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**State of Logistics and Operations Management  
in Finnish and Swedish Companies  
– Survey Research Findings**



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## **ABSTRACT**

In this research we are examining what is the status of logistics and operations management in Finnish and Swedish companies. Empirical data is based on the web based questionnaire, which was completed in the end of 2007 and early 2008. Our examination consists of roughly 30 answers from largest manufacturing (highest representation in our sample), trade and logistics/distribution companies. Generally it could be argued that these companies operate in complex environment, where number of products, raw materials/components and suppliers is high. However, usually companies rely on small amount of suppliers per raw material/component (highest frequency is 2), and this was especially the case among Swedish companies, and among those companies, which favoured overseas sourcing. Sample consisted of companies which mostly are operating in an international environment, and are quite often multinationals.

Our survey findings reveal that companies in general have taken logistics and information technology as part of their strategy process; utilization of performance measures as well as system implementations have followed the strategy decisions. In the transportation mode side we identify that road transports dominate all transport flow classes (inbound, internal and outbound), followed by sea and air. Surprisingly small amount of companies use railways, but in general we could argue that Swedish companies prefer this mode over Finnish counterparts. With respect of operations outsourcing, we found that more traditional areas of logistics outsourcing are driving factors in company's performance measurement priority. In contrary to previous research, our results indicate that the scope of outsourcing is not that wide in logistics/operations management area, and companies are not planning to outsource more in the near future. Some support is found for more international operations and increased outsourcing activity. From the increased time pressure of companies, we find evidence that local as well as overseas customers expect deliveries within days or weeks, but suppliers usually supply within weeks or months. So, basically this leads into considerable inventory holding. Interestingly local and overseas sourcing strategy does not have that great influence on lead time performance of these particular sourcing areas – local strategy is anyway considerably better in responding on market changes due to shorter supply lead times.

In the end of our research work we have completed correlation analysis concerning items asked with Likert scale. Our analysis shows that seeing logistics more like a process rather than function, applying time based management, favouring partnerships and measuring logistics within different performance dimensions results on preferred features and performance found in logistics literature.

**Keywords:** Logistics, Finland, Sweden, Outsourcing, Internationalization

## TIIVISTELMÄ

Tässä tutkimuksessa tarkastelemme logistiikan ja toiminnanohjauksen tilaa suomalaisissa ja ruotsalaisissa yrityksissä. Empiirinen aineisto on kerätty verkkokyselyllä, joka toteutettiin vuoden 2007 loppupuolella ja vuoden 2008 alussa. Kokonaisuudessaan aineisto käsittää n. 30 vastausta, lähinnä valmistavilta (suurin osuus vastauksista), kaupan alan sekä logistiikan ja jakelun yrityksiltä. Yleisesti ottaen voimme sanoa, että vastanneet yritykset toimivat haastavassa monimutkaisessa ympäristössä, jossa lopputuotteiden, komponenttien / raaka-aineiden ja tavarantoimittajien määrä on korkea. Tätä taustaa vasten ehkäpä yllättäenkin havaitsimme, että yritykset kuitenkin suosivat kovin vähäistä määrää toimittajia per komponentti / raaka-aine (korkein frekvenssi on 2); tilanne oli erityisesti kuvatenlainen ruotsalaisten yritysten, ja niiden vastaajien keskuudessa, jotka suosivat enemmän kaukaisempia toimittajia. Vastanneet yritykset toimivat yleensä kansainvälisessä ympäristössä ja määrittelivät itsensä monikansallisiksi yrityksiksi.

Tutkimuksemme mukaan yritykset ovat kummassakin maassa ottaneet logistiikan ja tietojärjestelmät osaksi strategiaprosessia, ja suorituskyvyn mittaus sekä järjestelmien käyttöönnotot ovat olleet seurausta tästä kehityksestä. Kuljetusmuotojen suhteen yritykset suosivat maantiekuljetuksia kaikissa mahdollisissa tapauksissa (toimittajilta tuleva, sisäinen ja asiakkaalle lähtevät kuljetukset), jonka jälkeen suosituimmuusjärjestyksessä seuraavat meri- ja lentokuljetukset. Yllättävän vähän vastaajista käyttää rautatiekuljetuksia, mutta näyttää siltä, että ruotsalaisyritykset suosivat näitä suomalaisia enemmän. Ulkoistettujen alueiden osalta päädyimme siihen, että tavanomaisten toimintojen (kuten varastointi ja kuljetukset) toimivat ajureina suorituskyvyn mittaukselle. Yllättävää kyllä, vastanneet yritykset eivät ole ulkoistaneet toimintojaan niinkään suuressa mittakaavassa, eikä ulkoistamisen nähdä lisääntyvän tulevaisuudessakaan. Löysimme jonkin verran tukea myös sille, että ulkoistukset johtavat tai johtuvat lisääntyneestä kansainvälisestä toiminnasta. Kyselymme perusteella näyttäisi myös siltä, että yritykset ovat nykyisin enemmän aikapaineen alla, sillä asiakkaat odottavat toimitustensa olevan toimitettuja päivissä tai korkeintaan viikoissa; yritykset raportoivat taas toimittajiensa toimitusaikojen olevan viikkoja tai kuukausia. Tämä tilanne johtaa lisääntyneeseen varastointiin. Yllättävää on kyllä se, että hankintastrategia (paikallinen vs. kaukaisemmat toimittajat) ei paljoakaan johda etuihin toimitusaikojen suhteen näiltä alueilta – on kuitenkin huomattava, että paikalliset toimittajat ovat huomattavan paljon nopeampia toimittamaan tilauksiaan.

Tutkimuksemme lopussa analysoimme Likertin asteikoilla vastattuja muuttujia korrelaatioanalyysin keinoin. Analyysimme osoittaa, että logistiikan näkeminen prosessina funktionaalisen ajattelun sijaan, aikaperusteinen johtaminen, partnerimuotoiset yhteistyösuhteet ja monipuolinen logistiikan suorituskyvyn mittaus johtavat haluttuihin organisaation ominaisuuksiin ja suorituskykyyn, jotka usein esiintyvät logistiikan kirjallisuudessa.

**Avainsanat:** Logistiikka, Suomi, Ruotsi, ulkoistaminen, kansainvälisyys

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## APPENDICES

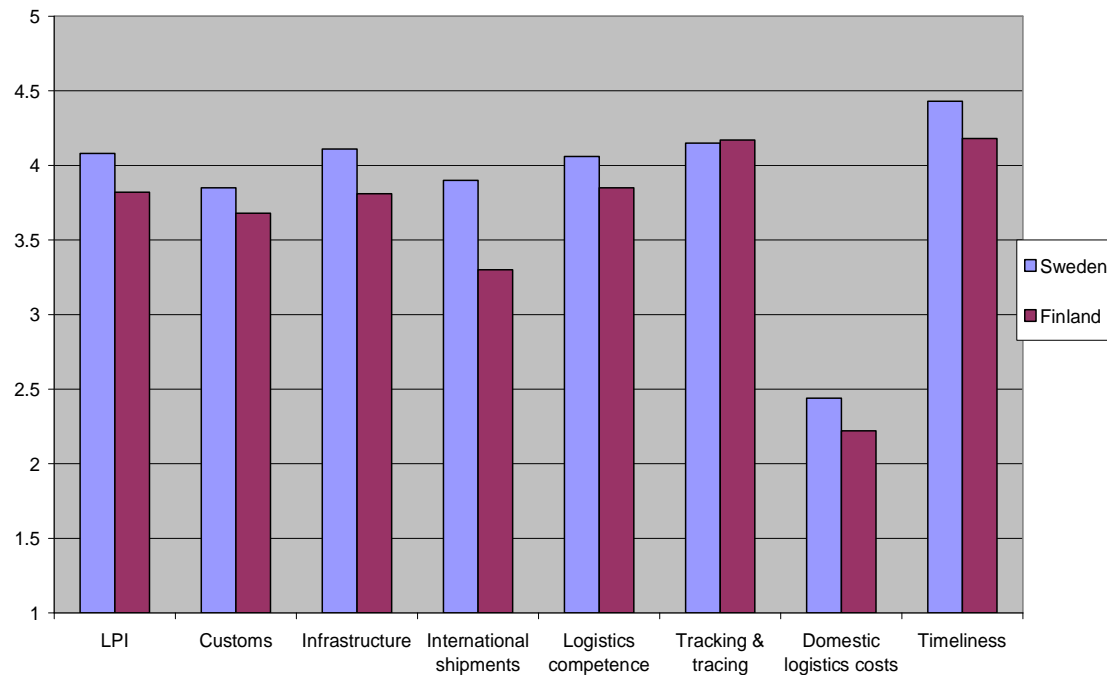


# 1 INTRODUCTION

In this research work we are interested about the state of logistics and operations management in North-European countries, namely in Finland and Sweden. Based on macro-level examinations and different indices these two countries are rather similar in logistics area; e.g. World Bank (2007) logistics performance index for Sweden was the third best in the whole world, while Finland was having 15<sup>th</sup> position; World Economic Forum (2007) survey showed that overall quality of infrastructure in Finland is the 7<sup>th</sup> best in the world, followed by Sweden in 15<sup>th</sup> place. So, operating environment for companies should be one of the best in these countries within world scale. However, it should be reminded that third party logistics (3PL) relationships and partnering started years before in Sweden than in Finland – possible difference in operating modes of logistics has diminished, but during 90's Swedish 3PL was well ahead with this respect (e.g. in research field surveys for providers were completed from early 90's onwards, like reported in Laarhoven et al. 2000). Thus, it is interesting to note from Figure 1 that Sweden still holds certain kind of advantage over Finland in all sub-branches of logistics performance index, except tracking and tracing. Greatest absolute difference is in international shipments, and this is most probably connected on the fact that southern part of Sweden is very near of Central Europe and it has well connected sea harbours, such as Gothenburg. In Finland nearly all harbours are fed by largest European ports, and do not have that many direct international connections available. Sweden is also a bit more developed in deregulation of transport sector, e.g. railways have had competition for nearly two decades (Hilmola, Ujvari & Szekely 2007), while Finnish markets opened for freight competition in 2007 (Hilmola & Leino 2006). From previous research we know that Finnish companies are generally better presented through warehouses in Central and Eastern Europe than Sweden (Hilmola & Szekely 2006). Actually Swedish companies are having warehouses mostly in 'old' Western Europe. In this research work we compare these countries in questionnaire interest areas, but in most significant part of the analysis we see them as a one group, and present findings from different areas of logistics and operations management. Earlier mentioned marco-level indicators and earlier research works have motivated us to see these countries as one group in analysis. In business side this is quite often the case as well – for example Finnish and Swedish companies have established impressive amount of mergers and acquisitions during the last two decades of



time (Torkkeli et al. 2007: 66), and 68 % of Finnish transactions are either done to home country (48 %) or to Sweden (20%).



**Figure 1.** Logistics performance index (LPI) and its sub-areas in Sweden and Finland. Source: World Bank (2007)

Outsourcing of functions, which are not related to firm's core competencies have gained a lot of popularity since their introduction in 1980s (all is dated back to introduction of IBM compatible PC) – with related to distribution activities, third party solutions started to appear during 80's, and these service firms were e.g. strong in transportation or warehousing (Berglund et al. 1999). It was just a matter of time that this trend would reach in significant manner capital intensive logistics functions. In 1990s logistics activities outsourcing started to gain ground and main drivers for this development as identified from literature by Lau and Zhang (2006) are: reducing costs, adding options to strategic considerations (accelerating business-process re-engineering, concentrating on core competencies, creating partnerships, and enhancing flexibility) and environmental statements (such as IT development, globalization, and capabilities of suppliers). Logistics outsourcing in 90's was mostly driven by network externalities (e.g. in Häkkinen 2005), which such companies as DHL, TNT and UPS offered (Berglund et al. 1999). Recently Cap Gemini (2007) concluded in their annual third-party logistics survey that in Europe about 91 percent of the companies have outsourced their domestic and 87 percent their international transportation. Other often outsourced logistics activities are

warehousing (68%), forwarding (51%) and customs clearance and brokerage (58 %). One motivation of this study is to find out, what is the scope of outsourcing in Finland and Sweden; this examination is interesting in a way that latter mentioned country should have better platform for large scale use of outsourcing. We also try to compare the scope of outsourcing to European level, e.g. presented in before mentioned study.

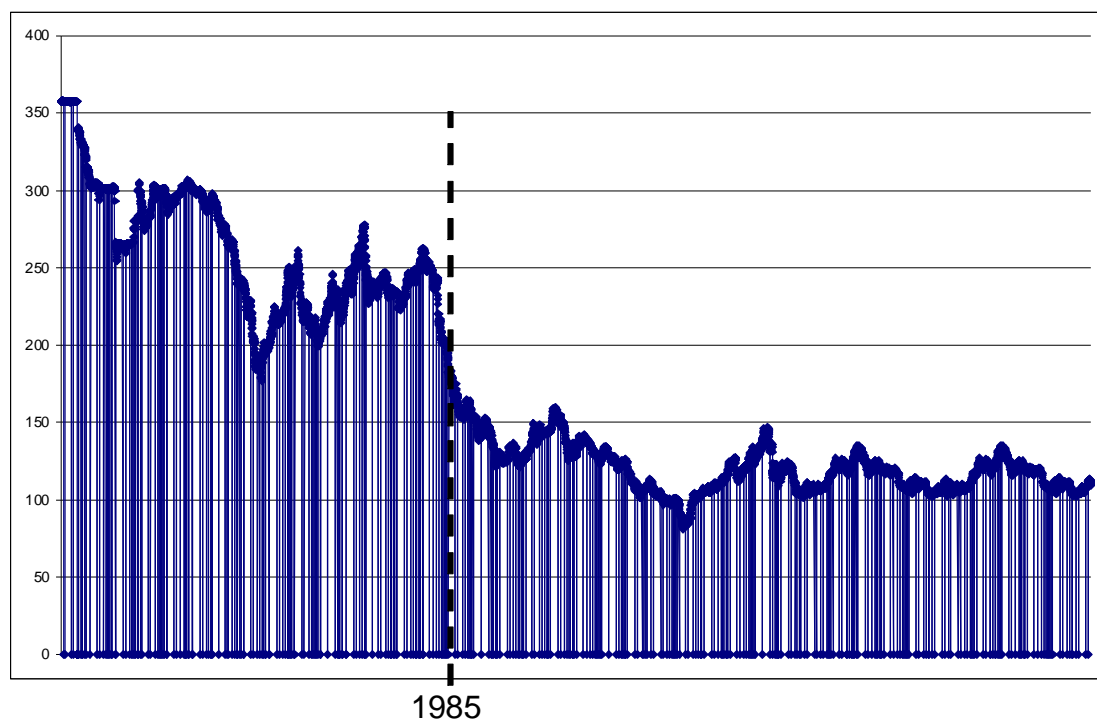
This report is structured as follows: In Section 2 we will review literature related to general trends in logistics and operations management, while Section 3 is devoted on logistics outsourcing issues. Thereafter in Section 4 we describe the research methodology of completed survey, and in Section 5 we will present the results of this survey. We discuss about such issues as general characteristics of respondents, direction of logistics and operations management strategy, level of outsourcing, differences between Finnish and Swedish companies, and possible effects on lead time of favouring some region of suppliers. In Section 6 we will discuss about the results, and present correlation analysis concerning Likert scale questions of strategy and overall direction of a company. In final Section 7 we conclude our work, and provide further avenues for research.

