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**The Role of the Logistics Service Providers in the
Improvement of the Nordic Logistics Networks
A Swedish Perspective**

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ABSTRACT¹

Nowadays managing efficient logistics networks often encounters difficulties. Different generations of Logistics Service Providers (LSP) attempt to overcome such difficulties not only by traditionally providing physical assets to their clients, but also through an integrated knowledge transfer of intellectual capital and information systems, and further design, coordinate and control agile logistics networks.

In the context of logistics outsourcing, the main purpose of the research is to examine, describe and analyze the role of the different LSP entities in the improvement of the Nordic logistics networks. The study focuses on logistics outsourcing and the key-buying criteria being employed by the buyers of logistics services, and further investigates how the LSP industry contributes to the improvement of the Nordic logistics networks.

The research is exploratory and based on qualitative observations, interviews and industry case studies, and its approach is mainly inductive.

The results of the research indicate that in the era of globalization logistics outsourcing is a fast growing trend and business practice throughout the Nordic region as LSP actors can guarantee improved network performance within the existing IT-, knowledge- and environment-led economic environment.

Key words: Logistics Network, Outsourcing, Nordic, Logistics Service Provider, Physical Assets, Knowledge Transfer, Intellectual Capital, Information Systems, Performance Improvement

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Aristogeiton K. Gavrielatos

“I am not an Athenian or a Greek, but a citizen of the world.”

Socrates
Ancient Athens, 470-399 BC

This thesis is dedicated to little Zoi,
the author’s nine-month old niece.

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ABBREVIATIONS

3PL Third-Party Logistics
4PL Fourth-Party Logistics
CLM Collaborative Logistics Management
CPFR Collaborative Forecasting Planning and Replenishment
CSCMP Council of Supply Chain Management Professionals
EDI Electronic Data Interchange
GPS Global Positioning System
GT&T Tetra Laval Group Transport and Travel
ISC Information Systems Consulting
KPI Key Performance Indicators
LCT Logistics Control Tower
LLP Lead Logistics Providers
LSP Logistics Service Provider
LSI Logistics Service Intermediary
NOFOMA Nordic Logistics Research Network
QTF Quality Task Force
RFID Radio Frequency Identification
SCOR Supply-Chain Operations Reference Model
SDS Schenker Dedicated Services
SECU Stora Enso Cargo Unit
TEU Twenty-foot Equivalent Unit
TMS Transport Management System
VCC Volvo Car Corporation
VBC Volvo Trucks Corporation
VLC Volvo Logistics Corporation
VTC Volvo Trucks Corporation
WMS Warehouse Management System

PART A

The present thesis consists of two parts. Part A provides the reader with the thesis' introduction, its theoretical framework, the analysis of the research problem and the methodology that is employed during the research. The purpose of this part is to offer the necessary information regarding the combined core concepts that comprise the research problem, the conceptual theories on which the main analysis included in Part B is based, the dimensional and analysis framework of the main research problem, the research methods and approach that lead the present thesis research to the collection of the needed data.

1 INTRODUCTION

The purpose of Chapter 1 is to present the background of the present thesis, provide a general overview and offer an outline of the study undertaken. The thesis' research problem is formulated and introduced, and the author continues by setting up the purpose and the delimitations in order to define the area of the study.

1.1 Background

1.1.1 Logistics Outsourcing

One of the core concepts defined and analyzed in the present study is the outsourcing of logistics activities. The outsourcing of an increasing number of logistics activities to Logistics Service Providers (LSP)² is a growing trend and business practice followed worldwide by the industry. As Figure 1 depicts, the outsourcing of logistics activities can be defined in three levels, the transactional outsourcing, the tactical outsourcing and the strategic outsourcing.

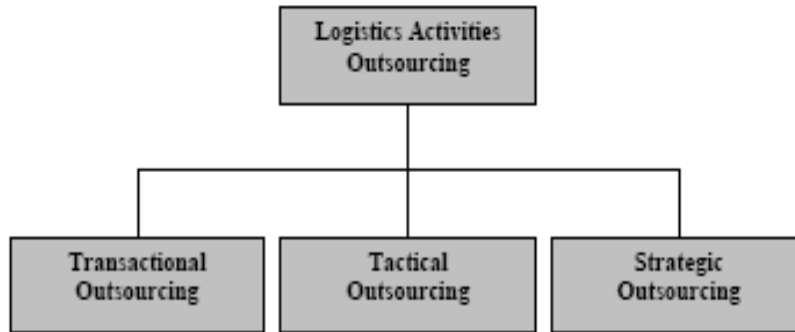
The *transactional outsourcing* is based on logistics transactions, with no long-term contracts and no bonding between the Logistics Service Providers (LSP) and the outsourcing company. The *tactical outsourcing* is the logistics outsourcing on a long-term basis with negotiated contacts and integrated IT systems to facilitate free information flow and create supply chain visibility. The *strategic outsourcing* is based on long-term relationships with successful outcomes where LSP business entities (e.g. 4PL Service Providers) become partners with their clients in the logistics-network management and establish transactional transparency³. The structure of a logistics network can consist of different logistics activities that are combined and coordinated to reinforce and improve the network's performance. Such logistics activities are, for instance, transportation, inventory management, storage, material handling, packaging, production planning, information processing, facility location, purchasing, demand forecasting, customer service, and design, redesign and control of the logistics network.⁴

²Today the Logistics Service Providers (LSP) are divided into Third-Party Logistics (3PL) and Fourth-Party Logistics (4PL) Service Providers on the basis of the logistics services they offer to their clients.

³ Transactional transparency is the quality in the relationships between LSP firms and their clients along the logistics networks and during the outsourcing of logistics activities.

⁴ Gourdin, K. (2006) "Global Logistics Management: A Competitive Advantage for the 21st Century", Blackwell Publishing

Figure 1 Levels of Logistics Activities Outsourcing



(Source: Author)

Most of these logistics activities are often outsourced to Logistics Service Providers (LSP) and consequently lower logistics costs can be achieved throughout the logistics network. Several drivers of logistics outsourcing can be identified in the relevant logistics literature and industry practice. In brief, some of these drivers are presented in Table 1.

Table 1 Drivers of logistics outsourcing

Drivers of logistics outsourcing
Increase in cost-efficient foreign competition
Faster movement of inventory – Shorter lead-times
Focus on core competencies
Company restructuring
Taking on new product lines
Need for flexible production
Mergers and acquisitions
Development of supply chain partnerships
Increasing customer demands
Increasing environmental awareness
Expanding to unfamiliar markets
Change in management structure
The success of contract logistics
Improved productivity measurements
Assessment of the present and future market prospects for a product
Determination of the products' competitive advantage in the marketplace
Existing facilities and / or systems

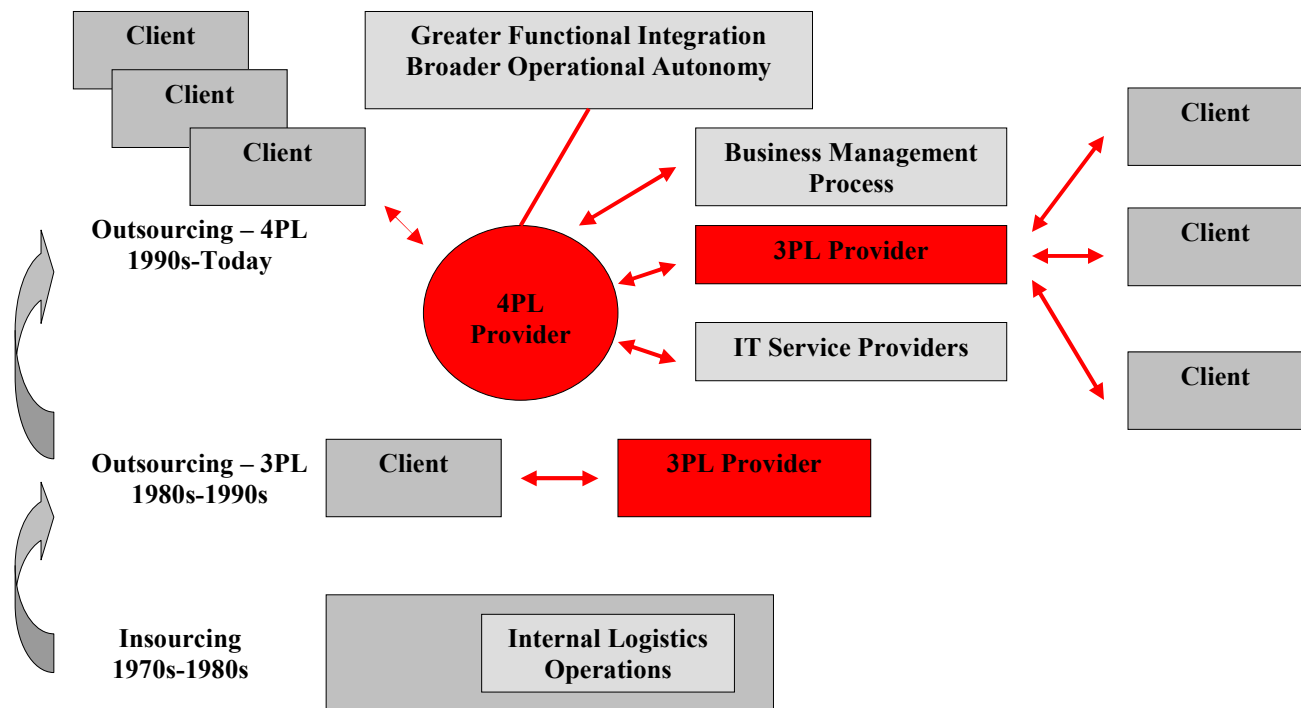
(Source: Author)

1.1.2 The evolution of logistics outsourcing

Today market forces of intensive competition and globalization have caused an evolution in the logistics outsourcing and further the LSP role to that of a Fourth-Party Logistics (4PL) Service Provider as depicted in Figure 2. In 1970s the in-sourcing of logistics activities was the absolute trend as, for instance, in most cases warehouses, truck fleets, terminals were owned by their users. In fact, a typical company managed everything from purchasing to delivery and post-sale service. In early 1980s the outsourcing of logistics activities started growing in the context of a “buyer-seller” relationship between the Third-Party Logistics (3PL) Service Providers and their clients. That time, due to rivalries in business, companies tried to squeeze all their costs down beginning with marketing, production, human resources and ultimately logistics. Hence, the logistics activities

outsourcing took place throughout the logistics network. Later in the 1990s, a new LSP entity appeared and was first named by Andersen Consulting as Fourth-Party Logistics (4PL) Service Provider.

Figure 2 Evolution of logistics outsourcing



(Source: Author – Modified figure from Strategic Supply Chain Alignment developed by John L Gattorna)

As it is apparent in Figure 2, the 4PL Service Provider integrates 3PL Service Providers together with IT Service Providers supporting simultaneously and managing its clients' business processes. A 4PL actor can achieve greater logistics functional integration and broader operational autonomy managing its clients' logistics networks from upstream to downstream and from a holistic perspective.⁵

1.1.3 Third-Party Logistics Service Provider

The outsourcing of the logistics activities to Third-Party Logistics (3PL) Service Providers has grown widely over the last decades. Due to the globalization forces more and more organizations worldwide want to develop products for international markets and, at the same time, they need to source materials globally to be competitive. One of today's trends of solving this problem is the outsourcing of logistics activities to 3PL Service Providers to manage complex distribution and logistics-network requirements.⁶ The Council of Supply Chain Management Professionals (CSCMP) has defined the Third-Party Logistics (3PL) as the outsourcing of all or some of a company's logistic operations to a specialized company.⁷

⁵ Gattorna, J. (1998) "Strategic Supply Chain Alignment: Best Practice in Supply Chain Management", Gower Publishing Limited

⁶ Logistics.About.Com: <http://logistics.about.com>

⁷ Council of Supply Chain Management Professionals: <http://www.cscmp.org/>

A 3PL Service Provider mainly offers a wide range of outsourced services based on physical assets and information technology, like warehousing, transportation, packaging, IT Applications (e.g. EDI, RFID and WMS), consolidation, inventory control and customer service. The 3PL Service Provider aims to provide a number of logistics solutions that will lead to lower logistics costs for its customers and a considerable logistics-network improvement. Table 2 presents the logistics services that are provided by 3PL Service Providers.

Table 2 3PL Services

	Basic	Intermediate	Advanced
Physical Services	<ul style="list-style-type: none"> • Storage • Good reception • Picking according to order • Packaging • Repackaging & labeling • Return of goods • Delivery from storage 	<ul style="list-style-type: none"> • Consolidation • Deconsolidation • Preparation for freezing • Freezing, thawing, sawing • Preparation for delivery & packaging • Setting building, sequencing, product resorting and labeling • Cross-docking 	<ul style="list-style-type: none"> • Assembly of components • Operate vendor management inventories in stores or stock-keeping facilities • Recycling with waste handling & reconditioning • Unpacking & quality control
Administrative Services	<ul style="list-style-type: none"> • Tendering & contracting other LSP • Tendering & contracting carriers • Insurance services • Stock-taking 	<ul style="list-style-type: none"> • Payment services • Order administration & customer service • Claims handling • Export clearance & import clearance • Track-and-trace information 	<ul style="list-style-type: none"> • Forecasting & inventory management • Administration of minimum & protective inventories • Purchase & call-offs • Delivery planning, management & follow-up • Exception management

(Source: Gunnar Stefansson - Chalmers University of Technology, Sweden - 2005)

1.1.4 Fourth-Party Logistics Service Provider

The concept of Fourth-Party Logistics (4PL) Provider was created and first defined in 1996 by Accenture as the use of a consulting firm to integrate and manage a company's logistics resources and LSP partners including Third-Party Logistics (3PL) providers and other transportation companies.⁸ In particular, Accenture defined a 4PL Service Provider as an integrator that assembles the resources, capabilities and technology of its own organization and other organizations, to design, build and run comprehensive logistics-network solutions.

⁸ Fourth-Party Logistics (4PL) is a registered trademark of Accenture (previously Andersen Consulting).

The 4PL Service Provider is an external organization which completely integrates its client's logistics network. Planning and management of the total logistics network are put into hands of an external company that acts as the single contact between the client and the 3PL Service Providers. The core value offered by a 4PL firm is in the management and integration of the information flow between the outsourced logistics-network partners and the enterprises that employ them. By taking care of the planning, steering and controlling of all logistics procedures, the Fourth-Party Logistics (4PL) Service Provider is able to combine the economy of skill with the economy of scale.

Fourth-Party Logistics (4PL) is the next generation of LSP firms, with operations that extend beyond 3PL and include logistics-network analysis, design and planning. While the present logistics activities provided by a 3PL service provider simply include the coordination of the distribution from one place to another, 4PL providers make possible for the companies to develop a superior expertise in transportation, warehousing and other logistics fields.

Table 3 4PL Services

	Basic	Intermediate	Advanced
Physical Services	None	None	None
Administrative Services	<ul style="list-style-type: none"> • Tendering & contracting LSP companies • Tendering & contracting carriers • Insurance services 	<ul style="list-style-type: none"> • Forwarding services • Payment services • Financial services • Order administration & customer service • Claims handling • Export clearance and import clearance • Providing one-stop logistics service purchase • Track-and- trace information 	<ul style="list-style-type: none"> • Design of individual logistics setups • Implementation of logistics setups • Operation of customers' logistics setup • Responsible for the customers' logistics operations • Exception management

(Source: Gunnar Stefansson - Chalmers University of Technology, Sweden - 2005)

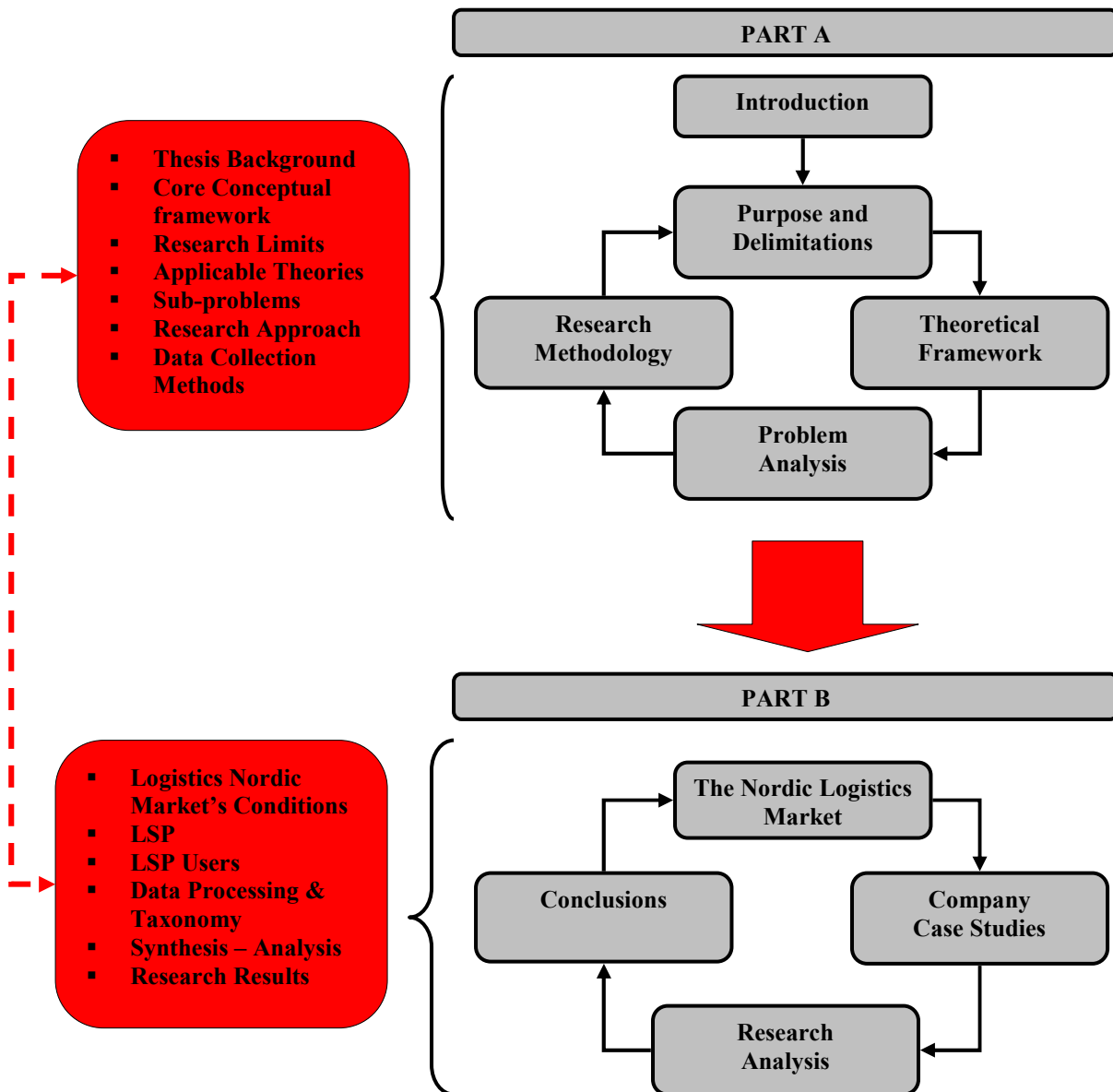
What a 3PL provider lacks is the essential involvement and management of information within the logistics network. Fast knowledge transfer and access to information seems to be a missing link for many shippers and other logistics-network actors. According to the performances achieved by a 4PL Service Provider, the activities covered by a 3PL provider cannot achieve ongoing logistics-network savings and efficiency because it lacks optimal combination of intellectual capital and information systems⁹. The development of the 4PL business entity attempts to overcome any difficulty through the integrative approach of designing, coordinating and controlling active logistics networks. Table 3 presents the logistics services that are provided by 4PL Service Providers.

⁹ Jonsson, S. and Gunnarsson, C. (2005) "Internet Technology to Achieve Supply Chain Performance", Emerald, Business Process Management Journal, 2005, Vol. 11 No 4, pp. 403-417, Emerald Group Publishing Limited

1.2 Master Thesis Outline

The outline of the master thesis results from the demands and nature of the research problem that is examined and discussed during the research process. As Figure 3 shows in its context the master thesis consists of two main parts, Part A and Part B. Part A includes an introduction describing the logistics activities' outsourcing and the concepts of the 3PL and 4PL Service Providers, the purpose of the present research and its delimitations, the research problem consisting of two sub-problems and their dimensions, the theories upon which the main research analysis is based, the research approach and finally the main research techniques employed.

Figure 3 Thesis Outline



(Resource: Author)

In Part B the Nordic logistics market is briefly described and several company case studies concerning the outsourcing of logistics activities and the LSP industry are

provided and then followed by an analysis, employing Sweden as its reference point. Ultimately, the thesis' conclusions form a brief framework that answers the main research problem's questions defined in Chapter 3.

1.3 Purpose and Delimitations

1.3.1 Purpose

The major objective of the present thesis' research is to study the current role played by the Logistics Service Providers (LSP) in the Nordic region and how this role leads to the improvement of the Nordic logistics networks. The research reflects a description of the Nordic LSP market through industry cases and focuses on the different roles played by 3PL and 4PL Service Providers respectively. Furthermore, the outsourcing of logistics activities as a business practice adopted by many Nordic corporations for operational cost-reductions and focus on core businesses is introduced and interpreted. In the end of the study, data process and analysis aim to bring about conclusions (see Chapter 8) on how the LSP business entities influence and improve the logistics networks established within the Nordic countries.¹⁰

1.3.2 Delimitations

Considering the scope and the potential that the present research topic offers, clear delimitations have to be set up in order to keep the research focused on a specific study outline. The main reason behind setting these delimitations is the timeframe provided by Gothenburg University's Business School to carry out the research. The thesis research focuses on the logistics networks established in the wider Nordic region and extended within Europe (or overseas in some industry cases), with main focus on Sweden and the Logistics Service Providers (LSP) operating in the pre-mentioned geographical limits. In terms of the primary data used employed through the research, most information emerges from the cooperation of several LSP companies and LSP users based in Sweden with the author. Interviews have been carried out within the logistics industry with 3PL and 4PL Service Providers as well as with LSP users (i.e. LSP clients).

In general, with regard to the integrated logistics services offered by the LSP companies, the author divides these companies into two conceptual groups:

1. The Third-Party Logistics (3PL) Service Providers and
2. The Fourth-Party Logistics (4PL) Service Providers

The first conceptual group includes the LSP companies that mainly offer integrated logistics solutions traditionally based on physical assets (e.g. warehouses, truck fleets, terminals) and information systems (e.g. EDI, RFID, WMS). The conceptual group of the 4PL Service Providers refers to the LSP business entities that offer integrated logistics solutions on a consulting basis completely supported by integrated IT systems (e.g. Control Tower). From the second conceptual perspective, the concepts of intellectual capital and information systems are defined and introduced in order to describe the nature of the 4PL Service Providers and their contribution to the informational integration and improvement of the Nordic logistics networks.

¹⁰The term "Nordic countries" addresses Sweden, Norway, Denmark, Finland and Iceland. For the research purposes, the Baltic States, Lithuania, Latvia and Estonia, are also considered in the Nordic block in some industry cases.

2 THEORETICAL FRAMEWORK

Chapter 2 provides the theoretical framework which is employed during the research analysis. The theories provided here are grouped thematically and divided into separate paragraphs concerning, in turn, the outsourcing key-buying criteria, the CLM model¹¹, the logistics information systems, the concept of intellectual capital and sample logistics performance metrics.

