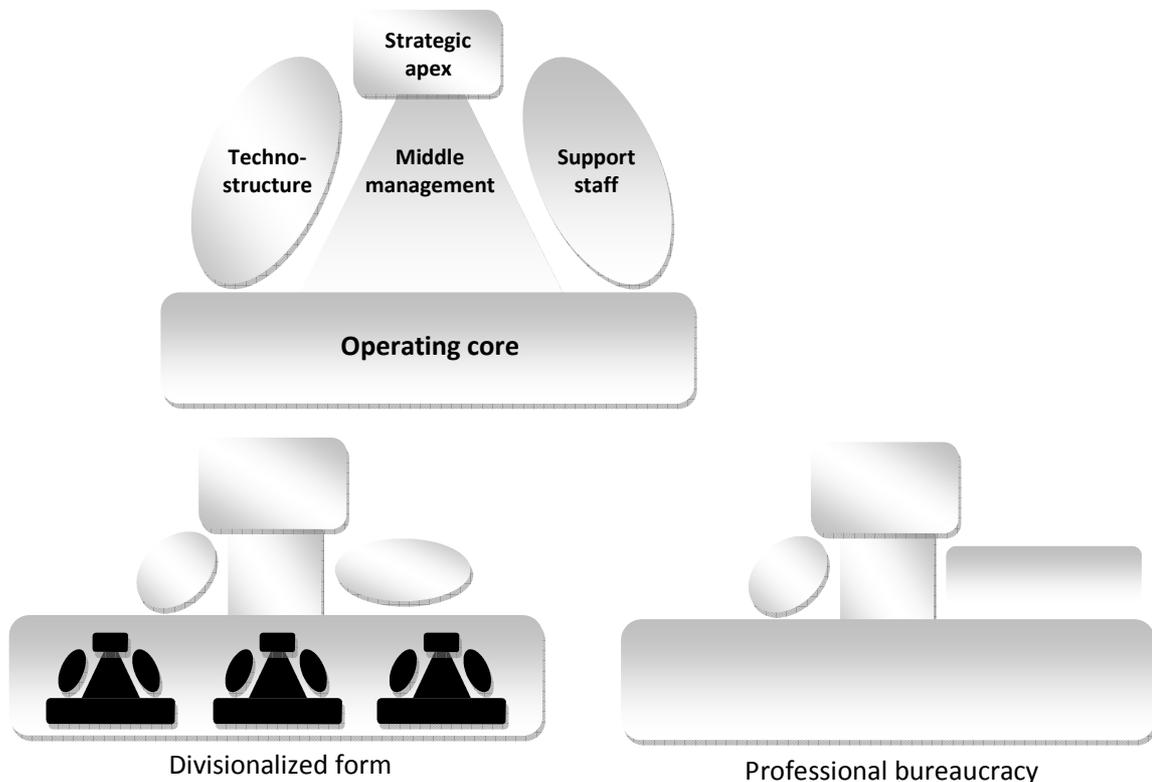
## 8.2 Appendix 2 – Structural configurations