## **2 METHODS CREATED BY JAPANESE AND CHINESE COMPANIES IN LOGISTICS AND OPERATIONS MANAGEMENT**

Four decades ago Japanese manufacturing companies were taking market share in numerous different industries, and as end result companies of this country have significant position currently in electronics, semi-conductors, automotive and machine building industries. For example, Toyota has been able to grow steadily in automotive manufacturing, and among the journey has by-passed numerous automotive giants from Europe and US – currently Toyota is the largest automotive manufacturer in the world, and profitable in industrial sector considered as sun set industry. New management principles related to zero/low inventories, customer focus, small lot size production, waste reduction emphasis, employee rotation in different functions, and defect free manufacturing have all spread around the world, and currently Lean management approach is applied in numerous different industries (from origins of JÍT enhanced profitability, please see Mistry 2005). Also Japanese keiretsu type of supplier network management (pyramid, where Original Equipment Manufacturer just assembles products and supplier network is owned by banks and OEMs, and whole structure is based on few amount of actors and long-term contracts, more information from financial and manufacturing type of keiretsus, please see Ostrom 2000) has been argued to be efficient even in old west (Kros et al. 2006) – suppliers should have longer contracts, higher responsibility over product development and supply modules instead of components, and being more responsible over smooth flow of materials in supply chain (e.g. through Vendor Managed Inventory contracts).

However, if Japanese revolution is being observed from macro-economical point of view, development of currency valuation against US dollar tells a different story. Japanese just in time miracle in manufacturing was having strongest hold during 70's and 80's, but thereafter larger market share increases in global markets have been rather conservative. So, old Bretton Woods currency contract was a good shield (1 USD = 360 Yen) for Japanese manufacturing companies to develop fine-tuned and high quality systems to challenge other companies in a world level. Thus, high valuation of Yen (currently three times valuable as US dollar – Japan has tried to keep its interest rates as low as possible,

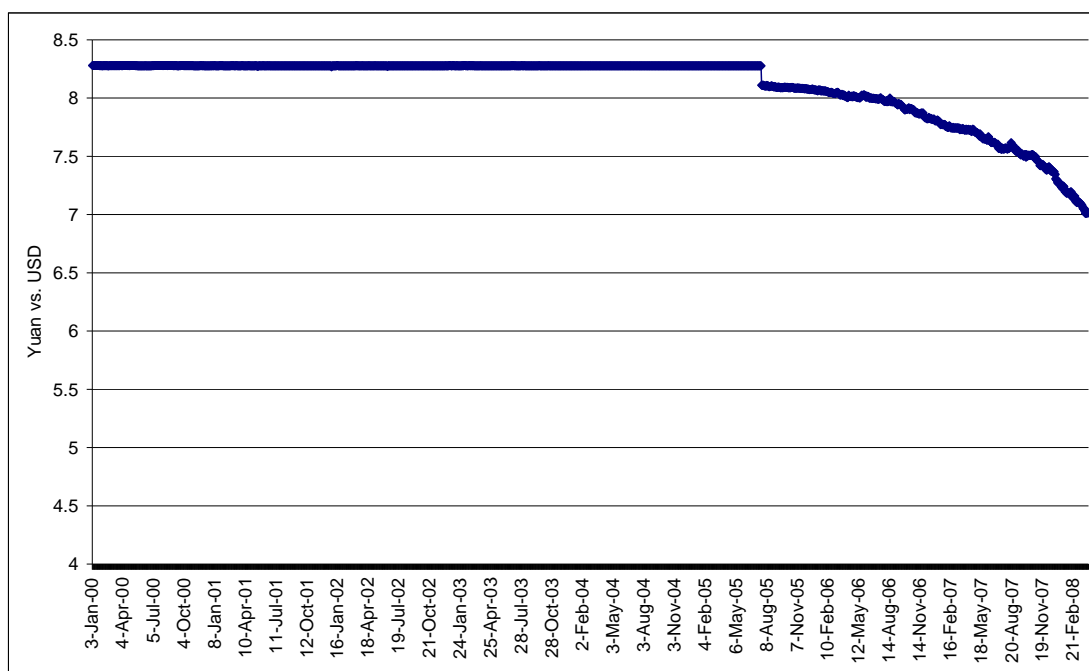
which has without a doubt kept valuation of Yen lower than with conventional interest rates) as well as increased costs in their home market for different input items have definitely acted against further growth. During early part of current decade, e.g. Nissan and Mitsubishi announced that they will give up favouring keiretsu supplier network practices, and are trying to find more competitiveness on old inefficient structures (originally reported in public relations material like Matsumura 2002 & Treece 2002; but confirmed in research side as well Rawwas et al. 2008). Lin (2005) reports that keiretsu structure cross-purchasing inside of Japan, and therefore more market type of orientation started in a smaller scale during the early 90's, when e.g. Nissan purchased components supplier close to Toyota's supplier network. Larger scale change for more free competition approach in sourcing during year 2002 helped Nissan to increase its profits considerably in short amount of time (Rawwas et al. 2008). Anyway, JIT adaption continues in west, and changes structures still, e.g. in customer interface (e.g. Green & Inman 2006).



**Figure 2.** Japanese Yen against US dollar in time period of 1971-2004. Source: US Federal Reserve (2008)

What then did Japanese manufacturing practices change in larger logistics management picture? Basically streamlined Japanese production and supply chain management resulted on the situation, where road transports, and especially smaller units (e.g. lorries)

were serving frequently customers. JIT revolution in global scale also resulted in electronics and semi-conductor products in the situation, where air transports and airports were important part in their manufacturing site location decisions (e.g. Kilpala & Box 2003). Transportation in this new environment was more like value driver rather than cost item to be minimized. For example, it is not uncommon to find out that Asian manufacturers currently load sea vessel full of cars, iron or machines, and then during sea journey try to sell these products for e.g. American dealers. This is also good example how sea transportation time could be changed to serve whole delivery process and business purposes.



**Figure 3.** Chinese Yuan against US dollar during time period of Jan.2000-April.2008. Source: US Federal Reserve (2008)

After year 2000 we have received increasing amount of news from Chinese economic miracle, which is also being based on new invented approaches on logistics and operations management. For example, TOP20 sea vessel harbours of the world currently have 8 Chinese ports in the list (United Nations 2007a). Due to favouring of containers in international transportation, container transport volumes in the whole world have been on constant increase for two decades (roughly 9-10 % p.a. – United Nations 2005 & 2007b), and we currently use larger ships than ever (United Nations 2007a; Containerization International 2008). Among being the driver in container revolution, Chinese companies

have showed how cluster approach really works in production and operations management. Basically Chinese government has given certain areas for particular type of manufacturing sub-branches, which has fostered collaboration and knowledge diffusion between actors (e.g. Tan 2006; Yeung, Liu & Dicken 2006). Although, China does not currently have large brand manufacturers at its disposal (except Lenovo and Haier, which both contain large-scale merger and acquisition activity), clustered networks have showed how sub-contracted items could really be delivered into seasonal old west markets (e.g. producing apparels, toys and electronic devises; e.g. Masson et al. 2007). Chinese environment has forced other well-known brands to use different operations strategies in these markets, e.g. Toyota (Liu & Brookfield 2006) has been utilizing joint-venture ownership, local suppliers and monotonous production of one model only (as compared in other countries for 100 % ownership of the manufacturing unit, the strict usage of Toyota keiretsu suppliers as well as high variety production environment).

However, as Japan in the mid 80's, China has currently strong pressure from its strengthening currency valuation and increasing input prices. After this currency was put on some sort of free float (still protected by contracts between different countries) in the mid 2005, it has improved against dollar within predictable manner. It would not be that great surprise, if Chinese Yuan would repeat pattern of Yen in mid 80's. This would mean appreciation level of 3-4 Yuan per USD, and would produce similar development for China as what has been the growth problem of Japanese economy in the last two decades. There is already weak signals available e.g. related to apparel and toy manufacturing that other Asian countries as well as own manufacturing in Europe are taking the market share from China (Caputo and Palumbo 2005; Chan & Chin 2007) – model is still more or less the same old, either using cheap labour or rigid automation combined to efficient usage of production networks and containerized transport.

Networked approach has also been adopted by companies operating in the old west (mostly high end or highly performing, even years before Chinese economic miracle took its world leading position), and this has especially been effective in rapid manner changing markets, where owning assets is too high carrying load and hinders significant amount of uncertainty with respect of technological and trend changes. However, it should be emphasized, that west has not copied networked approach from China, but these have emerged due to reason that arranging operations accordingly provides clear

economical benefits. For example, in Northern Italy companies, which supply e.g. high performing motor cycles or cloths, are eventually being built by number of small and middle sized companies in a networked manner (Guerrieri & Pietrobelli 2004; Guercini 2004). Also anomalies could be found from electronics industry, e.g. in Silicon Valley starting from early 80's and 90's, where contract manufacturers just took the responsibility of manufacturing issues of new start-ups (Saxenian 1996). Interestingly, Taiwanese cell phone, PDA and laptop industry operates with same horizontal, and networked approach (TSIA 2004; Lu, Hung & Yang 2004). In Taiwan, there exists vast number of small and fabless semiconductor OEMs, as well as ODMs developing and delivering branded cell phones and laptops for large OEMs (most in categories, which are low/middle volume).

### **3 LOGISTICS OUTSOURCING IN MANUFACTURING CONTEXT**

Usually global Original Equipment Manufacturers (OEMs) of logistically convenient end-items (it is economically and within time dimension sensible to move items around) follow the principles of focused factory, which was the main proposal for productivity improvement of Skinner during 1970's (Skinner 1974). Using the principles of this approach, low amount of manufacturing sites (quite often below 10) will take care of the entire worldwide production each focusing on a small number of different product families – some cases geographical issues force to establish regional focused factories. This focus will foster the local supplier network also to be developed to serve high volume challenges, and tight delivery schedules. However, as responsiveness of the supplier network as well as the focused manufacturing unit increases (which results to significantly lower inventory levels), the management of global distribution becomes quite troublesome. Most often OEMs will experience high changes of demand (including both volume and mix) in different markets due to the demand amplification effect (described in e.g. Lee et al. 1997, Lee & Whang 2000, Miragliotta 2006), and therefore their efficiency of outbound logistics operations suffers. Specialization among companies (also within inside of these), availability of low cost transportation and new emerging economies, have resulted into situation, where we are currently transporting more than ever, as transportation growth is compared to global GDP growth (United Nations 2005, United Nations 2007b).

Due to the challenges related to distribution, OEMs have started increasingly to favor the use of services offered by Third Party Logistics (TPL) operators. In practice TPL solution will contain some kind of integrated logistics service package, which is taking care by external operator (e.g. Bowersox 1990, van Laarhoven et al. 2000, Skjoett-Larsen 2000 and Hertz & Alfredsson 2003). Most often third parties will have joint responsibility of e.g. inventory management in distribution centers as well as all needed transportation services of distribution. It is not so rare to find out that TPL operators will customize products (quite often OEMs are using postponement) in their distribution centers, and therefore services could also include some amounts of assembly and packaging. Also administrative functions of order management could be outsourced (e.g. typing of



customer and purchase orders) as well as logistics process optimization (4th party logistics). In these administrative functions, there might be a need for decision-making, e.g. purchase orders, which in low cost items could be given for external partner. Reverse logistics (product returns and repair service) has recently been reported to be one part of TPL provider portfolio. Basically in all of the outsourcing alternatives economics of scale is emphasized (e.g. through higher volumes of transports for certain regions and needed warehousing space, personnel etc.) as well as flexibility. Most often benefits are driven by simplification and centralization of own processes, and eventually by “merging” them together with other customers of TPL provider (e.g. Maister 1976 and Das & Tyagi 1999). In recent decade time TPL providers have considerably increased their size, e.g. FedEx employs more than 260 thousand people with annual revenue of 35 billion USD, while DHL employs 460 thousand persons with respective revenues of 60 billion Euros. Most of the growth has occurred because of acquisitions of small TPL providers into these conglomerates (e.g. dealt within Häkkinen 2005), or through outsourcing decisions of OEMs (e.g. distribution centers are sold to outside, to 3PL operators).

As an OEM is using focused factory principles, its manufacturing operations could also quite easily be outsourced from contract manufacturers (more about contract manufacturing, please see Hilmola et al. 2005 & Hilmola et al. 2007). Usually OEM in the beginning establishes and owns all the facilities, inventories and needed resources, but after completed outsourcing decision it will sell everything for contract manufacturer. However, it is not unusual situation either that OEM will not have any manufacturing operations at all – this has been the case with Apple iPod as well as Microsoft Xbox, or cell phones of Skype, Palm and Sony-Ericsson. Most often outsourcing decisions are not so extreme as in these cases, and contract manufacturers will take care of manufacturing of lower margin products in maturity phase of product life-cycle (either locally for some number of countries or having global delivery responsibility), while OEM tries to handle efficiently higher margin products as well as new product introductions. Thus, contract manufacturing size, especially in electronics, has increased during the last five years considerably – currently largest contractors employ altogether 1 million employees, and mostly the growth has appeared in Asian low-cost countries. For increasing number of OEMs question of using contractors in manufacturing is not anymore an option, it is a must, since they have all the needed capacity in their hands. Some of these contract manufacturing organizations have grown as OEMs (e.g. Lenovo, BenQ and Acer).

## **4 RESEARCH METHODOLOGY**

In this study, in order to examine the current state of logistics and operations management in Finland and Sweden, an online survey was conducted during time period of 17th of December 2007 – 21st of January 2008. For empirical data gathering, we used web-based survey (see Appendix A for survey form) where respondents were able to answer in three different languages (in Finnish, Swedish, and English) according to their preference. Contact to companies was made by email. The questionnaire was composed of two main sections. Section A was descriptive questions in order to gather company profile and information. The latter part of the questionnaire, section B concerned about logistics and operations management strategy/tactical questions, among IT, performance measurement and structural issues.

Altogether survey was sent to roughly 650 companies, where 371 companies were having origin from Finland and 286 companies from Sweden. Altogether there were about 546 questionnaires that were able to reach the target companies' email systems. All of the companies had approximately four weeks time to respond. At the first survey round, all of the questionnaires were sent out on 17th of December 2007. In between the four weeks, there were two reminder emails sent to all of the companies (4th and 14th of January 2008) who had not responded on the survey. As a result, we received 45 responses from the population of 546 companies and thus the response rate was 8.2%. Among the 45 responses, 34 were valid, while 5 answers were submitted with empty, 3 were from the same companies, and 3 of the answers did not have identification code typed in the answer. So, in the end our real valid response rate was about 6 %.