2.1 Outsourcing Key-buying Criteria

In the logistics literature and industry practice, several key-buying criteria for the LSP evaluation are described and employed respectively. In brief, before contracting with LSP partners, the customers of logistics services place considerable emphasis on the following criteria depicted in Figure 4.

Figure 4 Key-buying criteria¹²

- ✓ **Business experience**
- ✓ **Capabilities / competency**
- ✓ **Compatibility of LSP IT and the firm's requirements**
- ✓ **Financial stability / strength**
- ✓ **High and improving standards**
- ✓ **Location**
- ✓ **Management structure**
- ✓ **Opportunities to develop long-term relationships**
- ✓ **Price / Low total costs**
- ✓ **Reliability / Reputation**
- ✓ **Speed / Service quality**
- ✓ **Supplier certification / Support services**
- ✓ **Systems flexibility and capacity**
- ✓ **Industry specialization / Flexibility**
- ✓ **Ability to provide highly detailed logistics data preceding, during and following shipments**
- ✓ **Business arrangements / Business development**

(Source: Author)

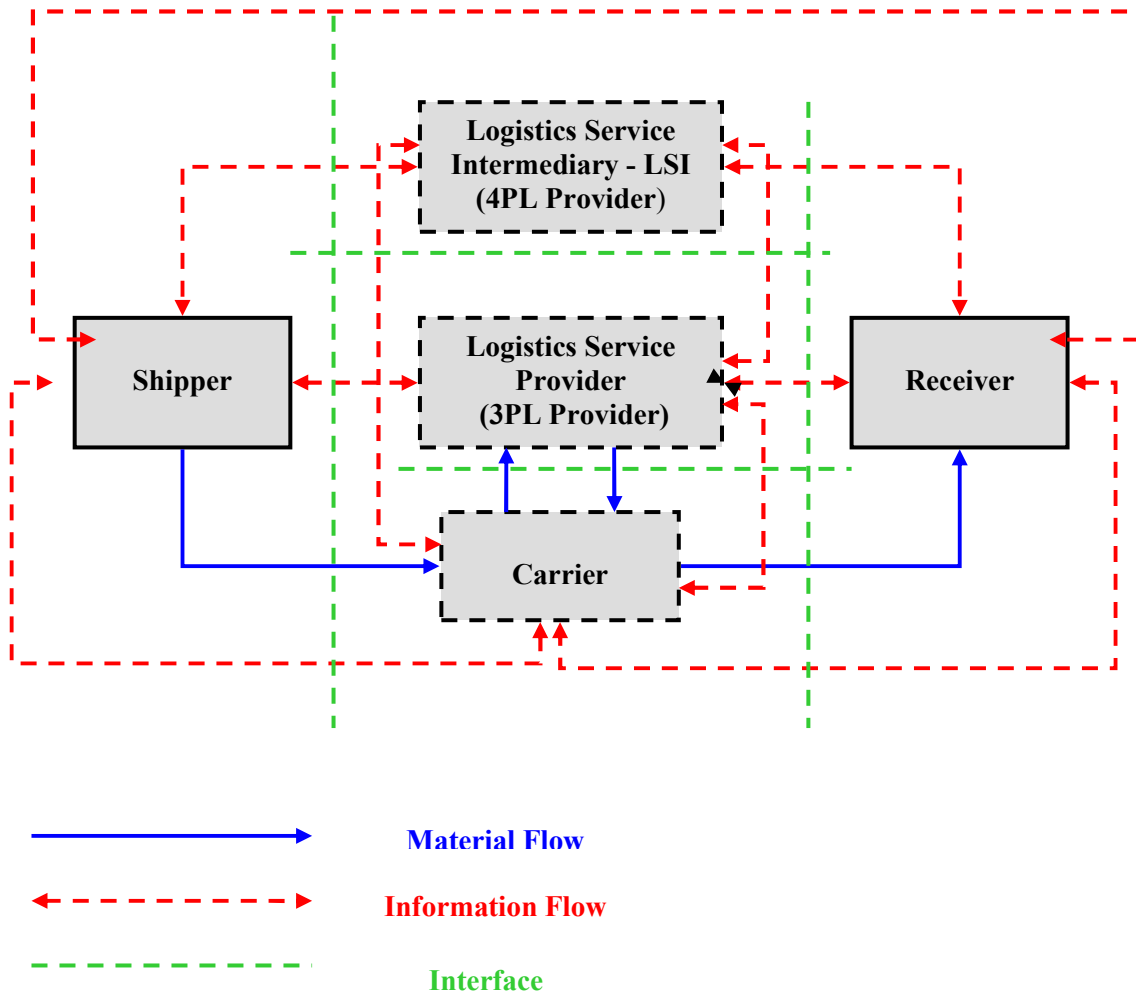
¹¹ CLM = Collaborative Logistics Management

¹² Based on lectures, e-material of Chalmers University of Technology, Gothenburg University's Graduate Business School and other industrial material.

2.2 The Collaborative Logistics Management model

Over the recent decades extensive research has been carried out in the inter-organizational relationships and, in particular, the supply chain management where the logistics relations form the basis of the logistics networks. Collaboration between companies participating in logistics-network setups is generally believed to increase efficiency and effectiveness, and decrease logistics costs. This applies particularly to collaboration on forecasts, as companies spend valuable resources on responding to unexpected conditions (e.g. product demand).

Figure 5 The CLM Model¹³



(Source: Author)

However, the potential for increased efficiency does not end with collaboration on forecasts; companies create increased value by collaborating on knowledge (e.g.

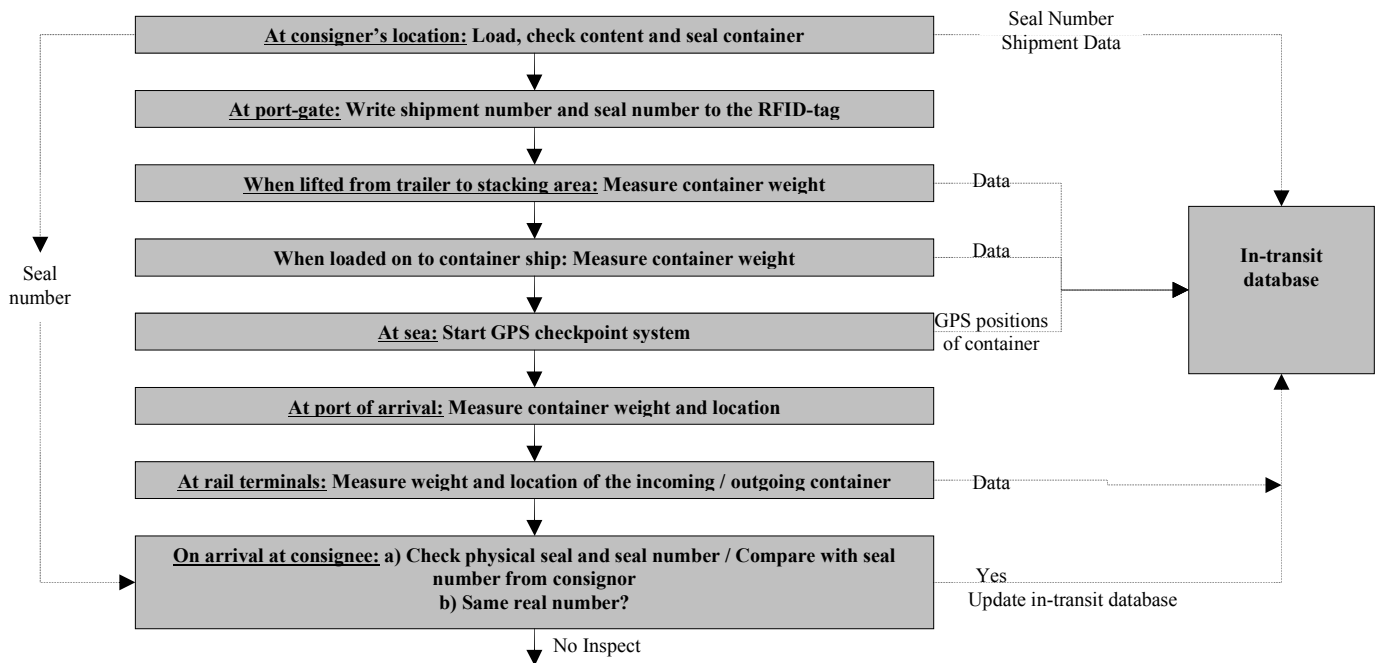
¹³ Modified figure based on Gunnar Stefansson's CLM model, Chalmers University of Technology, Autumn 2005)

intellectual capital), resources, promotion, placed orders which are equally valuable. Hence, collaboration is a process of decision-making among interdependent parties and those parties including the carriers and LSP companies. The Collaborative Logistics Management (CLM) model, which is shown in Figure 5, is a three-stage model for the LSP business entities including: a Carrier, a Logistics Service Provider (e.g. 3PL Service Provider) and a Logistics Service Intermediary (e.g. 4PL Service Provider). The CLM model is applicable where firms want to design and negotiate third-party services for specific logistics assignments.

2.3 Logistics Information Systems

Rapid developments in information technology (IT) have many implications for the organization and management of the logistics networks. IT has transcended the borders of the individual firm and management control and decision-making throughout the logistics networks has therefore become an important focus of attention for management and for academia. Several information systems (e.g. EDI, RFID and GPS¹⁴) are needed and can support the control and decision-making upon the efficiency and effectiveness of the modern logistics networks. Information systems (IS) support all facets of logistics work, for instance, like programme and project management, acquisition strategy and planning, requirements analysis and performance assessments (e.g. employing suitable KPI metrics), market surveys and commercial off-the-shelf product assessments, business process reengineering, system architecture, design, and integration.

Figure 6 Container Security Technology



(Source: Prof. Jensen, Arne -2005)

Additionally, in terms of security, IS play an important role reinforcing the trade and, in general, the logistics networks. Figure 6 presents an example of IS application concerning

¹⁴ GPS = Global Positioning System – EDI = Electronic Data Interchange – RFID = Radio Frequency Identification

container security technology.¹⁵ The IS provided by Fourth-Party Logistics (4PL) Service Providers mainly assist the participating actors throughout the logistics network to develop functional and technical requirements for logistics information systems incorporating logistics database design, customer response systems, inventory management systems, supply and production management systems, transportation management systems, warehouse management systems (e.g. WMS), and supporting logistics decision support tools.

2.4 Intellectual Capital

Thomas Stewart, editor of the Fortune magazine, introduces the concept of *intellectual capital*, offers a taxonomy for organizing it and successfully makes the case for managing it. Stewart's three main constructs that encompass the concept of intellectual capital are *human capital* which is the talent base of the employees, *structural capital* which equals the non-human storehouses of information and *relational capital* which refers to the knowledge embedded in business networks.¹⁶

Figure 7 depicts a possible structure of intellectual capital as part of the a total company's capital. In terms of logistics, the concept of intellectual capital includes skilled employees and logistics-network consultants, stored logistics-network information and logistics-network knowledge embedded in the established logistics networks mainly by the 4PL Service Providers.

From a more theoretical perspective, the concept of human capital deals with investments in productivity, enhancing skills and knowledge, career choices and other work characteristics like wages and hours of work. In particular, individuals choose an occupation or employment that maximizes the present value of economic and psychical benefits over their lifetimes. According to the majority of definitions, human capital comprises knowledge, skills, intellect and talent of individuals regardless of the context of the firm in which they are employed. For instance, the human capital of a services firm (e.g. a 4PL Service Provider) equals the knowledge and skills of its professionals that can be used to produce consulting (e.g. logistics consulting). An analysis of the value of human capital evaluates each set of knowledge and skills in the firm according to its contribution to the enactment of strategies that improve performance (e.g. the logistics-network performance). It is according to the dimension of the value of human capital to the firm that whether employees either reduce costs or provide increased benefits to the firm can be assessed. The value of human capital is very important when its nature in services firms (e.g. 4PL business entities) is considered, because here, a client (e.g. a buyer of logistics consulting services) may often contract with a firm to gain direct access to valuable human capital.

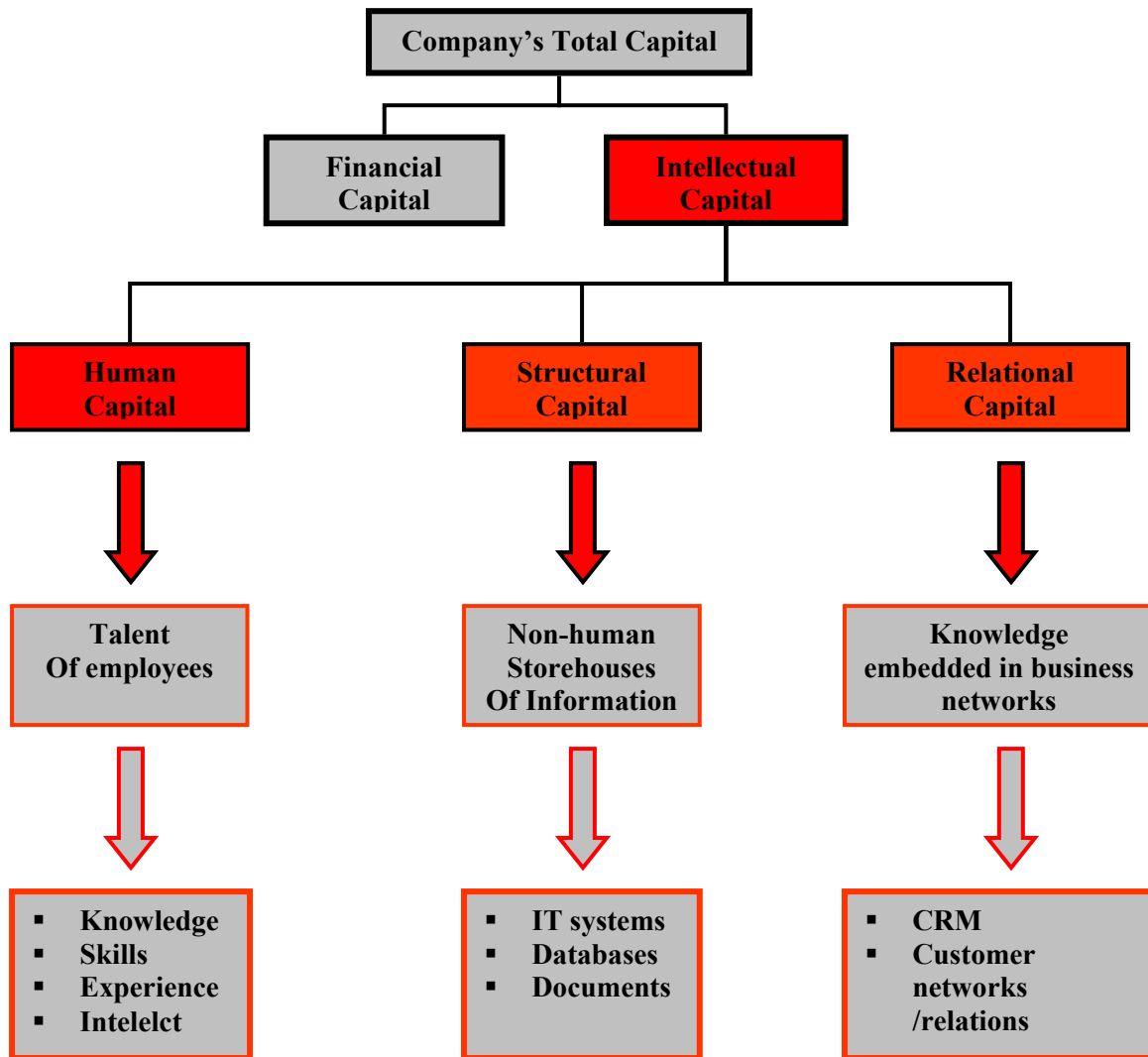
Thus, the dimension of value should not only be the judgement of how much central the knowledge and skills are to the competitive advantage of the firm but also whether it sits at the heart of the client's core competence. For instance, clients often form long-term relationships with consulting firms because principal consultants develop the expertise that contributes directly to the effectiveness and efficiency of the client. Moreover, the

¹⁵ Jensen, A. (2005) "*Trade Facilitation and International Logistics Performance*", Presentation at the 14th IFPSM World Congress, Beijing, 17-18 September 2005, China

¹⁶ Thomas Stewart is the journalist of record on Intellectual Capital. He has been following its development since 1991. He has also written the book "Intellectual Capital" since 1997.

development of core skills may be purchased into the firm through the knowledge networks that are available to the firm.¹⁷

Figure 7 Intellectual Capital as part of a Company's Total Capital



(Source: Author)

The structural capital addresses, for instance, the total of IT systems and infrastructure, documents and any other physical or electronic material where valuable information can be stored. Ultimately, the relational capital equals to the CRM which has been developed in the company and the supplier-client relationships that have been established in the business networks.

2.5 Key Performance Indicators

Key Performance Indicators (KPI) are quantifiable measurements that reflect the critical success factors of an organization. KPI differ depending on the organization. A business may have as one of its KPI the percentage of its income that comes from return customers. The performance indicators must reflect the organization's goals, they must

¹⁷ Swart, J. (2006) "Intellectual Capital: Disentangling an Enigmatic Concept", Journal of Intellectual Capital, Vol. 7 No 2, 2006, pp. 136-159, Emerald Group Publishing Limited

be keys to its success, and they must be measurable. The goals for a particular KPI may change as the organizations goals change, or as it get closer to achieving a goal. In terms of logistics-network management, there is a wide range of KPI metrics that can measure the logistics-network performance. For instance, with regard to transport performance, some metrics are the following:

- ✓ Freight cost per unit shipped: Calculated by dividing total freight costs by number of units shipped per period.
- ✓ Outbound freight costs as percentage of net sales: Calculated by dividing outbound freight costs by net sales.
- ✓ Inbound freight costs as percentage of purchases: Calculated by dividing inbound freight costs by purchase value.
- ✓ Transit time: Measured by the number of days (or hours) from the time a shipment leaves your facility to the time it arrives at the customer's location.
- ✓ Claims as % of freight costs: Calculated by dividing total loss and damage claims by total freight costs.
- ✓ Freight bill accuracy: Calculated by dividing the number of error-free freight bills by the total number of freight bills in the period.
- ✓ Percent of truckload capacity utilized: Generally used for shipments over 10,000 lbs. Calculated by dividing the total pounds shipped by the theoretical maximum.
- ✓ Mode selection vs. optimal: This is calculated by dividing the number of shipments sent via the optimal mode by the total number of shipments for the period.
- ✓ Truck turnaround time: This is calculated by measuring the average time elapsed between a truck's arrival at your facility and its departure.
- ✓ Shipment visibility/traceability percent: Calculated by dividing the total number of shipments via carriers with order tracking systems, by the total number of shipments sent during a period.
- ✓ Number of carriers per mode: Calculated by counting the total number of freight carriers used in a given period, by mode (ocean, barge, rail, inter-modal, truckload, LTL, small package, etc.).
- ✓ On-time pickups: Calculated by dividing the number of pick-ups made on-time (by the freight carrier) by the total number of shipments in a period.

In brief, other logistics KPI are:

- Inventory record accuracy

- Product damages
- Lead-time
- Deviations
- Picking correct item
- Customer order fill rate
- Transport fill rate
- Delivery precision
- Lead-time
- Load degree

3 PROBLEM ANALYSIS

Chapter 3 aims to provide the reader with the formulation and the primary analysis of the main research problem, the dimensions of which are defined, connected and depicted in the Research Problem Analysis model (Figure 8). To facilitate the research, the main research problem is primarily divided into two sub-problems that are defined and analyzed in order to point out the information needs of the study and identify any existing barriers. Later in Chapter 4 the research process continues with the selection of the methods that are employed for the data collection. In Chapter 3 the research follows the Research Process Analysis model depicted by Figure 27 in Appendix B.

3.1 The Main Research Problem in its Sub-problems

As it has already been mentioned in the first chapter of the present thesis, the purpose of the present research is to study, in the context of the logistics activities' outsourcing, the role of the Logistics Service Providers (LSP) in the improvement of the Nordic logistics networks. In order to fulfill this purpose, the main research problem can be grouped into two main sub-problems as follow:

First Sub-problem

3PL & 4PL Service Providers: Two different conceptual frameworks of the logistics theory and practice. In which different ways do these two generations of LSP firms contribute to the improvement of the Nordic logistics networks? Are there any definable interfaces between their different roles?

The dimensions of the first sub-problem are:

- ▶ **Third-Party Logistics (3PL) Service Provider**
- ▶ **Fourth-Party Logistics (4PL) Service Provider**
- ▶ **Role interfaces**
- ▶ **Nordic logistics networks**
- ▶ **Network improvement**

Here the author aims to investigate into the role of the two different LSP business entities, identify the different ways by which they contribute to the design and redesign of more efficient and effective logistics networks and point out any existing role interfaces between the 3PL and the 4PL entities. What is really a 4PL Service Provider and why it is regarded as a growing trend by the logistics market? Concepts like intellectual capital, IT integration (e.g. Control Tower), physical assets and logistics information systems are included in several case studies of LSP companies and their clients, following the dimensions of the first sub-problem set above.

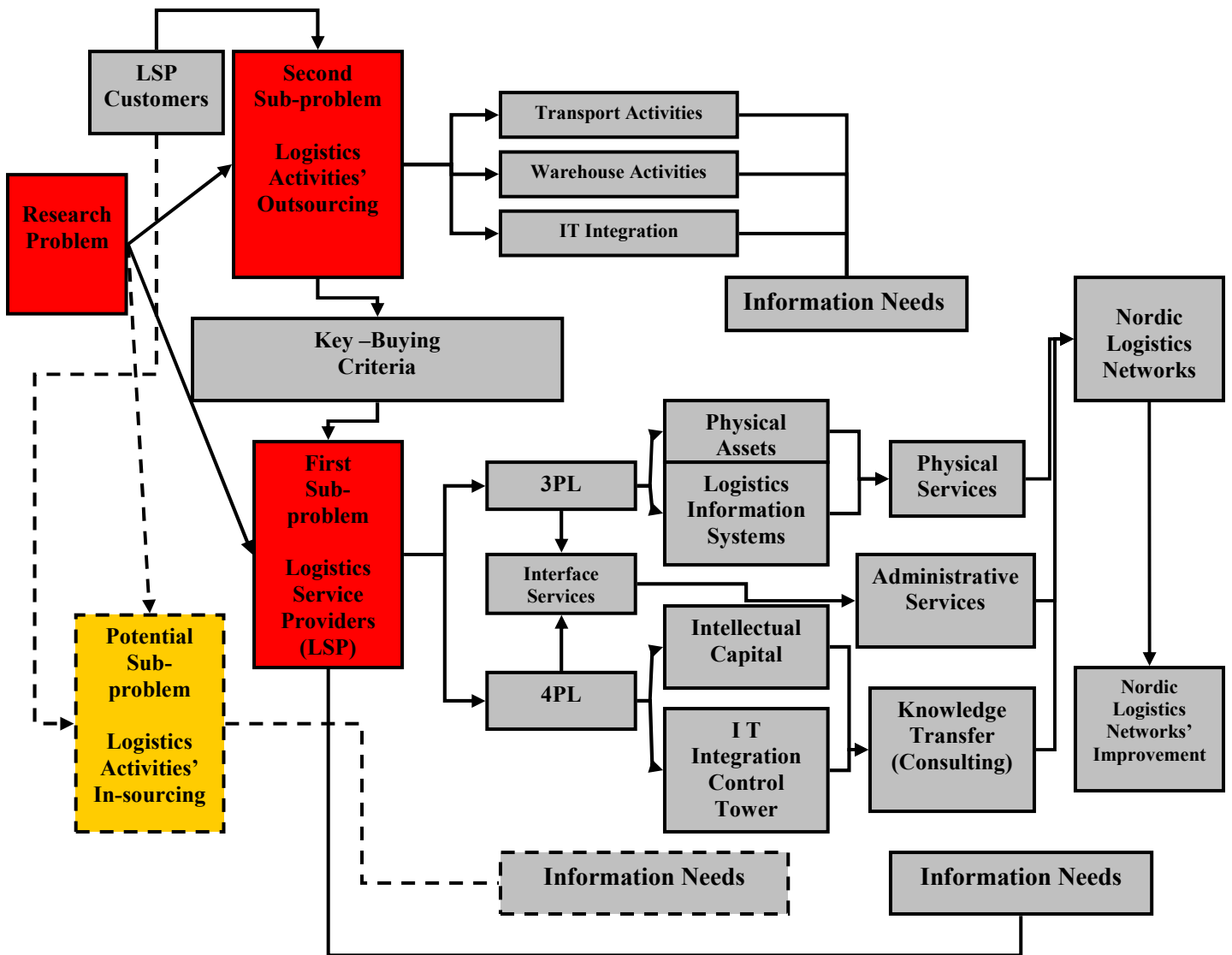
Second Sub-problem

Which logistics activities are usually outsourced to Logistics Service Providers (LSP) and which key-buying criteria do the customers of logistics services employ?

