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FINLAND STATE OF LOGISTICS 2014

Tomi Solakivi & Lauri Ojala & Sini Laari & Harri Lorentz &
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1 SUMMARY

Key findings of the Finland State of Logistics Survey 2014:

- Finland's rank in the Logistics Performance Index was lower than before in 2014. In the aggregate LPI 2007–2014 data, Finland is still in the top 10% out of 166 countries.
- Firms in Helsinki and Uusimaa regions are most satisfied with their regional logistics preconditions.
- The condition of transport infrastructure is considered less than satisfactory. In South Finland the biggest concern is road capacity; in North and East Finland it is the technical conditions of the roads.
- Logistics costs in manufacturing and trade were on average 13.4% of turnover in Accounting Year (AY) 2013, compared to 12.1% in AY 2011. Industry restructuring is a major cause for the increase in costs.
- Over half of total logistics costs are incurred in internal processes in trade and manufacturing firms; the single biggest cost category is inventory carrying costs
- Logistics costs in Finland in relation to GDP were on average 11.4%
- The size of the logistics market in Finland (logistics services bought from service providers) was approx. 8.8 billion € in AY 2013.
- Slowee inventory turnover has prolonged cash-to-cash cycle times. Specialization and supply chain management are seen more important elements in firms' strategies than cost awareness.
- Firms' economic success is a significant element in how they take environmental issues into account in their operations.
- The efficiency of transportation firms' operations has improved
- Logistics service providers' dependence on large customers has increased.

In 2014 Finland ranked 24th in World Bank's Logistics Performance Index LPI 2014, compared to the 3rd rank in 2012. However, Finland is still in the top 10% of 166 countries in the aggregated LPI ranking for 2007–2014. The LPI measures in particular the performance of foreign trade logistics. Assessments of Finland by LPI subcategories indicate a similar trend as do the Finnish respondents' replies in the Finland State of Logistics 2014 survey. The Finnish replies are predominantly more critical than the international assessment. An exception to this norm is Tracking and Tracing, where the

Finnish respondents in all industries give a higher rating than the LPI (Figure 1). The biggest difference in the Finnish data is in Transportation availability, where especially the view of domestic trade firms is more critical than the international assessment in LPI.

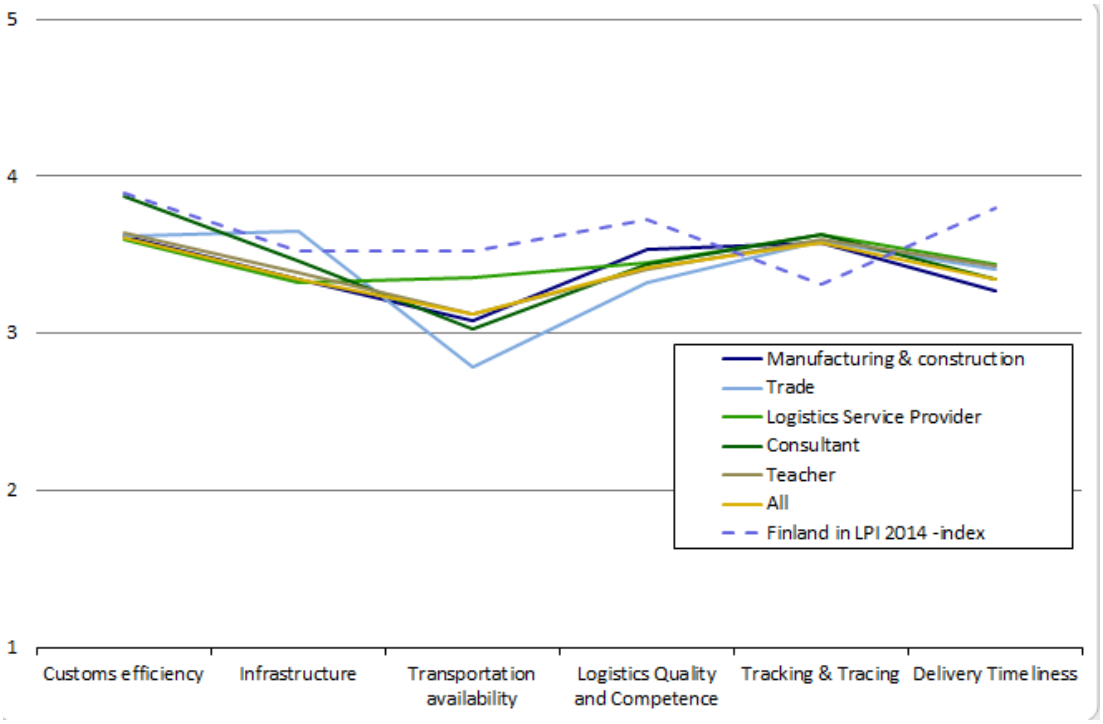

Figure 1: Finland's scores in Logistics Performance Index 2014 and the assessments of over 1 700 Finnish respondents on the same dimensions in 2014 (LPI=Arvis, Saslavsky, Ojala, Shepherd, Busch & Raj 2014) (Min =1, Max =5)

Since 2006, Finland State of Logistics surveys have surveyed the local operating preconditions along five dimensions: a) general business perspective; b) logistics efficiency; c) location of production; d) transport infrastructure; and e) location of competitors. Already in 2006, firms in South Finland considered their operating preconditions as better than firms operating elsewhere in Finland.

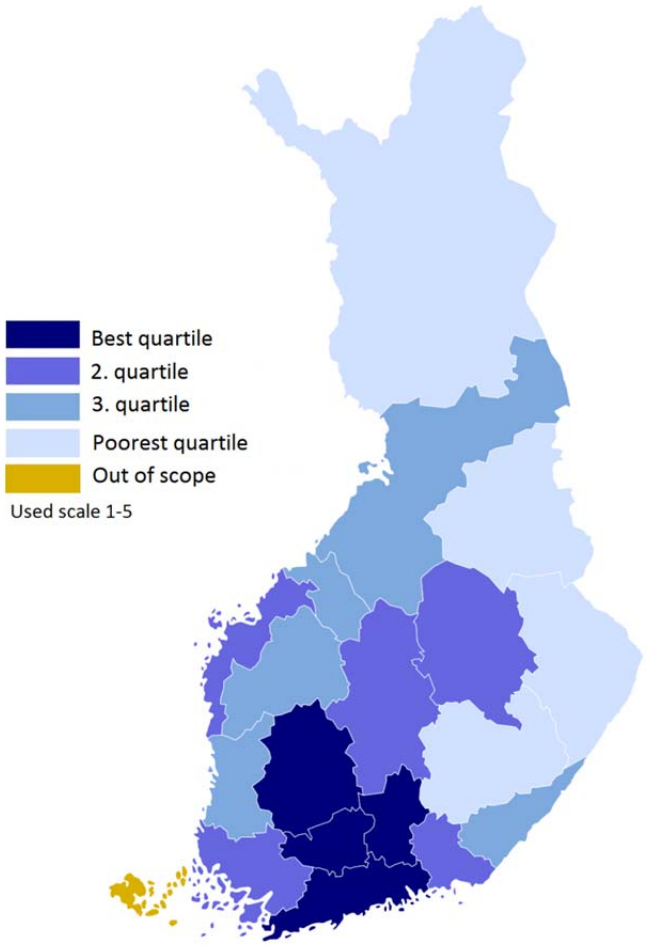

Figure 2: Firms' estimates on their regional logistics preconditions in an aggregate of the following dimensions: a) General business perspective, b) Location of production c) Logistics efficiency d) Transport infrastructure e) Location of competitors

Respondents valued the operating preconditions as best in general business perspective and in logistics efficiency. The poorest operating preconditions were found in the respondents' views in transport infrastructure and location of competitors. As in previous years the regional differences in firm views are clear. The overall operating preconditions are considered best in South Finland and poorest in North and East Finland (Figure 2). The regional differences in views on operating preconditions were biggest concerning transport infrastructure.

The logistics costs for manufacturing and trade firms operating in Finland seem to have increased somewhat since the two previous surveys. The

logistics costs weighted by firm and industry turnovers were on average 13.4% of turnover in 2013. In comparison, in 2011 the share was 12.1% (Figure 3).

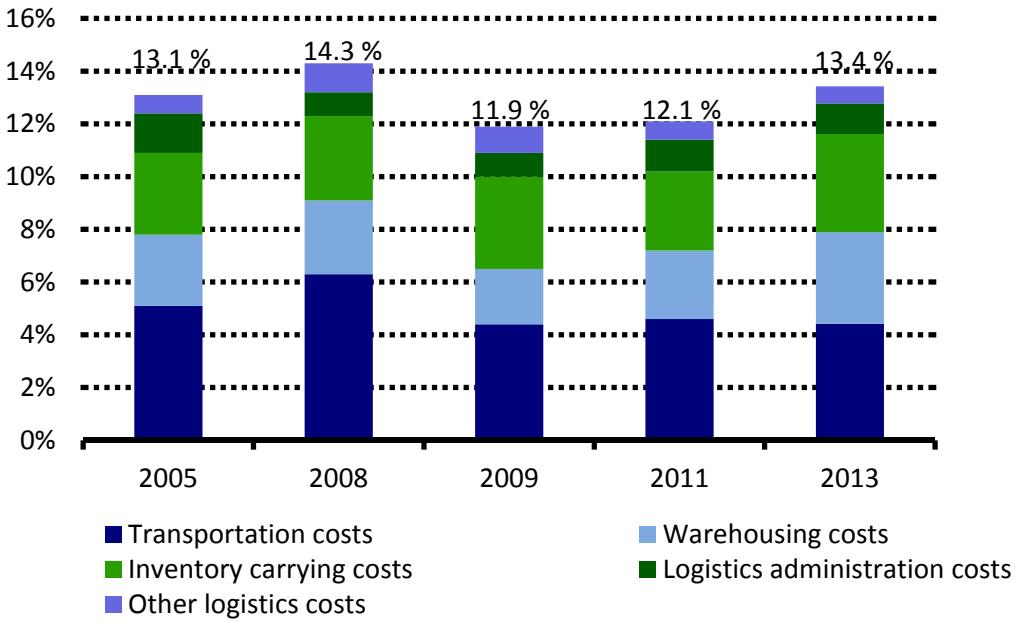

Figure 3: Logistics costs for manufacturing and trade as % of turnover, weighted by firm and industry turnover; Accounting Years 2005–2013

Transportation costs continue to be the single biggest cost category; their share of individual firm's turnover was on average 4.4% in 2013 (4.6% in 2011). The transportation costs also include transport packaging costs. Although the industry restructuring has partially restrained overcapacity in the transportation market the competition is still fierce, which should restrict the increase of transportation costs in the future as well. The IMO resolution on requiring lower sulphur oxide emissions for ship fuels from 1 January 2015 onwards brings its own challenge for transportation costs, because it is estimated to raise the costs of maritime transport in particular. In addition the resolution is estimated to have indirect effects. There have been estimates according to which the increase in demand for low-sulphur fuels will cause pressures to increase the price of diesel fuel because of limited refining capacity. More precise effects can only be seen in 2015. (Figure 3, Table 1 and Table 2)

Table 1: Comparison to GDP of the logistics costs of manufacturing and trade firms operating in Finland. (Finland State of Logistics surveys 1993, 1997, 2001, 2006, 2009, 2010 and 2012; Statistics Finland 2014a)

	1990	1995	2000	2005	2008	2009	2011	2013
Logistics costs of manufacturing and trade, billion € (old calculation method)	13,7	13,3	18	26,4	34,7	29,9		
Logistics costs of manufacturing and trade, billion € (new calculation method) incl. functions abroad				29,2	40,1	34,7	33,1	37,8
GDP at market price, billion €	89,3	96	132,1	157,3	184,2	171,3	191,6	201,3
Foreign subsidiaries as a share of the turnover of Finnish companies		20,3 %	42,6 %	46,5 %	49,6 %	49,6 %	50,0 %	39,2 %
Logistics costs in relation to GDP (old calculation method)	17-18%	14-15%	14-15%	17 %	19 %	17,50 %		
Logistics costs of manufacturing and trade, billion €, only costs incurred in Finland included	**13,7**	**10,6**	**10,3**	**15,6**	**20,2**	**17,5**	**16,6**	**22,9**
Logistics costs in relation to GDP (new calculation method)	**12,2 %***	**11,1 %***	**7,8 %***	**9,9 %**	**10,9 %**	**10,2 %**	**8,6 %**	**11,4 %**

* calculation method changed

Converted to Euros the logistics costs for manufacturing and trade were 37.8 billion € in 2013 (33.1 billion € in 2011) of which 22.9 billion € concerned logistics in Finland. In relation to Finland's GDP the logistics costs were on average 11.4% in 2013 (8.6% in 2011).

Table 2: Logistics and transport costs for manufacturing and trade firms operating in Finland, time series from 1990 in 2013 prices (Finland State of Logistics surveys 1993, 1997, 2001, 2006, 2009, 2010 and 2012)

Indicator/year	1990	1995	2000	2005	2008	2009	2011	2013
Logistics costs (billion €), manufacturing and trade (incl. functions abroad)	20,9*	18,1*	22,7 *	34,6	43,8	37,9	34,5	37,8
Logistics costs, share of turnover	11,0 %	10,3 %	10,2 %	13,1 %	14,2 %	11,9 %	12,1 %	13,4 %
Transportation costs, share of turnover	4,8 %	4,7 %	4,5 %	5,0 %	6,3 %	4,4 %	4,6 %	4,4 %

* Old calculation method

Based on the comparison of logistics costs in 2011 and 2013 in relation to GDP it would be tempting to come to the conclusion that logistics costs in Finland have changed significantly or that logistics efficiency has considerably weakened. However, the change in relative costs is for the most part

explained by structural changes in the Finnish economy, especially in the manufacturing industry. Within a short period of time there have been major structural changes in the industries operating in Finland. As a result the share of industries of higher added value (and of relatively low logistics costs) has decreased significantly. At the same time the importance of industries of lower added value (and of relatively higher logistics costs) has increased. The structural change of the manufacturing industry has had the additional effect that the relative importance of industries operating mainly in the Finnish domestic market has increased. This is evident e.g. in the fact that the foreign subsidiaries' share of Finnish firms' turnover in 2013 was approx. 39%, when it has amounted to 50% at most in the past. In terms of logistics costs this change has signified that a larger share of logistics and logistics costs for manufacturing firms is directed to operations in Finland.

The logistics costs of firms are divided into internally produced services and to services purchased from the market. Of the total costs 22.9 billion € are focused on Finland. Of these costs a considerable amount, approx. 14.1 billion €, is firms' internal costs. Over 10 billion € of these internal costs is connected to warehousing and inventory carrying.

The logistics services that firms bought from the market amounted to approx. 8.8 billion €. (Figure 4). Transportation services (6 billion €) and warehousing services (2 billion €) accounted for the largest share of the total. Firms purchase other logistics services, like logistics administration services including logistics information systems and value added services, for approx. 0.8 billion € a year.

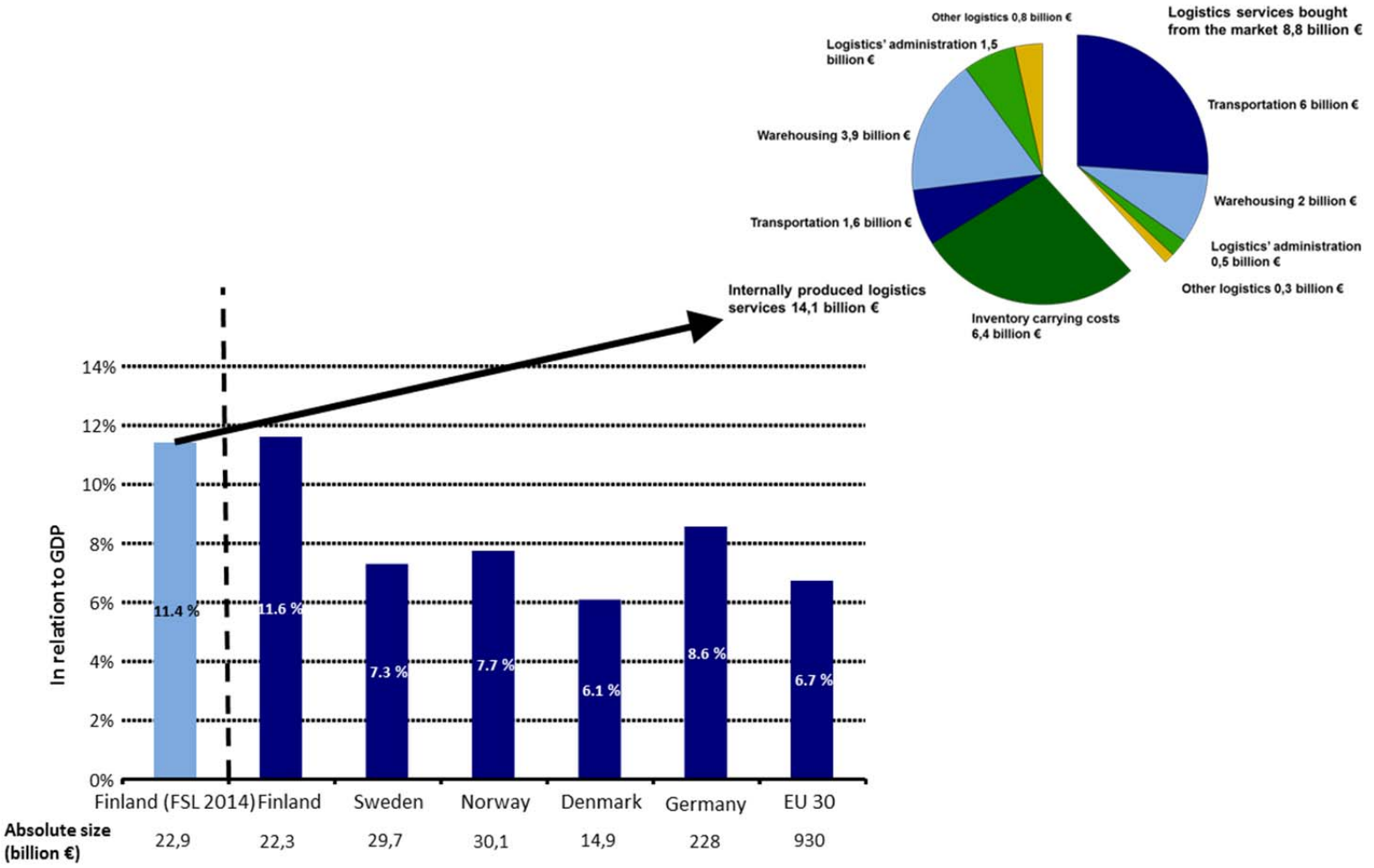

Figure 4: Estimation of the size of the logistics market based on FSL2014 survey results (left column and pie diagram) and a Europe wide research (other columns; Kille & Schwemmer 2014)

Cash-to-cash cycle times have been increasing since 2006 (Figure 5). In 2006 the average cash-to-cash cycle for manufacturing companies was just over 40 days whereas in 2014 it was already over 60 days. The change is mostly explained by the increase in the time that the material is in the possession of the firms. Days of sales and payables outstanding have stayed mostly the same. The average cash-to-cash cycles are not the whole truth, since there are major differences between industries and individual firms. Even within the same industry the cash-to-cash cycle time, material possession time and payment times may vary considerably. This would indicate that firms continue to have significant potential for more efficient supply chain management and internal processes.