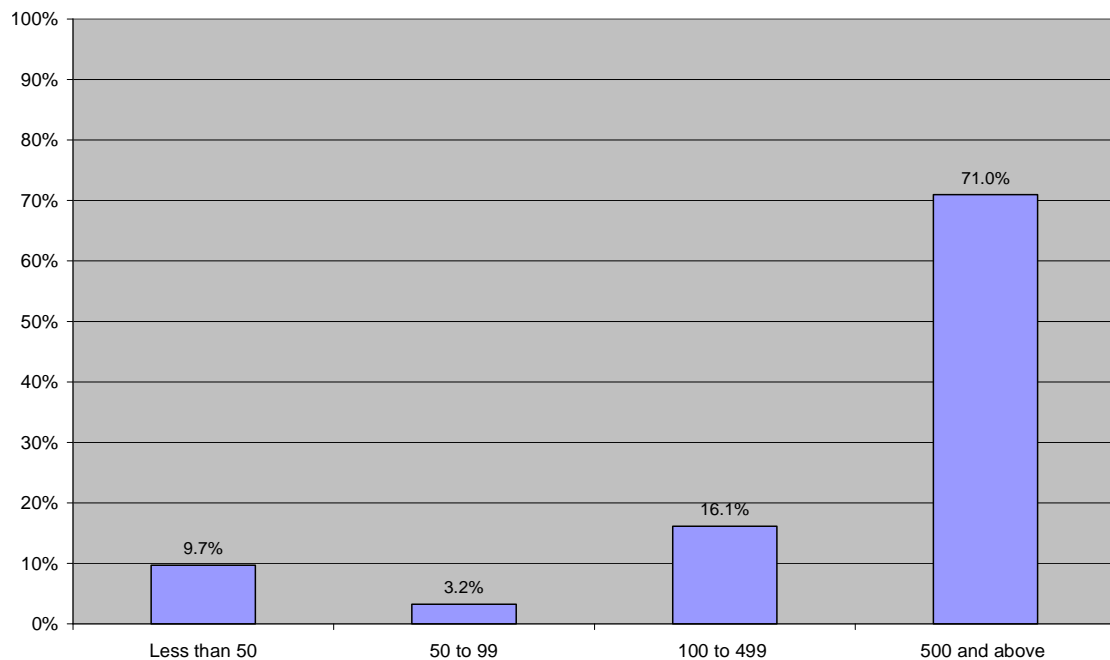
Respondents of the survey were mostly either manufacturers (62 %) or trading companies (18 %), while the remaining companies were from logistics/transportation and other sectors. Respondents were usually multinationals (59 %) and most of the companies employed more than 300 employees (74 %). Finnish and Swedish responses were somewhat different: in Swedish sample manufacturing sector representation was over 70 % and trading companies had share of roughly 9 %, while in Finnish sample these figures were respectively 57 % and 22 %.

## 5 EMPIRICAL DATA ANALYSIS

### 5.1 General Information and Business Environment

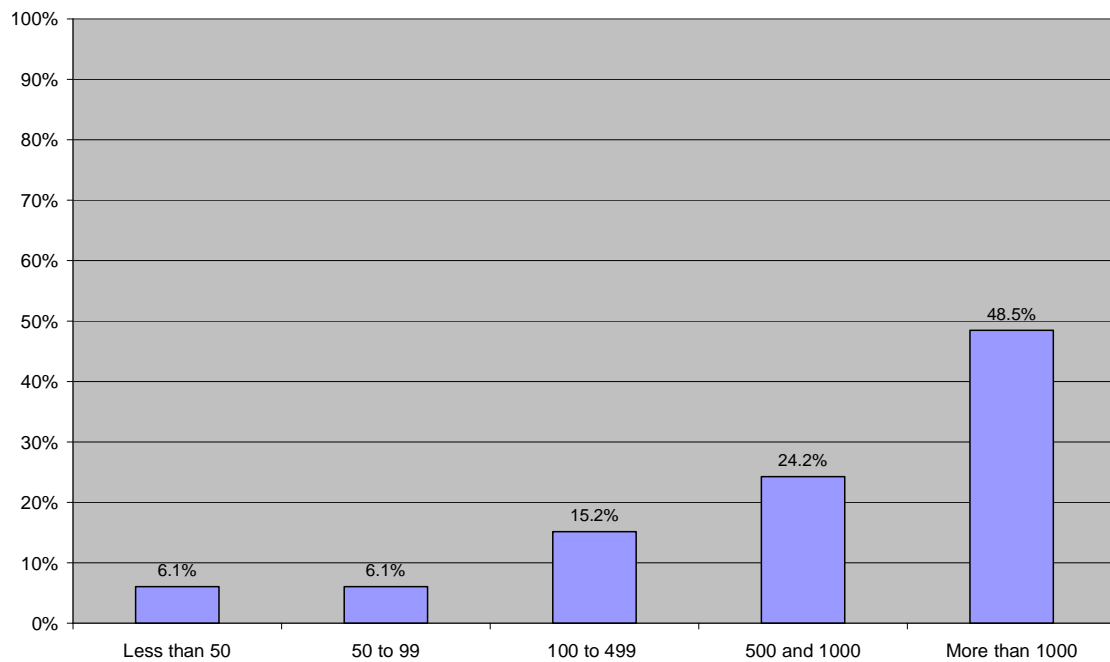
In the following we introduce analysis concerning the general background information of the respondent companies and their business environment. It is the first major item of our questionnaire; from the respondent companies we introduce company types, their main sources of supply and customer regions by location and how complex their operating environment in general is (e.g. number of end-products, purchased components/raw materials and suppliers).

As it was stated in previous section, most of the respondent companies were manufacturers. Figure 4 presents the distribution of respondent companies with respect of the number of products offered for the customers. We can identify that there are more than 70 % of the companies having more than 500 different product items. Secondly, about 16 % of the companies produce over 100, but less than 500 products. Only a little more than 3% of the respondents have products in between 50 to 99. About 10 % of the companies have less than 50 different product items.



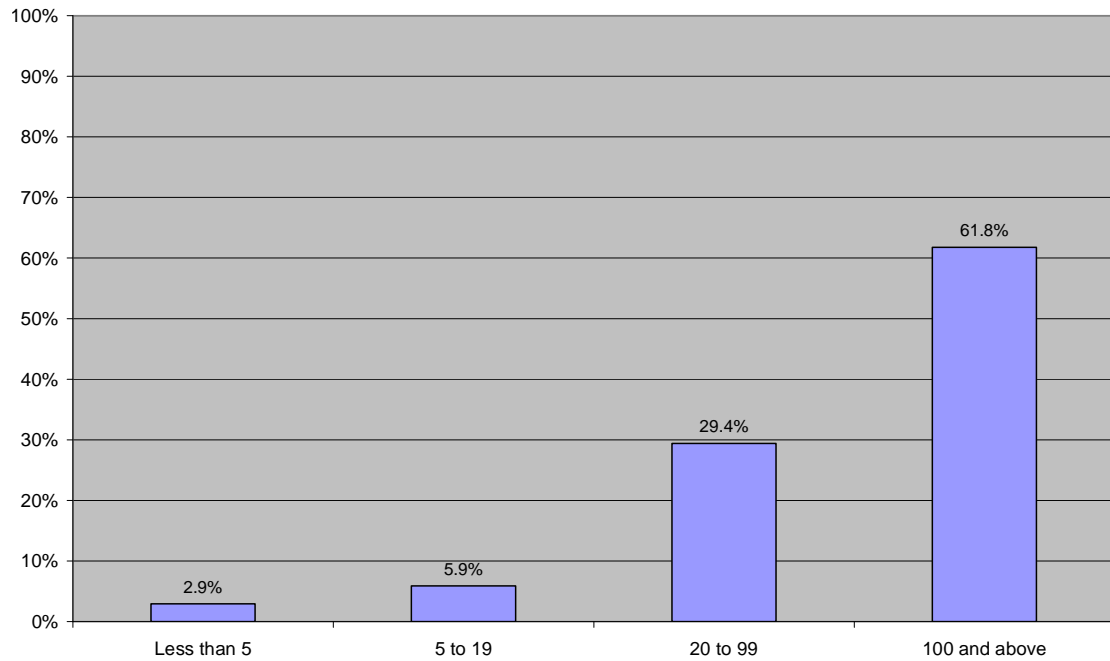
**Figure 4.** Number of end-products offered for the customers.

From Figure 5 we can identify that the total number of different components and raw materials purchased shows a bit more variation among the respondents. Altogether, 48.5% of the total companies purchase more than 1000 different components/raw materials. Our data shows the result of 24% of the companies purchase items among 500 to 1000 being the second highest share within the sample. Thirdly, roughly 15% of the respondents are purchasing from 100 to 499 different items. Among this sample it is very improbable to purchase less than 100 different components (altogether about 12 %). So, in other words 88 % of respondents purchase more than 100 components/raw materials.



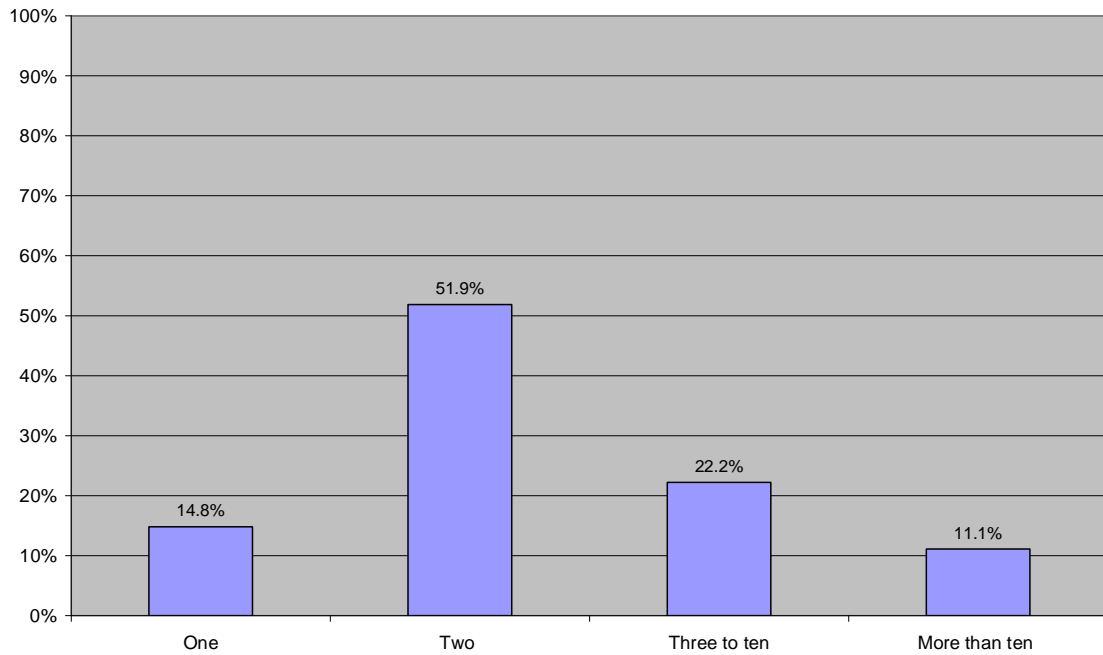
**Figure 5.** Amount of purchased components/raw materials.

Total number of suppliers among the companies is presented in the following Figure 6. It shows that over 61 % of the total companies have more than 100 suppliers. A little less than one third of the companies have from 20 to 99 suppliers. In Sweden and Finland most of the companies have various suppliers, as only very low amount of the companies have less than 20 suppliers for the components and raw materials.



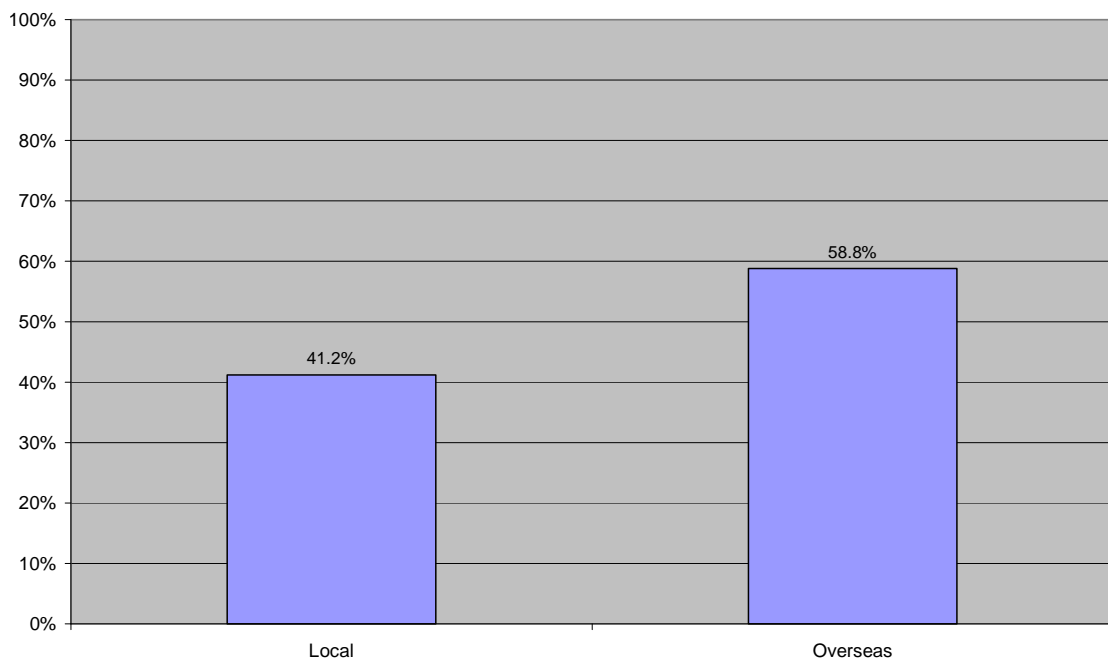
**Figure 6.** Companies by total number of suppliers.

In Figure 7 responses are divided by average number of supplier per component/raw material. The figure shows that about 52 % of the respondent companies have on the average two suppliers per each component/raw material. In addition, about 22 % of the total companies have three to ten suppliers for each component/raw material – indicating possibly from availability problems or from improper/un-controlled sourcing strategy. Altogether, over 85% of the companies are having various suppliers (two and more), instead of sole supplier for each component/raw material. This is probably due to reason to secure the delivery of the components/raw materials at all times. Modern supply chains attempt to minimize risks, due to fact that hazardous events could cause a great loss for the manufacturers, as well for the whole supply chain. The companies sometimes face supplier's shortage of supply of raw materials/components or the goods are damaged during the transportation process. In these cases, the company can make order from the additional suppliers as back-up. It is also an advantage for the companies to have options to e.g. compare prices, service and lead time.