The dimensions of the second sub-problem are:

- ▶ **Logistics activities**
- ▶ **Outsourcing**
- ▶ **Logistics Service Providers (LSP)**
- ▶ **Key-buying criteria**
- ▶ **Customers of logistics services**

Figure 8 The Research Problem Analysis



(Source: Author)

The author's purpose here is to investigate into the business practice of outsourcing from the perspective of the LSP users. The outsourcing of logistics activities to 3PL and 4PL Service Providers aims to create agile logistics networks through a combination of tangible assets (e.g. warehouses, truck fleets, infrastructure, information systems and

hardware infrastructure), and intangible assets (e.g. skilled human resources offering the needed intellectual capital, experience, know-how to design, redesign and control agile supply chains, plan commodity routes and fleet capacity, manage warehousing and control stock availability, track-and-trace throughout the distribution channels). LSP users employ several key-buying criteria to first evaluate and then choose the best LSP partner to meet their outsourcing needs.

A third potential sub-problem could be the in-sourcing of logistics activities instead of their outsourcing. What leads the potential LSP users to choose in-sourcing instead of outsourcing? The present thesis research and analysis will focus on the two sub-problems mentioned and described above. However, it would be necessary and important for the spherical research and analysis to incorporate the in-sourcing concept as an opposite logistics practice. In terms of definition, in-sourcing is the opposite of outsourcing and is often defined as the delegation of operations or jobs from production within a business to an internal entity that specializes in that operation. In-sourcing is a business decision that is often made to maintain control of certain critical production or competencies¹⁸ and is widely used in an area such as production to reduce costs of taxes, labor and transportation.

3.2 Information Needs

Based on the Research Process Model depicted by Figure 27 in Appendix B and the Sub-problems presented in Figure 8, the author defines the research information needs as follow:

- ▶ **Nordic Logistics Networks:**
 - ✓ Logistics market situation mainly in Sweden
 - ✓ Nordic logistics network bridges within Scandinavia, Europe (and, if needed, overseas)
 - ✓ Challenges for the Nordic logistics market
 - ✓ Globalization and its impact on the Nordic logistics networks
- ▶ **Logistics Service Providers (LSP):**
 - ✓ Company background:
 - Historical - Financial - Organizational Information
 - ✓ 3PL or 4PL structural data:
 - Physical assets / Physical services provided
 - Information Systems employed and provided
 - Intellectual Capital
 - E-material employed and provided
 - Interface services between 3PL and 4PL
 - ✓ Key Performance Indicators (KPI)
- ▶ **LSP Customers - Outsourcing:**
 - ✓ Company background:
 - Historical - Financial - Organizational Information
 - ✓ Outsourced logistics activities
 - ✓ Key-buying criteria for outsourcing
 - ✓ Key Performance Indicators (KPI)

¹⁸ Experts About.Com: <http://experts.about.com>

▶ **In-sourcing as a potential sub-problem:**

- ✓ Why is in-sourcing preferred to outsourcing and in which cases?
- ✓ In-sourcing vs. Outsourcing = Trade-off

3.3 Barriers

As it is clarified in the following chapter including the thesis' methodology, the author employs only qualitative methods for the data collection, processing and analysis. One of the main barriers appeared during the data collection was that the quantitative information was difficult to be collected due to several reasons such as:

- ▶ Corporate privacy
- ▶ Data unavailability
- ▶ Contract restrictions between LSP firms and LSP clients
- ▶ Publishing restrictions
- ▶ Non-updated information

Another important barrier was the Swedish language. Sometimes it seemed difficult to translate a wide range of numerical and qualitative data provided by the company interviewees. Despite that, a number of cases and relevant information have been translated from Swedish into English for the research purposes employing SYSTRAN software¹⁹. Such a research barrier was an important challenge for the author as his final award was the enrichment of his vocabulary and command of Swedish.

3.4 Information Sources

The information sources and the research approach are thoroughly described in the next chapter including methodology. In brief, the information sources will be:

- ▶ Theoretical frameworks
 - Relevant papers, articles, research on outsourcing / LSP industry
 - Bibliography
- ▶ Secondary data
 - Annual reports / Company Background
 - Internet
 - Company press releases
- ▶ Case studies:
 - LSP cases
 - LSP users' cases
- ▶ Questionnaires:
 - Semi-structured questionnaires
 - Open questions
 - Focus on qualitative data
- ▶ Semi-structured Interviews:
 - Free interaction with the interviewee
 - Feedbacks after the interview

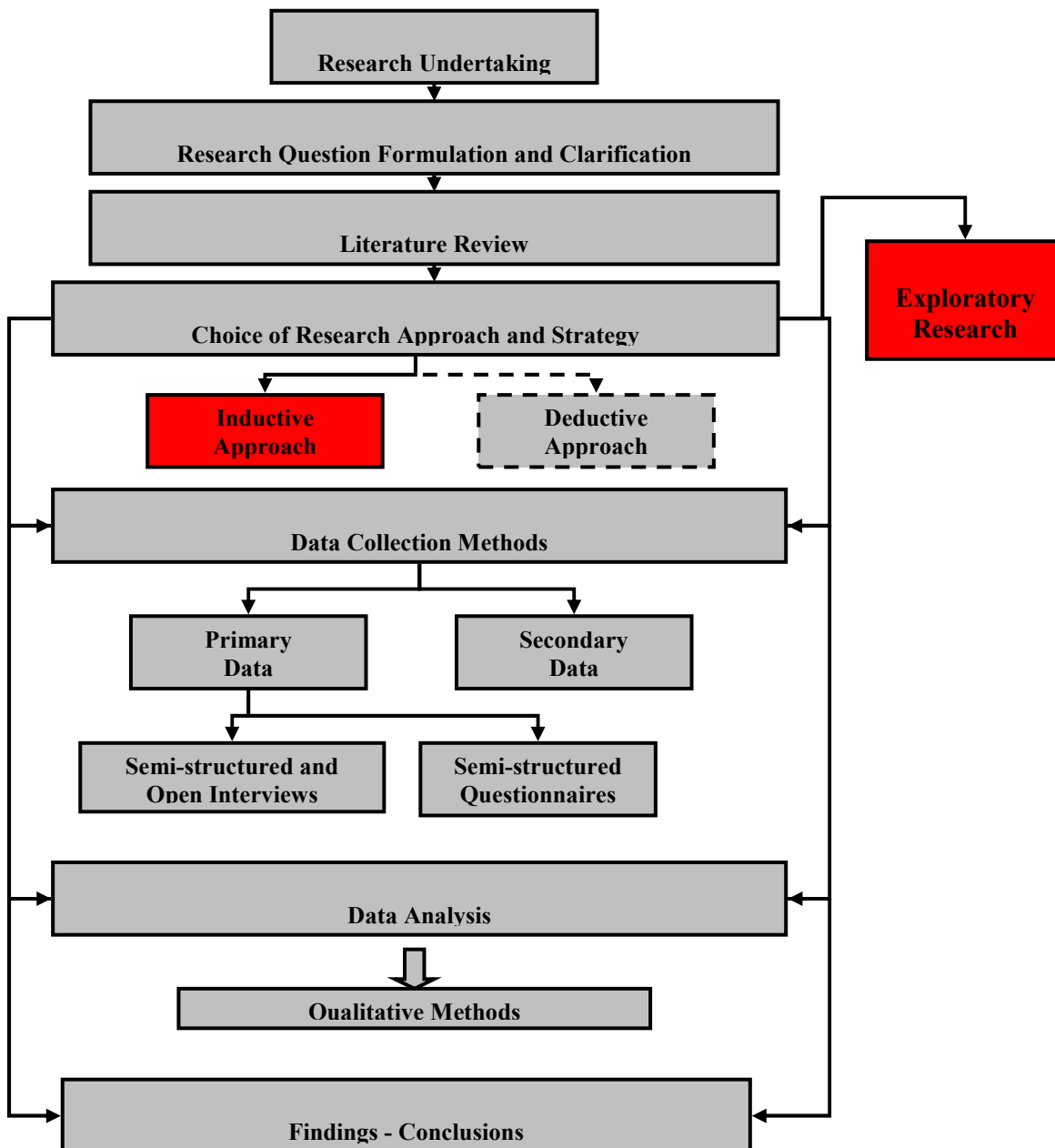
¹⁹ SYSTRAN Language Translation Technologies: <http://www.systransoft.com>

4 METHODOLOGY

The purpose of Chapter 4 is to present, explain and justify the methods and processes which are employed while the research is carried out. Theoretical definitions concerning different methodology patterns are provided and precede the description and discussion of the applied research framework of the present thesis.

In the beginning of the research, the author had to decide upon several matters concerning the research methods that would be employed. Figure 9 offers an outline of the research methodology followed during the research process.

Figure 9 Research Methodology



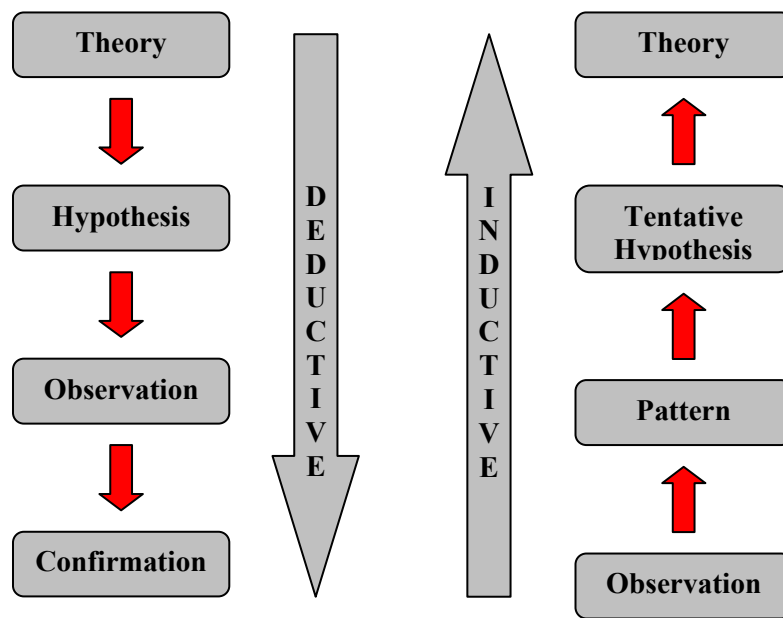
(Source: Author)

First and foremost, regarding the objectivity of this academic study, the author believes that any results may first be subjected to personal judgment and may be not valid for an indefinite period of time as the logistics industry is constantly changing. The results may also not be applicable to other geographic markets except for the Nordic logistics market. Exploratory research design is used to study the main research problem as the author has no considerable knowledge on the Nordic logistics market. The research described in this thesis has been undertaken, designed and carried out in the context of the author's postgraduate education and according to the academic schedule and requirements set by the School of Business, Economics and Law of Gothenburg University. Its main purpose is the investigation into the dimensions of the research problem analyzed in Chapter 3 and the draw of useful conclusions based on the research analysis; conclusions that answer and shed light to the questions of the sub-problems set in Chapter 3. The literature review forms the foundation on which the present research is built and its main purpose is to help the author develop a good understanding and insight into the relevant previous research and the trends that have emerged over the last years.

4.1 Deductive and Inductive Research Approach

The deductive research approach works from the more general to the more specific. Sometimes this is informally called a "top-down" approach. The researcher might begin with thinking up a theory about his topic of interest. Then that can be narrowed down into more specific hypotheses that can be tested. The researcher narrows down even further when observations are collected to address the hypotheses. This ultimately leads the researcher to be able to test the hypotheses with specific data -- a confirmation (or not) of the original theories. Inductive reasoning works the other way, moving from specific observations to broader generalizations and theories. Informally, this is sometimes called a "bottom up" approach. Figure 10 below depicts the deductive and inductive approaches to research.

Figure 10 Deductive and Inductive Research Approach



(Source: Author)

In the inductive research approach, the researcher begins with specific observations and measures, begins to detect patterns and regularities, formulates some tentative hypotheses that can be explored, and finally ends up developing some general conclusions or theories.

These two methods of reasoning have a very different feel when research is being conducted. Inductive reasoning, by its very nature, is more open-ended and exploratory, especially at the beginning. Deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses. Even though a particular study may look like it is purely deductive, most social research involves both inductive and deductive reasoning processes at some time in the project.²⁰ The author of the present master thesis mainly employs inductive research reasoning but wherever it is appropriate deductive reasoning is also adopted.

4.2 Data Collection

4.2.1 Secondary Data

Secondary data is the information collected from literature, the internet and several reports. In the present thesis, books, articles, papers, research contributions, journals, company material are mainly used as secondary sources.

4.2.2 Primary Data

Primary data is the information collected for the first time with the purpose of pointing out a specific case. It can be obtained through several techniques such as:

- ▶ Observations
- ▶ Interviews
- ▶ Surveys

The main technique for collecting primary data in this thesis is through semi-structured and open interviews.

4.2.3 Quantitative or Qualitative Data Collection

4.2.3.1 Quantitative Data Collection

In quantitative data collection concerns the gathering of numerical data such as statistics, and the transformation of information into figures and amounts. This information is then analyzed by statistical software like SPSS to get results about correlation between different factors or to get a cross-section of the studied phenomena. Quantitative data gives the answer to “how many?” and provides a small amount of information about a large number of units, which makes the study wide. There is a large distance to the studied reality, and the study is aimed at describing and explaining phenomena. The analytical tool is selected from a standardized set of tools that are commonly used, both in natural- and social sciences.²¹

4.2.3.2 Qualitative Data Collection

In qualitative data collection, the result is not produced by statistical methods or similar procedures. Qualitative research is more exemplifying than generalizing, which means that it is hard to draw general conclusions from the results. Qualitative data answer the question

²⁰Trochim, M. - Research Methods Knowledge Base - <http://www.socialresearchmethods.net/kb/>

²¹ Saunders, M., Lewis, P. and Thornhill, A. (2003) “*Research Methods for Business Students*”, Financial Times (FT) Prentice Hall

“why?” A large amount of information is collected from a small number of units, which demands that the researcher is close to the studied reality. The study is deep and aimed at describing and understanding several phenomena. The qualitative method focuses on the researcher’s perception of the information, which means that it cannot and should not be transformed into numerical results. Characteristic for qualitative studies is flexibility. The same questions don’t have to be asked to different respondents. If it is discovered that some of the questions are not correct, they are changed.

4.2.3.3 Qualitative Interviews

Qualitative interviews have been widely used in the present research. In qualitative interviews, discussions are often performed face-to-face with the interviewees. The typical qualitative interview is unstructured, which means that the interviewer only has a very general interview guide and makes up the questions depending on which direction the interview takes. The interviewees are free to answer whatever they want, unlike structured interviews, where there are a few given alternatives. This makes it harder to analyze the results, as the interviewees might have answered in completely different ways. It is therefore hard to make comparisons, and the interviews therefore serve mainly as sources of information. To perform a good unstructured interview necessitates training and experience. One of the perils with qualitative interviews is that the interviewer might affect the interviewee in some way. This can happen by the tone of voice, clothes, or the way the questions are asked. The outcome of the interview is also strongly dependant on the skill of the interviewer. An interviewer that lacks proper training and experience might miss vital information because he doesn’t ask timely questions. There are also problems later on when the information should be interpreted and analyzed. Many of the parts of the interview, such as gestures and other small indicators are lost unless the interview is videotaped, which is a somehow controversial and also might affect the interviewee in a rather negative way.

4.3 Applied Methodological Framework

As it has already been mentioned in the introduction of this methodology chapter, an exploratory research design is employed to study the main research problem as the author has no considerable knowledge of the Nordic logistics market. In general, the exploratory research design is usually used for the fulfillment of the following research purposes²²:

- The formulation of a problem for more precise investigation.
- The establishment of alternatives and priorities for further research
- The development of hypotheses.
- The collection of information about the practical problems of carrying out research on conjectural statements.
- The increase of the analyst’s familiarity with the research problem.
- The clarification of the employed concepts.

Data collection methods that are appropriate for the exploratory research can be²³:

- The literature search
- The key informant survey (i.e. experience survey or expert interviews)
- Focus groups

²² Prof. Jensen, Arne (2006) “*Seminar in Research Methodology II*”, Logistics & Transport Research Group, Graduate Business School, School of Economics and Law, Göteborg University

²³ Prof. Jensen, Arne (2006) “*Seminar in Research Methodology II*”, Logistics & Transport Research Group, Graduate Business School, School of Economics and Law, Göteborg University

- Analysis of selected cases

As Figure 9 presents semi-structured and open interviews, and semi-structured questionnaires (see relevant sample questionnaire in Appendix A) comprise the main primary data collections methods of the present exploratory study. Taking into account several research barriers mentioned in the previous chapter, the author's choice is to conduct qualitative research based on qualitative data emerging from both primary and secondary sources. Semi-structured questionnaires are structured to facilitate the research and become the main means of qualitative data collection. This sort of questionnaires is also used during the semi-structured / open interviews conducted with industry principals by the author. Concerning the secondary data, the relevant published literature (i.e. books, academic papers, company websites, etc.) has been searched for the collection of useful and valid information.

In the present research several industry cases are also employed so as to provide the reader and the ultimate analysis with valuable combined information concerning the dimensions of the research sub-problems. The employed cases comprise combinations of secondary data and primary data, and intend to become important tools for the thesis analysis in the final research stage. Industry cases are selected to fulfill the information needs on the following subjects:

▶ **Nordic Logistics Networks**

Great emphasis is placed on Sweden however the wider Nordic region including Norway, Denmark, Finland (and the Baltic states) is discussed.

▶ **Logistics Service Providers (LSP)**

Several Nordic LSP business entities are discussed so that valid information can derive about their role in the Nordic region and also about the different conceptual frameworks of 3PL and 4PL. The discussed LSP firms are:

- Green Cargo
- DFDS Tor Line AB
- Port of Göteborg AB
- Svenska Retursystem AB
- Schenker Dedicated Services AB
- Schenker Consulting AB
- VOLVO Logistics
- SKF Logistics
- Tetra Laval GT&T

▶ **LSP Users and Outsourcing**

Some of the industry cases focus on the customers of logistics services (i.e. LSP users) provided by the LSP firms and the business practice of logistics activities' outsourcing. The examined LSP users are:

- IKEA
- Tetra Laval
- SKF
- VOLVO Buses
- Stora Enso

Moreover, information about Mölnlycke Health Care AB and Uponor AB is also employed in the analysis despite the fact that these two LSP users are not presented in

separate cases. However, interviews have been conducted with principals from both companies.

▶ **In-sourcing (as a potential sub-problem for further research)**

It seems inevitable to analyze the business practice of logistics activities' outsourcing without discussing the opposite business practice of in-sourcing. In the industry cases in-sourcing is mentioned and discussed wherever this is appropriate as there are LSP users that adopt a combined strategy of both outsourcing and in-sourcing or they completely in-source some of their logistics activities.

Each industry case offers a company-background introduction which clarifies each corporate structure and the nature of its operations. Then, more detailed information is provided about different subjects that cover the range of the problem dimensions defined in the problem analysis (see Chapter 3):

- Third-Party Logistics (3PL) Service Provider
- Fourth-Party Logistics (4PL) Service Provider
- Role interfaces 3PL and 4PL business entities
- Nordic logistics networks
- Network improvement
- Logistics activities
- Outsourcing
- Logistics Service Providers (LSP)
- Key-buying criteria
- Customers of logistics services
- In-sourcing
- Key Performance Indicators (KPI)

Regarding the author's reasoning throughout the research, two main approaches are followed:

- The deductive reasoning
- The inductive reasoning

For the present exploratory study, the deductive reasoning leads the author from general theories (e.g. what is a 4PL or a 3PL business entity according to the published literature and business practice) to the formulation of hypotheses (e.g. the dimensions of 3PL and 4PL concept in Figure 8: Physical Assets, Information Systems, Intellectual Capital, IT Integration can be considered hypothetically based on the existing theories of the introductory chapter) then to the observation (e.g. of Green Cargo, Schenker Consulting AB, etc.) and ultimately to the approach of confirmations. On the other hand, the inductive reasoning starts from observation to pattern to tentative hypothesis and finally to theory. For instance, using inductive reasoning the author of this study can:

- Observe the structure of the examined 3PL and 4PL business entities
- Detect the common characteristics found in each LSP form
- Make tentative hypothesis of what is 3PL and 4PL
- Develop general conclusions regarding the conceptual frameworks of 3PL and 4PL

4.4 Important Research Challenges

Employing an exploratory research design the author aims to formulate a research problem (see its sub-problems in Figure 8) for more precise investigation so as to cover the range of the dimensions set with some flexibility. The establishment of alternatives

for further research can be easily achieved (see potential sub-problem in Figure 8) and the clarification of the employed concepts of 3PL and 4PL is better facilitated. Through literature search, semi-structured interviews, semi-structured questionnaires and analysis of selected industry cases the author intends to give answers to the questions comprising the defined sub-problems (see Chapter 3). However, the author has to cope with important research challenges.

The problem of questionnaire relevance

Taking into account several barriers mentioned in the previous chapter, the author's choice is to employ semi-structured questionnaires (see sample questionnaire in the Appendix A) depending on what information is needed, which will direct the questions shown to the interview respondents. The relevance of the questions is of high importance as they will be the means of getting the needed information. Which questions will give the needed data? Which key words will communicate better the gist of the question? Which other questions can emerge from the specific question during the interview?

The problem of interview success

As it has already been pointed, qualitative interviews are chosen to be conducted in the present research. The success of such an interview can be influenced by:

- ✓ The freedom of the interviewee to answer what he/she wants, unlike highly structured interviews. This makes it harder for the author to analyze the results, as the interviewees may answer in completely different ways.
- ✓ The training, the skill and experience of the interviewer (i.e. the author).
- ✓ The tone of voice, clothes, or the way the questions are asked by the interviewer (i.e. the author).