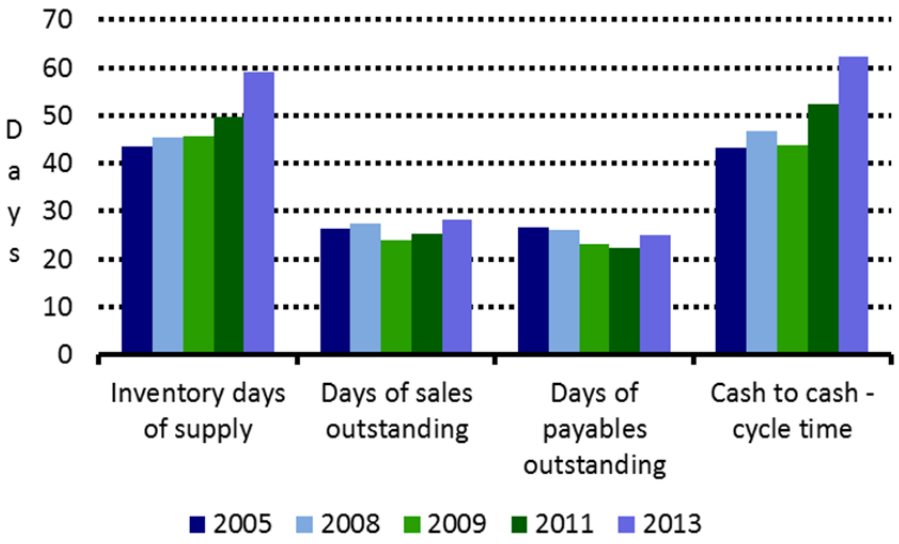

Figure 5: Cash-to-cash cycle times in manufacturing firms 2006–2014 (Finland State of Logistics surveys 2006, 2009, 2010 and 2012)

Cost factors appear to have less relevance than other factors as a source of competitive advantage for firms (Figure 6). Firms in trade, manufacturing and logistics all considered specialization related factors as the most important source of competitive advantage. Also supply chain management and environmental factors were considered more important than cost factors. This cannot however be interpreted as costs not being important for firms. A more likely explanation is that cost awareness and cost effectiveness are considered as a prerequisite rather than a consciously chosen competitive strategy.

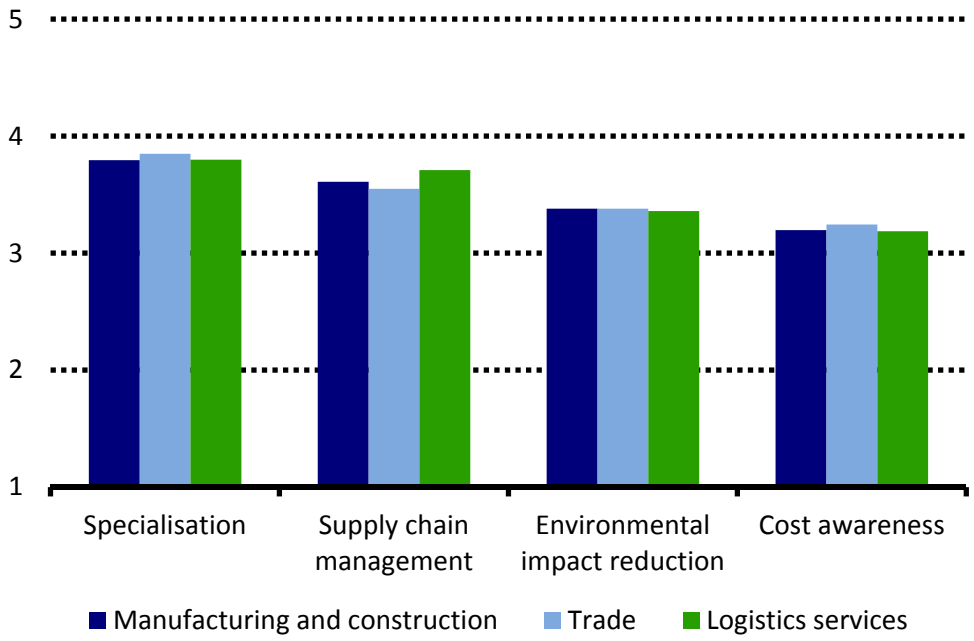

Figure 6: Firms' competitive strategies in 2013; Min. = 1, Max. = 5

The economic situation of firms appears to positively relate to what extent they are able to take environmental issues into account in their operations. Firms were asked to rate statements on how their economic situation has developed during the last two years considering the overall economic situation in Finland. They were also asked to give replies on how they have managed to improve their environmental performance, e.g. by reducing carbon dioxide emissions. Based on Figure 7 it would appear that the firms, whose economic situation has improved, have also been able to improve their environmental performance. This connection appears to be similar in all industries covered in this survey.

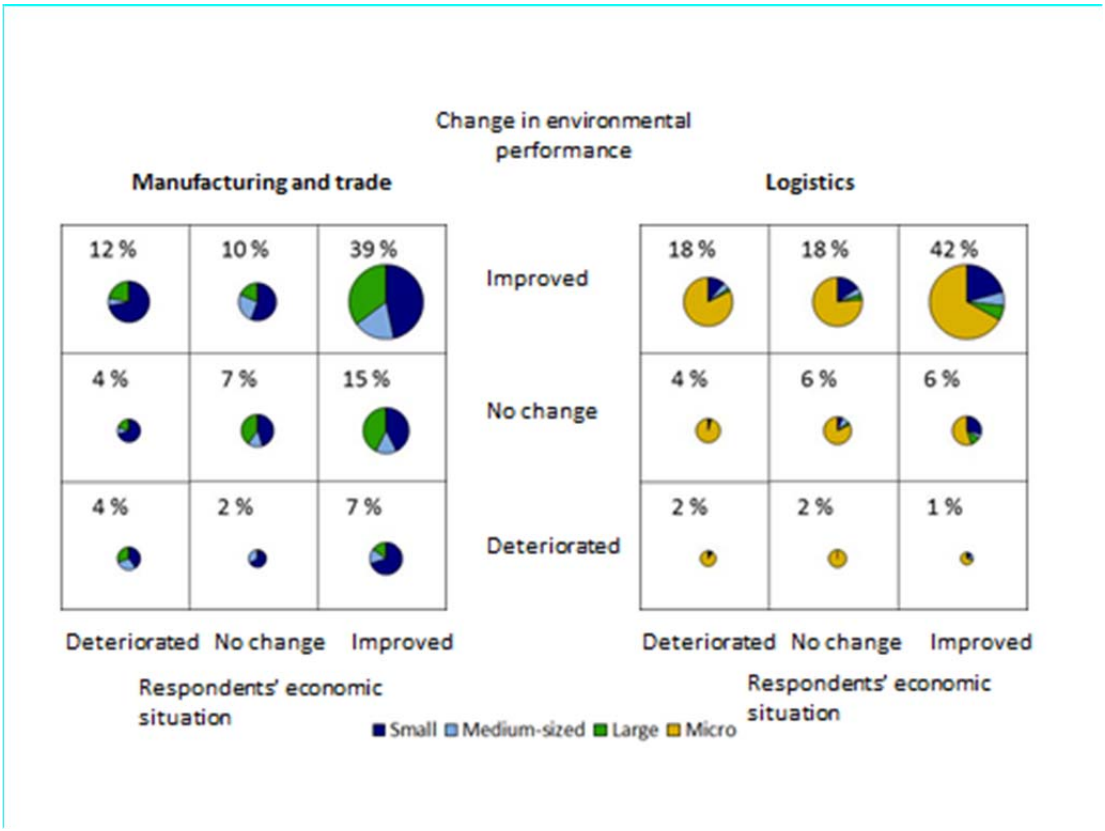

Figure 7: Cross-tabulation of change in respondents' environmental performance and economic situation in the last two years, manufacturing and trade (N=270) and logistics service providers (N=599), percentage of respondents

The logistics markets appear to be further concentrating. The share of the largest customers of individual logistics service provider's sales has increased for firms of all sizes. This development makes logistics service providers more and more dependent on changes in individual customers' operations. The change in customers' strategies is evident; especially large customers concentrate their logistics operations to one or two service providers (Figure 8).

Another development trend in the logistics market is the increase in subcontracting (Figure 9). Large logistics service providers in particular have increased the use of subcontracting as part of their service production. At the same time the role of smaller logistics service providers has increasingly become that of a subcontractor to a larger service provider.

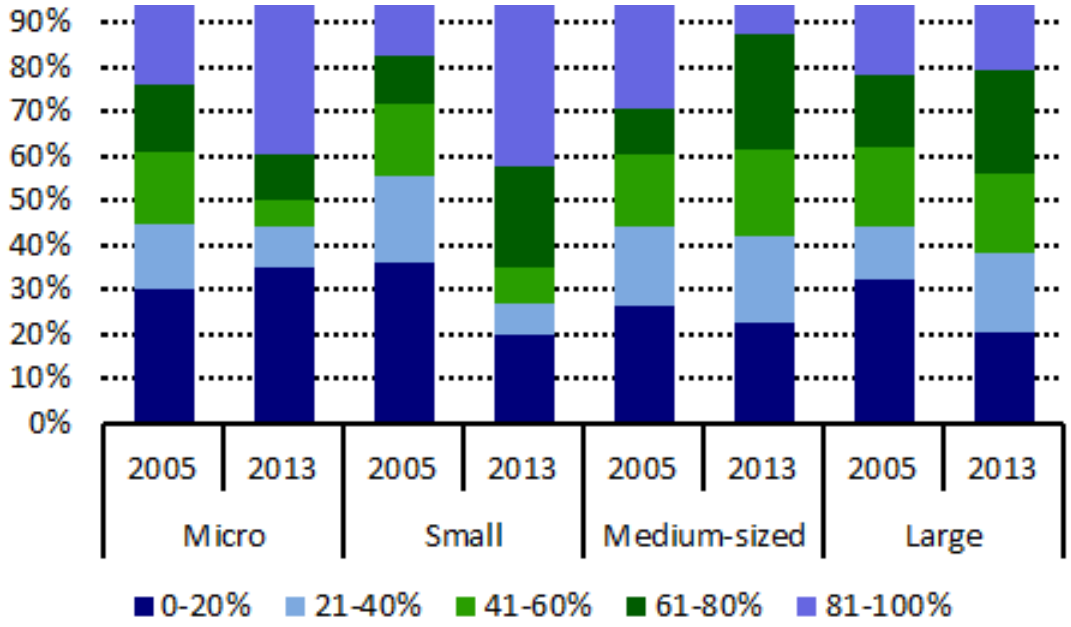

Figure 8: The share of the largest customer on logistics service providers' turnover in 2005 and 2013

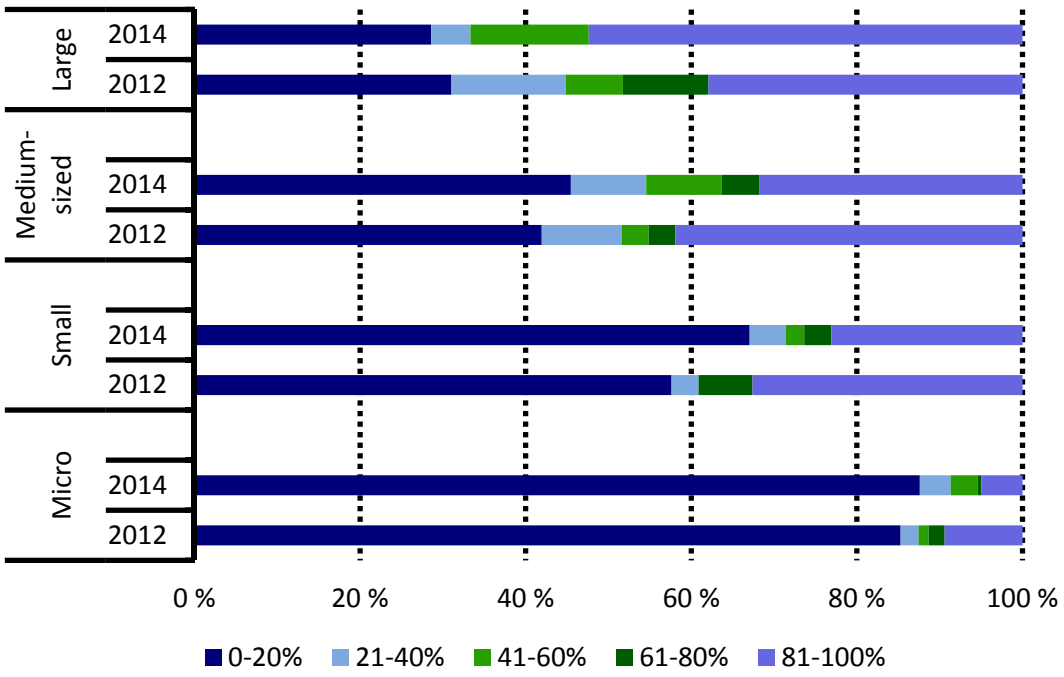

Figure 9: The share of subcontracting in transportation firms' services in 2012 and 2014

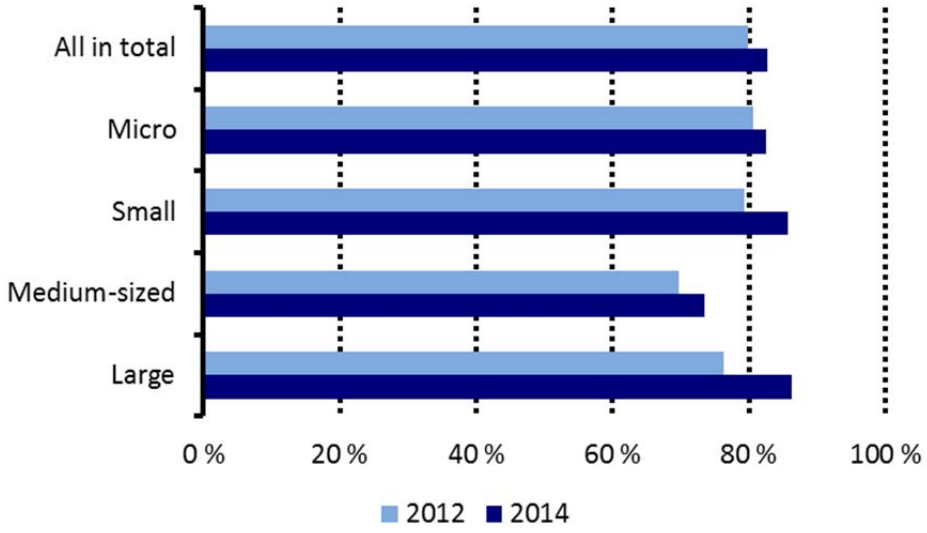

Figure 10: The average load factor for domestic transportation in 2012 and 2014

The tight competition in the logistics industry and especially in transportation is evident in the operational performance of transportation firms. They have pursued to improve their profitability by increasing the efficiency of existing capacity (Figure 10). They have been able to decrease the share of empty loads as well as increased the average load factors in both domestic and international transports. The efficiency of Finnish transportation firms is top class based on all of the above key figures.

2 SURVEY

2.1 The commission

The state of logistics in Finland and its future development trends have been researched regularly for over twenty years. The Ministry of Transport and Communication commissioned the first national Logistics survey in 1992. This is now the eight national Logistics survey and has been conducted by the commission of the Finnish Transport Agency.

This survey, like the four preceding ones, was conducted by a research team in the Operations and Supply Chain Management subject in the University of Turku. This survey was executed in the same manner as the preceding Finland State of Logistics surveys since 2006 and data comparability between surveys remains high.

The similarity in the lay-out of questions and their topics, such as firm performance measures and regional operating preconditions, has created a time series since 2005, enabling a comparison of results over time. For logistics costs it is possible to carry out a comparison that goes all the way back to the 1990s. Especially for costs the used time series are unique in length and breadth world-wide.

2.2 The research team

D.Sc. Tomi Solakivi acted as the Project Manager under the supervision of Professor Lauri Ojala. D.Sc. Solakivi also administered the on-line questionnaire. Ms Noora Viherlehto acted as research assistant. Both were responsible for collecting and editing the data. Other components were the work of Harri Lorentz (D.Sc.), Juuso Töyli (D.Sc.; D.Eng.) and Sini Laari (M.Sc.). Jarmo Malmsten (Ph.D) contributed to the maps in the report.

Finland State of Logistics 2014 examines the following themes, which have been analysed by the below mentioned researchers (Table 3):

Table 3: Themes in this Finland State of Logistics survey and researcher mainly responsible for each topic

Economic operating environment	Noora Viherlehto
Finland's logistics performance	Sini Laari
The logistics operating environment of firms	Sini Laari and Jarmo Malmsten
The state of the transportation infrastructure	Tomi Solakivi
The essential competitive factors of firms	Harri Lorentz and Jarmo Malmsten
The location of production of Finnish firms	Harri Lorentz and Jarmo Malmsten
The demand for and outsourcing of logistics services	Tomi Solakivi
Selecting the freight carrier	Tomi Solakivi
The international logistics market	Sini Laari and Lauri Ojala
The size of the logistics market in Finland	Tomi Solakivi and Lauri Ojala
The logistics costs of firms and Finnish economy	Tomi Solakivi
The key indicators of logistics	Tomi Solakivi and Juuso Töyli
Logistics and sustainable development	Sini Laari

2.3 Target group and sample

As in the surveys of 2006, 2009, 2010 and 2012 the target groups in Finland State of Logistics 2014 are Finnish manufacturing companies (including construction), trade firms and logistics service providers. Firms specialising in consultation in the logistics industry as well as those in logistics educational services and research form their own separate groups.

The data in the survey was collected by means of an on-line questionnaire in April/May 2014. Depending on the main sector of industry, the survey consisted of 23–25 groups of questions. Consultants and educational staff

answered a shorter range of questions mainly focusing on regional operating conditions for logistics. This time as well, the survey was worded in a way that would preserve comparability with the key components of previous surveys.

The request to take part was emailed to a total of 29,196 persons. To ensure the survey coverage, the 100 largest firms in the survey's main industries were contacted beforehand by phone. A total of 1,115 of the sent e-mails were returned to the sender implying that the final target population was 28,081 persons. For the survey to be successful, it was crucially important to obtain personal email addresses from the following: the Finnish Association of Purchasing and Logistics (LOGY), the Federation of Finnish Companies (SY), and Finnish Transport and Logistics (SKAL). A total of 1,731 approved replies were received, giving an overall response rate of 5.9%. The response rate was especially high for large and medium-sized firms.