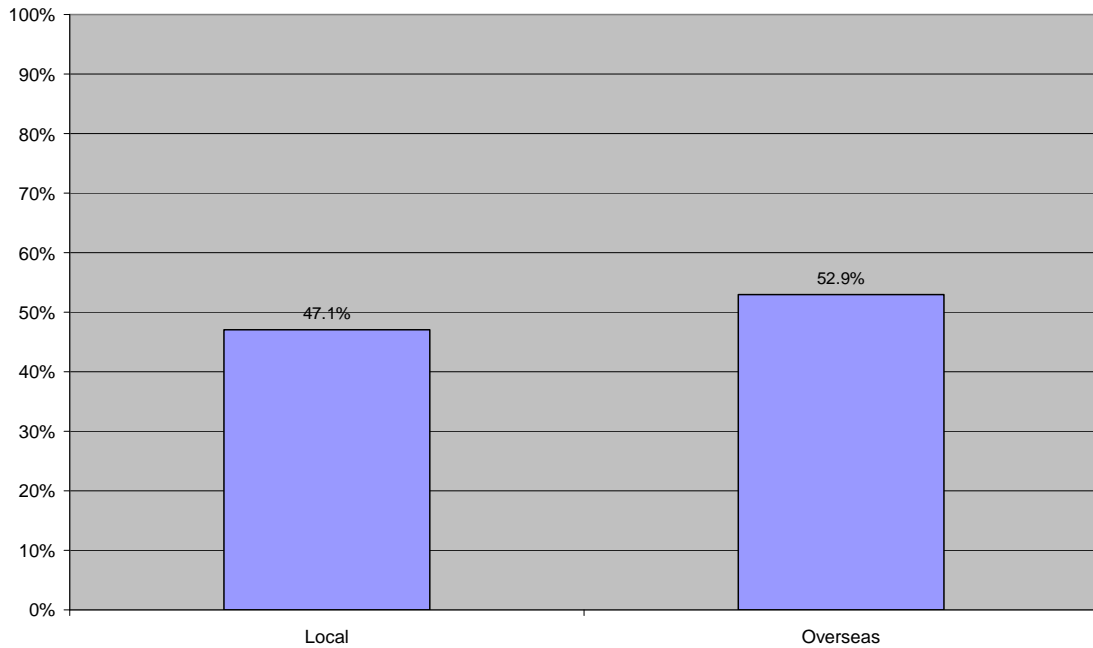
**Figure 7.** Average number of suppliers for each component/raw material.

In terms of the major source of supply among the respondent companies (Figure 8) are divided into two groups by whether the most of their suppliers are local companies or companies from overseas. It seems that currently Finnish and Swedish companies are slightly favouring to have the suppliers from overseas (about 59 %) rather than from their own countries (about 41 %).



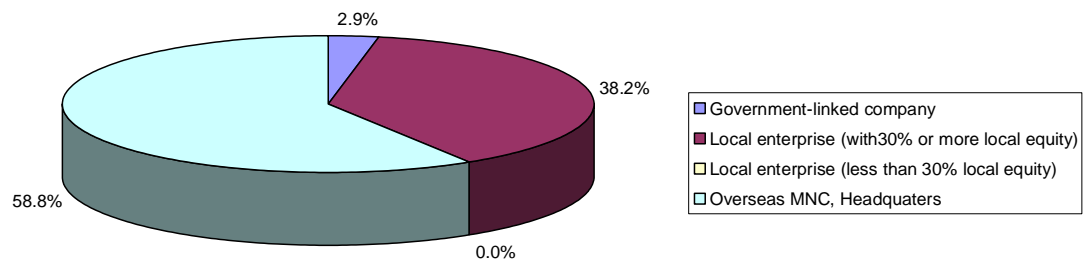
**Figure 8.** Companies by major source of supply.

Similarly with the source of supply, it can be seen from Figure 9 that the distribution for major market shares of respondent companies follows equal amounts; results indicate that the major market shares within this sample are divided almost equally (53% vs. 47 %).



**Figure 9.** Companies by major market share.

Additionally we received information about the respondent companies' ownership structures which are presented in Figure 10. Nearly 60% of the respondents are Multi-National Corporations (MNCs), and about 38 % of the companies' are local enterprises (with 30% or more local equity). Additionally, approximately 3 % of the companies are government-linked companies, and none of the respondents are local enterprises with less than 30 % of local equity.



**Figure 10.** Ownership of the respondent companies.

Overall, from completed survey we can state that most of the respondents are MNCs, and companies have numerous products and quite number of suppliers. Companies could also be described as complex entities, and they have significant amount of overseas activities.

## ***5.2 Company Strategy and Overall Direction***

Section B of the questionnaire was aiming to get a general view of logistics and supply chain management in tactical and strategic level. Respondents were asked to consider whether given statements are true regarding their company with the Likert scale of 1 (strongly disagree) to 5 (strongly agree). It seems that in Finland and Sweden status of logistics and supply chain management is at least satisfactory, at least on observed levels, as on the average answers to almost all of the areas are more than 3.5 (see Table 1 for questions and descriptive statistics). Highest averages were identified in the following areas:

- Adopting development of IT systems as a part of strategy; question m)
- Advanced logistics performance measurement; question c)
- Logistics is seen as core company core strength; question l)
- Investments in IT systems are made in manufacturing or logistics; question f)

On the other hand it seems that companies have most room for improvement in the following areas (see Table 1): re-engineering of their logistics processes (question k), more customer-oriented approach in their management (question j), and implementing principles of rewards and risks in supplier strategy (question e).

So, according to the completed questionnaire, Finnish and Swedish companies are rather conservative in their logistics / SCM strategy, and have not challenged structures to large extent. However, companies clearly have identified the importance of logistics/SCM, and supported core competences with the implementation of IT and performance measurement systems.

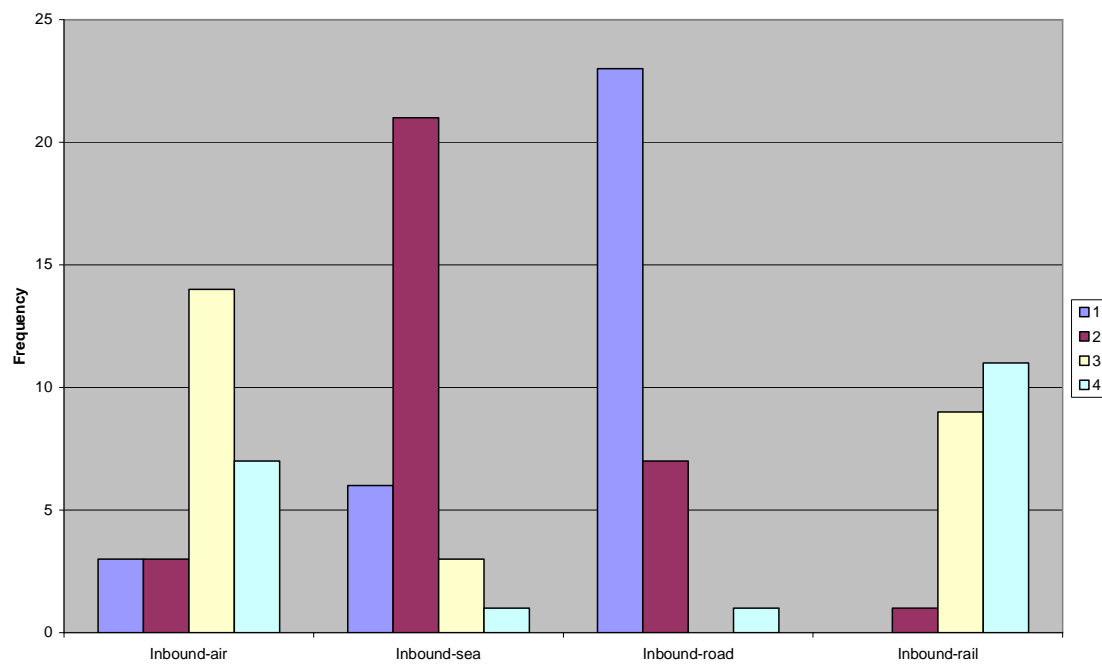


**Table 1.** Statements and their statistics from Section B of the questionnaire.

<b>Statement</b>	<b>Average</b>	<b>Mode</b>	<b>n</b>
<b>a)</b> The orientation of my company has shifted from managing vertical functions to integrating full stream processes from the supplier to the consumer.	3.64	4	33
<b>b)</b> My company has developed and is pursuing a plan to establish and maintain business partnerships.	3.82	4	33
<b>c)</b> My company extensively measures logistics performance in terms of costs, productivity, customer service, asset management and quality.	3.91	4	33
<b>d)</b> My company successfully utilises time-based logistics solutions like continuous replenishment, quick response and just-in-time with customers and/or suppliers.	3.61	4	33
<b>e)</b> My company has partnerships with suppliers or customers who operate under principles of rewards and risks.	3.27	4	33
<b>f)</b> Manufacturing or logistics information systems in my company are being expanded to include more integrated applications.	3.97	4	33
<b>g)</b> My company has common, agreed-to policies and procedures to standardise logistics operations.	3.61	4	33
<b>h)</b> My company utilises more strategies to postpone movement and final product configuration today than two years ago.	3.52	4	31
<b>i)</b> My company has procedures in place to facilitate reverse logistics.	3.82	4	33
<b>j)</b> Management emphasis has shifted from producers to customers over the past two years.	3.27	4	33
<b>k)</b> My company has undergone extensive logistics process re-engineering during the past two years.	3.15	3	33
<b>l)</b> My company considers logistics as one of the core strengths.	3.91	4	33
<b>m)</b> My company believes in the strategic values of using IT in our supply chain. Therefore the development of IT is driven and planned by senior management.	4.00	4	33

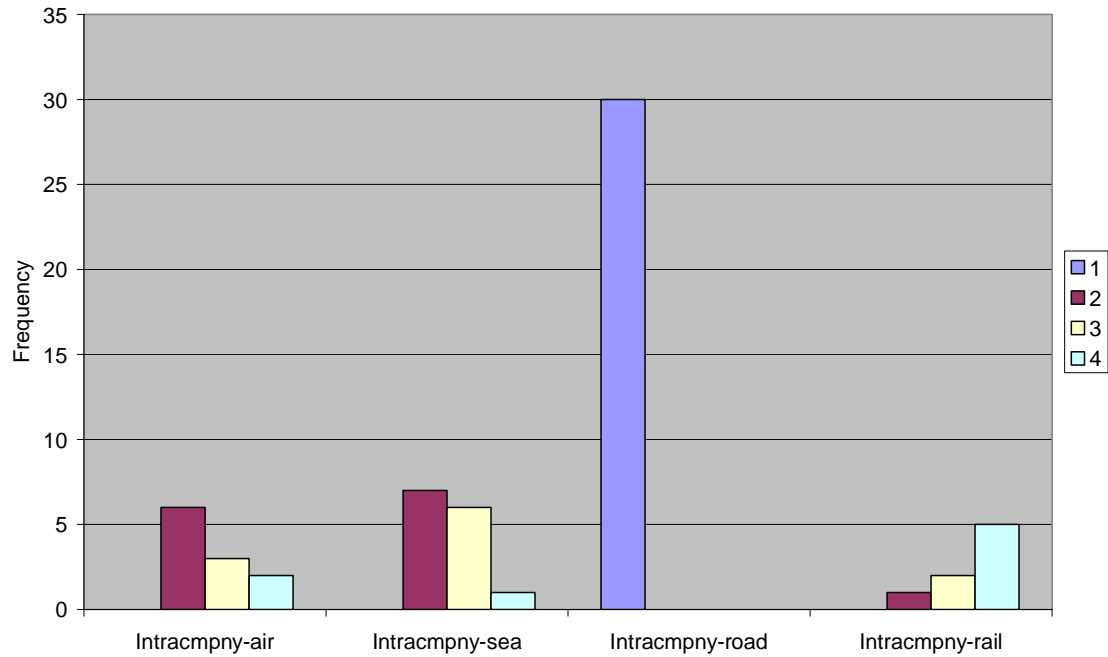
### 5.3 Transportation Mode Selection

Figures 11, 12 and 13 present answers to questions where respondents were asked to rank transportation modes by the amount of expenditure (1 meaning most and 4 meaning least). From Figure 11 it can be clearly seen that in incoming transports the Finnish and Swedish companies prefer road transportation. The ranking of other almost as clear: Sea transportation is the second, air transportation third and rail transportation accounts for the smallest part of the inbound transport expenditure.



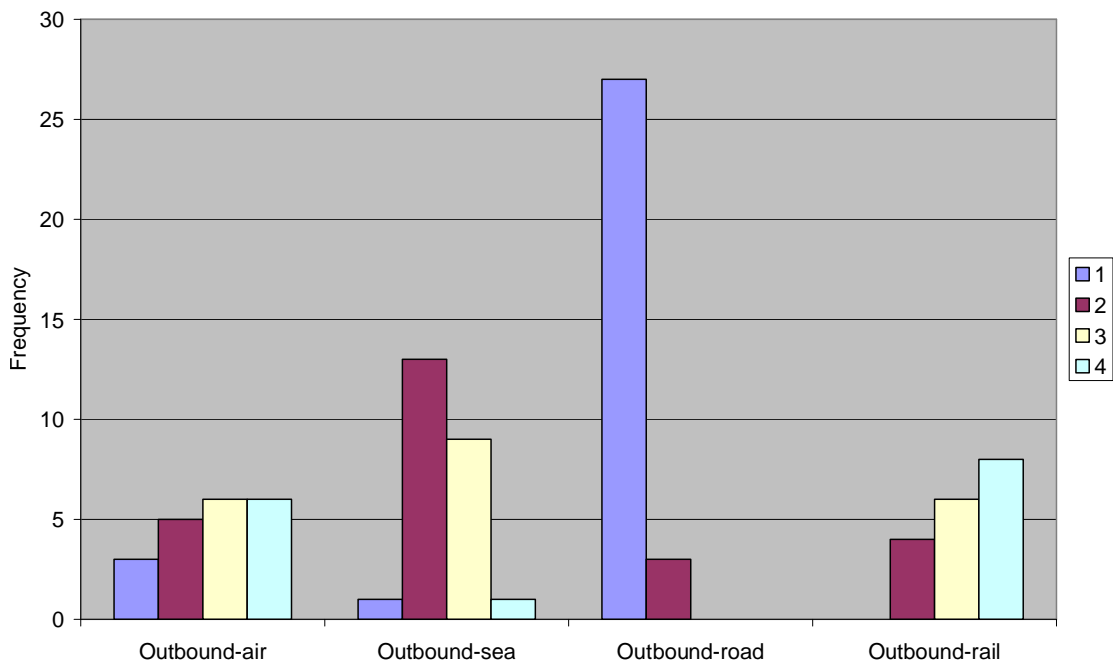
**Figure 11.** Inbound transport modes selection among respondents.

Figure 12 shows that intra-company wise it is even clearer that most of the transports modes are compared with road. Here sea and air transportation are very close second and third, and again rail transportation is the least utilized option.



**Figure 12.** Intra-company transportation mode selection among respondents.

In Figure 13 situation outbound from the surveyed companies is presented and the situation is again very clear: Road transportation is the mostly used, sea transportation is the second by tight margin over air transportation, while rail transportation is yet again fourth.