The problem of generalization

The author employs a wide range of information included in published literature and emerging from questionnaires and industry cases. It is rational that the more information the author chooses to use and analyze, the easier it is to avoid biases and data invalidity of information, however, the greater lack of in-depth analysis can characterize the whole study. The risk of constant generalizations over a specific subject is probable so the challenge for the author is to direct his analysis where reliable conclusions and suggestions to the research sub-problems can be constructive.

The problem of data validity

Last but not least, the data validity is a parameter that should be constantly considered during the research. The validity of the respondents' answers is very difficult to be checked by the interviewer (i.e. the author). Regarding the published literature, the author chooses to use officially published information by corporate websites and consultancy institutions. Bibliography and academic papers published in electronic databases (e.g. Emerald, Business Source Premier, etc.) are also employed. The author avoids adopting unofficially published information for the research purposes as that decreases the probability of data invalidity.

PART B

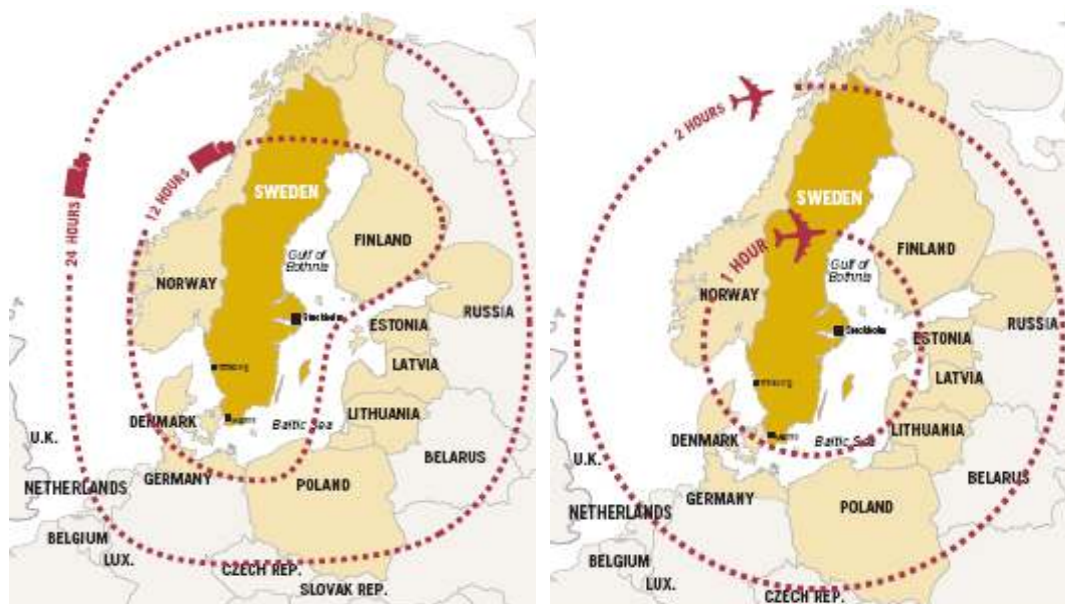
Part B offers a brief overview of the Nordic logistics market with Sweden as a main reference point, industry cases, the research analysis structured according to the dimensions of the main research problem and, ultimately, conclusions and suggestions considering the future trends of logistics outsourcing and the LSP industry primarily in Sweden.

5 THE NORDIC LOGISTICS MARKET

The purpose of Chapter 5 is to describe the Nordic logistics market in brief, and provide information on the Nordic logistics networks with Sweden as the main reference point.

The Nordic logistics market can be seen as a dynamic and growing industry as all Nordic countries have long tradition of good trading relations. Sweden is playing a vital role in most Nordic logistics networks due to the fact that it is the largest economy in Scandinavia and is located in the Baltic Sea region. The Nordic region due to vast geographical coverage, strong economies, advance technological developments and skilled human resources provide, both, opportunities and challenges to a number of Logistics Service Providers (LSP). Figure 11 depicts the logistics networks' coverage from Sweden to all major destinations in Northern Europe.

Figure 11 Distribution to all major destinations in Northern Europe by road and air



(Source: Invest in Sweden Agency)

Most of the major international logistics companies are present in the Nordic countries. For instance, the leading logistics company of the world Maersk based in Copenhagen, Denmark, and other companies such as DHL, Schenker, Wilson Logistics have their regional and head offices in Sweden. The reason behind this is the number of benefits which these companies receive and as Hiedo Masuda, Managing Director of Honda Nordic, says: “Centralizing logistics activities to Sweden has shortened delivery lead times, reduced warehousing cost and increased total delivery quality. In Sweden we find all expertise and supplier networks that we need to operate and further improve our logistics operation.” Bill Blomquist, Managing director of DHL Nordic, adds that:

“Sweden is right in the middle of future, likely massive, massive flow of the goods expected for markets in major Eastern European Economies.”

The Port of Gothenburg is the largest port in Scandinavia and acts as main hub for trading with rest of the world. There are many small Logistics Service Providers (LSPs) but there are also a few big ones in the wider Nordic region. Activities such as transportation planning and management, warehousing & inventory management are provided by most of the LSP business entities. The Nordic countries, especially Sweden, have many advances in IT, thus, the majority of LSP actors are providing IT-based services such as RFID, EDI, track-and-trace facilities, fleet-and-vehicle management and online booking. A large number of LSP business entities also give value-added services such as consolidation, packaging, assembling and product returns. Financial and consulting services including cargo insurance, project management and training of employees are provided by big players of the LSP industry.

For many corporations, Sweden is the preferred platform for centralized logistics activities. From Sweden, all major cities in Sweden, Denmark, Finland and Norway can be reached in less than 12 hours, while Estonia, Latvia, Lithuania and Western Russia can be reached within 24 hours (see Figure 11). Moreover, Sweden is the largest domestic market in the Nordic region and most multinational companies find their largest customer base there, and it is also where regional purchasing decisions are often made. The large Swedish economy and diversified, international industry have helped build excellent infrastructure for distribution, communications and financial services. For example, the fast-track system implemented by the Swedish Customs allows high-volume transporters cost-efficient and rapid customs handling. Furthermore, Sweden is one of the world’s leading IT countries, and Swedish companies integrate highly advanced IT solutions into their logistics activities. Systems for Radio Frequency Identification (RFID) and traceability are today used in all industry sectors. Companies in a wide range of industry sectors have already chosen Sweden to strengthen competitive advantage through centralized logistics and cost savings and improved customer service levels are among their gains.²⁴

²⁴ Invest in Sweden Agency (2004) “*Logistics*” – www.isa.se

6 CASE STUDIES

The purpose of Chapter 6 is to present cases of the LSP industry and provide combined information concerning the Nordic logistics networks, the LSP firms and their customers (i.e. LSP users) that outsource part of their logistics activities. Where it is appropriate the information provided is grouped thematically following the structure of the main research sub-problems.

6.1 The Case of Green Cargo

6.1.1 *Company Background*

Green Cargo is a Swedish national and international 3PL company that employs more than 3000 employees in over 100 locations throughout the Nordic region and Europe. A 94% of the goods which Green Cargo transports are carried on electrically powered trains and its entire operations carry the Good Environmental Choice label. The company transports goods by rail-freight as far as possible, and complements its rail operations with road-freight in order to reach the final destination. Green Cargo has some 30 terminals and logistics centres, and provides road haulage distribution all the way to the client. Its services include warehousing as well as advanced logistics solutions, and occasionally we are also responsible for the final production process and the distribution of the goods to the client. Today Green Cargo has more than 1 500 customers and the mainstream of its international traffic flow goes to Norway, Germany and Italy. An 80% of the company's revenues are generated by railway operations while a 13% and a 7% derive respectively from road-based haulage and 3PL services. Green Cargo offers 3PL services for companies that supply goods to the Nordic market and need cost-effective, reliable, flexible logistic solutions. It also takes care of the client's storage needs and manages, operates and checks the total goods and information flow between the client's customers and suppliers. Green Cargo's logistics centres are strategically placed in the Nordic transport corridors, and have access to a complete transport net consisting of road, rail, sea and air transport. Green Cargo's 3PL services give its clients a partner which takes full responsibility for the complete logistics network, including long distance transport, storage and distribution. Green Cargo owns a fully-developed IT support system for 3PL providing direction and management of the goods flow from its client's suppliers to their customers. The system uses Electronic Data Interchange (EDI) to integrate carriers, customs and, if needed, Green Cargo's suppliers and customers.

6.1.2 *The Nordic Tyre Market: GoodYear*

According to Mr. Jan-Ola Wede, Project Sales Manager of Green Cargo, Green Cargo's 3PL Tyre-Logistics is situated in Norrköping and from this strategic location Green Cargo is able to cover the major parts of the Nordic market mainly including Norway, Denmark and Finland, within 24 hours²⁵. In particular, the logistics centre is located on Händelö in Norrköping and consists of a 21.500m²-warehouse which layout has been developed specifically for handling tyres. One type of carrier is used for 85% of all tyres stored ensuring high flexibility.

²⁵ Green Cargo has recently incorporated the Baltic region as an entrance to the Russian market.

Green Cargo unloads up to 30 units daily and each arrival is scheduled. All the tyres are already assigned a certain position determined by frequency and warehouse-zone layout, and before intake each pallet is registered. After intake the position is confirmed by hand scanner updating the Warehouse Management System (WMS). High-frequency goods placed in bulk-storage are confirmed with a check number and, in addition to bulk-storage for the high frequency goods and racking for the medium-frequency goods, special racks are used for low-frequency goods. Each tyre is tagged during compressed picking and random spot-test is made before loading to ensure picking quality. To attain higher efficiency the pallets are loaded for destinations where the Pallet-Exchange-System (PES) is used and the distributor best-suited for the Nordic market is employed (e.g. Schenker AG). Green Cargo's logistics implementation plan concerning Goodyear during 1999 and 2005 took place in four phases. Sweden was the start-up country of the implementation plan in August 1999, Norway was integrated in July 2003, Finland and Denmark followed in January 2004 and January 2005 respectively.

6.1.3 The Nordic athletic market: Adidas

Adidas' Nordic hub is located in Händelö in Sweden where a warehouse of 30,000m² has been finalized since 2001. Main characteristics of this facility owned by Green Cargo are the highly daily frequency of trailers and containers, its 100 employees, the sprinkle equipment and the 150metres rail tracks that are built in. According to Mr. Wede, between the years 2003 and 2005 the logistics cost per unit for Adidas remarkably decreased from 15.43 SEK/unit in 2002 to 13.52 SEK/unit in 2003 and 12.81SEK/unit in 2005. This decrease was due to:

- The new warehouse in Händelö
- Process mapping
- Transfer from Norway
- Transfer from Finland
- Reinforcement of the production organization
- Development of the IT support
- Introduction of bonus salary

For 2006 till 2011 there is a forecast of further decrease from 11.69 SEK/unit in 2006 to 7.99 SEK/unit in 2011.²⁶ This further decrease has been forecasted taking into account the following parameters:

- Implementation of Control Tower
- Carton picking
- Reduction of peaks (pre-picking)
- Optimization of storage capacity
- Pick-by-voice
- RFID – Scanning on piece level
- Optimization of transport contracts
- Benchmarking with other Adidas warehouses
- Flexibility

6.1.4 Key Performance Indicators

In terms of performance measurement, Green Cargo offers a number of targets for the major Key Performance Indicators (KPI) as Table 4 depicts below.

²⁶ Green Cargo's Presentation CD 2006

Table 4 Green Cargo’s KPI targets

Element	Indicator	Target
Picking correct item ²⁷	Monitored on order row level	99.8%
Customer order fill rate	Order ready for dispatch on time	98.5%
Transport fill rate	Shipment lead time is met	98.0%
Inventory record accuracy	Stocktaking net divergence compared to 12-month through-flow of goods	99.95%
Product damages	Damaged goods compared to 12-month through-flow of goods	<0.05%

(Source: Green Cargo’s Presentation CD 2006)

6.2 The Case of DFDS Tor Line AB

6.2.1 Company Background

DFDS Tor Line AB is mainly a leading North-European liner shipping 3PL operator and part of the DFDS Group. DFDS Tor Line AB is a 3PL company operating mainly in the North Sea and the Baltic Sea, and has subsidiaries in Sweden, Norway, the United Kingdom, the Netherlands, Belgium, Germany, Poland, Latvia, Lithuania and Russia. The activities of DFDS Tor Line AB also include those of the daughter companies AB Lisco in Lithuania and DFDS Lys Line AS in Norway. Furthermore, DFDS Tor Line offers a Ro-Ro service between Kiel in Germany and St. Petersburg in Russia in a joint venture with the Russian state-owned shipping company SOVCOMFLOT. The fleet of DFDS Tor Line counts approx. 67 Ro-Ro, Ro-Pax, Lo-Lo and multipurpose vessels, and among the services offered by DFDS Tor Line are the "12 Bridges for Trade in Europe". The main customers of DFDS Tor Line are international transport and shipping companies, large manufacturers of industrial goods and automotive manufacturers whose logistics include a significant element of transport by sea. In 2005 DFDS Tor Line transported a total of approx. 10.7 million lane metres, had a turnover of approx. DKK 4.5 billions and a staff of 2,535 persons.²⁸

6.2.2 Logistics Network

According to Mr. Björn Petrusson, Managing Director of DFDS Tor Line AB, DFDS Tor Line AB builds bridges for trade in Northern Europe and focuses on high reliability and frequent sailings in accordance with its customers' demands. DFDS Tor Line AB is growing both organically and through acquisitions enabling itself to offer comprehensive transport solutions in Northern Europe. Table 5 offers a summary of the DFDS Tor Line’s main “Network Bridges”.

²⁷ The target shall be reached within 6 months from the start of the assignment. Until then the picking quality shall amount to at least 99.4%.

²⁸ DFDS Tor Line AB: <http://www.dfdstorline.com/>

Table 5 DFDS Tor Line’s Network Bridges

Bridge	Network Description
AngloBridge	Sweden-UK (Immingham – Tilbury – Newcastle)
BalticBridge	Denmark-Lithuania
Britannia Bridge	Denmark-UK(Harwich –Immingham)
ElbeBridge	Germany (Cuxhaven)-UK (Immingham – Harwich)
EuroBridge	Sweden (Gothenburg) – Belgium (Ghent)
NorBridge	Norway – UK – Germany – The Netherlands
RailBridge	Sassnitz (Mukran) – Lithuania (Klaipeda)
HansaBridge	Latvia (Riga) – Germany(Lübeck - Travemünde)
ShortBridge	Midlands & Northern England - Belgium - Germany
DFDS Lisco Line	Germany (Kiel) – Lithuania (Klaipeda)
ScanBridge	Sweden (Karlshamn) - Lithuania (Klaipeda)

(Source: DFDS Tor Line AB – Autumn 2006)

In order to further improve the service level DFDS Tor Line AB aims to own and operate port terminals on the bridge locations. Such terminals are:

- ▶ DFDS Nordic Terminal in Immingham & Newcastle upon Tyne, UK
- ▶ DFDS Scandic Terminal in Esbjerg, Denmark
- ▶ North Sea Terminal in Brevik, Norway
- ▶ DFDS Tor Terminal, Maasvlakte in Rotterdam, The Netherlands

Additionally, “InfoBridge” is called the link that connects DFDS Tor Line with its customers, partners, ports and suppliers. In particular, for industrial customers, the transport information can be directly used in their own production and planning systems. The “InfoBridge” system is Windows-based and communicates through the Internet. “InfoBridge” gives all our customers the possibility of being directly connected to DFDS Tor Line’s IT systems. The advantages are simplified booking routines, electronic and customised invoicing, access to statistics and tracing of units.

6.3 The Case of Schenker Dedicated Services AB

6.3.1 Company Background

Schenker Dedicated Services (SDS) AB is a 4PL subsidiary company of the Schenker organization, providing customized transport networks for clients with special needs. In particular, SDS provides custom-made logistics and transport solutions for large customers operated by a dedicated Control Tower. As an integrator, SDS can decide on the transporters best suited for the logistics solution and market, develop, implement and operate its own system solutions. Each client possesses its own operation unit with dedicated personnel comprising a Control Tower. SDS has 42 employees, a turnover of approx. 50 MEUR in 2006 and is today located in Gothenburg and in Malmö in South Sweden. SDS belongs to the global Schenker Group, which gives it access to one of the

world's leading networks within transport and logistics as the Schenker Group shows a turnover of EUR 6.3 billion and has 36,000 employees in 120 countries.²⁹

6.3.2 SDS in the Nordic market

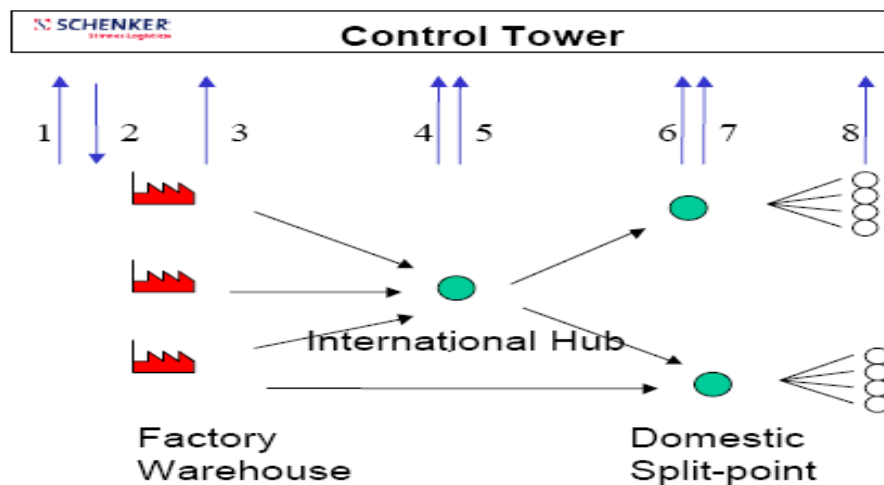
Schenker Dedicated Services (SDS) AB builds up exclusive logistics networks for its Nordic clients with re-loading and co-loading into line with their operations, products and customers. According to Mr. Kent Jönsson, Consulting Manager of Schenker Dedicated Services, for several of SDS' clients the hub-and-spoke principle is used to serve their logistics networks. SDS also helps its clients improve their information systems and communications flow right from manufacturer through to customer, by taking over its clients' entire operating logistics activities, or parts of them. SDS is a company which expands quite quickly as Table 6 presents and this can be considered as a sign that the new trend of 4PL Service Providers has now established itself in the Nordic LSP market.

Table 6 SDS' Facts

	2002	2003	2004	2005	2006-F
Turnover (in MSEK)³⁰	166	247	336	420	470
Growth³¹	+6%	+49%	+36%	+25%	+12%
Number of Employees	13	28	32	36	42
Sites	Göteborg	Göteborg & Malmö	Göteborg & Malmö	Göteborg & Malmö	Göteborg & Malmö

(Source: Schenker Dedicated Services AB - Gothenburg - Sweden)

Figure 12 SDS' Cargo Control via Control Tower



(Source: Schenker Dedicated Services AB - Gothenburg – Sweden)

²⁹ Data from Schenker Dedicated Services AB (2006) based in Gothenburg - Sweden .

³⁰ MSEK = Millions of Swedish Kronor - 1 SEK \approx 0.1EURO

³¹ For instance: $SDS' Growth_{2003} = \frac{Y_{2003} - Y_{2002}}{Y_{2002}} = \frac{247 - 166}{166} = 0.488 \approx 0.49 = 49\%$

As it has already been mentioned, SDS is a 4PL company that provides customized transport networks for clients with special needs and mainly custom-made logistics and transport solutions for large customers operated by a dedicated Control Tower. Figure 12 shows SDS' cargo control through its Control Tower. The 8 stages of the SDS' cargo control through the Control Tower seen in Figure 12 are:

1. Pre-booking
2. Load plan confirmation
3. Dispatch advice of trip
4. Unload international hub
5. Load international hub
6. Unload domestic split-point
7. Delivery at customer's

For each one of its large customers³², SDS creates an individual department called Control Tower, with specially trained personnel whose responsibility is to create logistics networks that run smoothly and coordinate, control goods and information flows from the supplier to the end-customer. A Traffic Manager who is responsible for ensuring that SDS delivers what its clients have promised their customers manages day-to-day activities. The main benefits are that SDS' clients and their customers have just one single contact point with both operative and financial responsibility for the processes. This increases the flexibility and allows SDS to rapidly modify its clients' logistics network in line with fluctuations in the market and season. Around each Control Tower a division lead by a key account manager is formed to develop the business operations both strategically and tactically. During a normal shift, SDS' traffic coordinators monitor 100,000 kilometers of land transport and deliver to thousands of customers in Scandinavia and the rest of Europe alone.³³ In general, at SDS, each Control Tower undertakes responsibility for:

- ▶ Customer relations and customer agreements.
- ▶ Monitoring and control of the daily operations.
- ▶ Financial result.
- ▶ The strategic, tactical and operational development of the customer business.

Concerning the IT services provided, SDS' information systems include functionalities like:

- ▶ EDI integration
- ▶ EDI monitoring
- ▶ Invoicing
- ▶ Track-and-Trace

³² ESAB - SKF - Tetra Laval - Exxon Mobil - LIAB – Mölnlycke

³³ Schenker Dedicated Services AB (2006): <http://www.schenkerds.se/>.

6.3.3 SDS' Customer Cases

6.3.3.1 P&G / Gillette's

Schenker has undertaken major logistics activities and business for P&G / Gillette. Schenker contributes to the improvement of Gillette's logistics networks offering:

- ▶ All transport modes: Sea - Air – Land.
- ▶ A Global Key Account Management team in all countries involved (both origin & destination).
- ▶ Dedicated in-plant personnel at major Gillette shipping locations.
- ▶ Global IT solutions for all countries and modes; solutions that support logistics operations and administration, calculate transport costs and measure overall performance.
- ▶ Constant mutual quality meetings
- ▶ Global communication platform (i.e. SchenkerNet) for all Gillette-transport involved people including both Gillette's and Schenker's Management and Operations.³⁴

Schenker combines forces and advantages in order to get a win-win situation for P&G / Gillette. In particular, the LLP project³⁵ for Gillette includes:

- Managing all transports for all modes independent from carrier.
- New supplier volumes and Gillette locations.
- Handling of competitors.
- Schenker's payment via Management Fee.
- One-Stop-Shopping for Gillette.

The improvements on Gillette's logistics network are:

- Benefits from Schenker's partnerships with carriers.
- Single point of contact for Gillette and carriers.
- Steering and coordination of the operational matters with carriers on a daily base.
- Streamline of processes and communication.
- Support on logistics and transport-chain related tasks (including consulting).
- More volumes with the same man-power on customer side.