The survey response rate can be compared to other surveys in the industry conducted throughout the world. Wagner and Kemmerling (2010) have gathered data from 229 scientific articles, whose findings are based on survey questionnaires. The response rate for such surveys is usually the lower the larger the number of respondents the questionnaire is sent to. (Figure 11)

If fewer than 100 surveys are sent out, more than a 90% response rate can be achieved, while the response rate for questionnaires sent to several thousand people is less than 20%. Figure 11 shows the State of Logistics survey response rate compared to the data collected by Wagner and Kemmerling (2010). It is evident that the response rate for this survey is in line with the other surveys conducted in the field. The number in the target group and the number responding are nevertheless higher compared to the others.

The survey was carried out so that each recipient received a personal email link to the web-based Webropol service. After two weeks, a reminder was sent to those who had not replied, and another followed two weeks after that. Of those who replied, 29.1% (504) represented manufacturing and construction, 22.9% (398) trade, 35.6% (617) logistics service providers, 3.6% (64) consulting services, and 8.5% (148) educational services.

The number of respondents is this time somewhat smaller than in 2012 and close to the level of 2010. In the total distribution the share of logistics service providers is emphasized more than in previous surveys.

The survey data in this report has been grouped by main industry, company size and partly by the extent to which a firm is international. The classification also makes use of other background variables insofar as they are at all meaningful for the analysis.

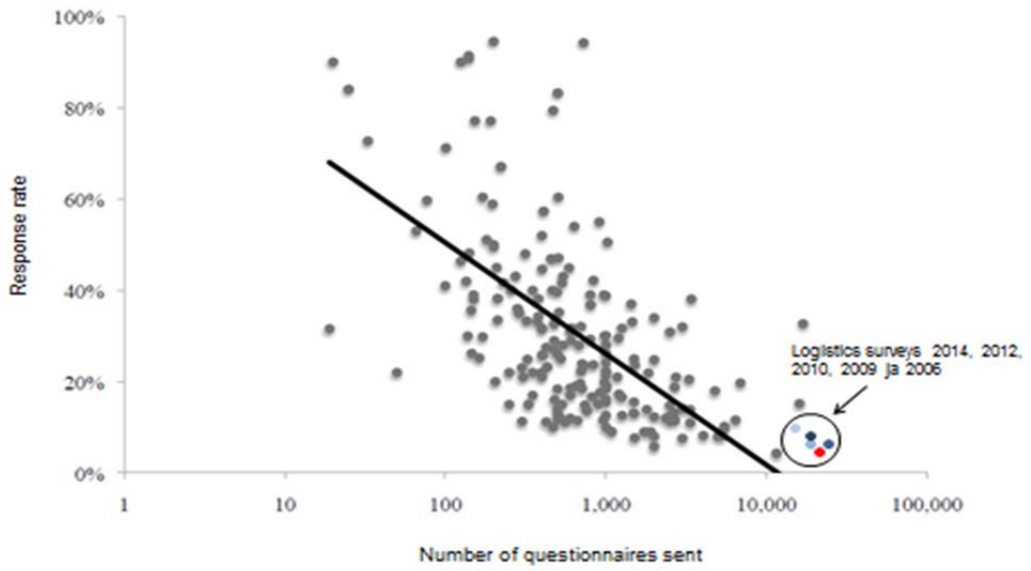

Figure 11: Finland State of Logistics 2014: survey response percentages and number of questionnaires sent out compared to other studies in the sector (Wagner and Kemmerling 2010)

The division of firms by size reflects the European Commission's definition of the size of micro-firms and small and medium-sized firms in terms of their turnover, as follows:

- Large firms: over EUR 50 million
- Medium-sized firms: EUR 10–50 million
- Small firms: EUR 2–10 million
- Micro- firms: EUR 0–2 million

The Commission's definition also covers the number of staff the firm employs and the balance sheet total, but with this report it has been found that firms can be divided into groups sufficiently precisely merely on the basis of turnover.

The distribution of respondent firms with regard to pivotal background variables is presented in Table 4.

Table 4: Respondent firms by main sector of industry and size in the Finland State of Logistics survey 2014

Company size	Manufacturing and construction	Trading	Logistics service providers	Consulting	Teaching and research	N
Micro	345	288	461	50		1 144
Small	73	69	97	6		245
Medium	28	18	31	2		79
Large	58	23	28	6		115
Size not asked					148	148
Total	504	398	617	64	148	1 731

The distribution of respondent firms in the previous logistics surveys by main industry is given in Table 5.

Table 5: Firms responding to Finland State of Logistics surveys by main sector of industry since 2006

Logistics survey	Manufacturing and construction	Trading	Logistics service providers	Consulting	Teaching and research	Total
2014	504	398	617	64	148	1 731
2012	875	773	684	121	279	2 732
2010	570	435	545	102	161	1 813
2009	996	794	915			2 705
2006	985	788	482			2 255

3 THE ECONOMIC OPERATING ENVIRONMENT WHEN CONDUCTING THE SURVEYS

Key findings:

- The uncertainty of the global economic situation is also reflected in the Finnish economy. No clear development for better or for worse can be seen when comparing to the time when data for the State of Logistics 2012 survey was collected
- Economic indicators showed marginal growth when conducting the previous survey. At the moment all the indicators except total consumption are in a downward trend.
- Both the global and Eurozone Purchasing Manager Index have risen since the previous survey time. Confidence indicators in manufacturing have risen a few points both in Finland and in the Eurozone. Consumer confidence on the other hand has improved significantly since 2012.
- Fuel prices have remained the same as during the previous survey
- Euribor-interest rates and the interest rates on firm loans granted by the Finnish financial institutions have decreased since the previous survey

Indicators for the state of the economy and economic expectations help to interpret the changes that companies make to their ratings for their business and operating environment. When the State of Logistics 2012 was conducted the economic climate was again getting gloomier after some emerging signs of recovery from recession. When the State of Logistics 2014 survey was conducted the economy still had not taken a turn for the better, but instead the uncertainty in economic development continued.

3.1 Turnover development for manufacturing, trade and logistics industries in Finland

The turnover for the logistics industry has remained relatively similar in 2006–2012. The economic crisis that began in 2008 has had a considerably larger impact on the turnover development of firms in manufacturing and trade

industries. Both decreased significantly in 2009, manufacturing turnover even more radically than that of trade. The manufacturing turnover was approx. 18 billion lower in 2012 than it was in 2008. For trade the turnover in 2012 finally surpassed the level it was on before the economic crisis began in 2008 (Figure 12).

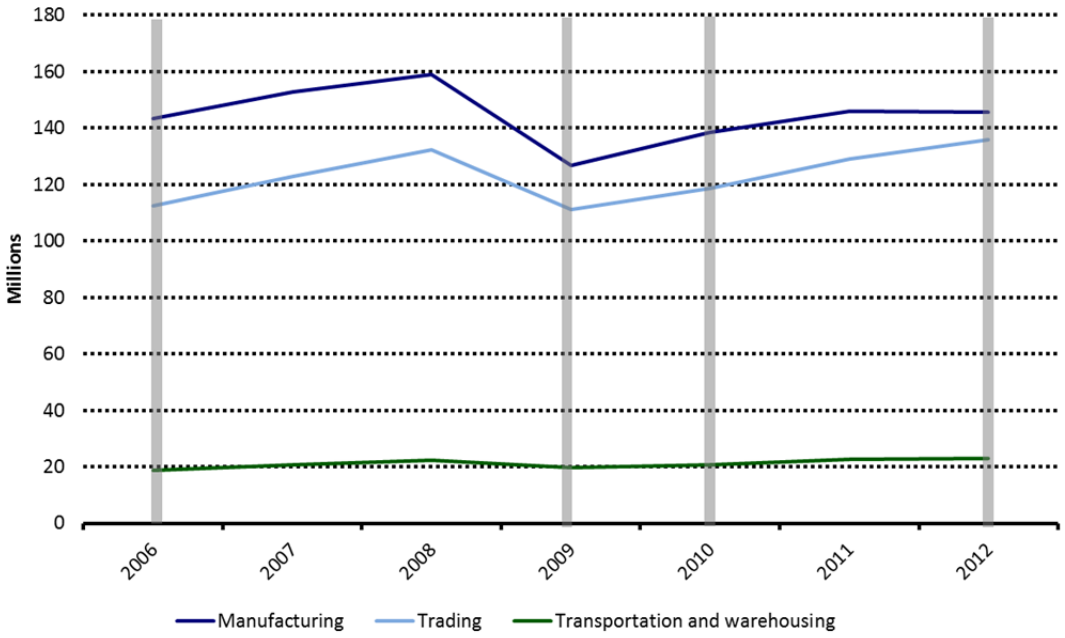

Figure 12: Turnover development in manufacturing, trade and logistics 2006–2012 (Statistics Finland 2014b). The columns represent the years when the State of Logistics surveys have been conducted since 2006

3.2 Development indicators of the Finnish economy

When assessing the operating environment at the time when the surveys are being carried out, data and indicators obtained from the national accounts also need to be examined. Figure 13 shows some of the key indicators for the Finnish economy.

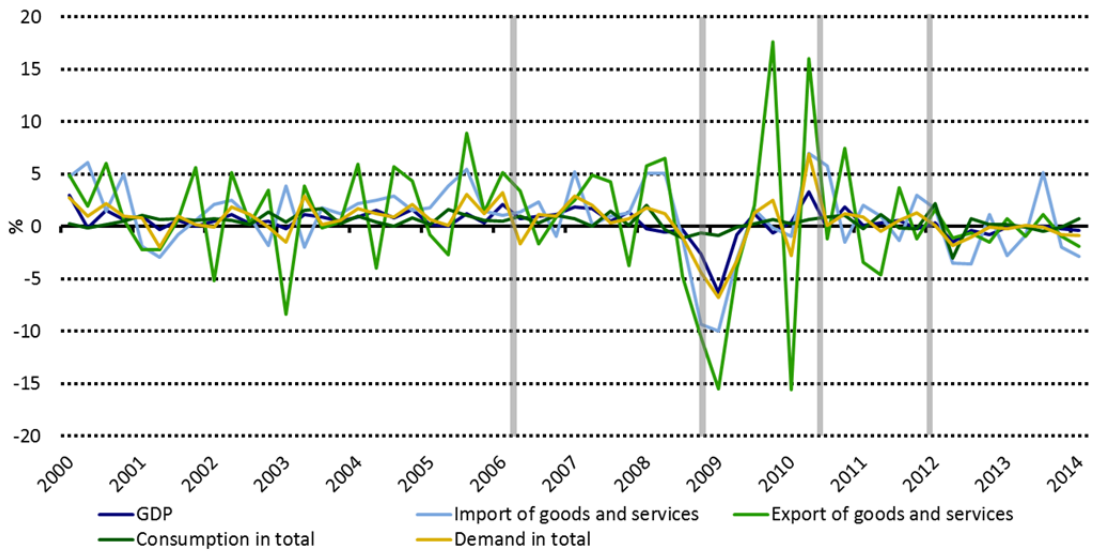

Figure 13: National account indicators quarterly, 2005–2014; percentage as the unit of change (Statistics Finland 2014 b); the columns show the times when the logistics survey were carried out since 2006

As can be seen from the national account indicators, in the first quarter of 2012 all indicators except exports were showing growth. After that time the growth has slowed down and turned negative. In the first quarter of 2014 the change in all indicators was slightly negative except for consumption, which was valued at +0.19% compared to the 2013 value.

When the State of Logistics 2012 was carried out the balance of trade in Finland (of 2011) showed an unusually large deficit of 3.7 billion euros. In 2012 the deficit decreased to 2.6 billion euros and in 2013 to 2.3 billion euros. Previously deficits comparable to the last three years have been experienced during the oil crisis in 1975. (Customs 2014b.)

3.3 The impact of Finnish companies' internationalisation on the logistics market

The swift rate at which Finnish businesses have internationalised has also had an impact on firms' logistics solutions and the demand for services. Subsidiaries abroad account for a significant share of the turnover for Finnish firms; in 2012 the share was 40%. Despite of this, there is a downward trend here, since in 2008 the share was 54% (Figure 14).

A large share of firms' business operations takes place outside the Finnish borders. Accordingly a large share of logistics services the firms are using are acquired and produced abroad.

Figure 14: Share of Finnish firms' turnover represented by subsidiaries abroad 2007–2012. (Statistics Finland 2014a) Columns represent years when State of Logistics surveys have been conducted since 2009

In the State of Logistics survey logistics costs have been informed as share of total turnover. Therefore the logistics costs produced by the operations in Finland are allocated based on averages of operations. This of course has an impact on the logistics costs applied to Finland. Even though the share of international trade of the Finnish economy has been substantial for a long time, the assumption can be made that approx. 60% of the logistics costs informed by firms was directed at domestic production and trade. The ratio has an effect on the actual share of logistics costs of the gross domestic product.

4 INTERNATIONAL LOGISTICS MARKET

Key findings:

- The size of the European logistics market 930 billion €, including internal logistics costs for firms
- The cost level of warehousing in Finland and especially in the capital area is very high

4.1 Global logistics market

Differing estimations on the size of the logistics market have been given. The difference in estimations is largely explained by the fact that no unified method for estimating the size of the logistics market exists. In broader definitions a wide range of logistics related functions and services are also included under the term logistics market. As a result the size of the market is in these cases often larger. In some cases also functions and services related to the logistics infrastructure are included. In addition, the background material varies from survey to another.

Third party logistics services are the fastest growing field in the logistics market in addition to air freight and couriers. The size and growth of this sector is hard to estimate, since it is quite unclear, what kind of firms and how large a portion of the turnover of various firms should be taken into account. Armstrong & Associates (2014) estimated the total global third party logistics services sector turnover in 2013 to amount to approx. 704 billion USD, of which 158 billion was estimated to be the European share.

The logistics market has in the last two decades both internationalized and centralized significantly. The economic crisis of the last few years has only accelerated this development. When the economic situation has deteriorated, the firms have centralized their logistics operations further to only a few service providers. This has led to many third party logistics service providers going out of business. (Langley & Capgemini 2014.) The centralization development will undoubtedly continue in the more capital intensive operations like air traffic, shipping and partially also in port operations, where centralization is already high.

4.2 European logistics market

Kille and Schwemmer (2014) have evaluated the size of the European logistics market on the commission of the German logistics union (BVL). The survey included all 28 European Union member states as well as Norway and Switzerland (”Europe 30”). In Kille and Schwemmer’s survey the size of the logistics market includes both the value of the production of logistics service providers and the supply chain management related internal (logistics) costs in manufacturing and trade. The definition and especially the data collection method differ from the State of Logistics 2012, where the level of logistics costs is based solely on what manufacturing and trade firms have informed as the share of logistics costs of their total turnover.

According to Kille and Schwemmer (2014) the total size of the logistics market in the ”Europe 30” area was approximately 930 billion € in 2012. Goods transportation amounted to approximately 409 billion € (44%) of the total sum. Warehousing accounted for 24 %, inventory holding cost totaled 22 % and order handling together with administration amounted to 10% of the total costs. (Figure 15) The total costs are the equivalent to 6.7% of the GDP of Europe 30 area. (Figure 16).

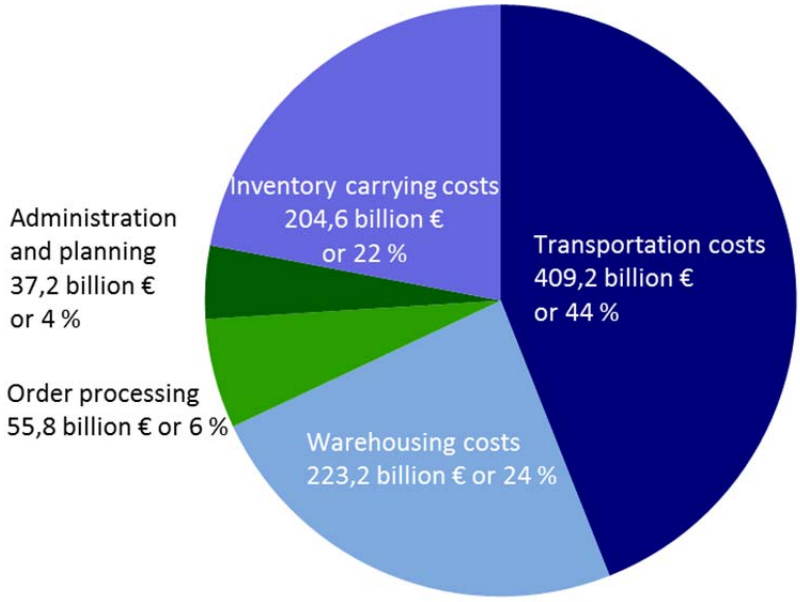

Figure 15: The estimated size of the logistics market (incl. internal logistics operations in trade and manufacturing) in the EU28-countries together with Switzerland and Norway in 2012 930 billion € in total (Kille & Schwemmer 2014)

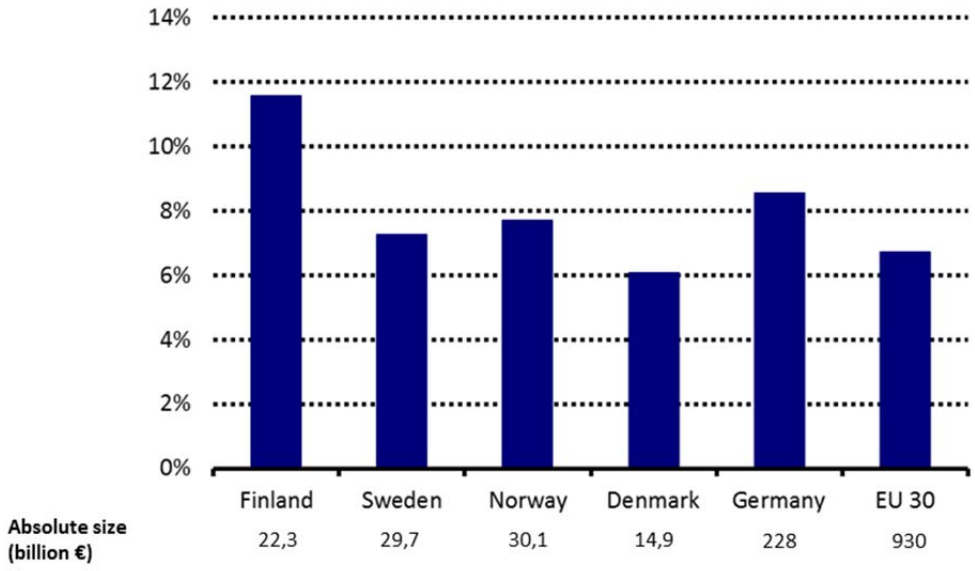

Figure 16: The size of the logistics market (incl. internal logistics operations in trade and manufacturing) in relation to GDP in selected countries in 2012 (Kille & Schwemmer 2014; Eurostat 2014)

Germany is by far the largest logistics market in Europe. Its logistics market in 2012 was estimated at 228 billion euros by Kille and Schwemmer (2014).