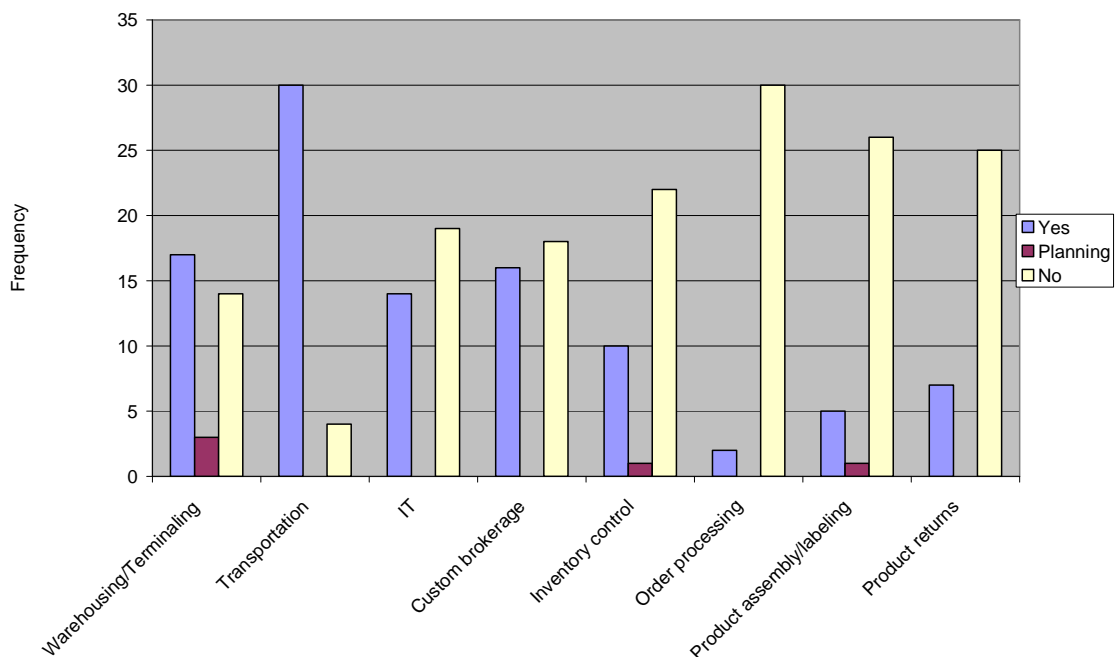


**Figure 13.** Outbound transportation mode selection among respondents.

Overall, we can identify from above transportation mode analysis that road as well as sea transportation to some extent dominate over other alternatives. It is also noteworthy that railways are not utilized as a major transportation mode.

#### 5.4 Scope of Outsourcing and its Effects

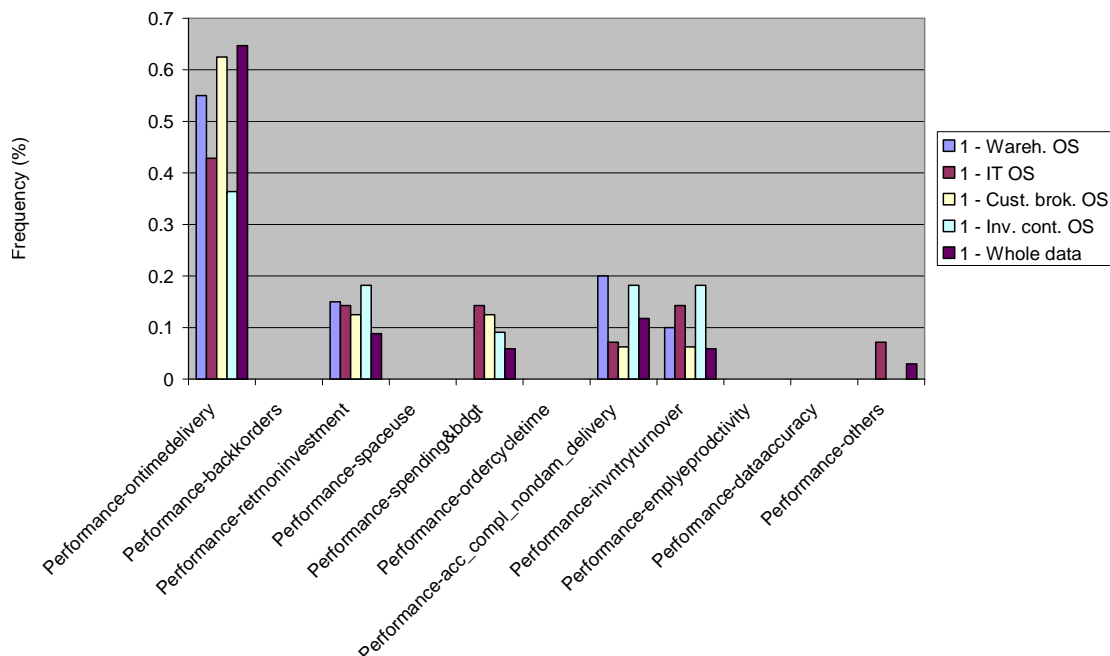
Our survey results revealed that large part of the companies have outsourced some logistics activities (see Figure 14), but surprisingly small number of these have given responsibility for external parties in inventory control, order processing, product assembly/labeling as well as product returns. In contrary, transportation is in nearly all of the cases outsourced and significant levels of outsourcing could be found from warehousing/terminaling and customs brokerage. One particular interest area of this research work, IT outsourcing, is with equal amounts outsourced or produced in-house. Interestingly, only handful of companies are “planning to” outsource activities among these sub-items of logistics process, which indicates that outsourcing issues have been discussed in companies, and strategies are set already some time of ago. This leads to conclusions that in respondent companies the level of outsourcing is not going to increase, but of course this would not mean decreasing volumes for outsourcing providers, since growth of the volumes is dependent on single companies, not on the whole sample.



**Figure 14.** Scope of logistics outsourcing (n = 32-34).

Interestingly based on our sample data outsourcing seems to be total only in handful of cases, as only one respondent company reported to have outsourced all the other functions than production/labeling. However, three companies reported totally opposite; any of the proposed functions was not outsourced in these companies. Quite often transportation outsourcing is the primary function to be purchased from outside, and we found only one respondent, which was having this function produced in-house, while company had outsourced warehousing. In other cases, where respondents have not outsourced their transportation function, did not have those kind of decisions made in elsewhere either.

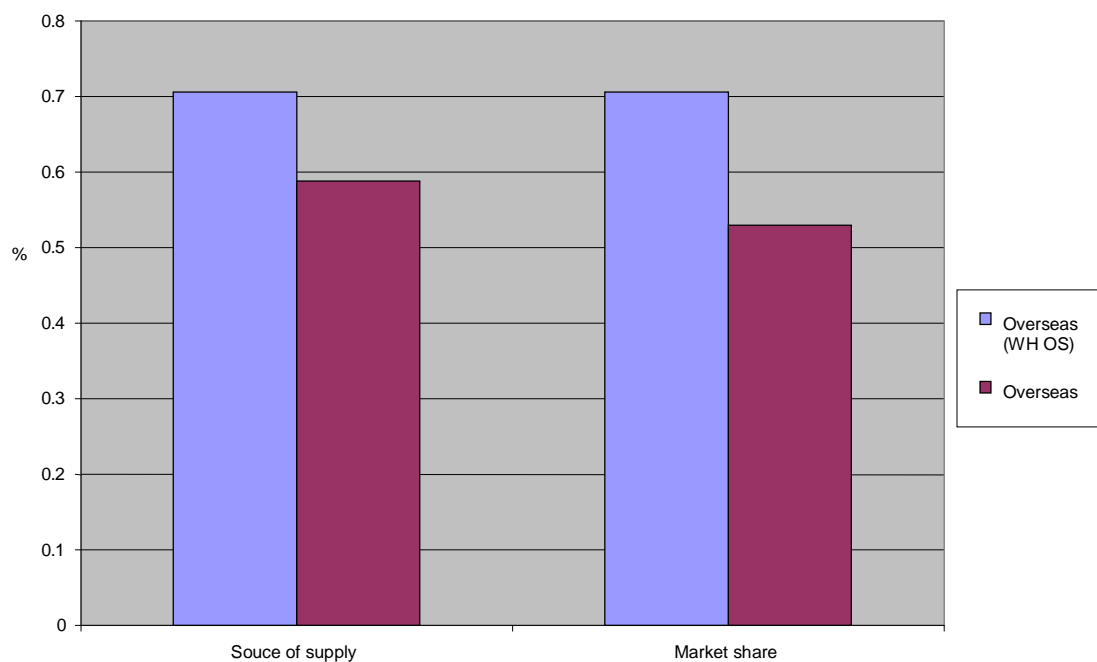
Compared to the results on European level (Cap Gemini 2007) according to this sample Finnish and Swedish companies seem to be somewhat lagging behind, when measured by the level of outsourcing. Only outsourcing of transport and order processing are on somewhat same level with the whole Europe, while outsourcing of warehousing, production (including labeling etc.) and product returns are much rarer than in Europe in general.



**Figure 15.** Most important performance drivers of logistics in whole data as well as four most frequently outsourced logistics functions sub-groups.

Based on the initial results of our outsourcing effects analysis, we found that outsourcing of warehousing, customs brokerage and inventory control gives less emphasis on the on time delivery than what is the case in whole data as well as when IT is being outsourced (however, on time delivery is in all of the cases driver of the performance – see Figure 15). Especially in warehousing as well as inventory control outsourcing situations companies are also interested from following metrics: (1) return on investment, (2) accurate, complete and damage-free delivery and (3) inventory turnover. So, it could be argued that outsourcing of these functions leads to more diverse use of performance drivers, and logistics is more like value-adding and profitability source rather than process, which ensures that products are delivered on time.

In addition to these analyzed measures, three companies said to use some other logistics measures – one of them argued the quality of electricity to be the most important, while two others placed risk management as the second most important and capacity utilization as the third most important measure of performance.



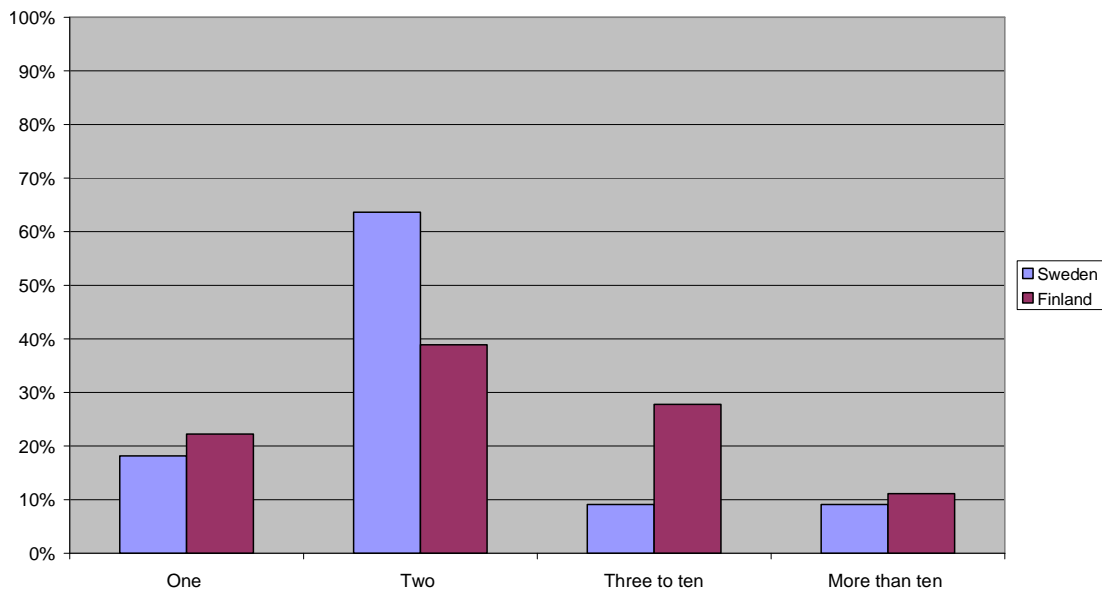
**Figure 16.** Warehousing / Terminaling outsourcing is connected on more distant markets and more global supply.

International markets, and especially the significance of them through market share, were identified to be connected into warehousing/terminaling outsourcing – as these are outsourced, more distant markets are getting growing importance (shown in Figure 16).

Interestingly supply network is also more international as these operations are outsourced – giving further support for 3PL services, not only in distribution, but with inbound material flows too.

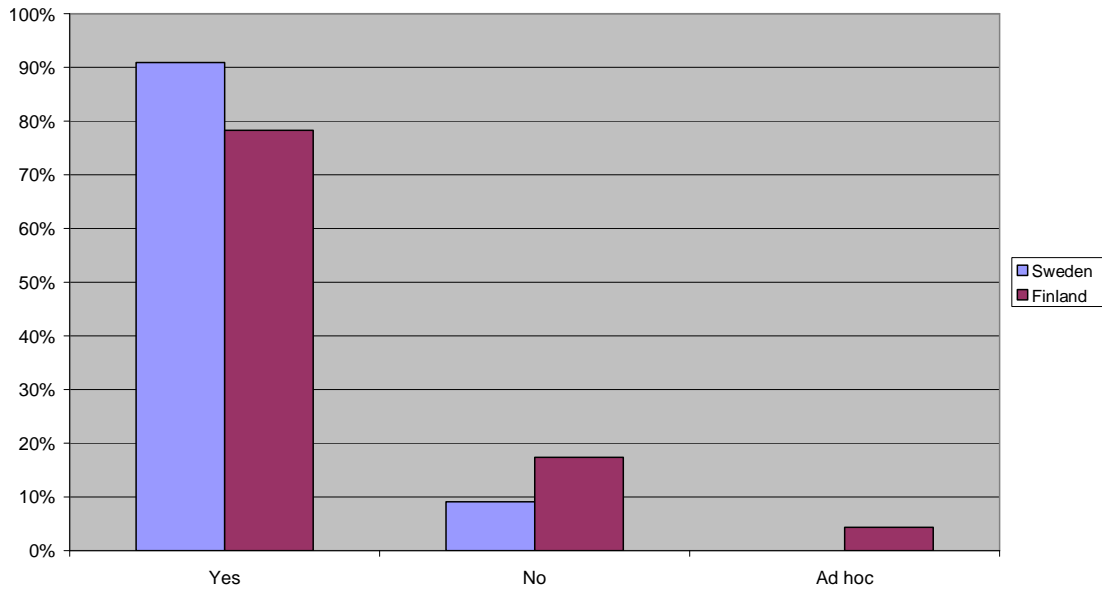
### 5.5 Noted Differences among Finnish and Swedish Responses

Similarly to analyze outsourcing effects, we examined potential difference among Finnish and Swedish companies in all of the response areas. One potential difference concerns suppliers per component, which is presented in Figure 17. There were 18 answers from Finnish companies and 11 from Swedish companies for this particular question. Swedish companies seem to have more often exactly two suppliers per component (over 60 % of the respondents), while Finnish companies have a bit more mixed amounts of suppliers per component (although mode is again 2). Interestingly about 40 percent of Finnish companies have three or more suppliers per component, while within Swedish companies this same percentage is fewer than 20.