IPAL: An 4PL IT application for P&G / Gillette (Control Tower)

IPAL is an inter-active IT platform for all involved parties of the Gillette transportation chain (Figure 13 below).³⁶ IPAL includes:

1. Internet-based communication platform for:
 - Gillette shipping site
 - Schenker origin branch
 - Carrier

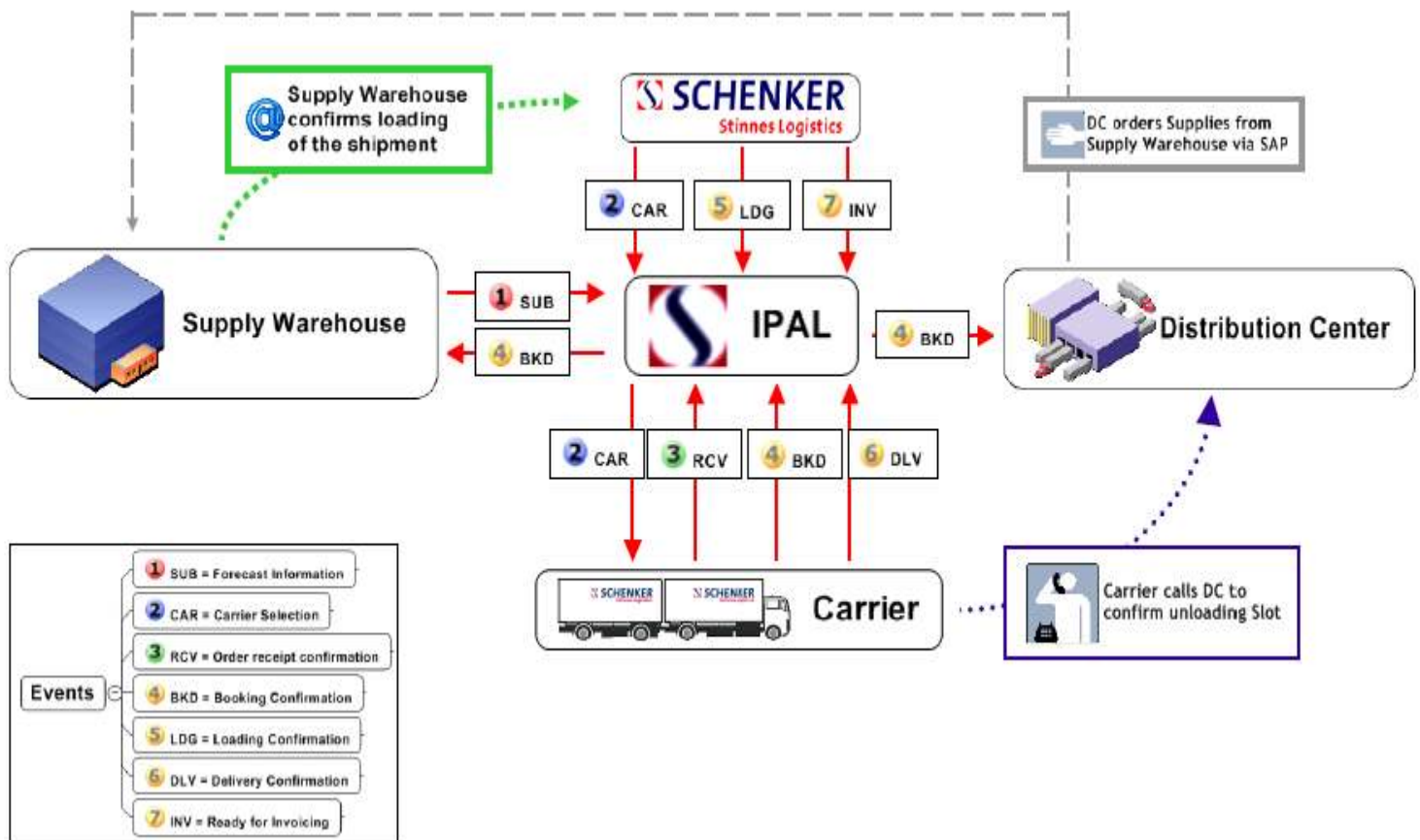
³⁴ Schenker AG (2006) "Control Tower & LLP solutions for P&G / Gillette", Case Study provided by Schenker Consulting AB and Robert Ljunggren, Consulting Manager.

³⁵ Schenker AG (2006) "Control Tower & LLP solutions for P&G / Gillette", Case Study provided by Schenker Consulting AB and Robert Ljunggren, Consulting Manager.

³⁶ Schenker AG (2006) "Control Tower & LLP solutions for P&G / Gillette", Case Study provided by Schenker Consulting AB and Robert Ljunggren, Consulting Manager.

- Gillette receiving site
2. Limited access with different user rights.
 3. Process-oriented IT tools.
 4. Automatic pre-alert functions for each relevant party:
 - Booking confirmation to Supply Warehouse (SW) or plant.
 - Pre-advise to receiving SW or Distribution Centre (DC).
 - Reminder emails to carriers for late booking confirmation.
 5. Statistics and download features.
 6. Linkage with the KPI system.

Figure 13 The IPAL Control Tower



(Source: Schenker AG -2006 Case Study)

As Figure 13 depicts above, IPAL’s involved processes divide the logistics network in 7 different process blocks and each process block is reserved for different parties. The 7 different process blocks are:

- ▶ Forecast Information
- ▶ Carrier Selection

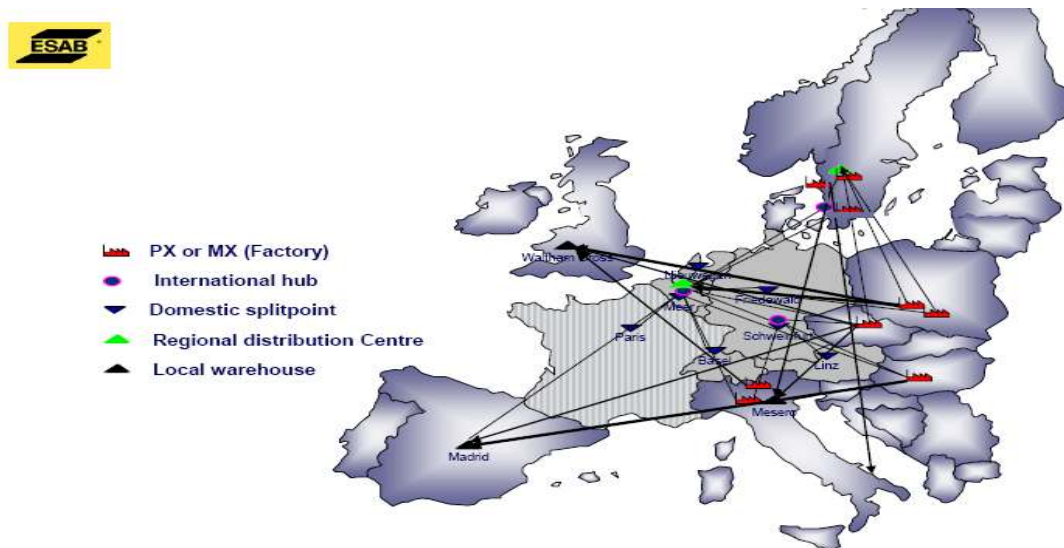
- ▶ Order Receipt Confirmation
- ▶ Booking Confirmation
- ▶ Loading Confirmation
- ▶ Delivery Confirmation
- ▶ Invoicing

IPAL improves communication and information flow throughout Gillette’s logistics network, from its shipping site (e.g. the supply warehouse) to its receiving site (e.g. the distribution centre),

6.3.3.2 ESAB

Another large client of SDS is ESAB Sweden. With operations in a large number of countries, ESAB is the world’s largest producer of welding consumables and equipment. Its business is in the areas of welding and cutting equipment, welding accessories, welding consumables, welding automation and cutting systems. ESAB’s customers operate in the transport and off-road vehicle industry, the offshore, shipbuilding, power, process and construction industries. ESAB owns a strong position supported by extensive distribution networks in all of its major markets and in the Nordic as well. Figure 14 presents ESAB’s logistics network in Europe. In the Nordic region, ESAB’s logistics network consists of 3 factories, 1 regional distribution centre and international hub. Schenker Dedicated Services (SDS) AB also provides ESAB with custom-made and transport solutions for Sweden. Dedicated personnel comprising a special ESAB operation unit is responsible for ESAB’s logistics network contributing to its overall operational development.

Figure 14 ESAB’s Logistics Network in Europe



(Source: Schenker Dedicated Services AB - Gothenburg – Sweden)

6.4 The Case of Port of Göteborg AB

6.4.1 Company Background

Port of Göteborg AB is the authority of the largest Nordic port organization for sea transport. The Port of Göteborg is the main port of Sweden and its position lies in the heart of Scandinavia, which means that about 70% of the population, and all industry, lie

within a radius of 500 km or six hours by car.³⁷ In 2005 the cargo turnover of the Port of Göteborg AB was 165 MSEK³⁸ and the Container Terminal accounted for the largest share of the port's business.

The Port of Göteborg consists of the following terminals:

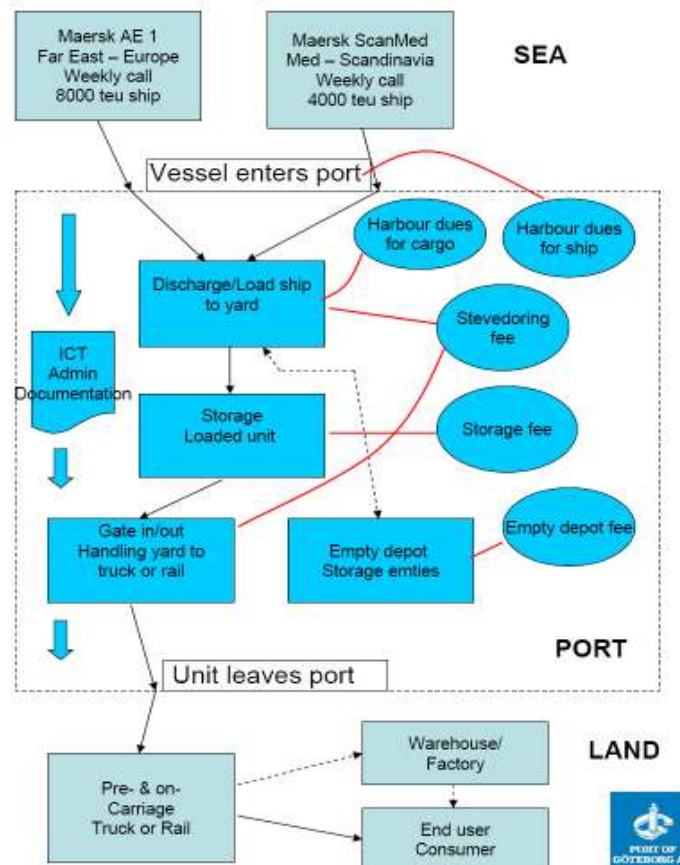
- The Ro/Ro Terminal
- The Ferry and Cruise Terminal
- The Container Terminal
- The Oil Terminal
- The Car Terminal

6.4.2 Customer Cases: Maersk and Stora Enso

Anders Johansson, General Manager of Business Development, provided the present research with descriptions of clients' logistics networks concerning Maersk and Stora Enso respectively. Figure 15 depicts two main logistics networks of Maersk:

- Far East – Europe
- Mediterranean – Scandinavia

Figure 15 Logistics Network of Maersk Line³⁹



(Source: Anders Johansson, General Manager Bus. Development of Port of Göteborg AB)

³⁷ Port of Göteborg AB (2003) "Annual Report"

³⁸ MSEK = Millions of Swedish Kronor - 1 SEK \cong 0.1EURO – 165 SEK according to Anders Johansson, General Manager Business Development.

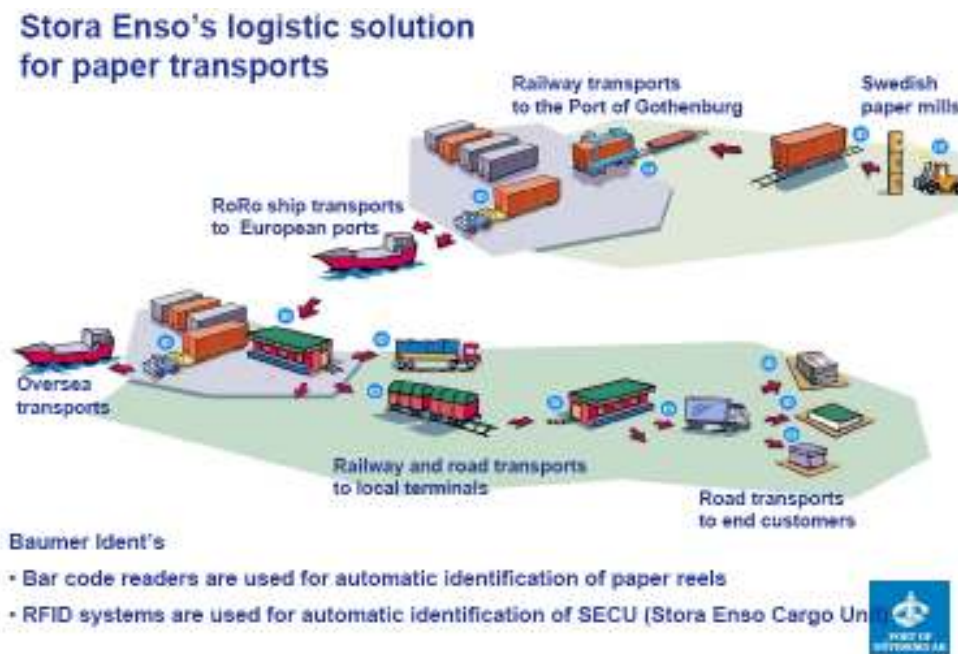
³⁹ TEU = Twenty-foot Equivalent Unit

In brief, the authorities of the Port of Göteborg AB offered the following logistics-network description and facts concerning their customer Maersk:

- All cargo is unitized in containers, flats and other ISO units.
- The process is described mainly for import but for export the reverse order applies.
- There is a fairly even balance between export and import.
- About 50% of the cargo is pre- /on- carried by rail to/from remote hinterland destinations.
- About 30 Logistics Service Providers (LSP) are involved in a ship call in Göteborg, including the Port of Göteborg AB
- Blue ovals indicate a transaction between buyer and seller.
- Harbour dues comprise ship and cargo and are based on gross tonnage and amount of cargo respectively.
- Stevedoring dues comprise all goods handling, physically and administratively, and include costs for men and machines. Gate in/out is included.
- The port keeps empty equipment in a dedicated yard and the customer can call off and is invoiced for this service.
- Contract is renegotiated on a regular basis.
- Operational meetings are held weekly with customers.
- Strategic meetings are held on MD level.

Figure 16 below depicts the logistics network solution of Stora Enso for paper transports via the Port of Göteborg.

Figure 16 Stora Enso's Logistics Network Solution for Paper Transports



(Source: Anders Johansson, General Manager Bus. Development of Port of Göteborg AB)

Swedish mills have been exporting paper on rail via the Port of Göteborg for further distribution since 1999. 1.4 Million tonnes / year. There are 6 calls per week from Göteborg to Zeebrugge. All volumes are transported in custom-built boxes, the so-called Stora Enso Cargo Units (SECUs), and each one box carries more than 80 tonnes of paper. Empty boxes are shipped back to the mills from Belgium via the Port of Göteborg. Finnish volumes have been added to the system: South Finland since 2005, North Finland since 2006 as Figure 17 depicts below. In particular, 3 million tonnes are totally added to

the system. Finnish volumes are shipped by RoRo-ships in SECU boxes and transhipped in Göteborg. Immingham and Tilbury in England (UK) are added destinations. Stora Enso builds high-bay warehouse in Tilbury. Overseas containers are added to the system from North Finland for loading on container ships in Göteborg. Contract is long term and exceeds the 15 years. All in all, about 4.5 million tonnes of Stora Enso paper is handled in the Port of Göteborg hub in 2006.

Figure 17 Phases and Volumes of both Sea-borne and Rail-borne Cargo



(Source: Anders Johansson, General Manager Bus. Development of Port of Göteborg AB)

6.5 The Case of Schenker Consulting AB

6.5.1 Company Background

Schenker Consulting AB comprises a 4PL competence centre taking on consultancy tasks in the logistics area and offers a wide range of logistics services by creating practical logistics solutions for Sweden and the rest Nordic region. The company is a subsidiary of the Schenker Group, which makes it frontrunner in logistics development, is based in Gothenburg and Stockholm, and today consists of 22 consultants.⁴⁰ Schenker Consulting is independent and has access to Schenker Group's competence and experience in projects. Being associated with Schenker, it has access to unique tools, for instance, for simulation of transport costs and the environmental impact. Another advantage is that the solutions which Schenker Consulting proposes are realizable as opposed to theoretical products. If the customer desires so, Schenker Consulting undertakes tasks of implementing proposed solutions, both in- and outside the Schenker organisation. Being associated with Schenker also means that Schenker

⁴⁰ Schenker Consulting AB – Robert Ljunggren, Consulting Manager

Consulting has a great experience in working with different types of tasks for companies in many trades.⁴¹

6.5.2 Network Consulting

As it has already mentioned, Schenker Consulting AB offers qualified consultancy in the logistics trade and is a logistics competence centre which belongs to Schenker Group. In particular, Schenker Consulting develops and implements logistics solutions by utilizing the experience and knowledge of Schenker Group and its strategic partners. According to this 4PL actor, consulting comprises an integration of knowledge and experience supported by information technology (IT). Here the concept of IT addresses a wide spectrum of information systems employed for the facilitation, upgrading and improvement of the clients' logistics-network information flow and communication. Below Figure 18 presents the multidimensional concept of logistics-consulting integration as it is defined and promoted by Schenker Consulting AB.⁴²

According to Schenker Consulting AB, the logistics consulting includes and integrates the following areas:

- ▶ Supply Chain Management
- ▶ Information Technology
- ▶ Education
- ▶ Warehouse
- ▶ Transport
- ▶ Project Management
- ▶ Environment

Schenker Consulting AB decides on its clients' basic requirements on a strategic and tactical level as Figure 19 depicts. At the strategic level, emphasis is placed on the client's business concept, logistics objectives and strategies. It is the level where the direction and frames of the logistics activities are formulated and defined. At the tactical level, the logistics networks' flows are specified by flow set-ups, network structure, preparation and the supplier agreements.

At the operational level, the implementation of what was decided in the previous two levels takes place and, from the consulting perspective, all the operations (e.g. warehousing, transportation, etc.) are electronically controlled so that the logistics networks' performance can be measured with the use of several Key Performance Indicators (KPIs).

Project Management is one of the main areas in which Schenker Consulting AB is specialized and is always applicable before the introduction of new solutions and the change of processes. The project's scope defines which methodology and which IT tools are necessary for the formulation and implementation of the logistics solutions proposed. To its help, Schenker Consulting AB owns a toolbox of IT systems for different purposes. These systems are commercial or own-developed and can be accessed to through Schenker's organization. Schenker Consulting AB employs several IT tools for the control and improvement of its clients' logistics networks such as:

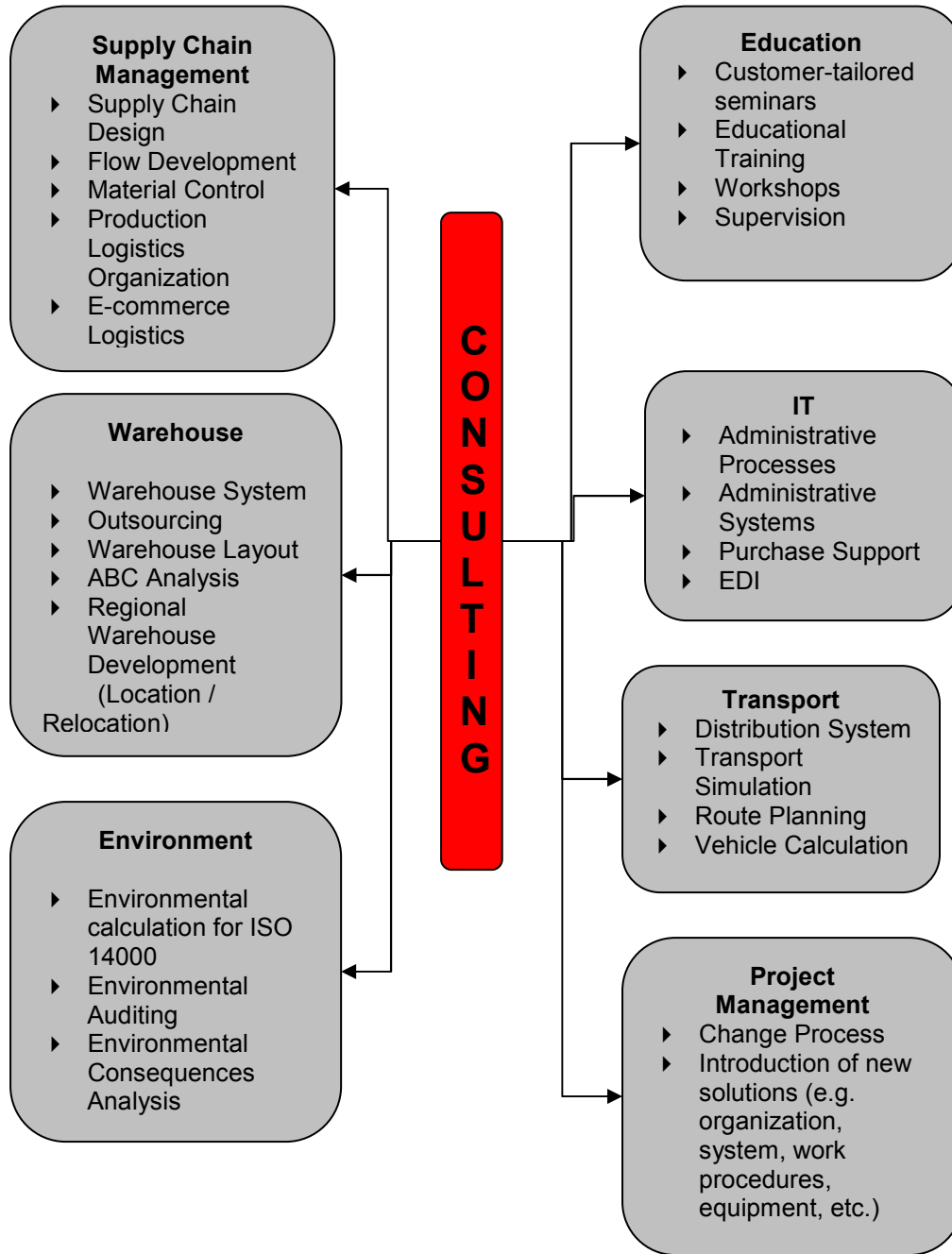
- ▶ Supply Chain Simulation
- ▶ Transport Simulation
- ▶ Warehouse Analysis

⁴¹ Schenker Consulting AB: <http://www.schenkerconsulting.com/>

⁴² Schenker Consulting AB (2002) "Schenker Consultings IT-verktyg" – Case Study (Published in Swedish)