Kille and Schwemmer (2014) evaluated the size of the Finnish logistics market to be 22.3 billion euros. In relation to GDP this would correspond to 11.6%. Kille and Schwemmer's (2014) estimate would also mean that the size of the Finnish logistics market would have been approx. 4,100€ per inhabitant in 2012. The number appears large, since the corresponding figure for Sweden is 3,100€ and 2,600€ for Denmark. The sizeable differences are likely the result of differences in production structures but also of differences in used information base. As an example, the share of logistics produced internally by firms is hard to estimate based solely on statistical information.

The size of the Finnish logistics market is examined in more detail in Chapter 5.2.

4.3 The market for logistics premises

Many international real estate agents and consultants, like Colliers, Cushman & Wakefield, Jones Lang LaSalle and CBRE, follow the development of the real estate market. These firms can offer comparative information on costs, occupancy rates and changes in capacity in different submarkets and geographic locations. Most of these firms follow the level of prime rents, in other words the rents of logistics premises in primary "Class A" locations.

The economic recession affected both the rental market and construction in many real estate sectors. In the market for logistics and warehousing premises rents decreased from 2008 and the amount of empty premises rose fast in 2009. When the economic situation improved the demand for logistics premises recovered and the demand for small logistics premises in particular increased. As the economy sank again and firms adjusted their operations accordingly, the demand has recently remained low. According to Newsec's (2013) market review, logistics operations are centralizing into new areas along good transport connections. Less attractive areas, when measured by location and premises, interest users comparably less, which heightens the differences between areas lucrative to investors and end users and other areas.

According to Cushman & Wakefield (2014) the rents for logistics and manufacturing premises in Finland have remained stable except for Helsinki, where the rents have decreased slightly: rents in Helsinki were on average 90 €/m²/year, in Turku and Tampere 66 €/m²/year. Colliers (2014a) estimates the rent level to be a bit higher: Helsinki 120, Tampere 96, Turku 108 and Oulu 96 €/m²/year. CBRE:s (2014) estimate of prime rents in Helsinki is even higher, approx. 138€/m²/year. According to Cushman & Wakefield (2014) a

lot of caution is used when new construction projects are started due to the tight economic situation. Prime rents are expected to remain the same due to constant demand and the scarcity in the supply of good-quality logistics premises. According to Colliers (2014b) the market for logistics premises in the capital area has remained stable in the past years and there are hardly any new construction projects at the moment. The situation on the market may change, if the projects planned in municipalities surrounding Helsinki, like Sipoo and Kerava, are carried out.

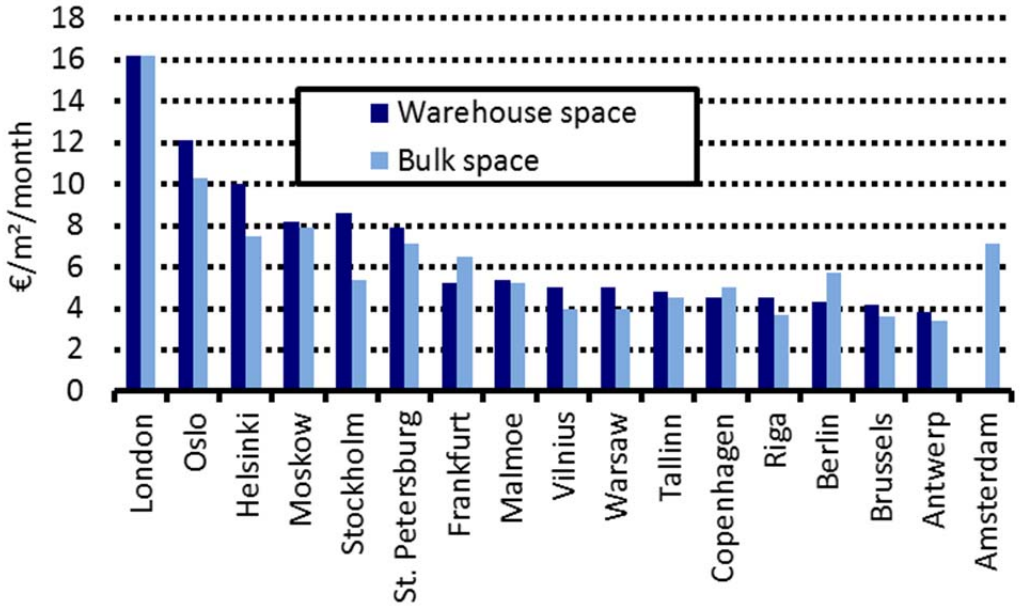

Figure 17: Rent levels of manufacturing and logistics premises in selected cities at the end of 2013 (€/m²/year) (Colliers 2014b)

Figure 17 elaborates on the state of the market for logistics premises at the end of the year 2013 in some European cities. The figure shows the prime rents for warehouse and bulk premises as euros per month. Warehouse in this instance stands for premises meant for logistics or manufacturing use with a surface area of 500 m² or more. Bulk premises are larger than 10,000 m², designed for manufacturing or logistics use and all loading is done via a loading bay.

According to Colliers (2014b) the rents for well-located and high quality logistics premises (usually Class A warehouses) are remarkably high in the Nordic capitals (Oslo, Helsinki and Stockholm) included in the comparison. Compared to German and Danish cities the rents in these capitals can be 30-50% higher. In Oslo and Helsinki the rents are even double that of Denmark, Germany, the Netherlands and Belgium.

5 FINLAND – SOME KEY INDICATORS

5.1 Finland at a glance

Finland is one of nine countries with shores that open onto the Baltic Sea. The others are Sweden, Denmark, Germany, Poland, Lithuania, Latvia, Estonia and Russia, and today all, except Russia, are member states of the European Union. In many respects the Baltic Sea might be called an inland sea of the EU, even more so than the Mediterranean. And for the EU the Baltic Sea is also a very important transport route to Russia, and through Russia to the Far East.

Shipping plays a vital role in Finland's economy; more than 80% of Finnish foreign trade is based on sea transport. Sweden is the only EU member state to have a land border with Finland, and even that border is located in the sparsely populated far north.

Transport costs within Finland are about twice the average of those in EU countries. And because of the country's relative remoteness and its long hard winters, the logistics costs of Finland's foreign trade are distinctly higher than those incurred by other countries in the EU.

Constant efforts are needed to lower logistics costs and to increase logistics efficiency. In the new competitive situation that is unfolding with globalization and stiffening competition in the Baltic Sea region, it is imperative that a long term and systematic effort is undertaken to strengthen Finland's logistics position. This will also require flexible customs and other official procedures at different stages of the transport chain.

Road transport is the most important mode of transport within Finland. Because of Finland's production locations and structures, railways take a bigger share than in other EU countries.

In 2014, domestic freight traffic totalled 28.9 billion tonnekilometres (tkm). Of this, road transport accounted for 20.3 billion tkm (70%), rail transport for 6.3 billion tkm (22%), and waterway transport for 2.3 billion tkm (8%).

A key challenge for Finland's infrastructure and logistics policy is to make sure there is access to reliable and moderately priced international routes to and from Finland's major export and import markets. Another major challenge is to maintain Finland's logistics position as Russia's neighbour, at the same time as the position of Estonia, Latvia, Lithuania and Poland continues to strengthen. The EU is committed to promoting closer EU-Russian integration

and to achieving strategic partnership. It is in Finland's best interests actively to promote that partnership.

Long distances from Finland to its main markets form a definite disadvantage, reducing speed and adding to costs. Long transport journeys involving multiple legs are time-consuming – and time is a very critical scarcity factor in logistics.

One way to reduce the impact of distance is to accelerate speed at all stages of the order delivery chain. Logistics is a recognized factor of competitiveness. In Finland logistics is based on efficiency, good transport markets and the development of transport connections. In their decision making business firms and the authorities take account of the needs of sustainable and competitive logistics.

Education and research in logistics are well respected. Finland has in place a comprehensive education system in logistics which produces competent and knowledgeable people for logistics jobs at all levels. Logistics research is of an internationally high standard. Logistics businesses have considerably stepped up their investment in research and development.

The following tables (Table 6) from the public domain website of the World Bank show the key indicators of Finland (World Bank 2015).

Finland's logistics knowhow contribute to the trade and logistics between the EU, Russia and Asia. Finland has taken advantage of its strengths since the Russian market opened up. Logistics has a key role to play in this partnership. Strong logistics boosts competitiveness, economic growth, employment and welfare. The European Union has in recent years been working to open up its transport services market, and the common market will continue to expand as new members come on board.

Table 6: Key indicators of Finland. Source: World Bank Development Indicators

	1980	1990	2000	2005	2010	2011	2012	2013
Worldview								
Surface area (sq. km)	338 150	338 150	338 150	338 150	338 420	338 420	338 420	338 420
Population, total (millions)	4,8	5,0	5,2	5,2	5,4	5,4	5,4	5,4
Population growth (annual %)	0,3	0,4	0,2	0,3	0,5	0,5	0,5	0,5
GNI per capita, PPP (current international $)	8 850	17 610	26 310	32 200	38 820	40 430	40 420	40 000
GDP (current US$)(billions)	53,4	141,2	125,5	204,4	247,8	273,7	256,7	268,2
GDP growth (annual %)	5,4	0,7	5,6	2,8	3,0	2,6	-1,4	-1,3
Life expectancy at birth, total (years)	73	75	77	79	80	80	81	81
GNI per capita, Atlas method (current US$)	11 450	26 000	26 420	40 100	49 330	49 910	48 670	48 910
GNI, PPP (current international $)(billions)	42,3	87,8	136,2	168,9	208,2	217,9	218,8	217,5
GNI, Atlas method (current US$)(billions)	54,7	130,0	136,8	210,4	264,6	268,9	263,5	266,0
People								
Fertility rate, total (births per woman)	2	2	2	2	2	2	2	2
Adolescent fertility rate (births per 1,000 women ages 15-19)	19	12	10	10	9	9	9	9
Mortality rate, under-5 (per 1,000 live births)	9	7	4	4	3	3	3	3
Immunization, measles (% of children ages 12-23 months)	..	97	96	97	98	97	97	97
Primary completion rate, total (% of relevant age group)	..	102	96	100	98	97	99	99
Ratio of girls to boys in primary and secondary education (%)	106	109	105	102	102	102	102	106
Prevalence of HIV, total (% of population ages 15-49)	..	0,1	0,1	0,1	..	..	..	..
Environment								
Forest area (sq. km)	264 000	218 890	224 590	221 570	221 570	221 570	221 570	..
Agricultural land (% of land area)	8	8	7	7	8	8	8	..
Improved water source, urban (% of urban population with access)	..	100	100	100	100	100	100	..
Improved sanitation facilities, urban (% of urban population with access)	..	100	100	100	100	100	100	..
Energy use (kg of oil equivalent per capita)	5 147	5 692	6 236	6 537	6 808	6 464	6 151	5 933
CO2 emissions (metric tons per capita)	12	10	10	10	12	10	..	..
Electric power consumption (kWh per capita)	8 296	12 486	15 304	16 116	16 483	15 707	15 687	..
Economy								
Inflation, GDP deflator (annual %)	10	5	2	1	0	3	3	2
Agriculture, value added (% of GDP)	10	6	3	3	3	3	3	3
Industry, value added (% of GDP)	38	34	36	34	30	29	27	27
Services, etc., value added (% of GDP)	52	60	60	64	67	68	70	70
Exports of goods and services (% of GDP)	31	22	42	40	39	39	39	38
Imports of goods and services (% of GDP)	32	24	33	36	37	40	41	39
Gross capital formation (% of GDP)	31	30	24	25	22	24	22	21
Revenue, excluding grants (% of GDP)	..	..	40	38	35	37	37	..
Cash surplus/deficit (% of GDP)	..	..	7	3	-2	0	-1	..
States and markets								
Time required to start a business (days)	..	..	..	14	14	14	14	14
Market capitalization of listed companies (% of GDP)	..	16	234	103	48	52	62	..
Military expenditure (% of GDP)	..	2	1	1	1	1	1	1
Fixed (wired) broadband subscriptions (per 100 people)	..	..	1	22	29	30	30	32
Roads, paved (% of total roads)	..	61	62	65	..	..	..	..
High-technology exports (% of manufactured exports)	..	8	27	25	11	9	9	7
Global links								
Merchandise trade (% of GDP)	56	38	64	61	56	60	58	57
Net barter terms of trade index (2000 = 100)	..	..	100,0	93,4	90,5	87,8	86,6	87,9
Foreign direct investment, net inflows (BoP, current US$)(millions)	28	812	9 125	10 876	12 226	-6 008	4 937	-5 297
Workers' remittances and compensation of employees received (current US$) (millions)	106	63	473	693	826	..	..	..

Source: World Bank, World Development Indicators

5.2 Finland in global competitiveness indicators

Finland ranks fairly high in many international comparisons measuring competitiveness (Table 7). Of these, Finland has often ranked at the top in the World Economic Forum Global Competitiveness Index. In the indexes of 2012–2013 and 2013–2014, Finland ranked 3rd among 148 countries. In the World Competitiveness Yearbook by IMD, Finland has not succeeded that well. Finland's rank has varied between 15th and 20th among 60 countries. Both indicators are partially based on interviews of economy representatives and partially on statistical information on the state of the country's economy.

Finland ranks high on the World Bank Doing Business comparison, which rates the general preconditions and obstacles on doing business. The comparison is executed mainly through national interviews. In 2014 Finland ranked 12th, and in 2015 the rank rose to 9th among 189 countries.

World Economic Forum published a comprehensive comparison on the performance of foreign trade by country in 2012 and 2014 (Enabling Trade Index, ETI). The comparison incorporates a large amount of statistical information and previously collected survey data on foreign trade transports, border crossings and customs operations to WEF's own interview material. The overall ranking for each country is calculated based on ten pillars that are established based on the above mentioned materials. Finland ranked 5th in the 2014 ETI, which covers 138 countries.

The ETI report uses data from the World Bank's Logistics Performance Index measures and UNCTAD's (United Nations Conference on Trade and Development) Liner Shipping Connectivity Index -comparison (LSCI), which depicts countries' connectivity to container line traffic.

The LSCI-comparison is based on Containerisation International's database on ship frequencies, sizes, transported amounts and amounts of direct linkages for ships in container traffic. Noticeable from Finland's point of view is that the database does not contain information on ro-ro traffic. This makes Finland's rank in the 2014 comparison quite low (85th of 157 countries). Also other countries, like Norway and Ireland, relying heavily on ro-ro traffic have ranked low in the LSCI comparison.

The KOF Index of Globalization, published by the Swiss KOF-economic institute, measures three dimensions of globalization: the economic, political and social dimensions. The economic dimension measures the amount of trade and investments, the political dimension examines political co-operation between countries and the social dimension explores the sharing of information and ideas. Finland ranked 10th in this comparison of 191 countries. The index value for Finland was 85.87, whereas the first place holder, Ireland, was valued at 92.17. On the individual measures, Finland ranked 9th on the economic dimension, 32nd on the political dimension and 16th on the social dimension.

Table 7: Finland and some control countries in comparisons on competitiveness and logistics performance

		Finland	Sweden	Germany	Estonia	Poland	Russia	Countries in comparison
Logistics Performance	2012	3	13	4	65	30	95	155
Index	2014	24	6	1	39	31	90	160
Liner Shipping	2013	90	21	7	117	28	38	157
Connectivity Index	2014	85	31	7	108	37	36	157
Enabling Trade Index	2012	6	4	13	26	48	112	132
	2014	5	9	10	28	45	105	138
Doing Business	2014	12	14	21	22	45	92	189
	2015	9	11	14	17	32	62	189
Global Competitiveness	2012-2013	3	6	6	34	41	67	144
Index	2013-2014	3	6	4	32	42	64	148
World Competitiveness	2012	17	5	9	31	34	48	59
Yearbook	2013	20	4	9	36	33	42	60
KOF Index of Globalization	2013	16	7	22	25	26	48	187
	2014	10	7	26	27	25	56	191
Corruption Perceptions	2012	2	4	13	32	41	133	174
Index	2013	3	3	12	28	38	127	177
Social Progress Index	2013		1	5		13	33	50
	2014	8	6	12	19	27	80	132

2013 KOF Index of Globalization; Doing Business 2014; Doing Business 2015; IMD 2013; KOF Index of Globalization 2014; Social Progress Index 2013; Social Progress Index 2014; Transparency International 2013; UNCTADstat 2014; World Bank Group 2013; World Economic Forum 2013; World Economic Forum 2014

Corruption Perception Index is produced by Transparency International. The index is based on expert opinions and measures the perceived corruption in the public sector. The index of 2013 included 177 countries that were all given points on a scale of 0–100, where zero stood for ”highly corrupted” and 100 for ”extremely free of corruption”. Two thirds of all countries in the comparison got less than 50 points on average. Finland ranked 2nd in this comparison together with Sweden. The first place was shared by Denmark and New Zealand with 91 points.

Social Progress Index is produced by Social Progress Imperative. The index is made up of 54 indicators, of which none is economic, and it concentrates on three areas: basic needs, the essentials of wellbeing and possibilities. Countries are given points within each area from zero to a hundred, where hundred is the best possible score. The score in the index itself is an average of scores in all the three areas. In 2014 Finland ranked 8th in the index out of 132 countries with a score of 86.91. New Zealand was again ranked first with a score of 88.24. When individual areas were measured, Finland ranked 4th on the basic needs, 11th on wellbeing and 8th on possibilities.

5.3 Finland in the global Logistics Performance Index

The World Bank has published the global Logistics Performance Index (LPI) since 2007. The index was developed together with the Logistics subject at the University of Turku. The comparison aims at evaluating the performance and ease of foreign trade logistics in reviewed countries.

LPI 2007 report covered 150 countries, LPI 2010 155 countries and LPI 2012 55 countries. The latest, LPI 2014 report, published in March 2014, covered 160 countries (Figure 18). The LPI 2014 is used in this survey as comparison material.

The LPI survey was answered by more than 900 international forwarding and logistics professionals from around the world in the period 2007–2014. The on-line survey was available in English, French, Spanish, Chinese and Russian.

Each respondent was given eight other countries to evaluate in addition to their own country. In this part (the International LPI) the evaluated practical areas were border crossing and customs performance, transport and telecommunications infrastructure, availability of international transportation, logistics know-how, ease of tracking deliveries and delivery timeliness. The evaluations for these dimensions were in this instance given from outside the country in question.

Respondents were also asked to rate the operating environment in their own countries (Domestic LPI) on these areas of foreign trade and transportation among others: the quality of the infrastructure, service providers' competence and border crossing performance. The time consumption and costs of border crossings were asked in several ways. In this dimension Finland ranked among the most efficient and best performing countries.

LPI is based on evaluations given by industry operatives on the viability of foreign trade logistics in each country. Together the over 6,000 country evaluations form an extensive database, which correlates very accurately with existing comparison and statistical data on economic development. The interactive statistical material and the LPI reports since 2007 (Arvis et al. 2007; 2010; 2012; 2014) can be found at http://lpi.worldbank.org/.