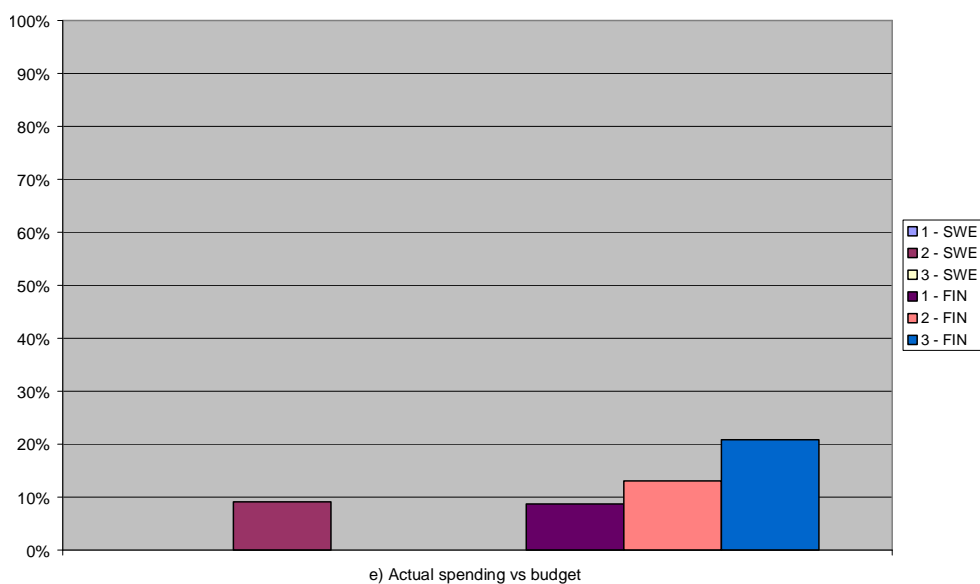
**Figure 17.** Average number of suppliers per component.

Another potential difference area is whether the company has annual logistics budget or not. To this question we received 23 valid answers from Finland and 11 from Sweden. Almost all of the companies have annual logistics budget, but Finnish companies seem to more often have no logistics budget or have ad hoc budget at the use (see Figure 18).



**Figure 18.** Annual logistics budget among respondent companies.

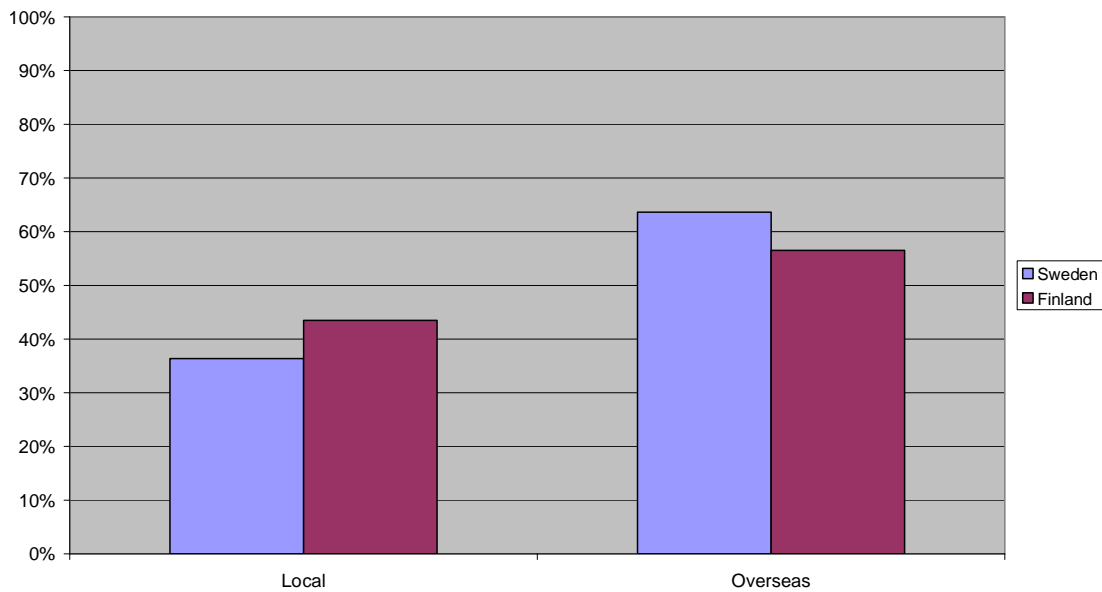
Budgetary issues in follow-up are also potential managerial difference area; results to this question are presented in Figure 19, where e.g. number 1 equals percentage of answers considering the measure as the most important one, as correspondingly number 2 indicates answers of answers considering this as the second important performance measure, and so on. It can be clearly seen that logistics budget control is much more emphasized among executives of Finnish companies, when compared to their Swedish colleagues, where only one executive considered it being among top three measures.



**Figure 19.** Importance of logistics measures: actual spending vs. budget.

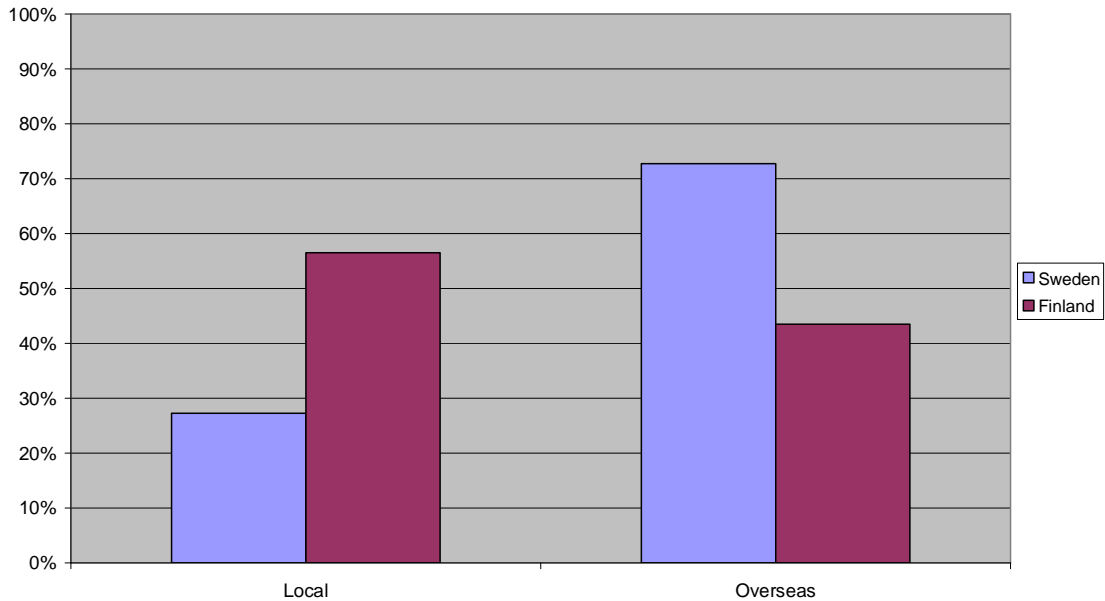


As number of suppliers per component/raw material was one potential difference area, Figure 20 presents the distribution of supplier base in Finnish and Swedish companies. Regarding this question the amount of valid answers from Finland was 23 and 11 from Sweden. Both Swedish and Finnish companies are having slightly more suppliers from overseas than from local area, but there are no significant differences between the two countries.



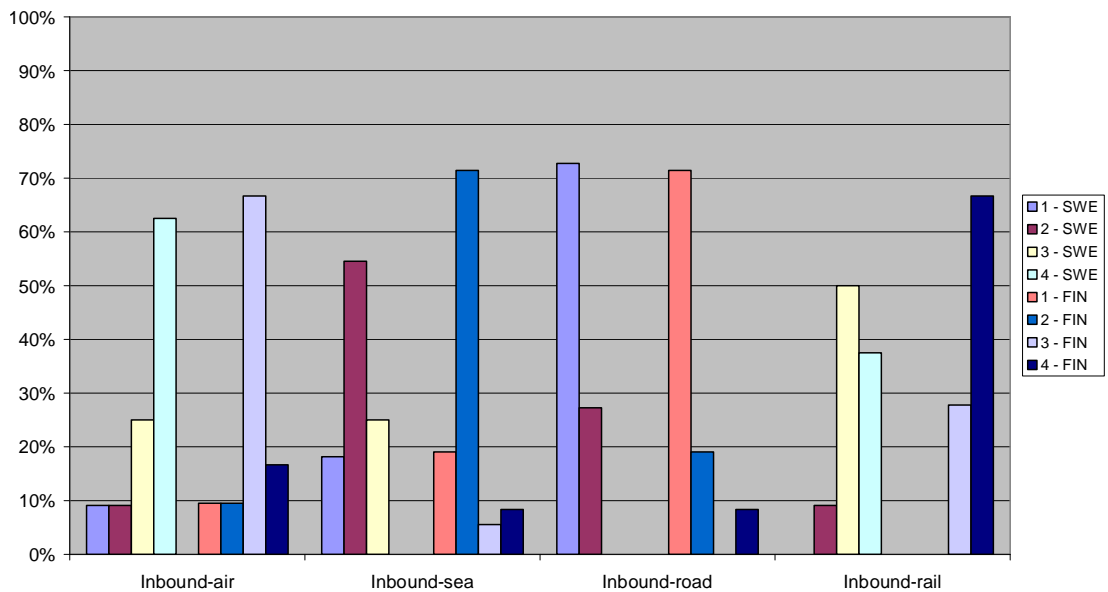
**Figure 20.** Major source of supply in Finnish and Swedish companies.

However, level of internationalization differed; in Figure 21 it is shown that Finnish companies have their major markets quite evenly divided between local and overseas, while Swedish companies are clearly having their customers mostly overseas. Similarly to previous question we received 23 valid answers from Finnish companies to this question and respectively 11 from the Swedish ones.



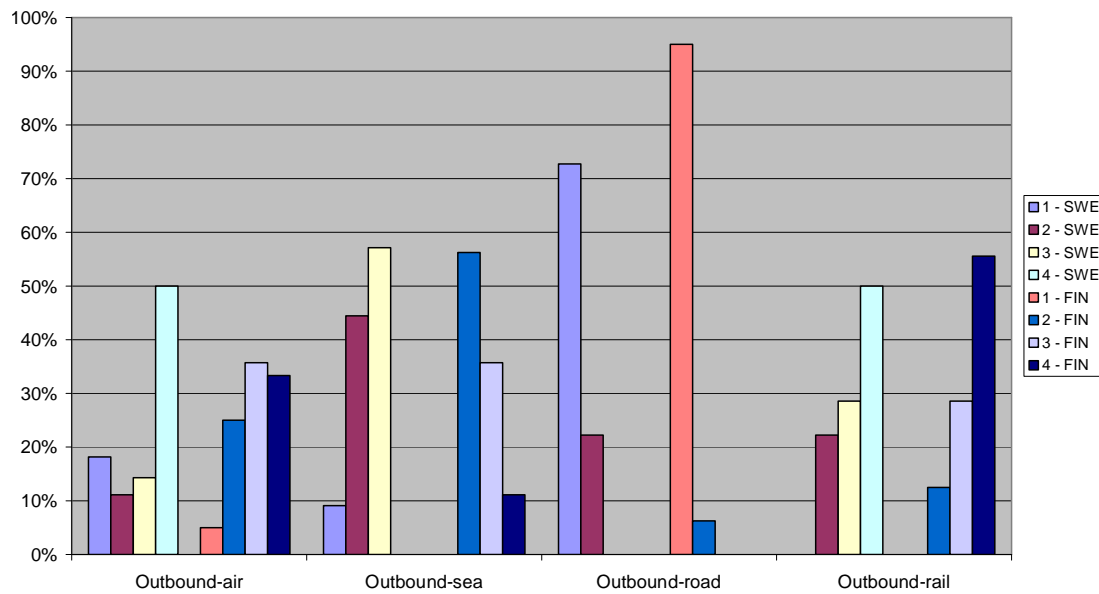
**Figure 21.** Major market share location of Finnish and Swedish companies.

In Figure 22 Finnish and Swedish companies' ranking of transport expenditure regarding inbound logistics by transportation mode is presented. It can be seen that in both countries the two most used transportation modes of inbound transports are respectively road and sea transports. Interestingly among Swedish companies rail transports are third most used, while Finnish companies (as well as the whole sample) favor air over rail transports.



**Figure 22.** Inbound logistics flows and usage of different transport modes among Finnish and Swedish companies.

The situation outbound (see Figure 23) is rather similar too in these countries: Road is again clearly the most important, followed by sea transportation. Again among Swedish companies use of rail transportation is third mostly used, while Finnish companies again favor air over rail transportation. Sweden seems to be ahead of Finland in utilizing rail transports, most likely due to their more open market and free competition applied for years in rails.



**Figure 23.** Outbound logistics flows and usage of different transport modes among Finnish and Swedish companies.

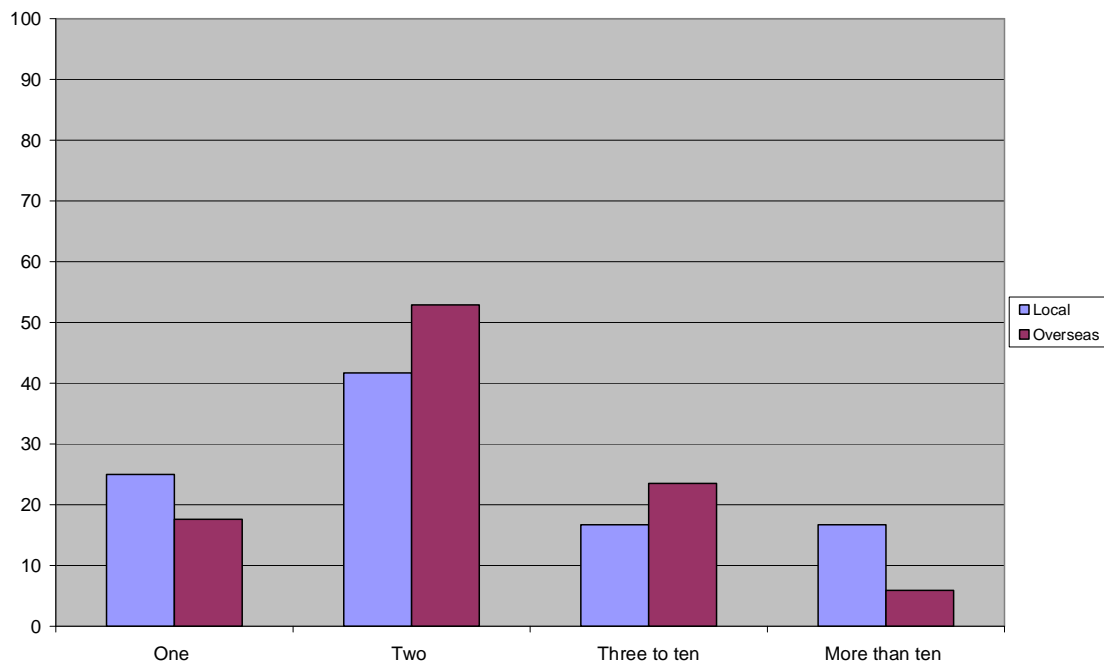
In general, Swedish companies are more internationalized, they have logistics budgets and they use railway transportation more than Finnish companies. Also supplier management potentially differs in a way that Swedish companies most frequently use two suppliers per component/raw material. However, it should be noted that although Finnish companies have less formal logistics budgeting, but as they do have it, it is being followed as performance measure.