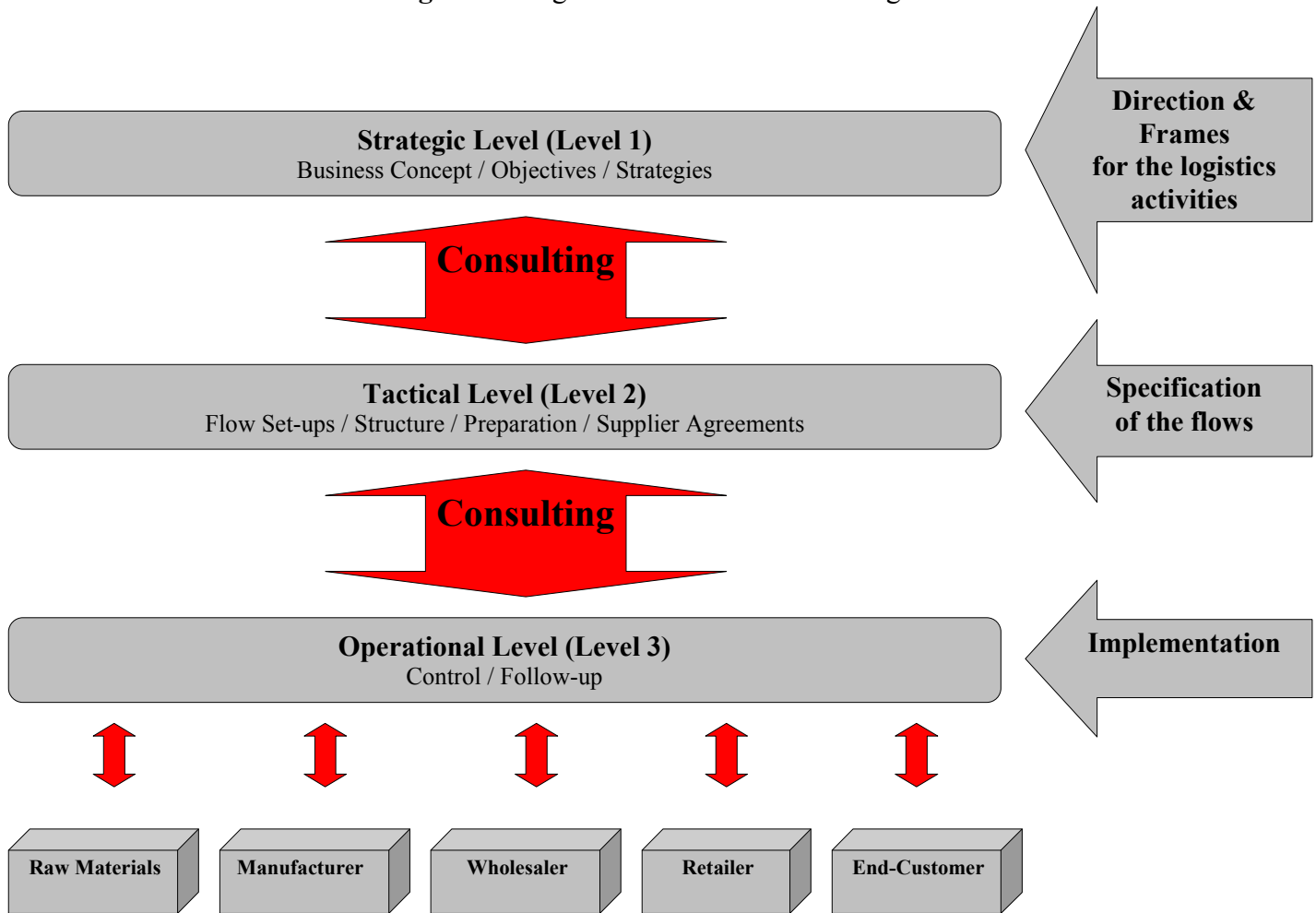
▶ Environmental Simulation

Figure 18 Consulting Integration



(Source: Schenker Consulting AB - Translated and modified in English by the author)

Figure 19 Logistics Levels and Consulting



(Source: Schenker Consulting AB – Translated and modified in English by the author)

6.6 The Case of VOLVO Logistics Corporation

6.6.1 Company Background

Volvo Logistics Corporation (VLC) designs, handles and develops business logistics systems for the automotive and transport industries worldwide. Apart from packaging which is the only physical service offered, VLC mainly offers 4PL services like customs services, consulting, contracting, operations, and is represented in Europe, North and South America and Asia, close to its customers' largest plants or logistic hubs. Being a wholly-owned subsidiary within the Volvo Group, the company is established in nine countries and has about 750 employees in three regions. VLC Scandinavia & Overseas is the largest region, with around 460 employees, VLC Europe has about 140 employees and VLC North America has approximately 150.

In brief, VLC offers a wide range of 4PL services that can be grouped as follow⁴³:

⁴³ Volvo Logistics: <http://www.volvologistics.com/>

1. Customs services:
 - Customs clearance, customs declarations and customs drawback.
 - Updating and determining of origin for bought or produced products.
 - Consultant services, such as inquiries, investigations and information.
2. Consulting:
 - Mapping where a certain logistics organization is penetrated by making flowcharts of the processes, analyzing of key performance data (e.g. Key Performance Indicators) and measurements.
 - GAP analysis as well as suggestions of improvements and logistics solutions.
3. Contracting with several 3PL Service Providers (e.g. transport companies).
4. Development of Information Systems.
5. Transport IT improvements.
6. Operations:
 - Transport management
 - Transport Control (i.e. Control Tower service)
 - Storage (i.e. service on a consulting basis)
7. Risk management:
 - Inspection Personnel Assessment of Transit Damages .

6.6.2 Customer Cases: Volvo Cars, Volvo Truck & Volvo Busses

6.6.2.1 A4D – An innovative IT system⁴⁴

A4D is the first distribution system in the world that is completely integrated with order and production systems. The benefit of A4D is optimum planning of the physical distribution process. At the same time, one gains the best possible overview of the entire flow process from order to delivery. Volvo Bus Corporation (VBC) has been using A4D since autumn 2000. The A4D e-business platform is all set to assist other customers such as Volvo Cars to further improve the precision of their deliveries. In particular, A4D creates information quality via a joint system for the entire distribution system; a system that gives everyone access to the same information sources so as to minimize the risk of errors. Regarding Volvo Cars, Volvo Logistics created the preconditions for real-time updating throughout the distribution process. A sophisticated interface based on EDI and the Internet makes it possible for all concerned actors to use the computer and trace the location of any given vehicle. Previously, smaller hauliers used to send diskettes with this information on a weekly basis. This information is now updated constantly. Together with Volvo Cars and Volvo IT, Volvo Logistics implemented A4D in October 2001 and it soon brought remarkable results of improvements in the customers' logistics networks. Volvo Logistics now sell comprehensive logistics IT systems and help its clients like Volvo Cars and Volvo Buses to keep their delivery promises to their customers. When an

⁴⁴ A4D = Applications for Distribution

order is placed in the order system, A4D automatically matches production of this vehicle with the programmed distribution routes – and calculates the exact delivery date. A4D then plans and monitors every unique vehicle all way to the dealer. If something changes, A4D quickly calculates a new delivery date. The aim is, for instance, to assist Volvo Cars raise precision to 98 percent and shorten lead times, which boosts its competitiveness and assists the company secure more satisfied and more loyal customers.⁴⁵

6.6.2.2 VLC saves money for Volvo Trucks

According to VLC, reducing a client's logistics costs in the first two years is easily achievable. The real challenge for VLC begins afterwards, and it is then that solid experience and true creativity (i.e. parts of intellectual capital) are put to the test. VLC always aims to achieve annual cost improvements of 5% and this percentage might be regarded by many as a very high target. For Volvo Trucks Corporation (VTC) in North America, a customer of VLC for the past eight years, VLC reduced transport costs in 2001 by no less than 10%. That was a total improvement of 1.42 million USD. In November 2000, VLC was given the task of finding solutions that could help to further reduce transportation costs for VTC in Dublin, State of Virginia. Five people from VLC joined their forces with another five from the VTC to create a hard-working team. Their motto was: "Every dollar counts!" The team met once a month to discuss, evaluate and implement various measures (e.g. KPI metrics). The entire inbound process was examined in minute detail for all possible improvements, resulting in no less than 75 sub-projects. 39 of these projects were subjected to various cost-cutting measures. The remaining sub-projects formed part of the normal continuous improvement process. Renegotiated contracts with carriers (i.e. several 3PL Service Providers), better utilisation of trailers and containers, modified domestic routes. These are some examples of improvements that have been made. These improvements resulted in savings of an impressive 106 USD per truck. That was more than twice the target based on year 2001 production volumes; volumes that were almost halved during the course of the year. Without the exceptional dedication of the team members (i.e. human resource capital), the various small, but nonetheless important, sub-projects would never have been created and implemented. Everyone is in total agreement on that score. For VLC, that success brought with it a rather pleasant problem for VLC's future operations, namely, to exceed its own goals and continue to save money for VTC in Scandinavia or worldwide, and for all other VLC customers in the Nordic region as well and by the same successful way.⁴⁶

6.6.2.3 Volvo Bus Corporation (VBC) – The Borås plant in Sweden

Volvo Bus Corporation (VBC) is one of the world's leading manufacturer's of heavy buses. The Borås plant is one of the most important hubs in the company's international operations. VBC makes complete chassis and produce kits of components to be assembled in its many production plants in Asia, South America and Africa. VBC also assists its partners abroad with technical advice and help get operations under way when it is time to commission a new factory. As VBC's main production plant, the Borås plant:

- ✓ Carry out final assembly of bus chassis tailored to suit the body-builder's requirements
- ✓ Supply material kits to suit local conditions

⁴⁵ Volvo Logistics – Cases Studies

⁴⁶ Volvo Logistics Corporation – Case Studies

- ✓ Develop global package solutions in the fields of product engineering and logistics

According to Mr. Claes-Göran Persson, Logistics Manager at the Borås plant in Sweden, to Volvo Logistics Corporation (VLC) is responsible for all the plant's outbound and inbound logistics activities. VLC undertakes the handling of VBC's contracts with its LSP partners and buys the most cost-efficient logistics solutions in Europe, North America, Asia or Africa. Main key-buying criteria for VLC are:

- Efficiency
- Cost
- Lead-times
- Quality
- Environmental profile

VBC informs VLC about its annual logistics budget and negotiations follow for which logistics activities VBC is interested in. Between the two independent corporations, VLC and VBC, there is a clear relationship "buyer – seller" and each part acts with free market criteria regardless of the fact that both of the companies belong to Volvo Group. As far as VBC's information flow is concerned, bar-coding is employed on the pallets received or sent, including product's name, code, quantity. VBC's logistics network performance is mainly measured by delivery precision and lead-times which comprise important KPIs for VBC.

Mr. Claes-Göran Persson believes that VBC's crucial future challenges will be the expansion of manufacturing outsourcing in the Far-East (e.g. China and India), which will result in longer lead-times and more hubs.

6.7 The Case of Tetra Laval Group

6.7.1 Group Background

The Tetra Laval Group consists of three independent industry groups: Tetra Pak, DeLaval and Sidel. Their activities are focused on systems for processing, packaging and distribution of food and accessories for dairy production and animal husbandry. Although the three groups operate independently they cooperate to develop the synergies between the groups. All the operating activities within Tetra Laval Group are organized into three independent industry groups: Tetra Pak, DeLaval and Sidel. Tetra Laval International is the financial support and control function for the Group's Board. This organization has responsibility for financing the Tetra Laval Group and managing its overall legal structure, tax planning, financial and equity structures. Today Tetra Laval has more than 30,000 employees and its net sales exceed 10 millions of euros.⁴⁷

6.7.2 Tetra Laval Group Transport and Travel (GT&T)

Tetra Laval Group Transport and Travel (GT&T) is the 4PL solutions provider of transport and travel, and the centre of expertise in export control to Tetra Laval. GT&T is accountable for delivering the most cost-efficient solutions by optimizing logistics flows, leveraging volumes, proactive supplier management and continuously securing compliance with trade terms. GT&T's strategy is to build the right supplier base

⁴⁷ Tetra Laval Group 2006

providing the right services at the low cost and its achievements during the years 2000-2005 are:

- ✓ Cost savings
- ✓ Cost reduction
- ✓ Consolidation
- ✓ Standardization
- ✓ Environmental awareness
- ✓ Environmental measurements

Regarding the Supplier Scorecard 2006, GT&T evaluates Tetra Laval's transport suppliers' performance (i.e. 3PL partners) according to the criteria presented below.

- ✓ Performance
- ✓ Transport (e.g. On-time-in-full delivery)
- ✓ Quality
- ✓ Solution (e.g. Proposals for operational/process improvements and cost reductions)
- ✓ Supplier-Customer relationship
- ✓ Environmental profile

Failures within the control of Tetra Laval's transport suppliers can be:

- ✓ Misrouted shipments
- ✓ Incorrect destination codes generated by supplier
- ✓ Vehicle failures due to technical reasons
- ✓ Ground delivery failures

Quality is another important factor for Tetra Laval and GT&T has introduced the *Quality Task Force (QTF)* procedure with several objectives and participants.

The QTF objectives are to determine:

1. The type of the transport problem.
2. When, where and how the transport problem occurred / occurs.
3. The ownership of the problem (e.g. the 3PL partner, Tetra Laval's customer, etc).
4. The actions to be taken.
5. The preventive actions.

The QTF participants are:

1. The carrier (e.g. a 3PL partner)
2. The shipper (e.g. Tetra Pak, DeLaval, etc.)
3. GT&T

According to Mrs. Lina Kruger, Purchaser within Tetra Laval Group in Lund, Tetra Laval cooperates with:

1. 60 Road Transporters
2. 5 Airlines
3. 5 Carriers for Express Freight
4. 35 Sea Freight Carriers

Schenker AG is one of Tetra Laval's main LSP partners in transportation and, in particular, transport services are bought by Tetra Laval via Schenker Dedicated Services AB. Some shipping departments of Tetra Laval are outsourced, not all of them. In Europe several Control Towers owned by LSP actors control Tetra Laval's transport and shipping traffic. In the Nordic market, one warehouse is outsourced in Malmö as Tetra Laval has bought this logistics service. However, Tetra Laval in-sources some of its

logistics functions. Furthermore, Schenker Dedicated Services AB offers 4PL consulting services to Tetra Laval (e.g. Control Tower). Mrs. Lina Kruger believes that Tetra Laval's outsourcing key-buying criteria are the quality, the environmental profile and the cost. In several cases, outsourcing is preferred to in-sourcing when Tetra Laval wants to improve cost-efficiency and quality, and focus on core businesses.

Figure 20 Shipping Key Performance Indicators (KPI)

	KPI Level 1	KPI Level 2
Time	Total Transportation time	Main transportation time (from TP/production to Customs or delivery place if no customs)
		Import Customs Clearance time
		On Carriage Transportation time (from Customs to delivery place)
Cost	Total Shipping cost	Administration cost
		Transportation cost
		Import cost
Quality	On Time in Full (OTIF) Delivery point (preferable customer site)	Confirmed order = Shipping instruction
		Accuracy of documents handed over to customs
		Transport damage
Environment	CO ₂ emission	
	Usage of "Green suppliers"	

(Source: Tetra Laval 2006)

Tetra Laval buys 4PL services for:

- ✓ Reducing lead-times.
- ✓ Reducing cost.
- ✓ Reducing environmental impact.
- ✓ Improve service and quality.

For instance, Tetra Laval has successfully cooperated with its LSP partner Schenker Dedicated Services AB to analyze inbound set-up in Northern Sweden. In the past Tetra Laval was very careful for implementing EDI connections with external parties for security reasons, but then realized that EDI and other IT set-ups were important for its supply chain. Tetra Laval's logistics-network performance is measured taking into consideration parameters such as the environment, the cost, the lead-times and the quality. Figure 20 depicts some shipping KPIs employed by GT&T on behalf of Tetra Laval.

6.8 The Case of Svenska Retursystem AB

6.8.1 Company Background

Svenska Retursystem AB (SRS) can be considered as a 3PL business entity providing its clients only with innovative packaging services. SRS runs a pool of Returnable Transit Packaging (RTPs) consisting of crates and plastic pallets for the Swedish food industry and retail trade. The company is equally owned by DLF (i.e. Grocery Manufacturers of Sweden) and SDH (i.e. the Swedish Trade Association consisting of ICA, Coop, Axfood and Bergendahls).

6.8.2 Innovative packaging logistics solution

According to Mr. Tryggwe Göransson, Business Development Director of SRS, the vision of SRS is to simplify the handling of goods throughout the industry in the Nordic countries by supplying a competitive and neutral system of returnable crates and pallets. Figure 21 depicts the SRS' Returnable-Transit-Item (RTI) system in brief.

The system of SRS includes 5 different sizes of crates and 800x600 mm size plastic pallets. The crates are the so-called Paxton (or Tesco) crate types and the system today contains in excess of 6 million crates and more than half a million plastic pallets and is rapidly growing. In 2005 more than 60 million crates and 2 million pallets, were delivered through SRS' washing plants. Out of these volumes approx. 10 % were shipped to customers outside of Sweden. SRS delivers the RTPs to users who fill them with goods. They pay a different user fee depending on where the units are shipped to. The RTPs also have a deposit, currently about 4 SEK per crate and 22 SEK per 800x600 mm size pallet. This deposit is invoiced back to the customer in Sweden, as the products are shipped. Once the RTPs reach the retail stores in Sweden, they are emptied and recollected by the DC delivery trucks and finally transported back to SRS' washing plants. According to Mr. Tryggwe Göransson, the SRS' packaging system can result in the following logistics and environmental benefits:

- Decrease in package waste by 25 % or 28.000 tons per year.
- Reduction in the volume of damaged goods by at least 20 %
- Reduction in lorry transports by 260.000 kilometres per year
- Reduction in energy consumption by 52 million kWh per year
- Decrease in transportation costs by 25 %
- Decrease in total costs for the industry by 3.5 million euro per year

Figure 21 The SRS' Returnable-Transit-Item (RTI) system

1. The manufacturer orders RTIs and SRS delivers clean items from the washing plant. The manufacturer then sends the RTIs filled with goods to the wholesaler (or directly to the store).

2. The wholesaler forwards the RTIs with goods to the store.



4. The RTIs are washed and can be delivered from SRS to the manufacturer again.

3. The store empties the RTIs and the wholesaler collects them at the next delivery and returns them to the washing plant.

(Source: Svenska Retursystem AB)

In terms of economic benefits, implementing the SRS' system all over Sweden should give savings of at least 15 million euro per year in distribution costs. If the system would be introduced all over the European Union, it would give annual savings of 700 million euro. Ultimately, the SRS' packaging system integrates its clients' whole supply chain offering several benefits to the Nordic logistics networks as distribution is highly facilitated, transports are decreased, environmental emissions and package waste are reduced.

6.9 The Case of IKEA

6.9.1 Company Background

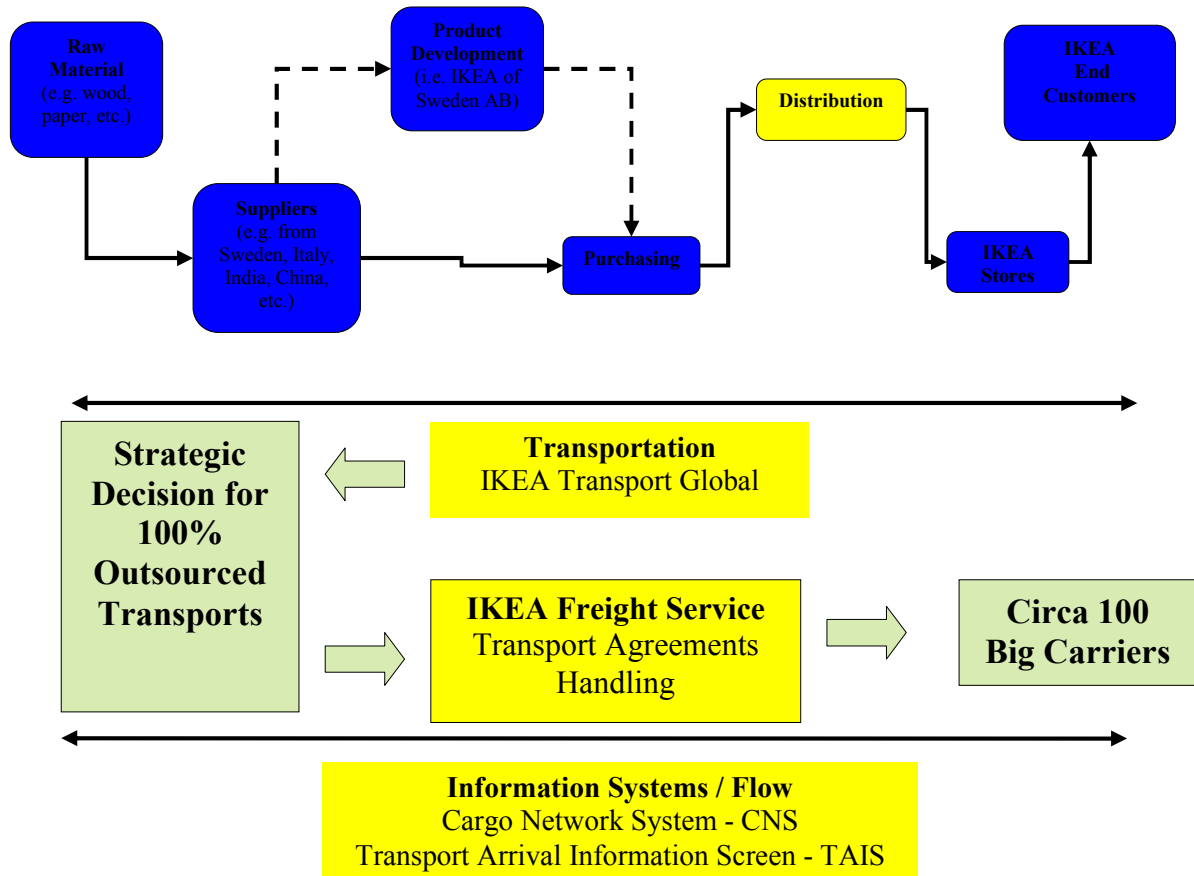
IKEA is a privately held multinational low-cost home furnishings retail company. The company was founded in Sweden, but is now owned by a Dutch-registered foundation, controlled by the Ingvar Kamprad⁴⁸ family. Inter IKEA Systems B.V. is the owner/franchiser of the IKEA trademark and the IKEA Concept. It is a Dutch-registered company, with offices in the Netherlands, Sweden and Belgium. IKEA distributes its goods through its retail outlets, which sell contemporary furniture. The IKEA chain has 247 stores in 35 countries; most of them in Europe, the rest in the United States, Canada, Asia and Australia. More than 20 stores opened during 2005.

⁴⁸ Ingvar Kamprad is the founder of IKEA.

6.9.2 Logistics Outsourcing within the IKEA Supply Chain

As Figure 22 depicts below the IKEA Supply Chain starts from the raw material and ends to the IKEA End Customers. IKEA Transport Global is an independent business organization within IKEA which undertakes to manage and control the whole IKEA Supply Chain. Its purpose is to satisfy the service level demands by providing the means to transport IKEA products in a cost-efficient, visible and environmentally-friendly way.

Figure 22 **The IKEA Supply Chain**



(Source: Author)

More than 10000 articles from over 1600 suppliers worldwide are transported to more than 230 stores in about 35 countries.

Transport Global Organization integrates all the former global transport areas within IKEA:

- ▶ Asia Pacific
- ▶ North America
- ▶ Southwest Europe
- ▶ North Europe
- ▶ Southeast Europe
- ▶ East Central Europe

West Central EuropeIKEA Transport Global has as purpose to plan, operate and control the IKEA transports around the globe in order to meet the service levels demands. According to Mr. Peter Olofsson⁴⁹, IKEA outsource 100% of its transports but still fully controls every outsourced transport activity. In the Nordic region, the IKEA DC in Älmhult is in-sourced and the DC in Jönköping is now also in-sourced after April 2006. The important criterion for the IKEA outsourcing is what the LSP Service Providers can do better than IKEA at a lower cost and mainly with improved lead-times. According to Mr. Peter Olofsson, the main key-buying criteria for purchasing LSP services are:

- ▶ Environmental profile of the LSP
- ▶ Social profile of the LSP
- ▶ Financial criteria:
 - ✓ Stability
 - ✓ Net-effect (In terms of capacity, precision and cost)

In a sense, IKEA aims to put limits to its LSP partners so as to have better control over its outsourced activities and secure the efficient and effective transportation throughout its supply chain. The best LSP partner for IKEA is the one that integrates everything and optimizes its transportation. Regarding the Nordic region, the Norwegian Post is a main LSP partner for IKEA and is responsible for transports to Denmark, Norway, Finland and Iceland.