Because of the way it is carried out and the target group it uses, the LPI represents a country's efficiency particularly as unitised in the trade in transported, refined products, where logistics and forwarding are often crucial. The LPI 2014 introduced the addition of a weighted total estimate for years 2007–2014, which strives to decrease the random variance between surveys. Thus it gives a more reliable presentation of each country's relative ranking than scores for individual years. Finland ranks 17th in this total estimation.

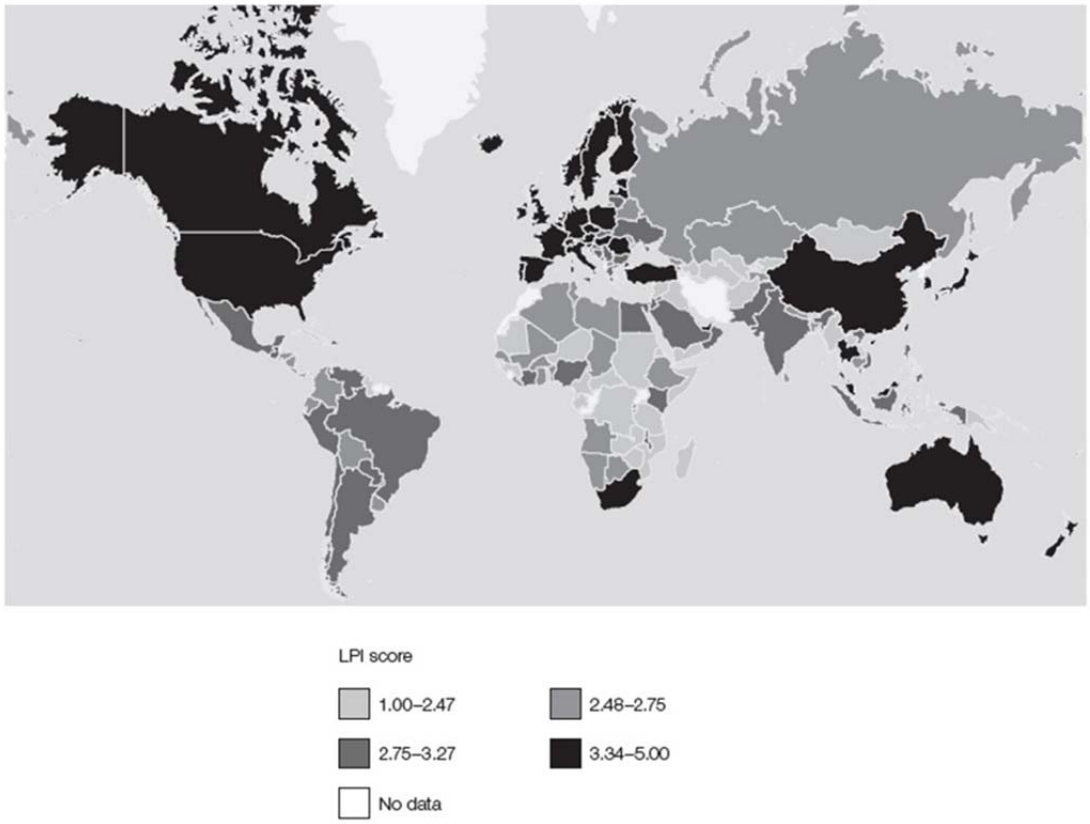

Figure 18: Logistics Performance Index 2014 scores in the comparison of 160 countries. The colours in the map represent different LPI score quartiles (Arvis et al. 2014.)

Finland ranked 24th in 2014 in the LPI, 3rd in 2012, 12th in 2010 and 15th in 2007. Excepting 2014, Finland has ranked in the top tenth along with other Nordic countries (excluding Iceland), which is an excellent achievement. Even though Finland dropped from the top tenth in the 2014 index, the differences in absolute scores are nevertheless quite small. An interpretation of the results must take account of the fact that the ranking in the various areas in the survey cannot be absolutely accurate, on account of the method used. Statistically, it is a confidence interval, in which (in this context) a country is placed. The range size depends on the number and standard deviation of country-specific ratings. The upper limit for Finland's ranking in 2010 was 1 and the lower limit was 15 (Arvis et al. 2014.)

6 TRANSPORT SECTOR IN THE FINNISH NATIONAL ACCOUNTS

6.1 The development of added value in the transport sector

According to the Liikennejärjestelmä.fi web site maintained by the Ministry of Transportation and Communication, the Finnish Transport Agency, Trafi and the Finnish Meteorological Institute, transportation and industries ministering to it have a large impact on the Finnish economy. Traffic and its supporting industries employ approx. 10 % of all employed people in Finland and their share of the Finnish economy is also approx. 10%. (Liikennejärjestelmä.fi 2014a.) According to Eurostat (2014) statistics the total turnover of Finnish transport and logistics firms (including passenger transport) was approx. 20.7 billion € in 2007 and the industry employed approx. 148,000 people in 23,000 firms in 2010. (EU transport in figures 2013.) According to Statistics Finland (2014b) the amount of firms operating in the transportation sector and the amount of personnel they employed has decreased since 2008. Appendix 1 compares the size, scope and performance of Finnish transport and logistics firms to corresponding figures from a few control countries.

Finland’s large surface area and the transport intensity of Finnish industry are visible in, for example, road traffic tonne-kilometre performance, which in 2011 amounted to just under 23.8 billion tonne-kilometres in domestic traffic (Statistics Finland 2012).

The transport intensity of industrial manufacturing measures the relation between the value of production and transport tonne-kilometrage (Figure 19). By 2008, Finland’s industrial transport intensity had fallen to below half of what it was in the mid-1990s. In 1995–1996, 1.4 tonne-kilometres were required for one-euro increment[5] value (adjusted to the monetary value in 2002). With rapidly increasing ’value added’[1], an average in manufacturing of only 0.6 tonne-kilometres were required in 2007 for similar added value, and in the technology industry only 0.1 tonne-kilometres. In 2009–2012 the manufacturing transport intensity has increased again, which is mainly the result of the decrease in average value added for transported goods.

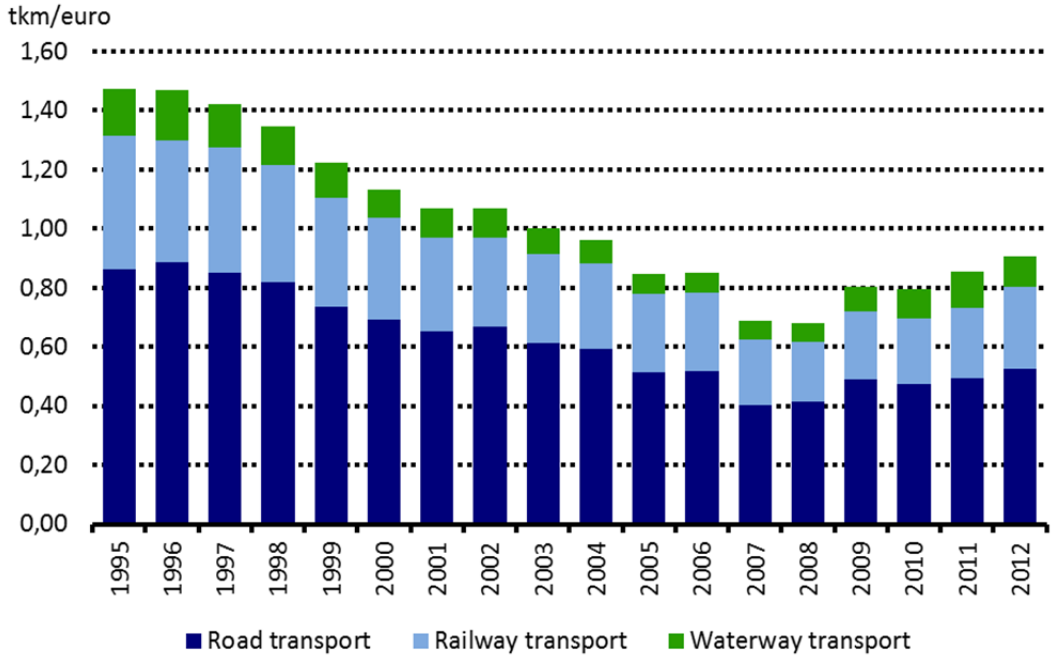

Figure 19: Transport intensity of different modes of transport in tonnekilometers per value added in € in 1995–2012 (Liikennejärjestelmä.fi 2014b)

The industrial structure and Finland's logistically isolated position are also reflected in export and import marine traffic transport. Compared to Poland, say, a country of 38.5 million people, or considering the size of the Finnish economy and the country's population, the volumes of goods carried by marine traffic between Finland and foreign countries are substantial – approximately 58 million import tonnes and 51 million export tonnes in 2011 (Appendix 1).

In the national accounts, transport, warehousing and telecommunications are their own main sector of industry, with an integrated entry in international statistics. The logistics operations within other industries, like in manufacturing and trade, are included in the figures for the industries mentioned.

Figure 20 shows the added value for the transportation sector according to TOL 2008 industry classification. In 2012 the total added value for the transport sector was approximately 9 billion €.

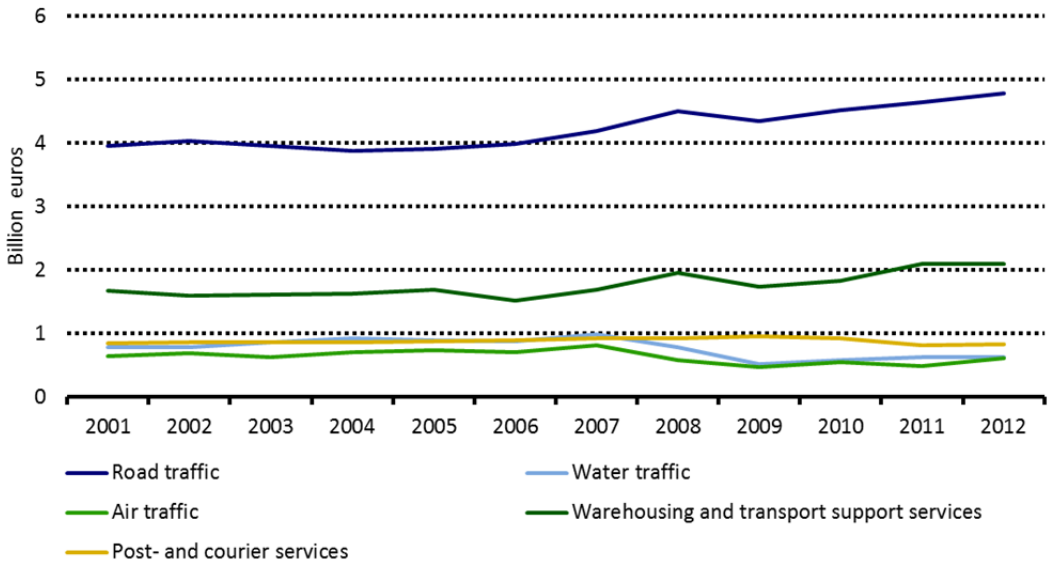

Figure 20: The added value for transportation and transport service operations in Finland in 2001–2012 according to TOL 2008 (billions of euros at current prices including public sector) (Statistics Finland 2014b)

6.2 Foreign trade on services in the transport sector

Booking logistics services needed outside Finland into the Finnish national accounts depends on the contract on transport and warehousing costs the parties have made. Similarly the practices in use in the overseas production or distribution unit, like transfer pricing between units in different countries, have an impact on the booking practices. On the other hand the services for transition transport are booked in Finnish national accounts even though the goods might not actually cross the customs border.

The majority of transport services are sea freight costs as well as stowage, port, passage and pilot fees, which the vessels pay. Income from sea freight consists of Finnish shipping companies' income from foreign goods transportation. The corresponding expenses include sea freight fees paid to foreign transporters. A significant part of the total transport income is the income from foreign passengers, which is divided into sea transport income and air transport income. The corresponding expenses are payments made to foreign transport companies. (Bank of Finland 2014d.)

Sea freight has traditionally had a considerable deficit due to the fact that most of the goods import to Finland is by sea (Bank of Finland 2014d). Balance of payments in transport services is shown in Figure 21.

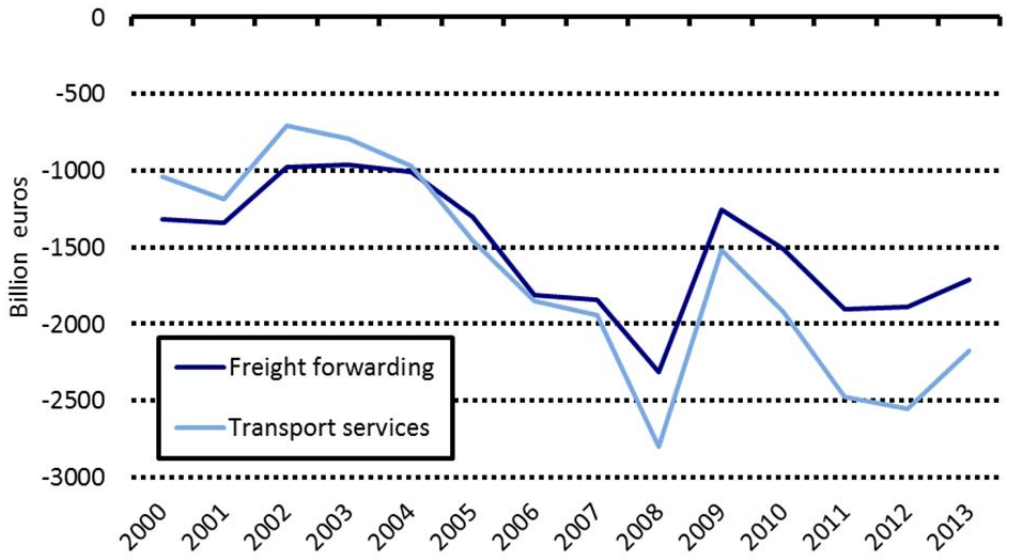

Figure 21: The balance of payments for Finnish foreign trade transport services and freight forwarding (millions of € in 2000–2013, at current prices) (Bank of Finland 2014d)

Due to the intangible nature of services their foreign trade booking practice differs somewhat from that of goods trade. The most recent numbers (Figure 21) show that the foreign trade on freight services showed a deficit of 2.8 billion euros for transport services and 2.3 billion euros for freight forwarding. In 2009 the situation was markedly different as the deficit in transport services decreased to 1.5 billion euros and the deficit for freight forwarding to 1.3 billion euros. In 2012 the deficit for transport services was again over 2.5 billion euros. This resulted from the fact that the strong growth in goods imports continued in 2011, but the growth in exports decreased. Transport imports, which are closely linked to goods imports, increased and transport exports decreased from the year before. The deficit in freight forwarding increased more moderately. The growth in imports in 2013 was subdued due to weak domestic demand, which is also evident in the deficit decrease in the balance of payments.

Table 8 depicts the foreign trade balance of payments for transport services by transport mode. The table shows that the deficit in transport services comes mainly from sea transportation. Air transport is the only transport mode showing a surplus.

Table 8: The balance of payments in foreign trade for Finnish transport services by transport modes in 2005–2013 in millions of euros by current prices (Bank of Finland 2014d)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Transport in total	-1 457	-1 849	-1 941	-2 800	-1 518	-1 920	-2 479	-2 554	-2 174
… of which maritime traffic in total	-1 365	-1 740	-1 606	-2 075	-1 127	-1 438	-1 771	-1 775	-1 674
… of which maritime freight	-1 316	-1 842	-1 720	-2 169	-1 195	-1 517	-1 872	-1 866	-1 724
… of which activities serving maritime traffic	- 141	8	15	- 9	- 22	- 20	1	- 7	- 67
… of which air traffic in total	230	344	265	55	96	293	208	284	314
… of which passenger transportation	168	271	353	310	262	287	356	363	363
… of which air freight	15	29	- 122	- 143	- 59	8	- 33	- 20	9
… of which activities serving air traffic	47	45	34	- 112	- 107	- 2	- 115	- 59	- 59
… of which other traffic	- 322	- 454	- 600	- 780	- 487	- 775	- 915	-1 063	- 813
… of which railway traffic	- 16	- 14	- 95	- 122	- 73	- 91	- 102	- 100	- 92
… of which road traffic	- 307	- 440	- 505	- 658	- 414	- 683	- 813	- 963	- 721

Table 9 shows the balance of payments for transport services in 2009 in Finland and other Nordic countries as well as Germany. It is evident from the table that especially Denmark (the Maersk group), Norway (shipping) and Sweden (shipping and road transport) are significant net exporters of transport services. For instance the share of freight and logistics services of all services exports is 54% in Denmark and 40% in Norway, whereas in Finland the corresponding share is only 4%.

Table 9: Balance of payments for foreign trade in services for Finland and some control countries in 2009 (United Nations Service Trade Statistics database 2014)

v. 2009 million USD	Finland	Sweden	Denmark	Norway	Germany
EXPORT OF SERVICES IN TOTAL	27 738	55 790	56 089	38 644	239 249
Export of transportation services in total	2 708	9 902	32 278	15 626	51 881
… of which export of freight- and logistics services	1 124	7 963	30 371	15 274	39 190
Share of freight- and logistics services of the entire export of services, %	4,1	14,3	54,1	39,5	16,4
Share of freight- and logistics services export of the GDP, %	0,5	2,0	9,8	4,0	1,2
IMPORT OF SERVICES IN TOTAL	27 198	44 493	52 210	36 871	261 211
Import of transportation services in total	4 817	6 845	26 775	9 464	53 680
… of which import of freight- and logistics services	3 391	5 326	25 114	8 074	41 565
Share of freight- and logistics services of the entire import of services, %	12,5	12,0	48,1	21,9	15,9
Share of freight- and logistics services import of the GDP, %	1,4	1,3	8,1	2,1	1,3
BALANCE OF THE FOREIGN TRADE OF SERVICES	540	11 297	3 879	1 772	-21 962
Trade balance of transportation services	-2 109	3 056	5 503	6 162	-1 799
… of which freight- and logistics services balance	-2 267	2 636	5 257	7 200	-2 374
GDP at current prices, million USD	239 383	405 783	310 545	378 849	3 298 218

When considering the foreign trade in all services, Finland along with the other Nordic countries is a net exporter. Germany on the other hand is a great net importer of services. In freight and logistics services Finland has been a

net importer since the early 1990s. In 2009 the net import for Finland was 1.4% in relation to GDP.