### ***5.6 Noted Differences among Local and Overseas Sourcing Companies***

Among outsourcing, and country of origin, interesting possible dividing point in the completed questionnaire is the sourcing strategy. In the questionnaire we asked with two options, whether major source of supply is originated from local suppliers or from

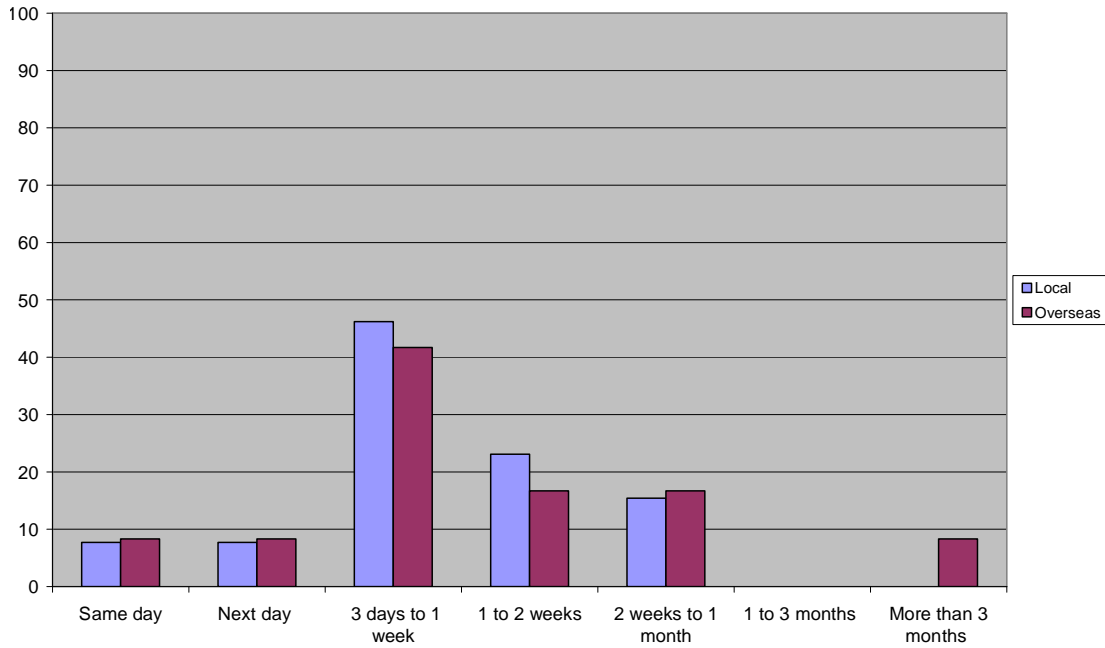
overseas. In the following we have shown some potential areas, where this strategic decision could have its implications.

In Figure 24 companies amount of suppliers per component are presented with regard to geographic location of their main source of supply. From it can be noted that companies with one supplier tend to be more locally oriented, and companies with two suppliers per components seem to be more oriented overseas regarding their sourcing decisions. There are no significant differences in companies more than two suppliers.



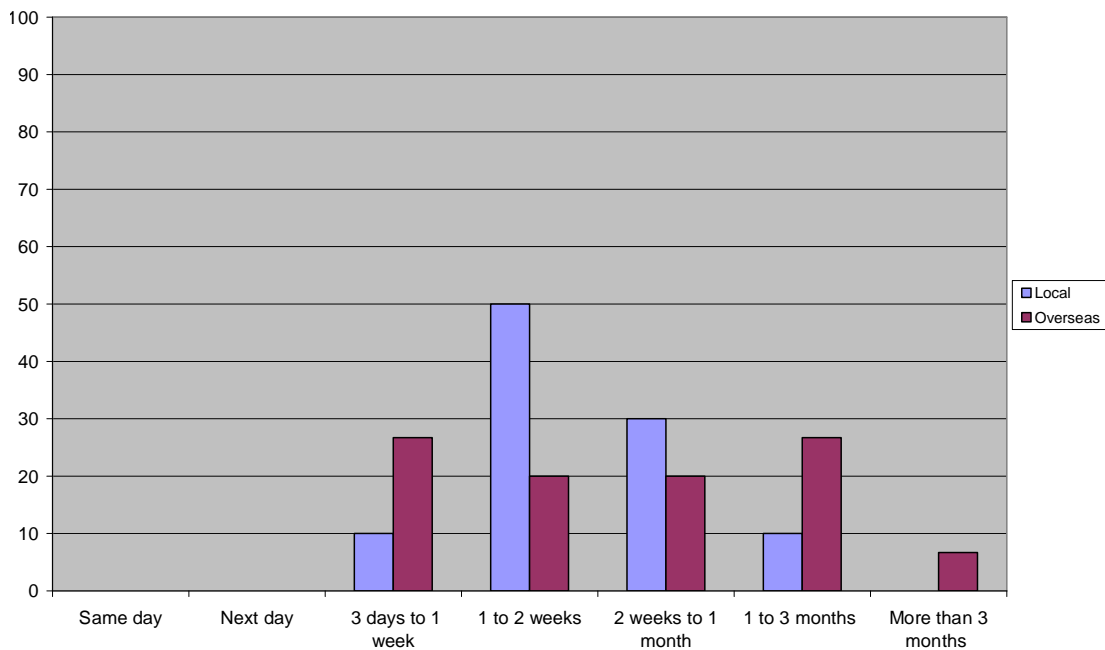
**Figure 24.** Amount of suppliers per component in companies either favouring local or overseas sourcing (%).

In the next four figures delivery lead times from suppliers and to customers are presented for Swedish and Finnish companies. Companies are divided in two groups by their major source of supply. Figure 25 represents the situation regarding local suppliers and their delivery times. According to it there does not exist any major differences between the two groups, possibly favouring of local strategy will result in somewhat better lead time performance.



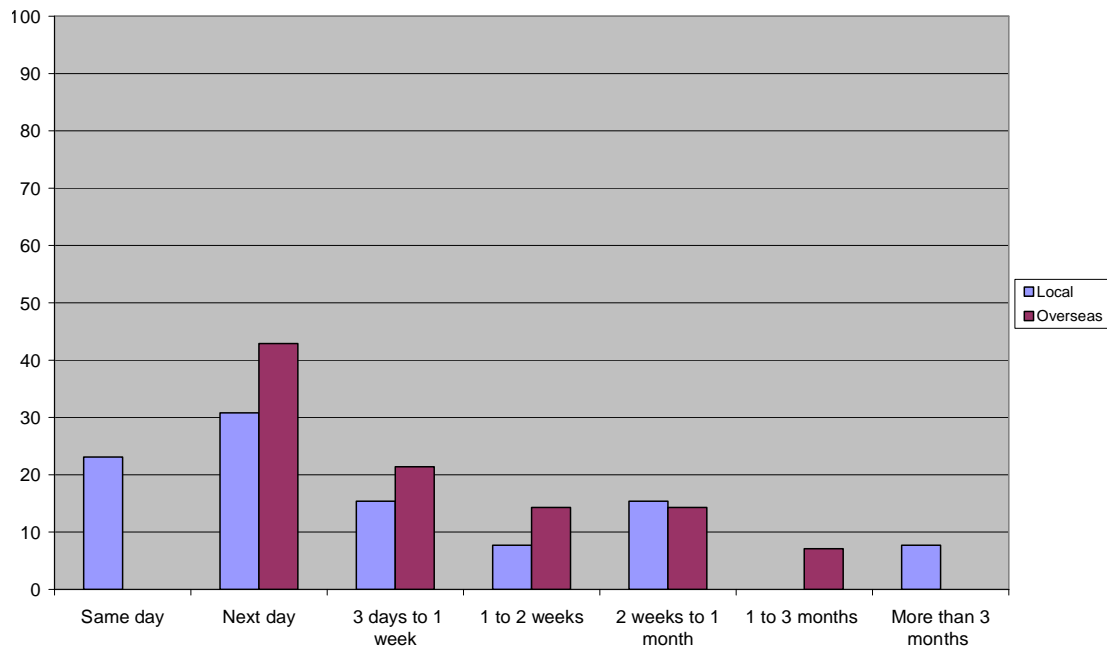
**Figure 25.** Delivery times from local suppliers (%).

In Figure 26 delivery times from suppliers located overseas are represented. Interestingly the results suggest that companies mostly sourcing from local companies are often having rather short lead time (1 to 2 weeks). Companies sourcing mostly overseas have more widespread distribution of lead times, even as long as over 3 months. Notable is the overall lead time performance of local suppliers vs. overseas suppliers – in a case of former lead time is days or weeks, while in the latter it is weeks or months.



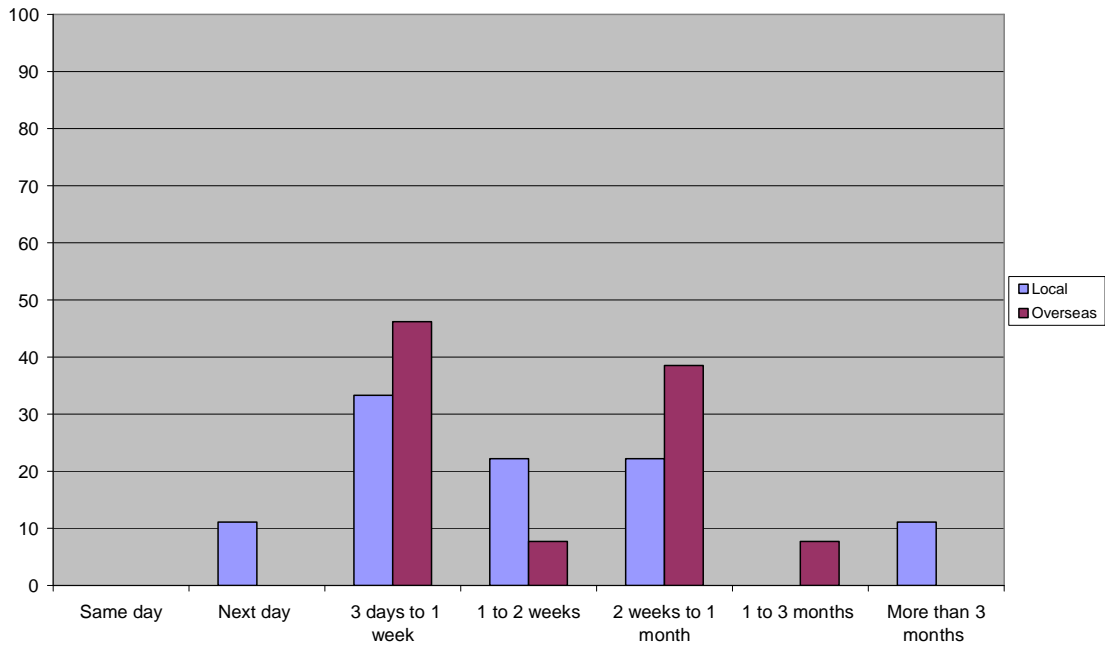
**Figure 26.** Delivery times from suppliers located overseas (%).

Figure 27 presents the delivery times to local customers. In general lead times are shorter than e.g. in the case of delivery times from local suppliers. Here it seems that companies who are having most of their suppliers in local area seem to be able to offer deliveries to their customers quite often during the same day. Interestingly companies who are having their major source of supply overseas can often complete delivery during the next day.



**Figure 27.** Delivery times to local customers (%).

Figure 28 represents the delivery times to customers located overseas. Surprisingly large proportion of the companies offer deliveries overseas in under a week time, which in practice means using air transportation. Differences between the analyzed groups are not significant. Notable is the fact that companies need to struggle with the lead time pressure set by the customers, while suppliers have much longer lead time towards them. This inevitably will lead on inventory holdings.



**Figure 28.** Delivery times to customers located overseas (%).

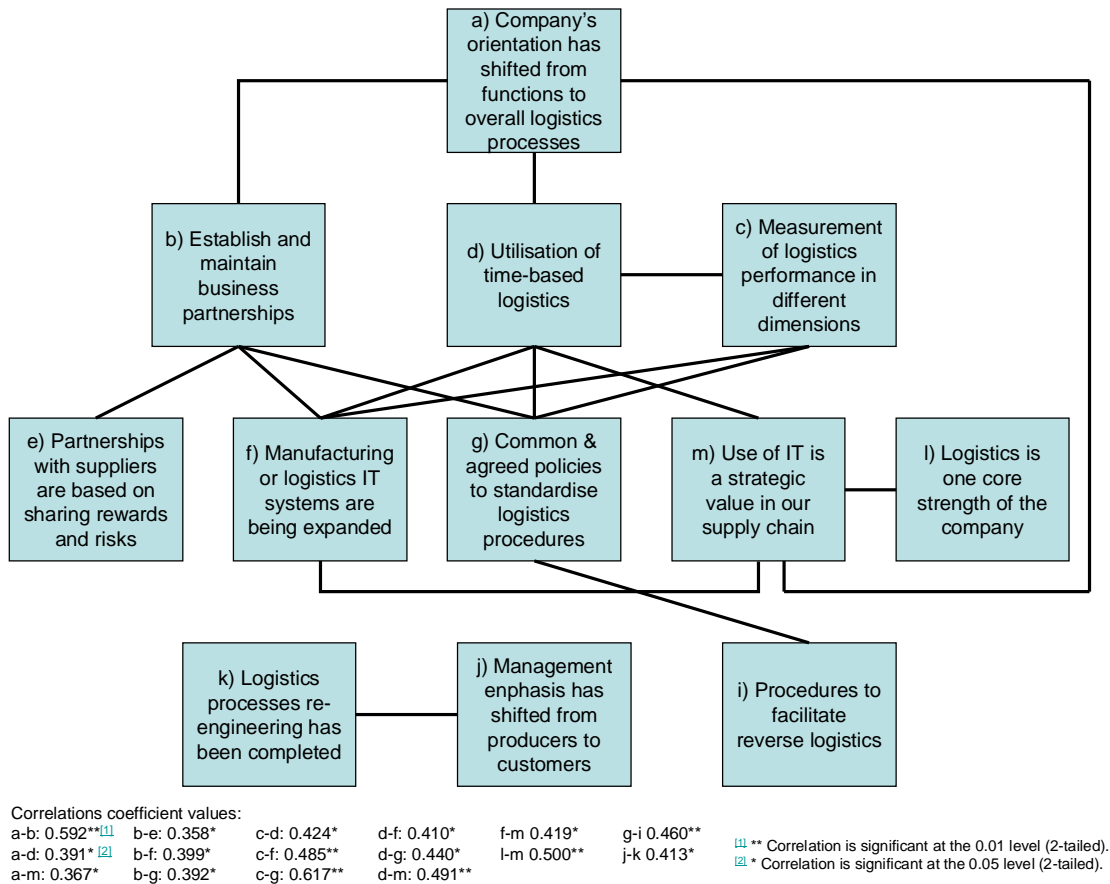
Altogether, we could say that sourcing strategy does not influence that much on lead time performance of supplier network – possibly local sourcing strategy could yield some benefit in terms of supply lead times from local suppliers, and this strategy could lead in some situations in shorter lead times for customers. However, only potential notable difference is between these sourcing strategies are the number of suppliers used per component/raw material. It seems to be the case that more international sourcing requires two suppliers to ensure availability of supplies.