In terms of the communication flow at a global and Nordic level, IKEA has created the Cargo Network System (CNS) which is a mature and stable system implemented and used globally with only some exceptions. In CNS it is possible to do follow-up of carrier's performance and that means integration of communication between Logistics Service Providers (LSP) (e.g. carriers) and IKEA. A new intranet page, Transport Arrival Information Screen (TAIS), used by the IKEA stores to see when the deliveries are expected to arrive, enabling also back-reporting of actual arrivals directly to CNS. An EDI/WEB solution with IKEA carriers has been developed and implemented and further improved the performance and accurate delivery information.

IKEA does not buy any consulting services from 4PL Service Providers and its logistics network management, including design, redesign and control of IKEA's logistics networks, in the Nordic region and worldwide, is 100% in-sourced. Today the company's main strategy is to highly invest in the construction of its own facilities. For instance, IKEA prefers to construct its own Distribution Centres (DC) where such a choice is considered more appropriate. Another growing trend within IKEA is the strategic decision on employing less big LSP partners than more small ones. As a matter of fact, in the past IKEA cooperated with about 238 LSP firms and today they have been reduced to 100 big LSP partners.

⁴⁹ Mr. Peter Olofsson is Transport Manager of IKEA DS North Europe based in Älmhult, Sweden.

6.10 The Case of Stora Enso

6.10.1 Company Background

Stora Enso is a world leader with 16.4 million tonnes of paper and board and 7.7 million m³ of sawn and processed wood products. It consists of four main divisions:

- Publication paper / Fine Paper
- Packaging Boards / Forest Products

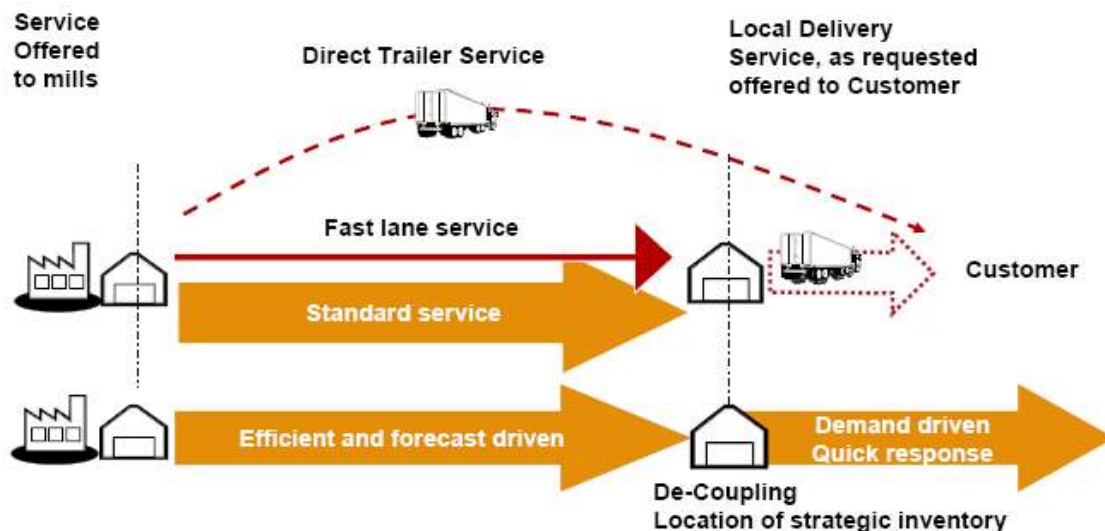
The company has sales approaching EUR 12.4 billion, approximately 45 000 employees in more than 40 countries and its main business characteristics concerning Europe are:

- Widespread production
- About 20 millions tones are produced of which 17 are sold within Europe
- Transportation costs comprise about 10% of the company's turnover
- High dependence on efficient transports, i.e. Supply Chains, in order to bridge long distances and fulfill customer service requirements.

6.10.2 Logistics Outsourcing within the Stora Enso Supply Chain

According to Mr. Stig Wiklund, Director Development and Project Leader NETSS of Stora Enso Transport and Distribution, Stora Enso's supply chain strategy (Figure 23) integrates the following:

Figure 23 The Stora Enso Supply Chain



(Source: Stig Wiklund, Stora Enso)

- Local Distribution Centers (LDC) close to customers
- Multimodal supply systems
- Unitization (e.g. SECU – Stora Enso Cargo Units)
- Unit level identification
- Supply Chain visibility (e.g. RFID, GPS, etc.)
- Frequency and reliability

Mr. Wiklund considers as key-buying criteria for outsourcing of logistics activities:

- Cost efficiency
- Short- / long-term price
- Quality of service
- Frequency of service
- Sustainability issues (e.g. LSP environmental profile)

Stora Enso mainly buys 3PL Services but not 4PL ones, at least on a frequent basis. Key Performance Indicators for the evaluation of its LSP partners are mainly:

- Cost
- Delivery reliability
- Quality (e.g. damages or not, etc.)

6.11 The Case of SKF Logistics Services

6.11.1 Company Background

According to Mr. Lennart Karlsson, Transport Coordination Manager, and Mr. Mats Kjellberg, Global Product Manager of SKF, SKF Logistics Services is an independent business entity, both of 3PL and 4PL character, within the SKF Group, which provides warehousing and transportation services for the SKF Group worldwide. Based on its wide experience in industrial logistics, SKF Logistics Services also provides integrated logistics services to help external customers. Today, SKF Logistics Services offers and supplies globally integrated logistics services for manufacturers, suppliers and distributors of durable goods across a number of industries, including industrial, automotive and technology.

6.11.2 Logistics Outsourcing within SKF

SKF Logistics Services has adopted an insourcing strategy on warehousing and owns all SKF warehouses in the Nordic region and the rest of Europe. On the other hand, transports have been completely outsourced since 1992. SKF Logistics Services contracts different carriers (i.e. 3PL partners) for the European logistics network (Figure 25) but owns its own Control Tower keeping the total control over the SKF supply chain. The SKF Control Tower was first outsourced to Schenker Dedicated Services AB but then it was decided to be insourced. For SKF main Key Performance Indicators (KPI) can be:

- Load degree
- Lead-time
- Deviations

According to Mr. Kjellberg, key-buying criteria for outsourcing services often seem to be the following:

- Lead-time offered
- Frequency
- Quality
- Price

- Presence in receiving market
- EDI capability

Figure 25 SKF's Logistics Network



(Source: SKF Logistics)

7 ANALYSIS OF THE NORDIC LSP INDUSTRY AND THE LOGISTICS OUTSOURCING

Chapter 7 provides the overall analysis which is based upon the theories and the case presented in Chapter 6 of the present thesis. In the context of the logistics activities' outsourcing, the focus of the analysis lies in the LSP industry's role in the improvement of the Nordic logistics networks.

7.1 The Nordic Logistics Service Providers

In the Nordic region and, in particular, Sweden, there are several Logistics Service Providers (LSP); some of which are presented through case studies in the previous chapter. Considering the definition of the thesis' first sub-problem depicted in Figure 8, the validity of the two main conceptual frameworks of 3PL and 4PL Service Providers can be examined and their different roles, including any existing interfaces, can be further justified. Table 7 presents a comparison of the Nordic business entities examined in the case studies of the sixth chapter. The comparison is structured according to the dimensions of the first sub-problem presented in Figure 8:

- Physical Assets
- Information Systems
- Interface Services⁵⁰
- Intellectual Capital
- IT Integration

As it can be seen in Table 7 the different LSP business entities offer different ranges of logistics services.

- **Green Cargo:**

Being a 3PL Service Provider, Green Cargo mainly provides its clients with transportation and warehousing services supported by Information Technology. It further provides few administrative services like documentation and customs clearance. In the business practice, such administrative services are also provided by 4PL Service Providers. It should be mentioned that Green Cargo plans to offer Control Tower service for its customer Adidas in the near future, which will be regarded as one more interface service of 4PL character. However, Green Cargo does not design, redesign, integrate or control its client's supply chain from a holistic perspective; something that is well done by a 4PL entity at a consulting level.

- **DFDS Tor Line AB:**

DFDS Tor Line AB is a 3PL Service Provider owning physical assets (i.e. terminals, Ro/Ro fleet, etc) and mainly providing transportation and terminal warehousing services which are supported by a tailor-made logistics information system (i.e. *InfoBridge*

⁵⁰ Logistics services which are provided both by 3PL and 4PL providers.

system). This system is the link that connects DFDS Tor Line with its customers, partners, ports and suppliers. Few interface administrative services are also provided throughout the DFDS' Nordic network bridges.

Table 7 Comparison of the Nordic LSP business entities

	3PL Field		Interface Field	4PL Field	
	Physical Services		Interface Services	Knowledge Transfer (Consulting)	
LSP Business Entities	Physical Assets	Information Systems		Intellectual Capital	IT Integration
Green Cargo	YES	YES	YES	NO	NO
DFDS Tor Line AB	YES	YES	YES	NO	NO
Svenska Retursystem AB (SRS)	Only innovative packaging	YES (Not compatible with SRS customers yet)	NO	NO	NO
Port of Göteborg AB	YES	YES	YES	NO	NO
Tetra Laval GT&T	NO	NO	YES	YES	YES
Schenker Consulting AB	NO	NO	NO	YES	Only IT Consulting
Schenker Dedicated Services AB	NO	NO	YES	YES	YES
VOLVO Logistics	Only packaging	YES	YES	YES	YES
SKF Logistics	Only warehousing	YES	YES	YES	YES

▪ **Svenska Retursystem AB (SRS):**

Svenska Retursystem AB comprises a pure 3PL business entity providing only innovative returnable packaging (i.e. physical service) and no interface services. SRS' Returnable Transit Items (RTI) introduce a new era of more efficient retail logistics networks in the Nordic logistics market. Despite the fact that the Nordic retail network efficiency can be reinforced by bar-coding and RFID solutions also provided by SRS, the company's customers are still not ready to adopt such technology.

- **Port of Göteborg AB:**

Port of Göteborg AB can be regarded as a 3PL actor as it offers short-term warehousing services in its terminals and, for the time being, limited IT support. Port documentation services comprise main interface services also provided by 4PL offices.

- **Tetra Laval GT&T:**

Tetra Laval Group Transport and Travel (GT&T) is a 4PL independent business entity and comprises the centre of logistics and transport expertise of Tetra Laval Group. At a consulting basis GT&T delivers cost-efficient solutions by optimizing logistics flows, leveraging volumes, proactive supplier management and continuously securing compliance with trade terms. All that is achieved through consistent knowledge transfer including skills, experience and IT integration. On behalf of Tetra Laval Group, GT&T acts as an intermediary between Tetra Laval Group and several 3PL or 4PL partners in transportation or warehousing. For instance, in Europe several Control Towers owned by LSP actors control Tetra Laval Group's transport and shipping traffic, but GT&T has an ultimate overall control upon these actors. GT&T also provides some interface services mainly concerning documentation that can also be provided by 3PL business entities. In general, GT&T offers consulting, intermediates and buys logistics services for the Tetra Laval Group.

- **Schenker Consulting AB:**

Schenker Consulting AB comprises a pure 4PL competence centre undertaking consultancy tasks in the logistics area and provides several logistics services by creating practical logistics solutions for Sweden and the wider Nordic region. The company is an independent business entity and has access to Schenker Group's competence and experience in projects. In practice, what Schenker Consulting offers its customers is experience, expertise, knowledge, skilled HR (i.e. combined intellectual capital) supported by internal information systems. No Control Tower service is provided but only IT consulting concerning the introduction and establishment of innovative logistics information systems like EDI, RFID or WMS. Regarding interface services of a 3PL nature, it can be said that Schenker Consulting AB provides no such services as the company undertakes its client's supply chain or logistics network from a holistic perspective to analyze and redesign it on a strategic consulting basis; theoretical knowledge is produced and transferred to the client's network for further implementation and network improvement, which is the core competence of every pure 4PL business entity.

- **Schenker Dedicated Services AB:**

Being a 4PL business entity as well, Schenker Dedicated Services (SDS) AB provides customized transport networks for its clients and, in particular, custom-made logistics and transport solutions for large customers operated by a dedicated Control Tower service. SDS also helps its clients improve their information systems and communications flow right from manufacturer through to customer, by taking over its clients' entire operating logistics activities, or parts of them. It should be pointed that SDS employs its own skills, experience, expertise and HR to create tailor-made logistics-network solutions for its

clients from a more practical perspective than Schenker Consulting AB. SDS operates as an intermediary between its clients and Schenker AG to design, buy the right logistics services (e.g. transportation, warehousing, etc.) and build cost-efficient logistics networks. Ultimately, in the context of the Control Tower service provided, SDS can offer some interface services of 3PL character like documentation.

▪ **VOLVO Logistics Corporation:**

Volvo Logistics Corporation (VLC) offers a wide range of 4PL services, designs, handles and develops business logistics systems for the automotive and transport industries worldwide (e.g. the case of transportation costs reduction for VOLVO Trucks Corporation). Packaging is the only 3PL physical service offered by the company. Interface services like customs services and tailor-made information systems (e.g. the A4D system) are provided. VLC is mostly a 4PL independent business entity regardless of its packaging services and any customer-made information systems offered. VLC can integrate its client's information flow from upstream to downstream from a holistic perspective, contract with the suitable 3PL actors for cost-efficient transportation and warehousing.

▪ **SKF Logistics:**

SKF Logistics Services comprises an independent business entity of both 3PL and 4PL character. The company owns only warehouses but contracts with 3PL actors and buys transportation services for the SKF Group worldwide. Based on its wide experience in industrial logistics, SKF Logistics Services also provides integrated logistics services to help external customers like manufacturers, suppliers and distributors of durable goods across a number of industries, including industrial, automotive and technology.

Dividing the Nordic Logistics Service Providers (LSP) into 3PL and 4PL business entities, their contribution to the improvement of the Nordic logistics networks can be easier analyzed, especially within Sweden, and any interfaces between their different roles can be identified.

7.2 The role of the Nordic 3PL Service Providers

In the Nordic countries, regarding Sweden as the reference point, the 3PL Service Providers reinforce and improve their client's logistics networks mainly providing warehousing and transportation services supported by modern and in some cases even tailor-made information systems. In its definition the 3PL business entity offers physical assets backed up by IT systems. Companies like Green Cargo, DFDS Tor Line AB, Svenska Retursystem AB and Port of Göteborg AB extensively invest in the construction of warehouses, port terminals spread around Sweden and the wider Nordic region, and the creation of innovative packaging solutions in some cases (e.g. Svenska Retursystem AB). Great emphasis is placed in the employment of IT systems (e.g. pick-by-voice, RFID, bar-coding, EDI, etc.); systems that can be tailor-made in order to meet the user's special requirements (e.g. A4D for Volvo Buses and Volvo Cars). The Nordic 3PL Service Providers invest and contribute to the restructuring of the region's logistics networking, for instance, establishing warehouses in different parts of Sweden (e.g.

Nörrköping, Helsingborg) or Scandinavia (e.g. Norway, Denmark, Finland) for better customer service and wider coverage of the market as it happens with the tyre market. In the short run, logistics costs per unit can be decreased through better synchronization of the logistics activities offered by the 3PL actors, IT support, and a decrease in the lead-times offered is also resulted. Another significant contribution of the 3PL organizations in the Nordic countries is the sea network bridges (e.g. of DFDS Tor Line AB) that are built up to connect different parts of Scandinavia with the rest of Europe. Today sea shipments comprise a dominant and growing mode of transportation for many Nordic companies. In this mode of transportation the information flow among different actors is of great importance and new IT systems are adopted to improve the network communication (e.g. DFDS' InfoBridge).

7.3 The role of the 4PL Service Providers

On the other hand, the 4PL business entities undertake to improve their clients' Nordic logistics networks or supply chains from a more holistic perspective. As it has already mentioned, such business entities (e.g. Schenker Consulting AB, Schenker Dedicated Services AB, etc.) provide qualified consultancy in the logistics trade and comprise logistics competence centres. In particular, the Nordic 4PL Service Providers develop and implement logistics solutions on a consulting basis by utilizing their experience and knowledge. Consulting comprises an integration of knowledge and experience supported by information systems. Here the concept of information systems or IT addresses a wide spectrum of information systems employed for the facilitation, upgrading and improvement of the clients' logistics-network information flow and communication. As it has already been mentioned, the 4PL Service providers decide on their clients' basic requirements on a strategic and tactical level. At the strategic level, emphasis is placed on the client's business concept, logistics objectives and strategies. It is the level where the direction and frames of the logistics activities are formulated and defined. At the tactical level, the logistics networks' flows are specified by flow set-ups (e.g. Control Tower), network structure, preparation and the supplier agreements (e.g. contracting with 3PL actors).

7.4 Role interfaces

Several interfaces can be identified among the roles of the 3PL and 4PL business entities. Such role interfaces mostly result from the following common administrative services:

- Tendering and contracting LSP partners
- Insurance services
- Payment services
- Order administration
- Customer service
- Claims handling

Common services of administrative nature are presented in the Tables 2 and 3 of the introductory chapter and further can be justified employing case data. For instance, in the case of Green Cargo the distributor best-suited for the Nordic market (e.g. Schenker AB) is employed by Green Cargo so as to transport tyre orders from the company's warehouse premises to the wider Nordic region (e.g. Norway, Finland Denmark). That means that

Green Cargo is contracting another LSP actor to meet the transport needs. Similar role is undertaken by 4PL actors like Schenker Dedicated Services (SDS) AB and VOLVO Logistics Corporation (VLC). These two 4PL business entities are also contracting with several 3PL partners for transportation and warehousing services. In particular, on behalf of its clients, SDS mainly signs contracts with Schenker AG or other partners, and VLC with several 3PL actors like Maersk, Cosco, etc. for different global logistics networks. It is understandable that due to the nature of the contracting role undertaken on behalf of their customers, both the 3PL and 4PL Service Providers further offer claims handling, customer service, payment services and order administration supported by integrated information systems (e.g. the classic EDI or other tailor-made software)

7.5 The Logistics Collaboration in the Nordic region

In the previous chapter which includes several cases of the logistics industry, several inter-organizational relationships and the logistics-network management on which the logistics relations form the basis of logistics networks, are presented. Logistics collaboration among different business entities (e.g. 3PL, 4PL, Suppliers, Manufacturers, Customers, other LSPs) participating in logistics-network setups seems to improve efficiency and effectiveness, and decrease logistics costs. Logistics collaboration is developed on different fields regarding:

- Forecasts (e.g. of monthly / annual article demand)
- Knowledge (e.g. HR training, consulting)
- Resources (e.g. warehouses, truck fleets, etc.)
- Placed orders

Thus, based on the industry cases that have been examined, in the Nordic region logistics collaboration is a structured process of decision-making among the following interdependent parties:

✓ 3PL Service Providers:

- Green Cargo
- Svenska Retursystem AB
- DFDS Tor Line AB
- Port of Göteborg

✓ 4PL Service Providers:

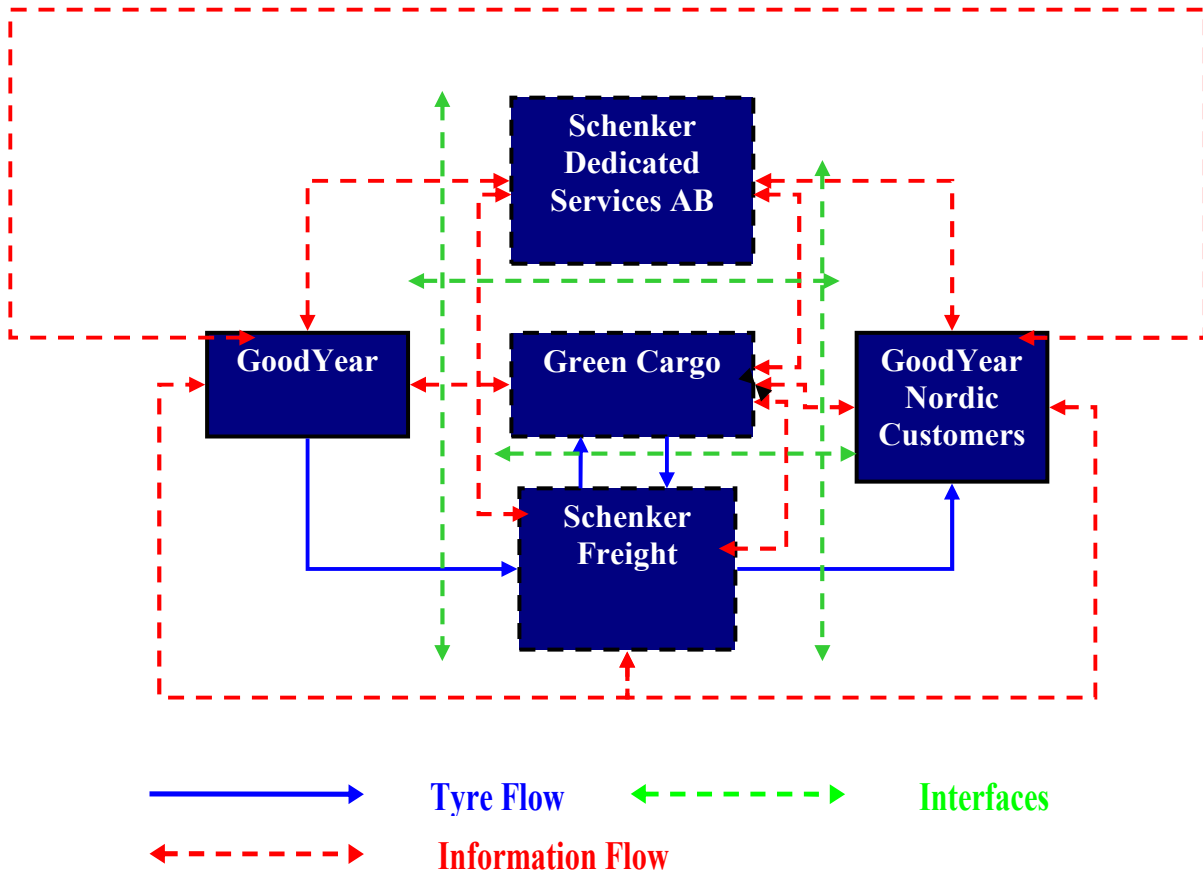
- Schenker Dedicated Services AB
- Schenker Consulting AB

- VOLVO Logistics Corporation
- SKF Logistics
- Tetra Laval GT&T

- ✓ LSP User's (Shippers / Receivers)
- ✓ Carriers

As it has already been mentioned, the Collaborative Logistics Management (CLM) model, which is also depicted in Figure 5, is a three-stage model for the LSPs including the LSP business entities 3PL and 4PL Service Providers. Based on Figure 5, Figure 26 depicts logistics collaboration within GoodYear's logistics network.