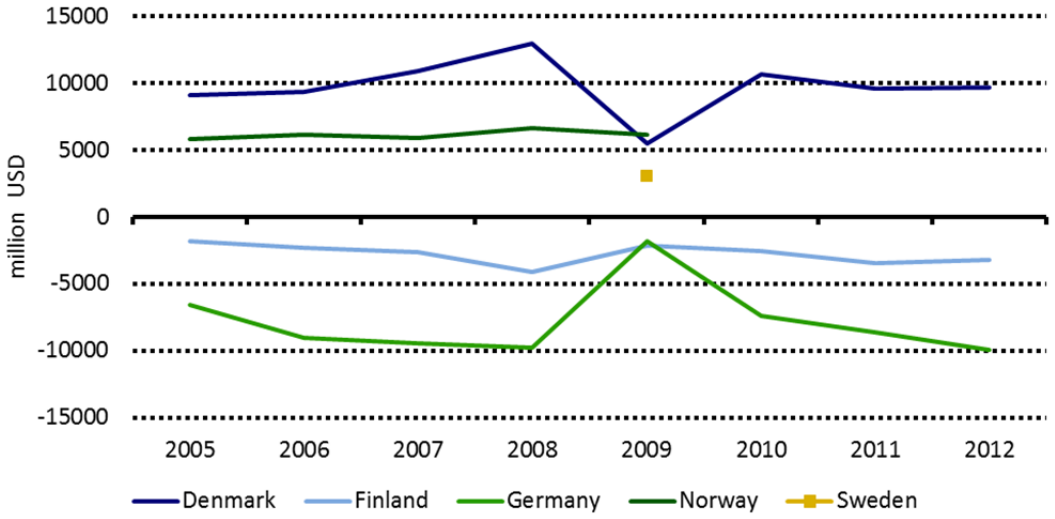

Figure 22: Development of balance of transports in Finland and in some control countries in 2005–2012 (United Nations Service Trade Statistics database 2014)

Figure 22 shows that the deficit in the Finnish transport balance of payments has remained relatively stable, whereas for Denmark and Germany large fluctuations have occurred between 2008 and 2010.

7 THE LOGISTICS MARKET IN FINLAND

Key findings:

- Transport intensity in manufacturing has increased due to the industry structural change
- Based on the State of Logistics 2014 survey the size of the Finnish logistics market is approximately 8.8 billion €, which corresponds to statistics on added value in the transport sector and the balance of payments statistics on foreign trade
- The dependence on large customers has increased for logistics service providers. There has been a shift from optimism to realism in logistics outsourcing and the degree of outsourcing appears to have reached its natural level

This chapter covers the current status and future prospects of the Finnish logistics market. The chapter also assesses the size and structure of the Finnish logistics market based on statistics and reports from various sources. In addition, the chapter covers the estimates of firms operating in Finland on the development of the logistics market from outsourcing point of view based on answers to this survey. The end of the chapter covers the views of manufacturing, trade and transport firms operating in Finland on what they consider the top priorities when selecting a freight carrier. For instance the variables of transport price, service level, flow of information and environmental aspects are discussed as some of the elements mentioned above.

7.1 The size of the logistics market and total logistics costs in Finland

Setting an unambiguous number for the size of the logistics market is quite challenging. Elements affecting the evaluation have been briefed in chapter 2.8. The most central elements are:

- ”Logistics” or ”logistics industry” are not statistical units
- The definition of logistics in firms is not fixed
- Logistics users produce some of the needed services internally as well
- Logistics costs are not an established accounting term

When evaluating the size of the logistics market the value of services purchased from the market and the total costs of logistics operations should be

kept separate. The latter include the services produced by trade and manufacturing firms (including construction) internally by their own staff and equipment.

The size of the market and of the total costs have been evaluated based on statistical data and answers to the State of Logistics 2014 survey.

7.1.1 The size of the Finnish logistics market based on statistical information

According to the latest statistics on added value in the transportation sector, (Statistics Finland 2014b) the traffic market in Finland amounted to approximately 9 billion € in 2012. The figure includes passenger transport services. Goods transport, cargo handling and other logistics services amount to approximately 7.5 billion € of the total sum.

According to the balance of services for foreign trade, transport services (incl. passenger transport service production in third party countries) were purchased from abroad by 3.0 billion euros more in 2012 than what the export for these services from Finland amounted to. In 2013 the corresponding figure was 2.6 billion euros.

Services rendered between third party countries and produced in Finland consists mainly of shipping, air traffic and cargo forwarding services, because the volumes of rail and road traffic outside Finland are quite small. Production of third party country logistics services from Finland is a comparatively small part of the balance of services as its net sum totals less than 100 million euros.

The foreign trade on goods traffic and logistics services alone showed a deficit of approximately 2.5 billion € and 2.0 billion € in 2012 and 2013.

The added value of goods traffic and logistics in Finland (approx. 7.5 billion €) together with the foreign trade balance of payments for the afore mentioned services (2.0–2.5 billion euros) shows the rough statistic magnitude of the volume of logistics services purchased from the market.

The mentioned figure also includes services the manufacturing and trade firms produce internally insofar as the services are produced in separate logistics firms owned by the firms. The largest of these firms by rounded up turnovers are Neste Shipping (420 million €), which in 2013 was still part of the Neste group, Keslog Oy of Kesko group (270 million €) and Movere Oy (70 million €), which is owned by both Hankkija Oy and Yara Oy. Some of these so called “captive” companies produce services for other customers as well. The line between “internally-produced” and ”market-purchased” services is not that clear in all cases.

In light of statistics, the Finnish logistics market (the ”market-purchased services) amounted to 9–10 billion € in 2012.

7.1.2 *The size of the Finnish logistics market based on the results of the State of Logistics survey*

In the State of Logistics 2014 survey the respondents were asked the percentage of logistics costs of firm turnover. In addition, the respondents evaluated the level of logistics outsourcing for different logistics functions. By combining these two sets of data an estimate was made on the division of logistics costs both between different cost elements and between “internally-produced” and ”market-purchased” services.

Table 10 shows the total value of market-purchased logistics services for manufacturing (incl. construction) and trade in 2013 as 8.8 billion € based on the survey data.

The figure does not include public sector (government, municipalities and other public authorities) logistics costs, for which no corresponding material exists. The volume for market-purchased logistics services in Finland is therefore estimated to be 9–10 billion €.

Table 10: The logistics services purchased from the market by manufacturing and trade firms in Finland in 2013 by cost category (not incl. inventory carrying costs), million €

Logistics services purchased from the market in Finland in 2013, by cost category	**Manufacturing and construction**					**Trade**					**Both in total**
	SMEs		Large companies		**Total**	SMEs		Large companies		**Total**	
	%	M €	%	M €	**M €**	%	M €	%	M €	**M €**	**M €**
Transportation	59 %	520	84 %	3 300	**3 820**	71 %	770	85 %	1 400	**2 170**	**5 990**
Warehousing	19 %	80	38 %	670	**750**	21 %	320	42 %	950	**1 270**	**2 020**
Administration	24 %	60	25 %	250	**310**	25 %	80	30 %	140	**220**	**530**
Other	19 %	30	22 %	140	**170**	23 %	30	46 %	90	**120**	**290**
		690		4 360	**5 050**		1 200		2 580	**3 780**	**8 830**

Large manufacturing firms purchase approximately half (49%) of all market-purchased logistics. The share for trade firms amounts to 29%. Of the total value of all market-purchased services, transports take up approx. 7% and warehousing approx. 24%.

Customer firms produced logistics services they needed internally at approximately 7.8 billion euros in 2013. In addition, the cost for inventory

carrying, which is typically included in firm logistics costs, is a considerable sum, approximately 6.4 billion euros in 2013.

Table 11: Logistics costs for manufacturing and trade within Finland in 2013 by cost category in billion € (not including the share of foreign subsidiaries)

	Outsourced logistics			Internally produced logistics			Within Finland
Billion € within Finland	Manufact.	Trade	Total	Manufact.	Trade	Total	**IN TOTAL**
Transportation	3.8	2.2	6.0	1.0	0.6	1.6	**7.6**
warehousing	0.8	1.3	2.0	1.4	2.5	3.9	**5.9**
Inventory carrying	*	*	*	3.0	3.4	6.4	**6.4**
Logistics administration	0.3	0.2	0.5	0.9	0.6	1.5	**2.0**
Other logistics, e.g. value added services	0.2	0.1	0.3	0.6	0.2	0.8	**1.1**
TOTAL	**5.1**	**3.8**	**8.8**			**14.1**	**22.9**

*= Calculated into internally produced logistics in its entirety

The total value of internally-produced logistics and cost of capital in Finland in 2013 was 14.1 billion €, which is approximately 1.6 times bigger than the value of market-purchased logistics services (Table 11).

Within Finland the logistics costs amount to approx. 23 billion € in total. This figure has also been used in this survey, when logistics costs have been evaluated in relation to the Finnish GDP. 23 billion € would be the equivalent of 11.4% of Finland's GDP in 2013. The estimate is quite close to Kille and Schwemmer's (2014) appraisal (22.3 billion € in 2012) given as part of an examination of the European logistics market.

The data collected in the State of Logistics survey also covers the relatively large foreign operations of Finnish firms. Of the total turnover of Finnish firms the share of total logistics costs (incl. market-purchased and internally-produced and inventory carrying costs) was 37.8 billion € according to the survey. This includes the firms' foreign operations.

7.2 The demand for and outsourcing of logistics services

The current state of outsourcing logistics operations has been covered in the State of Logistics surveys by an identical set of questions already since 2006. Figure 23 shows, how widely manufacturing firms operating in Finland have outsourced their logistics operations in 2014.

Transport related functions are the most widely outsourced logistics services. Approximately 93% of manufacturing firms has outsourced domestic transport completely or partially. For international transports the correspond-

ing figure is 77%. In addition to these, reverse logistics and forwarding are widely outsourced; over 70% of manufacturing firms have outsourced both functions at least partially. Of other logistics operations the logistics information systems are the most widely outsourced. They have been outsourced completely or partially by approximately 45% of manufacturing firms. Order handling, invoicing, warehousing, inventory handling and added value services are outsourced more rarely. The above mentioned services are still mainly handled internally in manufacturing firms.

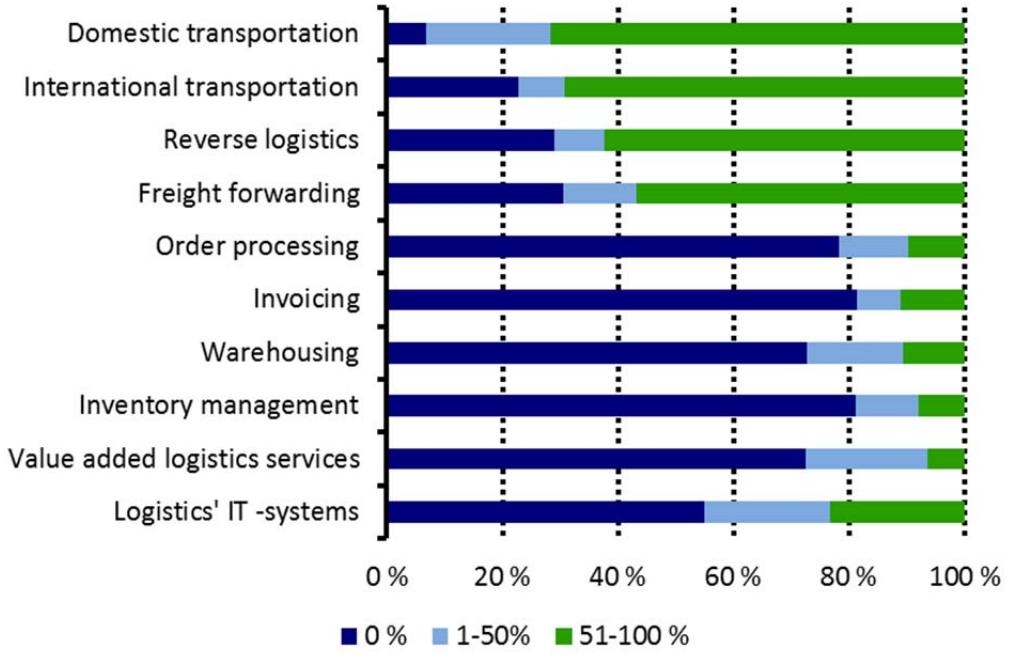

Figure 23: The outsourcing of logistics operations in manufacturing firms operating in Finland in 2014

Because the question on outsourcing logistics operations has remained the same since 2006, it is possible to examine changes over time in outsourcing different operations. For reverse logistics the share of firms that have outsourced most of that function has increased the most, 16.6 percentage points since 2006. Outsourcing over 50% of added value logistics services has increased second most by 12.5 percentage points. For domestic transportation the corresponding figure is 9 percentage points and for forwarding 8 percentage points. For other, less outsourced logistics services, the development has been slower. Firms in trade have outsourced their logistics operations more widely and more universally than manufacturing firms. (Figure 24). 97% of firms in trade have outsourced their domestic transports either completely or partially. For international transports the corresponding figure is 87%, for

reverse logistics 83% and for forwarding 80%. Firms in trade have also outsourced their logistics information systems more. The share of firms that had either completely or partially outsourced their logistics information systems was 53% among firms in trade.

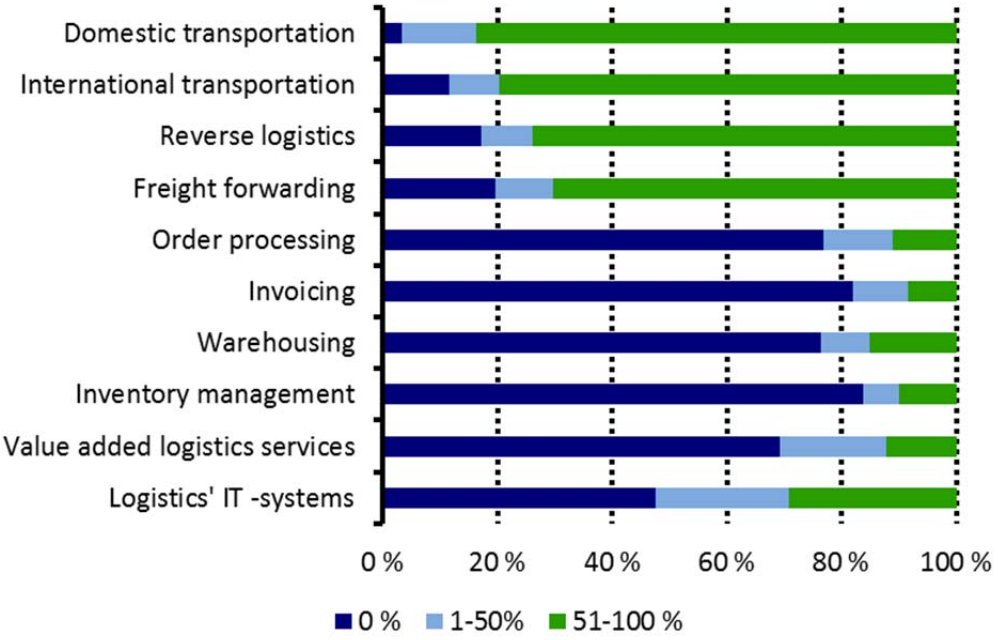

Figure 24: Outsourcing of logistics operations in trade firms operating in Finland 2014

The outsourcing development in trade has occurred fastest in reverse logistics (15%) and forwarding (11%). Nearly as fast has been the growth in outsourcing domestic transports (10%) and logistics information systems (9%). For other logistics operations the development has occurred more slowly. For instance outsourcing more than 50% of logistics added value services has only grown by 2 percentage points and the corresponding figure for invoicing outsourcing is only 1.6 percentage points.

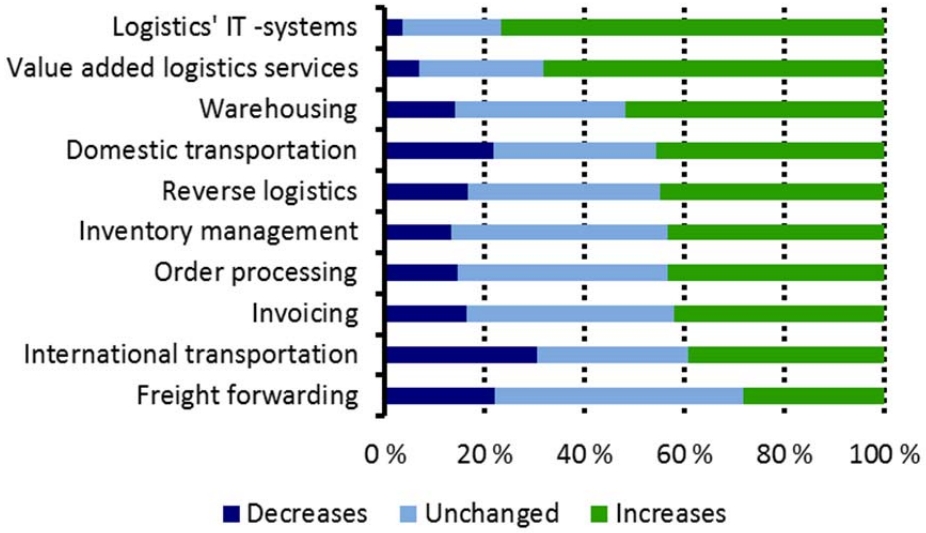

Figure 25: Logistics service providers' views on the future development of outsourcing logistics services during the next five years

Figure 25 depicts the views of logistics service providers on the future development of outsourcing different logistics services within the next five years. In general their estimate was that outsourcing will rather increase than decrease for all logistics services. The estimates on the development of outsourcing vary for different operations. Most commonly (77% of respondents) the logistics service providers estimated that the outsourcing of logistics information systems will increase the most. The majority of respondents estimated that outsourcing logistics value added services (68% of respondents) and warehousing services (52%) will increase.