### The matrix structure (own creation)

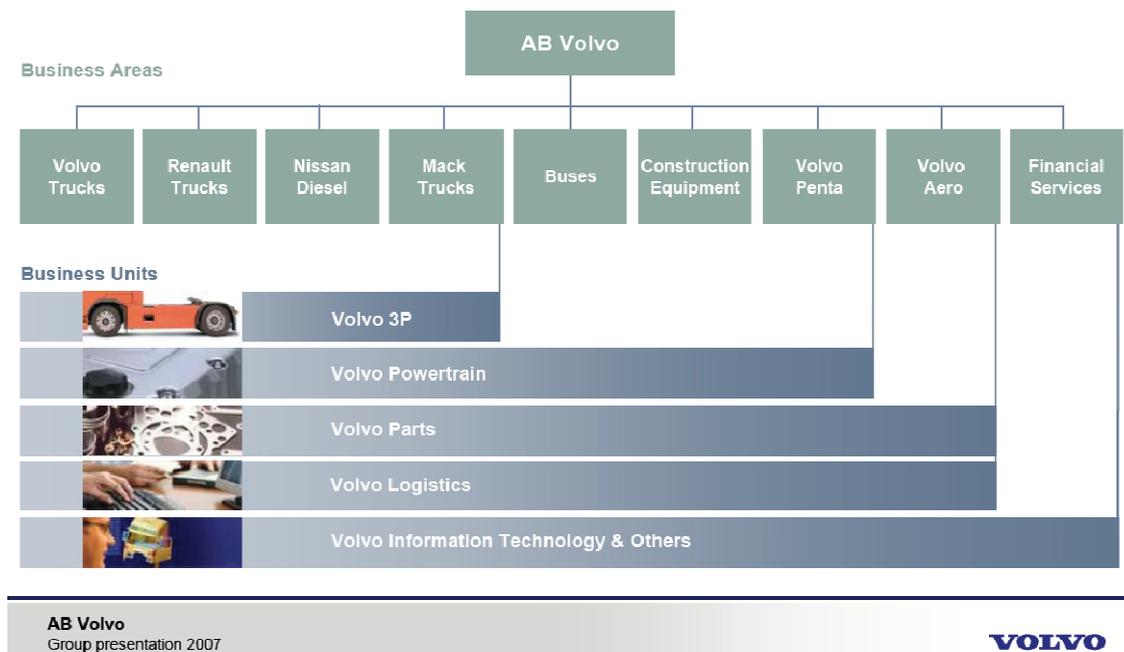
As per Daft (2007) the matrix is the best organizational structure for a company that requires being multi-focused where both product and function or product and geography are needed to be emphasized at the same time. The author points out that matrix are unique in a sense that it gives both product division and functional structures (horizontal and vertical) are implemented simultaneously. Moreover, matrix structure besides being a strong form of horizontal linkage is similar to the use of full-time integrators which again is very relevant in for the purpose of our study.

### Mintzberg's Fives (Bolman & Deal, 2003, p.74-79, revised)



### 8.3 Appendix 3 – Volvo Group organization chart (Courtesy of Volvo Logistics)

## Organisation



## 8.4 Appendix 4 - Interview Guide

### General Interview Guide

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#### **The single firm theme**

1. What position do you have within the company?
  2. Do you consider the company to be a 4PL company?
  3. How much has the company grown since its start (year)?  
(i.e. nr of employees, turnover and number of customers)
  4. What is the company's vision?
  5. Would you say the company has more customers importing (raw materials) or exporting (finished goods)? Do they operate globally?
- 

#### **Enterprise logistics integration theme**

6. The company helps companies to develop logistics strategies. Can you develop on the different business areas?
7. What major impediments does the company encounter when implementing 4PL services for a new customer?
8. Does the company work in project form? If so, could you please briefly describe your line of action?
9. Which activities within your customers' logistics pipeline do you have control over?
  - inbound logistics
  - internal logistics
  - outbound logistics
10. As a Supply Chain Manager, how would you describe the concepts of the extended enterprise and the virtual supply chain?
  - What are the implications for a logistics manager?
11. Do your customers use Vendor Managed Inventory (VMI) / Co-managed Inventory (CMI)?
12. Could you please describe the network IT-systems integration?  
Is the company involved in the selection process of the customers' suppliers?
  - Do you check for their quality and the quality of products?
13. Supply Chains have become more global. How does the company help customers managing supply chain risks?
14. What are the advantages with having long-term partnerships? Disadvantages?