Figure 26 Collaboration in GoodYear's Logistics Network



(Source: Author)

GoodYear contracts with Green Cargo and buys warehousing services in Nörrköping to cover the Nordic market. Then, Green Cargo chooses the best-suited carrier (e.g. Schenker Freight) to transport tyre orders from its warehouse premises to several Nordic

destinations (e.g. Norway, Denmark, etc). Schenker Dedicated Services AB can act as intermediary company between GoodYear and Green Cargo and design GoodYear’s logistics network finding the best transportation solutions. Green Cargo can also buy consulting services (e.g. Control Tower service) directly from Schenker Dedicated Services on behalf of its client, GoodYear. Thus, all actors within GoodYear’s Nordic logistics network can simultaneously interact and collaborate for the sake of a well-organized cost-efficient logistics network.

7.6 The outsourcing of logistics activities in the Nordic countries

Considering the definition of the thesis’ second sub-problem depicted in Figure 8 and based on the industry cases provided in Chapter 6, the logistics activities that are usually outsourced to the Nordic Logistics Service Providers (LSP) can be examined and the key-buying criteria which the LSP users employ can be identified. Table 8 presents a comparison of the outsourcing strategies adopted by the examined LSP users of the previous thesis chapter.

Table 8 Outsourcing strategies of LSP Users

LSP Users	Transport Activities	Warehousing Activities	IT Integration
IKEA	Outsourced	Combined Strategy	Inourced
Tetra Laval	Outsourced	Combined strategy	Outsourced
SKF	Outsourced	Combined Strategy (Mostly in-sourced)	Outsourced
VOLVO Buses	Outsourced	Inourced	Outsourced (Tailor-made)
Stora Enso	Outsourced (Except for SECU)	Inourced	Inourced
Mölnlycke Health Care⁵¹	Outsourced	Combined strategy	Outsourced
Uponor⁵²	Outsourced	Inourced	Inourced

(Source: Author)

The comparison is structured according to the dimensions of the second sub-problem presented in Figure 8 of Chapter 3:

⁵¹Data received from Hans Jansson, Logistics Manager of Mölnlycke Health Care AB in Göteborg.

⁵²Data received from Thomas Hyltner, Logistics Manager of UPONOR AB in Fristad.

- LSP Users
- Transport Activities
- Warehousing Activities
- IT Integration

As a matter of fact, in the Nordic region the companies (i.e. LSP users) contracting with LSP partners adopt different outsourcing strategies to meet the demands of their logistics networks. The outsourcing of logistics activities to 3PL and 4PL Service Providers aims to create agile logistics networks through a combination of tangible assets (e.g. warehouses, truck fleets, infrastructure, information systems and hardware infrastructure), and intangible assets (e.g. skilled human resources) offering the needed intellectual capital, experience, know-how to design, redesign and control agile logistics set-ups, plan commodity routes and fleet capacity, manage warehousing and control stock availability, track-and-trace throughout the distribution channels). Table 8 shows that in Sweden the LSP users strategically choose to completely outsource their transport activities to 3PL or 4PL Service Providers. Apart from Stora Enso which uses its own cargo units (i.e. SECU) the rest customers of logistics services do not in-source any transport activities, which means that these companies do buy everything concerning transportation from their LSP partners. Regarding warehousing activities, the LSP users adopt different outsourcing strategies depending on their operations and needs. IKEA, SKF, Tetra Laval and Mölnlycke Health Care have decided on a combined strategy of both outsourcing and in-sourcing. For instance, the main IKEA strategy is to invest in its own local warehouses (LW) and distribution centres (DC) so as to acquire full control over its warehousing activities, despite the fact that today there are a few outsourced warehouses (e.g. LW in Jönköping until April 2006). Volvo Buses, Uponor and Stora Enso own their own warehouses following a clear in-sourcing strategy. Regarding IT integration in the form of a Control Tower service, Tetra Laval, SKF, Volvo Buses and Mölnlycke Health Care have contracted with 4PL partners for a Control Tower service which integrates the information and communication flow throughout the logistics network. For instance, Tetra Laval and SKF have bought Control Tower services (e.g. IPAL system) from Schenker Dedicated Services AB. On the other hand, IKEA, Uponor and Stora Enso have total control over their logistics networks and own their tailor-made information systems. For instance, in terms of the communication flow, IKEA has built up the Cargo Network System (CNS) which is a stable system implemented and used worldwide with only some exceptions. In CNS it is possible to do follow-up of carrier's performance and that means integration of communication between Logistics Service Providers (LSP) (e.g. carriers) and IKEA. A new intranet page, Transport Arrival Information Screen (TAIS), used by the IKEA stores to see when the deliveries are expected to arrive, enabling also back-reporting of actual arrivals directly to CNS. An EDI/WEB solution with IKEA carriers has been developed and implemented and further improved the performance and accurate delivery information.

LSP users employ several key-buying criteria to first evaluate and then choose the best LSP companies to meet their outsourcing needs. Table 9 shows the key-buying criteria per examined LSP user.

Table 9 Key-buying Criteria of the Nordic LSP Users

LSP Users	Key-buying criteria
IKEA	<ul style="list-style-type: none"> ✓ Environmental profile of the LSP ✓ Social profile of the LSP ✓ Financial criteria: Stability / Net-effect (In terms of capacity, precision and cost) ✓ Quality of service
Tetra Laval	<ul style="list-style-type: none"> ✓ Performance ✓ Transport (e.g. On-time-in-full delivery) ✓ Quality of service ✓ Environmental profile of the LSP
SKF	<ul style="list-style-type: none"> ✓ Lead-time ✓ Frequency of service ✓ Quality of service ✓ Price ✓ Presence in receiving market ✓ EDI capability
VOLVO Buses	<ul style="list-style-type: none"> ✓ Cost efficiency ✓ Lead-time ✓ Quality of service ✓ Environmental profile of the LSP
Stora Enso	<ul style="list-style-type: none"> ✓ Cost efficiency ✓ Short- / long-term price ✓ Quality of service ✓ Frequency of service ✓ Environmental profile of the LSP
Mölnlycke Health Care ⁵³	<ul style="list-style-type: none"> ✓ Damage of goods ✓ Quality of service ✓ Response time
Uponor ⁵⁴	<ul style="list-style-type: none"> ✓ Quality of service ✓ Lead-time ✓ Cost efficiency

(Source: Author)

In Table 9, the dominant key-buying criterion is the quality of service provided by the LSP business entity to its client (i.e. LSP user). The quality of service as key-buying criterion is of high priority for all the examined LSP users. Second in-priority criterion is

⁵³ Data received from Hans Jansson, Logistics Manager of Mölnlycke Health Care AB in Göteborg.

⁵⁴ Data received from Thomas Hyltner, Logistics Manager of UPONOR AB in Fristad.

the environmental profile of the LSP partner and third the cost-efficiency. In Sweden and the wider Nordic region, the buyers of logistics services place great emphasis on environmental issues following the EU directives as well. Lead-time comes fourth in priority.

7.7 Nordic Logistics Network Performance

In some industry cases, the role of the Logistics Service Providers (LSP) in the Nordic logistics networks is measured with the employment of different Key Performance Indicators (KPI). As it has already been pointed, Key Performance Indicators (KPI) are quantifiable measurements that reflect the critical success factors of a corporation (or a network). However, the analysis of the present thesis will not include any measurements or results as only qualitative research has been adopted (see Chapter 4). In terms of the Nordic logistics-network performance, there is a wide range of KPI metrics that can measure the performance.

In the case of Green Cargo, the employed KPI are:

- Picking correct item
- Customer order fill rate
- Transport fill rate
- Inventory record accuracy
- Product damages

For VOLVO Bus Corporation the logistics network performance is mainly measured by:

- Delivery precision
- Lead-time

Tetra Laval GT&T divides KPI into three groups:

- Time KPI:
 - Total transportation time (Level 1)
 - Main transportation time (Level 2)
 - Import customs clearance time (Level 2)
 - On carriage transportation time (Level 2)
- Cost KPI:
 - Total shipping cost (Level 1)
 - Administration Cost (Level 2)
 - Transportation Cost (Level 2)
 - Import Cost (Level 2)
- Quality KPI:
 - On time in full delivery point (Level 1)
 - Transport damage (Level 2)
 - Accuracy of documents handed over to customs (Level 2)
 - Confirmed order = Shipping instruction (Level 2)
- Environment KPI:
 - CO₂ emission
 - Usage of green suppliers

For SKF main KPI can be:

- Load degree
- Lead-time
- Deviations

It is obvious that a wide range of KPI is employed by the Nordic actors for the measurement of the logistics-network performance. Of course there many more KPI that are used as performance metrics however here the author refers to those having been mentioned by the industry respondents. Parameters like the lead-time, the quality, the cost, the environmental impact are highly considered by the KPI as they can show the analyst how much effective and cost-efficient a Nordic logistics network is.

8 CONCLUSIONS

Chapter 8 includes the conclusions of the conducted research concerning the role of the Logistics Service Providers in the Nordic logistics networks.

Two different generations of Logistics Service Providers (LSP) aim to serve the Nordic logistics networks not only by providing physical assets to their clients, but also through intellectual capital transfer supported by information systems. Here, in the present research, the LSP companies were divided into:

- 3PL Service Providers and
- 4PL Service Providers

In the context of the logistics outsourcing, the main purpose of the research was to study the role of the 3PL and 4PL actors in the improvement of the Nordic logistics networks. Exploratory research design was employed and was based on qualitative observations, semi-structured interviews and industry cases, and its approach was mostly inductive. The research process was structured according to the research process model which is depicted by Figure 27 in Appendix B.

8.1 3PL and 4PL: Are these two conceptual frameworks valid only in theory or in business practice as well?

From the beginning of the present research the author is aware of the conceptual frameworks of 3PL and 4PL as these concepts have been studied in the context of his postgraduate studies both at Gothenburg University and Chalmers University of Technology. A description of the mentioned concepts is provided in the introductory Chapter 1 including two relevant tables (Table 2 and Table 3) as well. In the published literature the concepts of 3PL and 4PL have been widely discussed, however, the greatest and most interesting challenge for the author was to study them within the business practice. After the research process a primary conclusion is that the concepts of 3PL and 4PL are also valid in the business practice. Not only academic institutions but corporations as well define and use these concepts to address the different generations of LSP actors. During the conducted interviews, most of the respondents were also aware of and used the 3PL and 4PL terminology. Moreover, the official websites of the LSP business entities employ these terms as well.

8.2 The 3PL and 4PL Service Providers in the Nordic logistics networks

Regarding the role of the LSP actors in the Nordic countries, several conclusions can be drawn and summed up. The 3PL Service Providers contribute to the Nordic logistics networks mainly providing warehousing and transportation supported by information systems. The 3PL actors invest in the construction of new infrastructure, warehouses and terminals and even in the creation of innovative packaging solutions, and in the short run, logistics costs per unit can be decreased through better synchronization of the logistics activities offered. IT support and a decrease in the lead-times offered is also feasible. The 4PL Service Provider undertakes to improve the Nordic logistics networks from a more holistic perspective. It provides qualified consultancy in the Nordic logistics trade

and comprise logistics competence centres spread throughout Sweden and the rest of Scandinavia. These LSP actors create logistics solutions employing their own experience, skills and knowledge (i.e. a form of intellectual capital as explained in Chapter 2) to decide on their clients' basic requirements on a strategic and tactical level. At the strategic level, emphasis is placed on their client's business concept, logistics objectives and strategies. At the tactical level, the logistics networks' flows are controlled by a Control Tower, network structure, preparation and the supplier agreements.

8.3 The logistics activities' outsourcing in Sweden and the Nordic countries

In Sweden and the rest of Scandinavia, companies adopt a wide range of outsourcing strategies to meet the demands of their logistics networks. In particular, almost all the examined LSP users strategically choose to completely outsource their transport activities to LSP partners. This can lead to remarkable reductions in their logistics costs and focus on core competencies. Considering warehousing activities, the LSP users choose different outsourcing strategies depending on their operations and their needs. Some of them decide on a combined strategy of both outsourcing and in-sourcing. Such combined strategy means not only investments in own warehouses or own distribution centres so that some control over the warehousing activities is undertaken but purchasing of warehousing services as well. Other LSP users completely own their own warehouses following a clear in-sourcing strategy. Regarding IT integration in the form of a Control Tower service, some corporations decide on contracting with 4PL partners for receiving Control Tower services that integrate the information and communication flow throughout their Nordic logistics networks. In general, after the research process, it can be concluded that the logistics activities' outsourcing is a fast growing trend and business practice, especially within transport operations and activities, mainly due to:

- ✓ Focus on core competencies
- ✓ Increasing customer demands
- ✓ Globalization - Expanding to unfamiliar markets
(E.g. the Baltic States, Russia, China, etc.)
- ✓ To assess the present and future market prospects for a product
- ✓ Increasing environmental awareness
- ✓ Increase in cost-efficient foreign competition
- ✓ Development of supply chain partnerships

8.4 IT, Knowledge and Environment in the Nordic logistics networks

In the era of globalization logistics outsourcing is a fast growing trend and business practice throughout the Nordic region as LSP actors can guarantee improved network performance within the existing IT-, knowledge- and environment-led economic environment. As it has already been pointed, Sweden is one of the world's leading IT countries (i.e. 1st for the last four consecutive years according to ISA), and Swedish companies integrate highly advanced IT solutions into their logistics activities. Systems for RFID and traceability are widely employed in most industry sectors. The majority of Logistics Service Providers (LSP) also provides IT-based logistics services (e.g. RFID,

EDI, track-and-trace facilities, fleet-and-vehicle management and online booking). In terms of knowledge, ISA reports that the Swedish business culture is characterized by the delegation of responsibility throughout company organizations and this coupled with excellent English language skills results in high productivity and professional management of customer relations in the logistics arena. Regarding the environmental factor, the present research shows (see Table 9) that most of the LSP actors and LSP users are highly concerned about the environmental issues and this factor comprises highly prioritized key-buying criterion for contracting LSP partners.

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Stora Enso with Stig Wiklund, Director Development and Project Leader NETSS, Stora Enso Transport and Distribution, Göteborg

Tetra Laval with Lina Kruger, Purchaser, Lund

VOLVO Buses with Claes-Göran Persson, Logistics Manager, Borås

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Green Cargo

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APPENDIX A

Unstructured Interview Questionnaires

Open Questions to LSP companies

1. How would you describe the logistics activities outsourcing in the wider Nordic region? How many customers do you have in Sweden and other Nordic countries? In which industry do they operate?
2. Which range of logistics solutions do you offer and to which main customers in Sweden?
3. How do you measure logistics network performance in terms of efficiency and effectiveness?
4. Would you consider your company's structure both as a 3PL and 4PL player in the Nordic logistics market?
5. What future challenges do you believe will arise in the Swedish and wider Nordic logistics market over the next decade?
6. It is said that Sweden is regarded as the "*Logistics Hub*" of Scandinavia. How would you evaluate and capitalize this statement?
7. "*Tangible Assets*", "*Intellectual Capital*" and "*Information Systems*" comprise the main elements of your outsourcing logistics activities. How would you evaluate and define these concepts from your company's perspective?
8. Do you foresee any changes in your customer needs and demands over the next years?

Open Questions to LSP Users

1. How would you describe your company's in-sourcing /out-sourcing of logistics activities in Sweden and the wider Nordic region?
2. Which logistics activities do you outsource, why and to which extent?
(e.g. transportation, warehousing, supply-chain design, etc)
3. Which Logistics Service Providers (LSP) do you cooperate with? 3PL, 4PL or both?
4. Which key-buying criteria do you employ when you choose an LSP partner?
5. Why do you prefer logistics in-sourcing to logistics out-sourcing?
6. How do you define the concepts of 3PL and 4PL Service Providers?
7. Do you buy any logistics consulting services from 4PL partners?
8. How do SKF's 3PL / 4PL partners assist you to improve your logistics networks' performance?
9. How do SKF's in-sourcing improves this performance?
10. Which IT systems do you employ for the improvement and upgrading of your information flow?
11. How do you measure your logistics networks' performance in terms of efficiency and effectiveness? Which Key Performance Indicators (KPI) do you use?

12. What future challenges do you believe will arise in the Swedish and wider Nordic logistics market over the next decade?
13. It is said that Sweden, and in particular Gothenburg, is regarded as the “*Logistics Hub*” of Scandinavia. How would you evaluate and capitalize this statement?
14. In brief, could you give me descriptions of your logistics networks in Sweden and further in Scandinavia (including your outsourced activities)?
15. Could you provide me with real cases of your company about how your company improved its logistics networks’ performance through in-sourcing /out-sourcing?
16. Do you provide your logistics staff with educational training in cooperation with 4PL Service Providers (i.e. logistics consulting entities)?

Sample Interview Minutes

Schenker Dedicated Systems AB

Interviewee: Robert Ljunggren, Consulting Manager

1. How would you describe the logistics activities outsourcing in the wider Nordic region? How many customers do you have in Sweden and other Nordic countries? In which industry do they operate?

There are two parallel and conflicting trends:

1. More outsourcing – companies that are focusing on their core business.
2. Not sourcing and insourcing – companies that either would like to own and operate the logistic system themselves because they see it as a part of their product or companies that are insourcing to have their own logistics department for managing the warehouses and distribution.

Number of customers: 7-10 depending on how to define customers.

Various industries: Paper, Industry, Chemical, Healthcare and Agriculture.

2. Which range of logistics solutions do you offer and to which main customers in Sweden?

We offer 4PL services and activities related to transports and warehousing.

3. How do you measure logistics network performance in terms of efficiency and effectiveness?

The logistics network performance can be measured by:

- Cost efficiency in many ways
- Time performances; loading in time, delivery on time etc
- Order fulfilment
- Delivery deviations

4. Would you consider your company's structure both as a 3PL and 4PL player in the Nordic logistics market?

I would say so both. It is difficult to define a strict borderline for what you do and don't. In each case you work close together with the customers and the roles are defined.

5. What future challenges do you believe will arise in the Swedish and wider Nordic logistics market over the next decade?

As industry is moving out to East Asia the demand for international transport services will increase. The core business focus will continue. Companies will expect that their logistics operations are produced by 3PL and the demand for more activities and administration will be allocated to the Logistic Service Providers (LSP). The demand for 4PL, transport management, outsourcing will probably increase. Mergers between

transport providers will continue. Fuel cost increase and new alternatives need to be implemented, and road taxes will probably continue. More problems with congestions will bring about higher logistic costs.

6. It is said that Sweden is regarded as the “Logistics Hub” of Scandinavia. How would you evaluate and capitalize this statement?

It is true in a way. In most analysis you find out that the distribution cost will be lowest if you distribute from Sweden and lead-time from order to delivery is shortest. But in some cases it is not rational to allocate warehouses to the central areas of Sweden due to capacity problems. In each case you need to evaluate the unique demand and requirements for the customer. The ports will have even more impact in the future, and Sweden has a strong position, so I think that infrastructure will play an important role.

7. “Tangible Assets”, “Intellectual Capital” and “Information Systems” comprise the main elements of your outsourcing logistics activities. How would you evaluate and define these concepts from your company’s perspective?

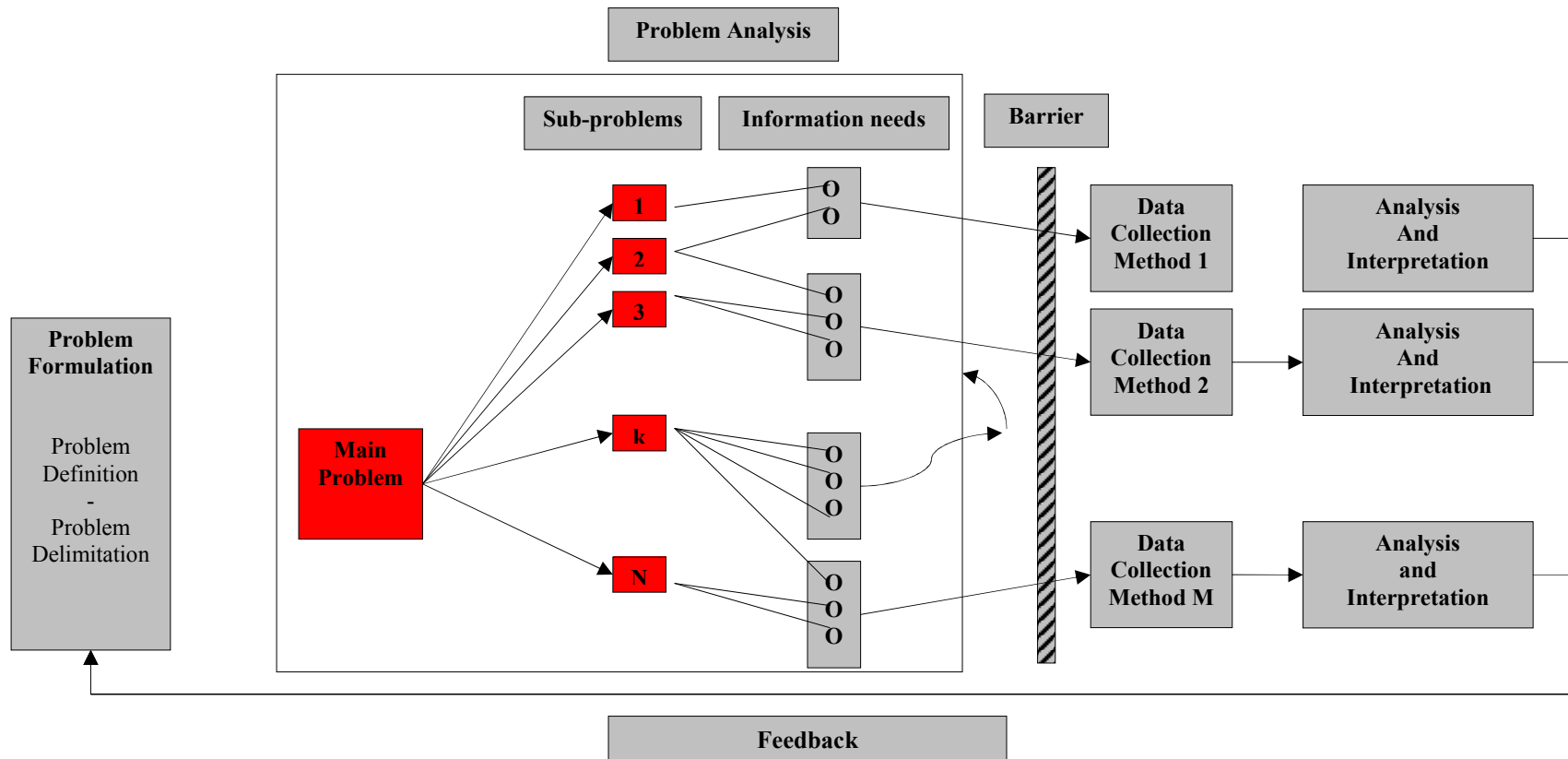
We are non-asset based and it is mainly important due to that you need to be flexible and seek the optimal solution for the customer. Then, you allocate resources based on the requirements. Competence is the key for 4PL companies. You need to understand your customers business and the expectations of their customers, create the logistic solution, continuous improvements, automate and integrate processes. IT is the platform in 4PL and efficient logistic systems need to fully support the operations, be flexible and coordinate all transactions related to the logistics.

8. Do you foresee any changes in your customer needs and demands over the years?

We expect that integration between companies will increase. We will perform what traditionally our customers have done previously. For instance, refine/manufacture/adjust products, purchasing and order process, invoicing, customer service etc.

APPENDIX B

Figure 27 The Research Process Model⁵⁵



(Source: Prof. Arne Jensen - 2006)

⁵⁵ Prof. Jensen, Arne (2006) "Seminar in Research Methodology I", Logistics & Transport Research Group, Graduate Business School, School of Economics and Law, Göteborg University