8 LOGISTICS OPERATING PRECONDITIONS IN FINLAND

Key findings:

- Finland is ranked lower in the Logistics Performance Index than before. As a whole Finland still ranks in the top tenth in the World.
- The firms in Helsinki-Uusimaa region are most satisfied with their logistics operating preconditions
- The condition of the transport infrastructure is considered less than satisfactory. In South Finland the biggest concern is road capacity, in East and North Finland the technical condition of the roads
- In firms' competitive strategies, specialization and supply chain management appear to be more important success factors than cost awareness

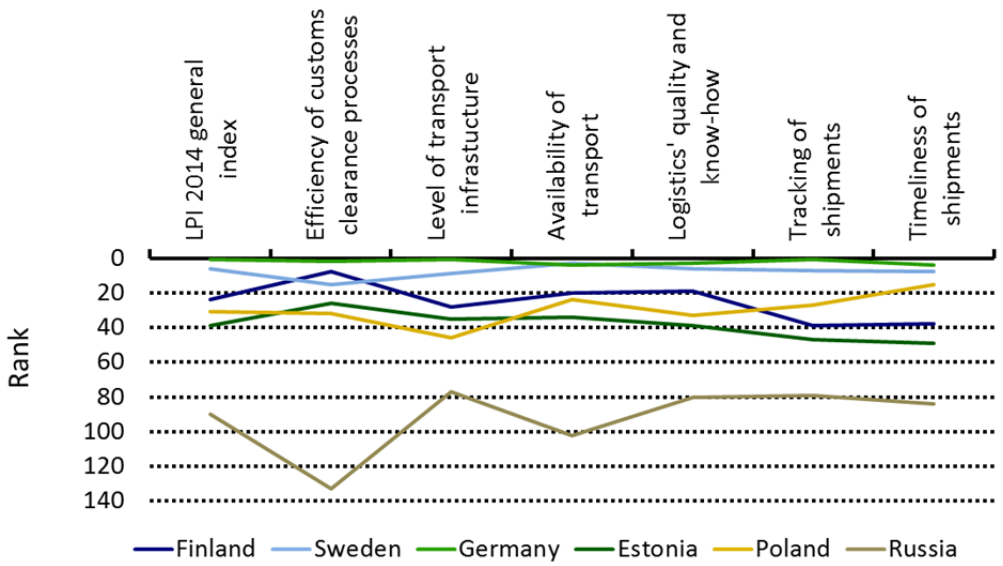

Figure 26: Logistics Performance Index 2014 and its components for Finland and neighboring countries. The figures indicate the rank among 160 countries (Arvis et al. 2014)

In the 2014 International LPI -scores Finland ranked highest in customs efficiency (8th), when the rank in other subcategories was between 20th and 39th. In comparison, in the 2012 International LPI -scores Finland ranked 3rd

in the general index and the ranks in all subcategories were between 1st and 6th except for delivery timeliness (15th). In the 2014 International LPI -comparison Finland's weakest scores came from tracking and tracing (39th) and delivery timeliness (38th). It's evident from the results that Finland's weakness is the lack of international transport connections. Finland's explicit strength is the efficient operation of customs and border authorities. In the new weighted total value for LPI indexes for years 2007–2014 Finland's highest rank (5th) is in fact in customs efficiency.

In the LPI 2014 -total comparison Germany ranked first and other developed and industrialized countries ranked well in general. Both in total and subcategory rankings the differences between Finland and Estonia and Poland, which were used as comparison countries, have narrowed (Figure 26). Poland for instance ranked higher than Finland on delivery timeliness in the LPI 2014 comparison. Of Finland's neighboring countries Sweden and Norway have continuously ranked in the top tenth in the LPI indexes. Russia on the other hand has ranked poorly, due to low scores in customs efficiency in particular.

8.1 Geography of firms' supply chains

Finland is a small market and thus offers a limited frame for firm growth. Finnish firms have had to internationalize the complete supply chains including sales, production and purchases in order to execute their strategies for growth. The internationalization of supply chains can be either export sales or purchase driven depending on the nature of individual firm's operations. According to prevailing theories export sales leads to forms of internationalization, where the firm commits more and more to the international market by e.g. investing in foreign production capacity. Utilizing the foreign procurement market requires special know-how as well as network and risk management.

It can be said that when the firm grows its international "foot print" grows first in relation to sales and purchases and continues to grow in relation to production. The complexity of the firm's supply chain network grows in proportion. The international fragmentation of supply chains verifiably affects firm performance negatively (Lorentz, Töyli, Solakivi, Hälinen & Ojala 2012) and on a certain firm specific level it outweighs the benefits gained from internationalization. This leads to a reverse U shaped relation between the internationalization level of a firm or its market diversification level and its performance (Narasimhan & Kim 2002). Managing the supply chain and especially its complexity is of central importance in an international firm.

The State of Logistics survey examines the location of supply chains for manufacturing, trade and logistics services firms in eight areas defined for the survey: Finland; Northern Europe; Western Europe; Southern Europe; Eastern Europe (e.g. Poland, Russia, the Baltic countries); USA; South and Central America (incl. Mexico); Middle East (incl. Turkey) and Africa; developed Asia (incl. Japan, South Korea and Australia); developing Asia (e.g. China and India). Manufacturing firms were asked about location of production (%) in relation to sales, production capacity and purchases, firms in trade in relation to sales and purchases and logistics service providers in relation to turnover in all above mentioned areas.

A general overview indicates that on average firms receive most of their sales orders from Finland. This is true especially in trade (large 98%, medium-sized 88%, small 92%, micro 94%). Figure 27 shows the division of sales (turnover) between the mentioned areas itemized by firm size. Manufacturing industry is the most active when it comes to internationalizing sales in many areas, although logistics service providers generate turnover relatively widely from Europe and developing Asia. Firm size appears to determine the level of international sales and turnover as expected.

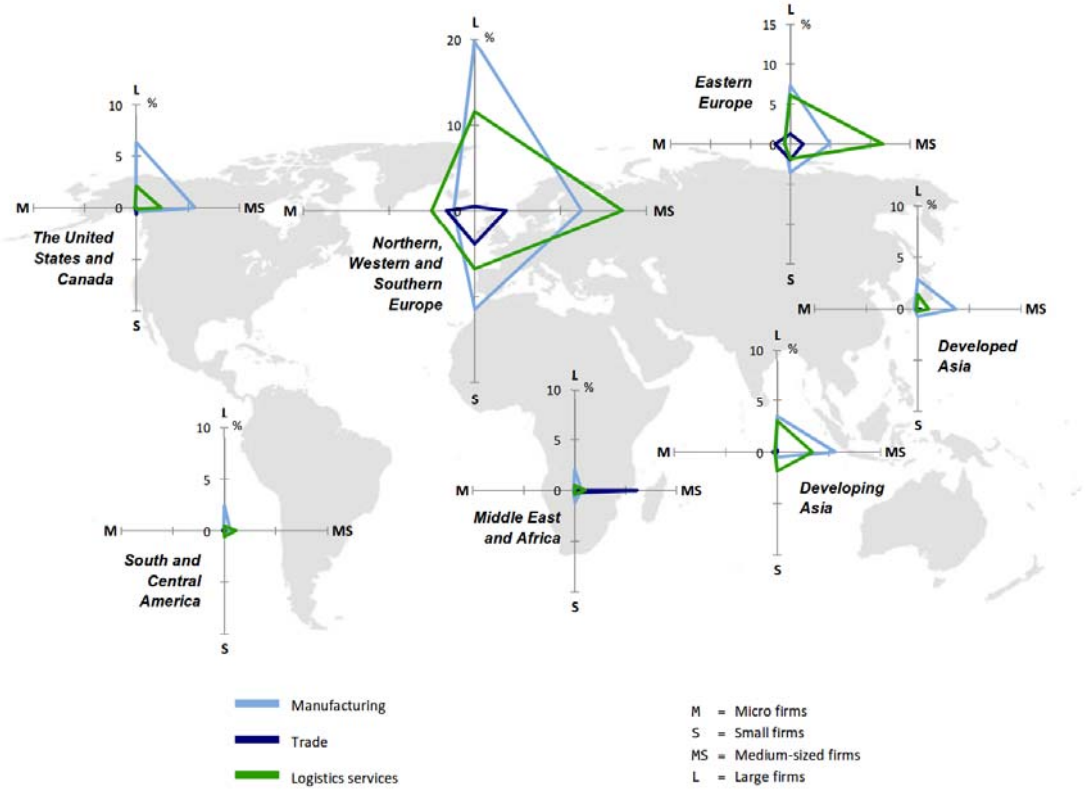

Figure 27: The geographical distribution of sales for responding firms in 2013 according to the State of Logistics 2014 data

8.2 Results of the State of Logistics 2014 survey in the LPI comparison indicators

The comparison results of the International section of the Logistics Performance Index are based on assessments from outside the examined country. These numbers in the so called International LPI section depict how logistics professionals from other countries perceive the operational environment for foreign trade logistics in a given country.

No comparative research on LPI scores collected within a given country has been published, so a corresponding section was added to the State of Logistics 2010 questionnaire and it was repeated in the State of Logistics surveys of 2012 and 2014. The replies illustrate how the perceptions of Finnish respondents on the different dimensions of LPI and the LPI general index differ from those of foreign respondents (Figure 28).

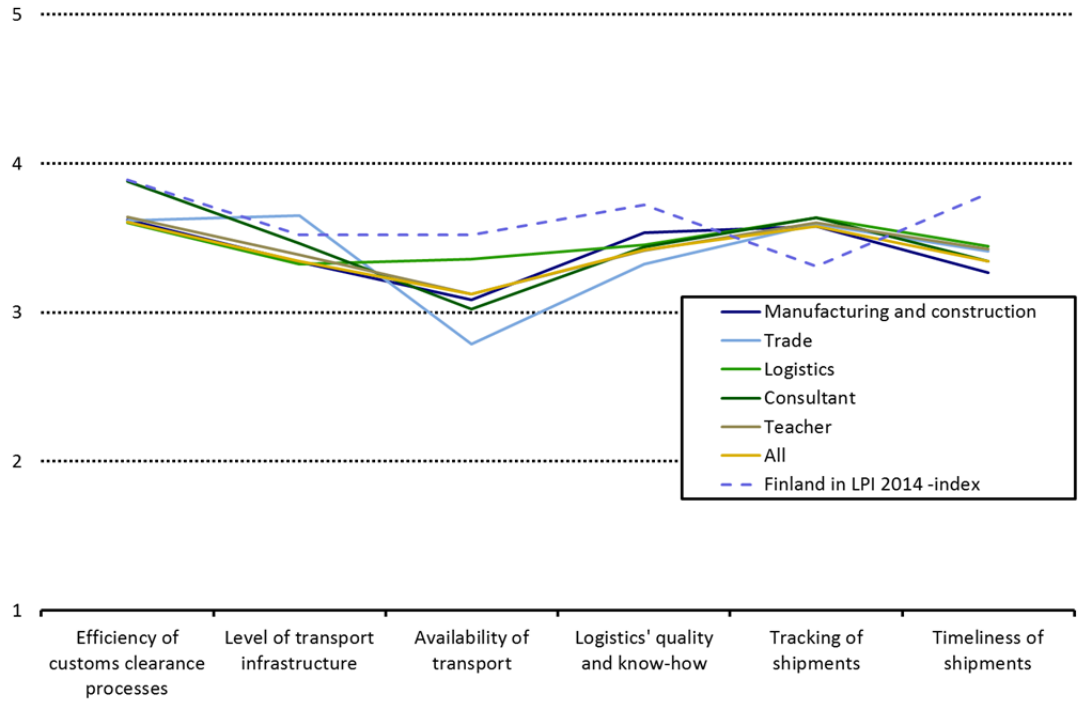

Figure 28: Finland's scores in the Logistics Performance Index 2014 comparison and the estimates of over 1,600 Finnish respondents on the same subcategories in 2014 (LPI=Arvis et al 2014.) (Min =1, Max =5)

The replies of the approximately 1,600 Finnish respondents given in spring 2014 behave somewhat differently concerning the LPI 2014 sub categories (variable "Finland in the LPI index"). The scores given by the Finnish respondents are lower than the international assessments in all sub categories except for tracking and tracing. The biggest difference in 2014 was in views on transportation availability, which the Finnish trade firms in particular found poorer than the international respondents. In 2012 the biggest difference was in delivery timeliness and also then the domestic respondents were decidedly more critical. In 2014 the smallest difference was found in transport infrastructure, when in 2012 it was in customs performance and in 2010 in availability of competitive transports (Figure 29).

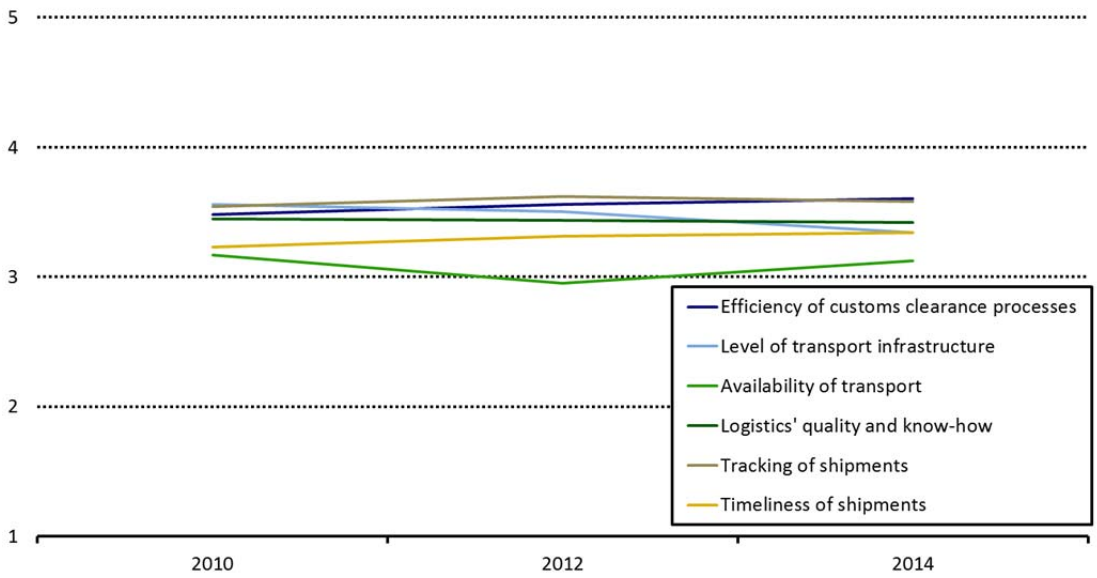

Figure 29: The evaluations of Finnish respondents on the sub categories of the Logistics Performance Index in 2010, in. 2012 and in 2014 (Min =1 Max =5)

The views of different groups of respondents (manufacturing, trade, logistics firms etc.) are mostly consistent. In 2014 the firms in trade industry viewed the state of the transport infrastructure slightly more positively than did firms from other industries. Then again their view on availability of transportation was more negative than that of the other groups of respondents. Logistics firms on the other hand assessed the availability of transportation higher than other groups. Also the calculated ”profile” for respondent groups is almost identical in 2010, 2012 and 2014. In 2012 the estimate of the availability of international transportation was somewhat lower than in 2010, but in 2014 it was again valued close to the 2010 level (Figure 29).

8.3 The importance of location in logistics and economic activities

The firms responding to the national State of Logistics survey appraised the operating preconditions at their location in 2006, 2009, 2010, 2012 and 2014 on the following dimensions:

- General business perspective
- Location of production
- Logistics efficiency

- Transport infrastructure
- Location of competitors

Figure 30 depicts the firms' assessments on their operating preconditions by region. Based on the regional examination the same provinces are represented in the best and poorest quartiles in different dimensions. Firms operating in Uusimaa, Tavastia Proper, Pirkanmaa and Päijät-Häme are the most satisfied with their operating preconditions in relation to the general business perspective. Firms operating in the same regions are also among the most satisfied when it comes to most other dimensions. An exception to this is the dimension of logistics efficiency, where firms operating in Kymenlaakso are in the best quartile instead of firms operating in Pirkanmaa.

There is more variation in the least satisfied quartile depending on the measured dimension. In general business perspective the most unsatisfied were the firms operating in North Karelia, Kainuu, Lapland and Central Ostrobothnia. Kainuu, Lapland and North Karelia are in the poorest quartile also in the dimensions of location of production and logistics efficiency. In the location of production dimension also Southern Savonia is included in the poorest quartile and in logistics efficiency both Southern Savonia and South Karelia are included. In the dimension of transport infrastructure the poorest quartile includes North Karelia, South Karelia, Southern Savonia and Lapland. When considering the location of competitors dimension the most unsatisfied respondents came from North Karelia, Kainuu, South Karelia and Central Ostrobothnia.

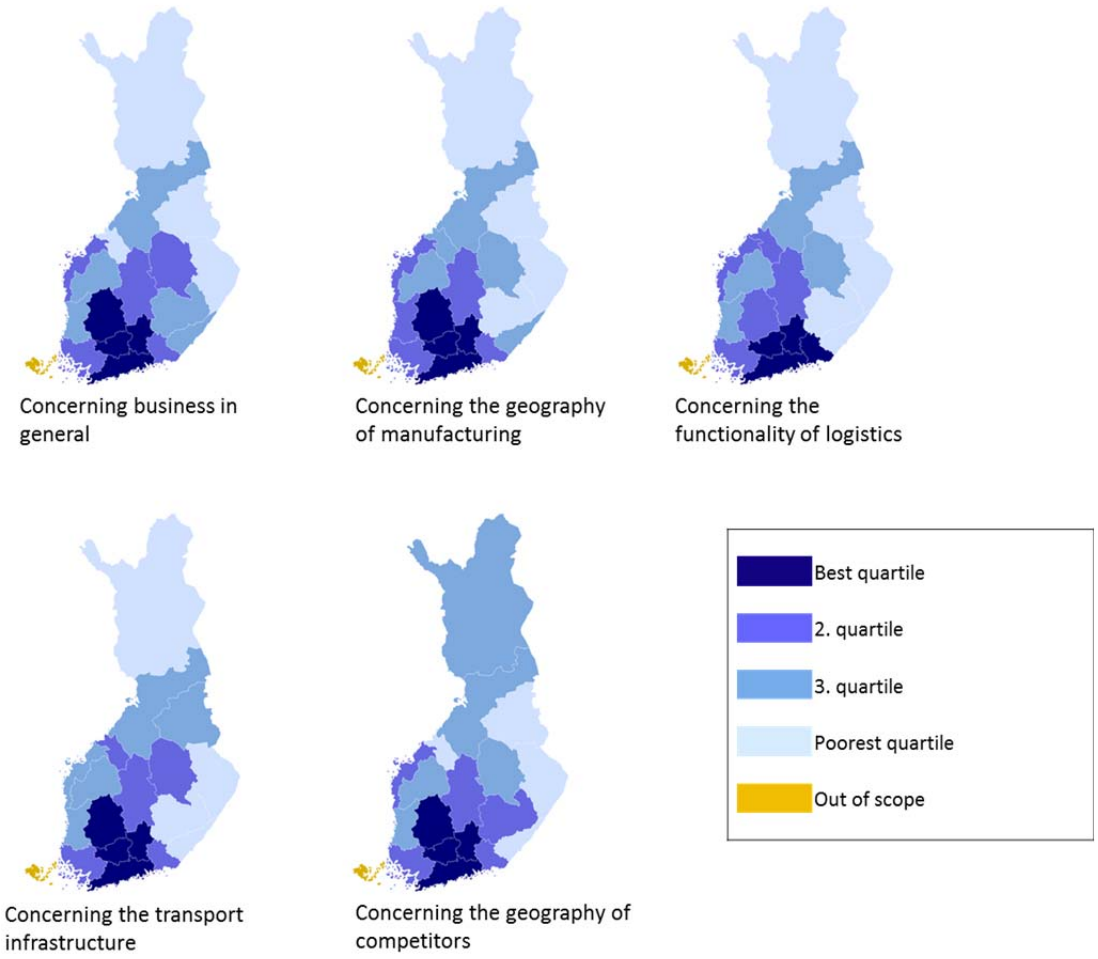

Figure 30: Operating preconditions for firms by region. Colours indicate the region's rank among all regions (N=1,353)

One likely explanation for the perceived regional differences could be the varying industry structures in different regions. If industries typical for certain regions consider their regional operating preconditions poor, it may result in a lower score on average for those regions.