## 6 DISCUSSION

Generally our research results from the questionnaire analysis showed some interesting implications, but driving factors in behind of these indicators were left as un-revealed in larger scale. Therefore, to provide proper discussion over the results, we completed correlation analysis from Section B responses of the questionnaire to shed more light on this issue. In order to identify, if there exist any significant causality between analyzed variables, a path diagram was constructed. It can clarify that what is the relation of each factor on the whole analyzed sample, and if there possibly exist any drivers for number of factors.

Figure 29 describes significant correlations among the 13 factors arising from the correlation analysis (please see details in Appendix B); we found out that all the factors are positively affecting on each other. Despite all the correlation coefficient value are resulted not extremely high, but we are able to see that factor '*c) Measurements of logistics performance*' affecting on factor '*g) Common and agreed policies and procedures to standardize logistics operations*', with correlation co-efficient of 0.617. Generally, all the rest of the results with respect to correlation coefficient values, are moderately high, which means the values from 0.358 to 0.592. Positive correlations are presented in the path diagram (Figure 29).





**Figure 29.** Path diagram from Section B questions (lines between questions areas indicate significant positive correlation between factors).

In general, from the diagram shown in Figure 29, we can see that each item in the diagram is located hieratically. Especially, factor 'a' is the primary driver, and most likely the factors 'a', 'b', 'c' and 'd' are the four main drivers for the rest of the items, namely 'e', 'f', 'g', 'm', and 'i'. Consequently, factors 'k' and 'j' are correlated to each other, but they do not indicate correlation with other ones.

According to the diagram, it shows that factor a) (Company's orientations shifts from vertical functions to the full stream processes from the supplier to consumer) affecting on three other factors namely: b) Establish and maintain business partnerships (a-b 0.592), d) Partnerships with suppliers or customers reward and risks sharing (a-d 0.391), and m) Utilizing IT in SCM has strategic values and driven by management (a-m 0.367).

Also we can see from factor b) (Establish and maintain business partnerships), affecting on three other factors, which are as follows: e) Partnerships with suppliers or customers are based on reward & risks sharing (b-e 0.358), f) Manufacturing or logistics are based on reward & risks sharing (b-f 0.399), g) Manufacturing or logistics IT systems are being expanded (b-g 0.392).

information system are being expanded (b-f 0.399), and g) Common and agreed policies and procedures to standardize logistics procedures and operations (b-g 0.392). However, those factors are not strongly correlated to each other as their correlation coefficient value is significant at 0.05 level, but we can estimate that if b) “Establish more partnerships”, then the following factors will be positively affected and have a tendency to increase the strategies as well as directions within those certain areas.

In terms of the factor c) “Measurement of logistics performance in different detentions, it affects on the following three factors: d) Utilization of time-based logistics, f) Manufacturing or logistics information system are being expanded (c-f 0.485), and g) Common and agreed policies and procedures to standardize logistics procedures and operations (c-g 0.617). We are able to see that the last two factors are highly correlated with c).

The last main driver d) (Partnerships with suppliers or customers reward and risks sharing) is affecting on the following three factors: f) Manufacturing or logistics information system are being expanded (d-f 0.410), g) Common and agreed policies and procedures to standardize logistics procedures and operations (d-g 0.440), and m) Utilizing IT in SCM has strategic values and driven by management (d-m 0.491).

Overall, based on the analyses above, it clearly shows in the diagram, there are four major drivers to the whole items. Factor a) “Company’s orientations shifts from vertical functions to the full stream processes from the supplier to consumer” is the primary driver. And factors “k” and “j” were identified as an independent sub-group, which did not have any correlation from other factors. These types of drivers in logistics and operations management literature have been well presented during the last two decades, and survey analysis just confirms that global change is in process in these two analyzed countries as well.

## 7 CONCLUSIONS

Generally this completed research work did not provide that large surprises; logistics and operations management in Finland and Sweden seems to have received place in strategy and overall business development. However, we could have assumed a priori that scope of outsourcing to be higher as well as usage of different transportation modes to be more versatile. Companies seem to be rather conservative in all respects, but environment has become increasingly more demanding. For example, operations (supplier network as well as sales) are increasingly more international, and complexity of operations could be considered as high (number of products, suppliers and components / raw materials). It might be so that longer lead time from overseas suppliers and demands of customers has taken all of the attention from development of other aspects. However, we are encouraged from Section B answers that companies have as a group tacit knowledge, what are the critical factors in the future development. Especially seeing logistics as a process and importance of partnerships hinders competitive advantage in the future as well – these might be the factors, which explain the unwillingness of outsourcing enlargement in the future. Companies have selected several partners to co-operate with, updated their own strategy related to operations structures, and develop these together within sustainable principles. For a researcher these results indicate that changes will occur in the future, but mostly in ‘how things are done’, not in ‘who will do those and in where’. This is of course a bit different from the daily news, where companies change their logistics strategies in short amount of time, and outsource as well as offshore operations with relatively small justification. This is naturally one further avenue for research to be dealt within future, e.g. using questionnaire concentrating how conservative logistics and operations management in these countries really is.

Other avenues for further research are the further comparison with different countries. We have plans to complete this same questionnaire in other continents as well, and comparison of these answers to Finnish/Swedish sample would bring interesting results. For example, the importance of logistics and operations management in overall strategy, use of different transportation modes as well as level of outsourcing are indeed interesting areas to compare groups with each other. It could be assumed that in emerging Asian economies companies are following rather vertical structures as compared to

horizontal integration applied in Northern-Europe. This will have of course effects on complexity of operations, and management principles. Similarly a priori it could be assumed that in emerging Middle-East economies, dominance of raw material production has resulted on situation, where secondary and tertiary sectors will have less developed logistics and operations management principles. This is also supported by World Bank (2007) research, where it is shown that “oil producer countries” have relatively unfriendly environment for logistics.

### **Acknowledgements**

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# APPENDICES

## APPENDIX A. SURVEY FORM

### The Role of IT to Enhance Supply Chain Management

Survey in co-operation with University of Wollongong in Dubai and Lappeenranta University of Technology, Kouvola Research Unit



#### Survey

Answer code (compulsory):

#### SECTION A: ORGANISATIONAL INFORMATION

Please mark one answer only unless otherwise specified.

1. What category does your company's main product fall under (e.g. computer, storage media, paint etc) ?
  1. Computer Systems
  2. Telecommunications
  3. Consumer Electronics
  4. Semi-conductors
  5. Passive Components & Devices
  6. Chemical, Oil related products
  7. Others, please specify :
  
2. What kind of business does the company run?
  1. Manufacturing
  2. Trading
  3. Logistics
  4. Other, please specify :
  
3. How many products (in terms of active part/item numbers) does your company produce ?
  1. Less than 50
  2. 50 to 99

- 3. Logistics
- 4. Other, please specify :

3. How many products (in terms of active part/item numbers) does your company produce ?

- 1. Less than 50
- 2. 50 to 99
- 3. 100 to 499
- 4. 500 and above

4. How many different components/raw materials (in terms of active part/item numbers) does your company purchase ?

- 1. Less than 50
- 2. 50 to 99
- 3. 100 to 499
- 4. 500 to 1000
- 5. More than 1000

5. (a) How many suppliers do you have in total and

(b) What is the average number of suppliers for each component/raw material ?

- |  |  |
|--|--|
| a) <u>Total No. of suppliers</u>       | b) <u>Average No. of suppliers for each component/raw material</u> |
| <input type="radio"/> 1. Less than 5   | <input type="radio"/> 1. One                                       |
| <input type="radio"/> 2. 5 to 19       | <input type="radio"/> 2. Two                                       |
| <input type="radio"/> 3. 20 to 99      | <input type="radio"/> 3. Three to ten                              |
| <input type="radio"/> 4. 100 and above | <input type="radio"/> 4. More than ten                             |

6. Please tick your major source of supply and your major market share by volume :-

- |                           | Local<br>(1)                | Overseas<br>(2)                |
|---------------------------|-----------------------------|--------------------------------|
| a) Major source of supply | <input type="radio"/> Local | <input type="radio"/> Overseas |
| b) Major market share     | <input type="radio"/> Local | <input type="radio"/> Overseas |

7. What is the **average** turn-around time for goods delivery (a) from suppliers and (b) to customers ?

**(a) Suppliers      (b) Customers**



	Local	Overseas	Local	Overseas
1. Same day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Next day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. 3 days to less than 1 week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. 1 to 2 weeks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. More than 2 weeks but less than 1 month	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. 1 to 3 months	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. More than 3 months	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. What is the average response time for customer enquiry ?

- 1. Immediate
- 2. Less than 0.5 hour
- 3. 0.5 to 1 hour
- 4. More than 1 hour but less than 4 hours
- 5. 4 hours or more

9. Does your company have an annual logistics budget ?

- 1. Yes
- 2. No
- 3. Ad hoc

10. Does your company have any measurements for your logistics performance ?

- 1. Yes
- 2. No (Go to Q11)

If Yes, please rank the top 3 measurements for your logistics performance (where 1 = "1st most important", 2="2nd most important" and 3 = "3rd most important"

- a) On-time delivery
- b) Back-orders
- c) Return on investment
- d) Space utilisation
- e) Actual spending vs budget
- f) Order cycle time

- g) Accurate, complete and damage-free delivery
- h) Inventory turnover
- i) Employee productivity
- j) Data accuracy
- k) Other (Please specify: )

11. For each movement namely:- "Inbound", "Outbound" and "Intra-company", rank the top 4 expenditure pertaining to your transportation cost where 1 = "1st highest", 2 = "2nd highest", 3 = "3rd highest", and 4 = "4th highest".

<b>a) Inbound</b>		<b>b) Outbound</b>		<b>c) Intra-company</b>	
<u>Transport</u>	<u>Ranking</u>	<u>Transport</u>	<u>Ranking</u>	<u>Transport</u>	<u>Ranking</u>
i) Air	<input type="text"/>	i) Air	<input type="text"/>	i) Air	<input type="text"/>
ii) Sea	<input type="text"/>	ii) Sea	<input type="text"/>	ii) Sea	<input type="text"/>
iii) Road	<input type="text"/>	iii) Road	<input type="text"/>	iii) Road	<input type="text"/>
iii) Rail	<input type="text"/>	iii) Rail	<input type="text"/>	iii) Rail	<input type="text"/>

12. Does your company outsource any of the following activities ?  
(Please mark only one tick for each activity)

	Yes (1)	No (2)	Planning (3)
a) Warehousing/Terminaling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Transportation/Shipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Information Technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Custom brokerage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Inventory control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Order processing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Product assembly/labeling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Product returns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. What is the ownership of your company ?
- 1. Government-linked company
  - 2. Local enterprise (with 30% or more local equity)

- 3. Local enterprise (less than 30% local equity)
- 4. Overseas Multi-national corporation (Headquarters :  )  
Country of origin

14. Information about your company

- a) What is your annual turnover?
- b) Total number of employees :
- c) Total number of employees supporting logistics :   
(excluding IT staff)
- d) What is your annual IT budget?
- e) Total number of employees supporting IT :

**SECTION B: COMPANY STRATEGIES AND DIRECTION**

15. The following statements concern the strategies adopted by your organisation. Please rate them individually on a scale of 1 to 5 where 1 = "Strongly Disagree" and 5 = "Strongly Agree".

- a) The orientation of my company has shifted from managing vertical functions to integrating full stream processes from the supplier to the consumer.

Strongly Disagree      Strongly Agree  
1       2       3       4       5

- b) My company has developed and is pursuing a plan to establish and maintain business partnerships.

Strongly Disagree      Strongly Agree  
1       2       3       4       5

- c) My company extensively measures logistics performance in terms of cost, productivity, customer service, asset management and quality.

Strongly Disagree      Strongly Agree  
1       2       3       4       5

- d) My company successfully utilises time-based logistics solutions like continuous replenishment, quick response and Just-in-Time with customers and/or suppliers.

Strongly Disagree      Strongly Agree  
1       2       3       4       5

- e) My company has partnerships with suppliers or customers who operate under principles of rewards and risks.

Strongly Disagree      Strongly Agree  
1       2       3       4       5

f) Manufacturing or logistics information systems in my company are being expanded to include more integrated applications.

Strongly Disagree 1  2  3  4  5  Strongly Agree

g) My company has common, agreed-to policies and procedures to standardise logistics operations.

Strongly Disagree 1  2  3  4  5  Strongly Agree

h) My company utilises more strategies to postpone movement and final product configuration today than two years ago.

Strongly Disagree 1  2  3  4  5  Strongly Agree

i) My company has procedures in place to facilitate reverse logistics.

Strongly Disagree 1  2  3  4  5  Strongly Agree

j) Management emphasis has shifted from producers to customers over the past two years.

Strongly Disagree 1  2  3  4  5  Strongly Agree

k) My company has undergone extensive logistics process re-engineering during the past two years.

Strongly Disagree 1  2  3  4  5  Strongly Agree

l) My company considers logistics as one of the core strengths.

Strongly Disagree 1  2  3  4  5  Strongly Agree

m) My company believes in the strategic values of using IT in our supply chain. Therefore the development of IT is driven and planned by senior management.

Strongly Disagree 1  2  3  4  5  Strongly Agree

[Send answers now](#)

## APPENDIX B. Correlations Section B

	Q15_a	Q15_b	Q15_c	Q15_d	Q15_e	Q15_f	Q15_g	Q15_h	Q15_i	Q15_j	Q15_k	Q15_l	Q15_m	
Q15_a	Pearson Correlation Sig. (2-tailed) N	1 ,592(**) 33												
Q15_b	Pearson Correlation Sig. (2-tailed) N		1 ,592(**) 33											
Q15_c	Pearson Correlation Sig. (2-tailed) N			1 ,293 33										
Q15_d	Pearson Correlation Sig. (2-tailed) N				1 ,098 33									
Q15_e	Pearson Correlation Sig. (2-tailed) N					1 ,293 33								
Q15_f	Pearson Correlation Sig. (2-tailed) N						1 ,098 33							
Q15_g	Pearson Correlation Sig. (2-tailed) N							1 ,098 33						
Q15_h	Pearson Correlation Sig. (2-tailed) N								1 ,098 33					
Q15_i	Pearson Correlation Sig. (2-tailed) N									1 ,098 33				
Q15_j	Pearson Correlation Sig. (2-tailed) N										1 ,098 33			
Q15_k	Pearson Correlation Sig. (2-tailed) N											1 ,098 33		
Q15_l	Pearson Correlation Sig. (2-tailed) N												1 ,098 33	
Q15_m	Pearson Correlation Sig. (2-tailed) N													1 ,098 33

\*\* Correlation is significant at the 0.01 level (2-tailed).  
\* Correlation is significant at the 0.05 level (2-tailed).



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