## General Interview Guide

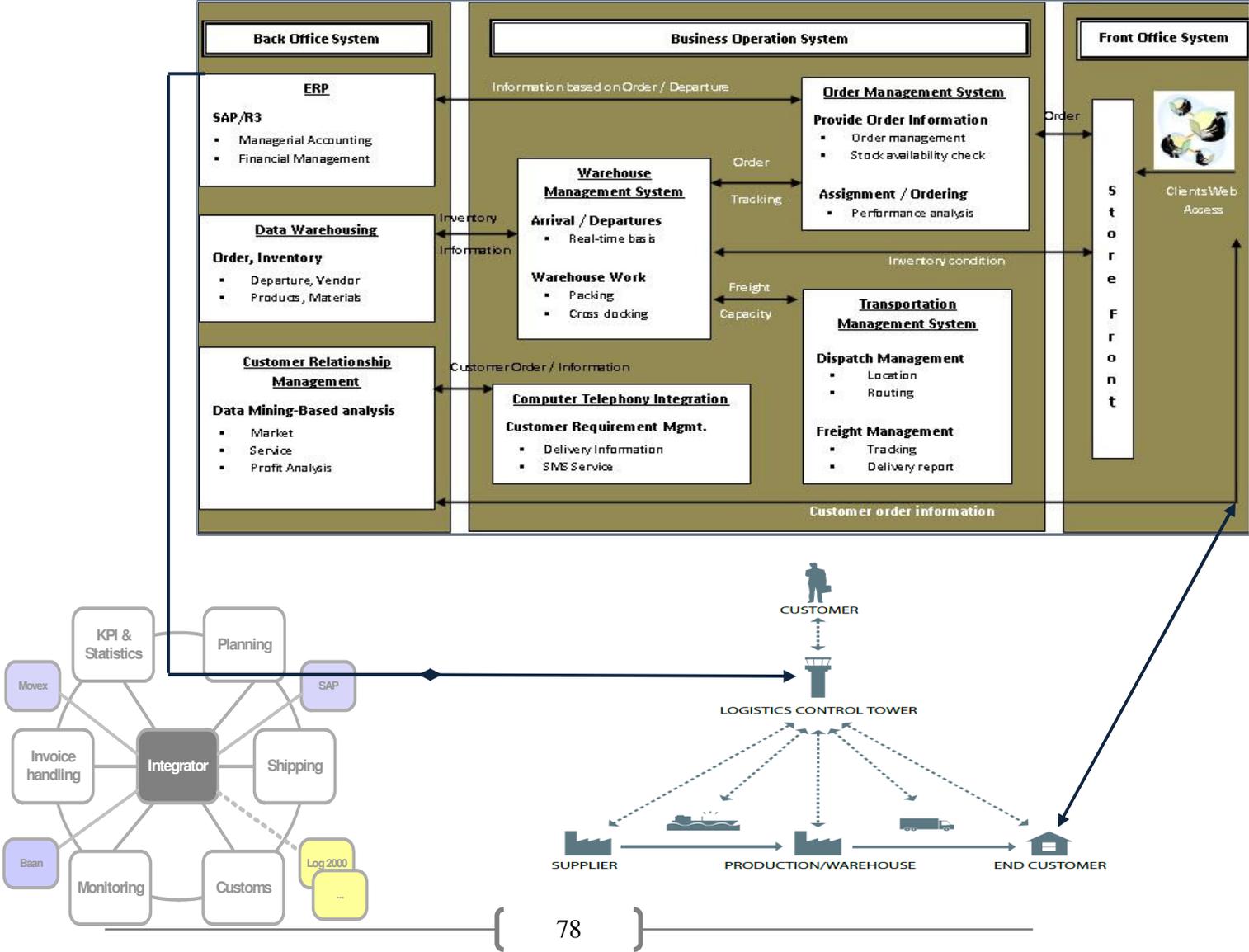
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### **Logistics & Competitive advantages theme**

During the last decade companies have realized the importance of Logistics/Supply Chain Management as a source of gaining competitive advantage.

15. In which way does the company help customers to achieve that?
  - Costs
  - Customer service
  - Time
  
16. In the your perspective what is the best way to:
  - Reduce cash-to-cash cycles?
  - What type of steps would you use?
  - Reduce costs i.e. capital binding?
  - Increase customer service levels?
  
17. What type of logistics tools do you use in order to achieve the above?

8.5 Appendix 5 - Graphic representation of IT integration with use of an LCT (own creation)



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