The differences between the views of separate industries on regional operating preconditions were further analyzed, and the most important finding was that at least between the main industries covered there appears to be hardly any differences in views on regional logistics preconditions. The difference is biggest in how trade and logistics firms view the transport infrastructure, approximately 3.7 units. Thus it would appear that at least on main industry level differences in views on regional operating preconditions result from regional differences rather than e.g. differences related to the economic structure within one region.

8.4 Firms' competitive strategies

Firms determine their business model based on the assumptions of the management on the nature of demand and customer requirements. Firms also define a more or less explicit competitive strategy for competing on the market or in different segments based on the business model selected. The strategy should also address the mechanisms and "machinery" through which value is created for the customer. (Teece 2010). From performance and results point of view this supply chain "machinery" should be in line with the firm's competitive strategy (e.g. Sun & Hong, 2002). For the strategic configuration of the supply chain the decision makers define e.g. those elements that are essential for customer decision making when placing orders to suppliers (so called order winning factors).

Based on currently dominant theories, firm's competitive factors can roughly be divided into two groups, the first of which represents competition, efficiency and standardization based on price (compare Porter's (1986) cost leadership strategy and Fisher's (1997) physically efficient delivery chain strategy). The other group includes factors that represent specialization based on customer needs and emphasize quality, flexibility and customization (compare Porter's (1986) differentiating strategy and Fisher's (1997) strategy on reactive supply chain).

The essential competitive factors functioned as a background variable in the Finland State of Logistics survey. The respondents were asked for their views on the level of the sources of the firm's competitive advantage compared to the competition. The questionnaire was conducted so that the following four factors belong to the first, cost oriented, group of competitive advantage sources:

- Cheap price level
- Uncomplicated product and service selection
- Low-cost operations
- Efficient capacity usage

The other group, focused on specialisation, includes the following seven factors:

- Strong brand
- Variety
- Customization of products and services
- Marketing communication
- Top quality
- Speedy operations
- Flexibility of operations

In addition, the respondents were asked about the significance of minimizing the environmental impact and about the significance of supply chain management in general. The following chapters examine the competitive factors by sector (manufacturing and construction, trade, logistics services) and firm size.

Figure 31 shows the competitive strategy profiles by firm size for manufacturing and construction firms. Based on statistical analysis the emphasis in relation to several competitive factors differs based on firm size. Smaller manufacturing firms, especially micro-sized, seek competitive advantage through price, simple selection and cost effectiveness. In addition, smaller firms compete relatively more on flexibility and customization. Large firms find their competitive advantage through strong brands and comprehensive product and service selections more than other firms. All manufacturing firms agree on the significance of flexibility and customization when competing for customer orders in the current market conditions. These factors set special demands on firms' supply chain management. The need for process development and innovation is evident.

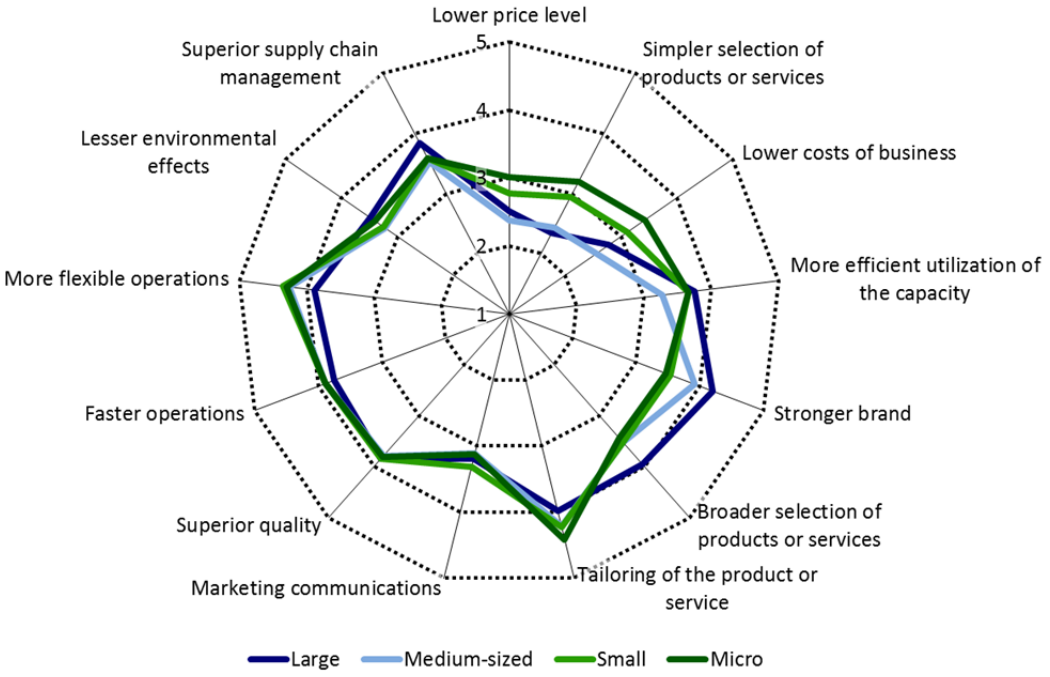

Figure 31: Competitive strategy profiles for manufacturing and construction firms by firm size (Min N=26; Max N=320)

Figure 32 shows the competitive strategy profiles by firm size for firms in trade industry. Based on statistical analysis the emphasis again varies by firm size. Smaller trade firms invest in flexibility as a source of competitive ad-

vantage more than large firms. Larger firms then again compete on strong brands and efficient supply chain management more than smaller firms do. All firms in the trade industry agree on the significance of speed, quality and customization when competing for customer orders in the current market conditions. Cheap price then again is not seen as a source of competitive advantage in their context.

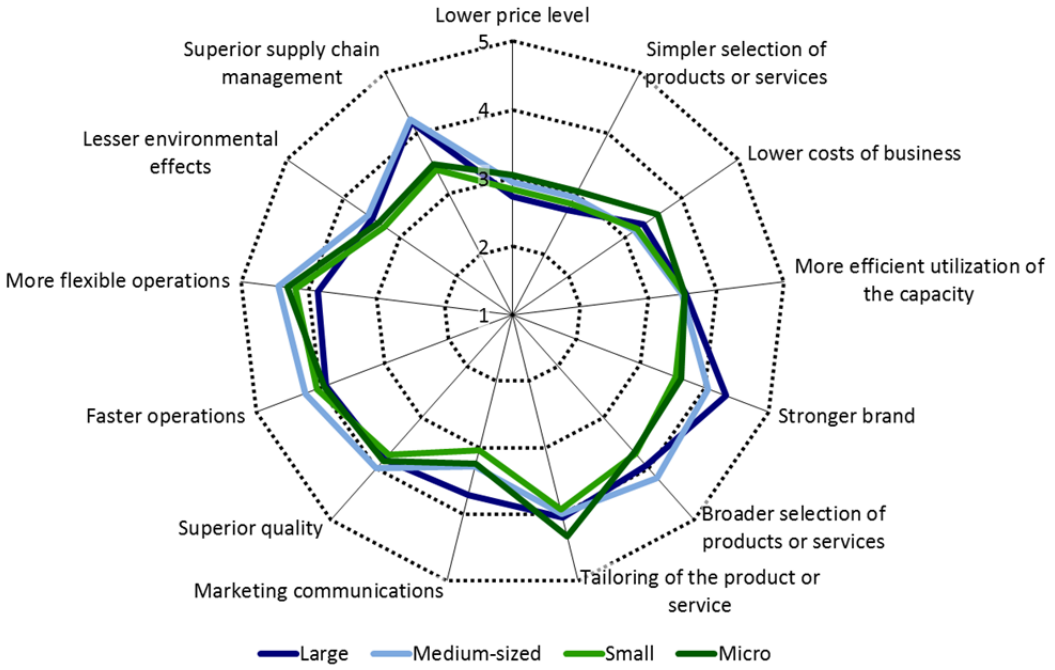

Figure 32: Competitive strategy profiles for trade firms by firm size (Min N=17; Max N=274)

Figure 33 shows the competitive strategy profiles by firm size for logistics service providers. Based on statistical analysis the emphasis again varies by firm size. Smaller logistics service providers invest in flexibility and speed as their top competitive factors more than larger firms do. Larger firms on the other hand compete again on strong brands and wider service selection. All logistics service providers agree on the importance of customized services and supply chain management. As above, price brings no significant competitive advantage on this sector either.

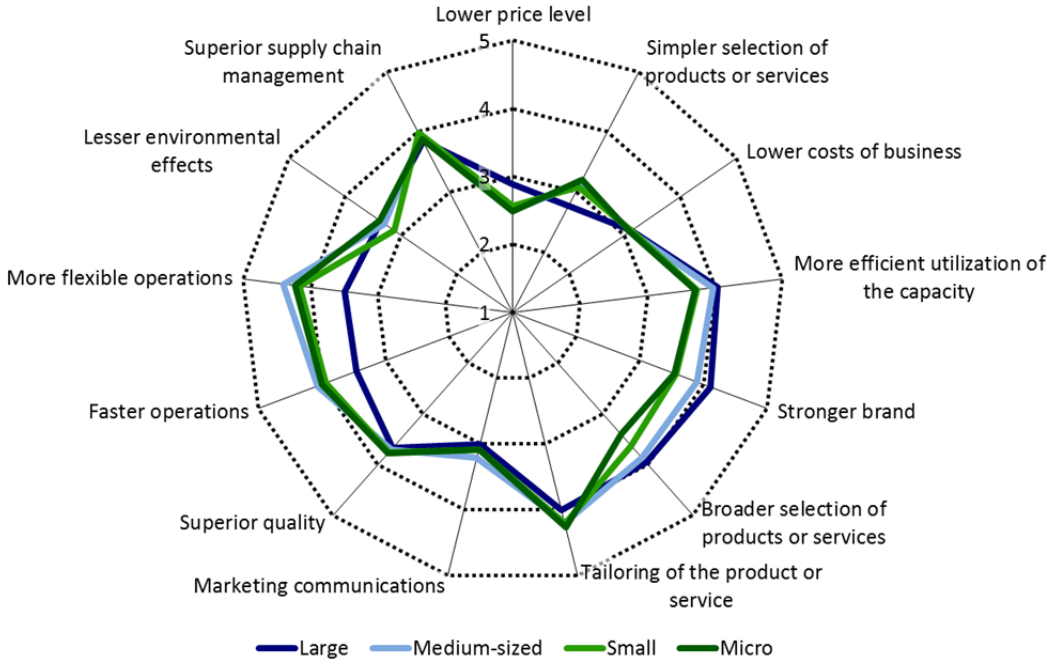

Figure 33: Competitive strategy profiles for logistics service providers by firm size (Min N=22; Max N=416)

To summarize the above, it can be stated that specialisation and customisation play key roles in firms' competitive strategies in all industries covered. This leads to customer specific product variants and supply chains, which both increase the complexity of the supply chain network. This in turn affects supply chain performance negatively (e.g. Milgate 2001; Bozarth, Warsing, Flynn & Flynn 2009; Lorentz et al 2012). As a result firms have an increasing need for managing complexity as well as for keeping the issue on the agenda when making decisions on new products and their structures in the corporate management group.

9 THE DEVELOPMENT OF FIRM PERFORMANCE ACCORDING TO SURVEY RESULTS

Key findings:

- Logistics costs in manufacturing and trade amounted to 13.4% in relation to turnover on average in 2013 (12.1 % in 2011), structural change in the industry explains the increase
- Majority of manufacturing and trade firms estimate that their performance has improved taking into account the current economic situation
- Slowed down inventory turnover has prolonged cash-to-cash cycles
- Delivery accuracy for manufacturing and trade firms is on a high level on average
- The operational efficiency of transport firms has improved

Both the Finnish and European economies have been in decline for years. The weak economic situation undoubtedly affects the performance of firms operating in Finland as well. The performance and its development in respondent firms was examined by asking the firms to evaluate the development of their economic and logistics performance in the last two years taking into account the current economic development in general. In addition the firms were asked to give estimates on their logistics costs and the current level of some indicators.

9.1 Logistics costs in manufacturing and trade

The State of Logistics surveys have followed the state and development of logistics costs since 1990. A comparable time series on the relative share of different logistics cost components in relation to firm turnover has been collected since 2005. In the following chapters the development and current state of logistics costs are presented by main line of business, firm size and level of internationalization. Data for manufacturing firms is also presented by production mode.

Figure 34 depicts the average logistics costs in manufacturing and trade weighted by firm and industry turnovers in 2005–2013.

The logistics costs in manufacturing and trade in relation to turnover have increased since 2011. In 2013 the logistics costs amounted to 13.4% in relation to firm turnover on average, when in 2011 the corresponding figure was 12.1 %. Of all cost components warehousing costs, which were 3.5% on average of firm turnover in 2013, and inventory carrying costs (3.7% in 2013 vs 3.0% in 2011) have increased.

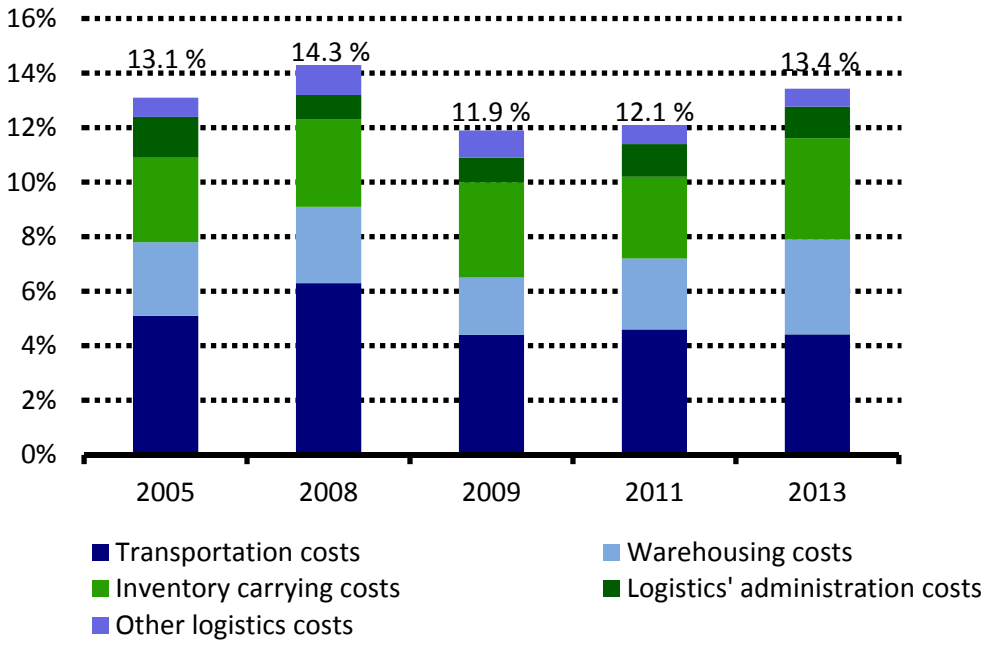

Figure 34: Logistics costs in manufacturing and trade as % of turnover and weighted by firm and industry turnovers 2005–2013

The share of turnover for transportation costs has decreased and they amounted to 4.4% of turnover in 2013. The shares of logistics administration costs (1.2%) and of other logistics costs (0.7%) of firm turnover have remained the same when comparing them to the cost level in 2011. The increase in the relative share of logistics costs is explained by the structural change in the Finnish manufacturing industry, where the share of high technology manufacturing has decreased rapidly in recent years. This in turn emphasizes the production share of the heavier industries with higher logistics costs. Logistics and logistics related solutions in production have become even more important competitive factors due to this structural change in recent years. For trade industry the increase in logistics costs is most likely explained by the uncertain economic situation, which has increased the share of warehousing and inventory carrying costs in particular.

Examining the logistics costs through different background variables gives a very different image than what can be deduced from the results weighted by

firm and industry turnovers. In firms of all sizes the logistics costs in 2013 appear to be lower than in 2011 (Figure 35).

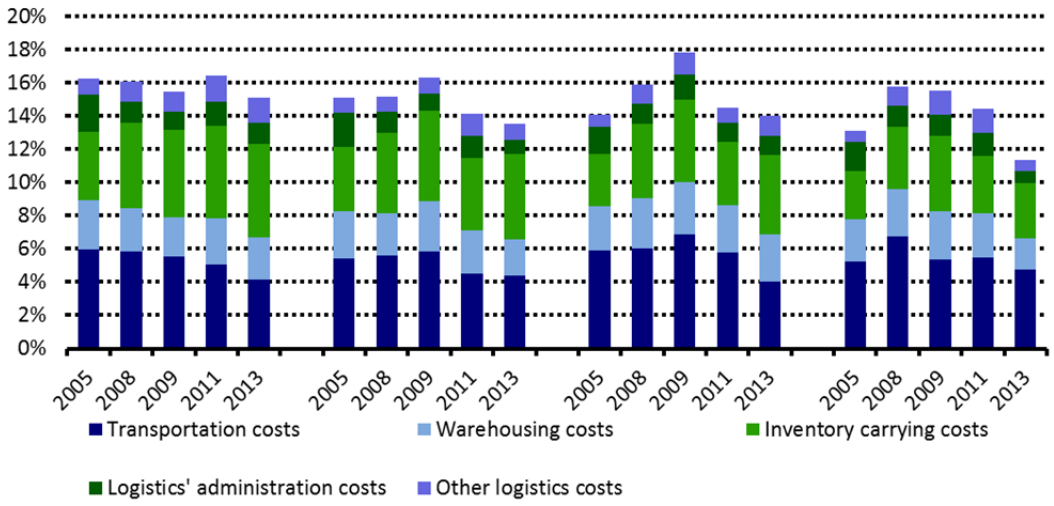

Figure 35: Logistics costs as % of turnover by firm size 2005–2013

Changes in different logistics cost components have been moderate when comparing to the time frame of the last survey. Transportation costs have decreased from 5.5% to 4.8% of turnover for large firms. For medium-sized firms the transportation costs amounted to 4.1% of turnover on average in 2013. For small firms the corresponding figure was 4.5% and for micro firms 4.1%.

Warehousing costs for large firms are on average 1.8% of turnover. For medium-sized firms costs for warehousing are 2.8%, for small 2.2% and for micro firms 2.5% of turnover.

It would appear that large firms can enjoy economies of scale when it comes to inventory carrying costs, since for large firms those costs are on average 3.3% of turnover. In comparison, for medium-sized the corresponding share is 4.8%, for small firms 5.2% and for micro firms 5.7%.

Figures 36 and 37 examine the average logistics costs in some key manufacturing and trade sectors in 2005–2013. Even though there appears to be fluctuation in the average cost level for some sectors on a yearly basis, no clear trend of cost increase or decrease is evident. Of key manufacturing sectors the average logistics costs have slightly decreased in the 2014 survey for the manufacturing of machines and appliances. For other manufacturing sectors the average non-weighted logistics costs have varied roughly around 15%. Of trade industry sectors the logistics costs for the retail of groceries, drinks and tobacco have varied around 12%, whereas for other sectors the costs have fluctuated around the 15% level, as in manufacturing as well.

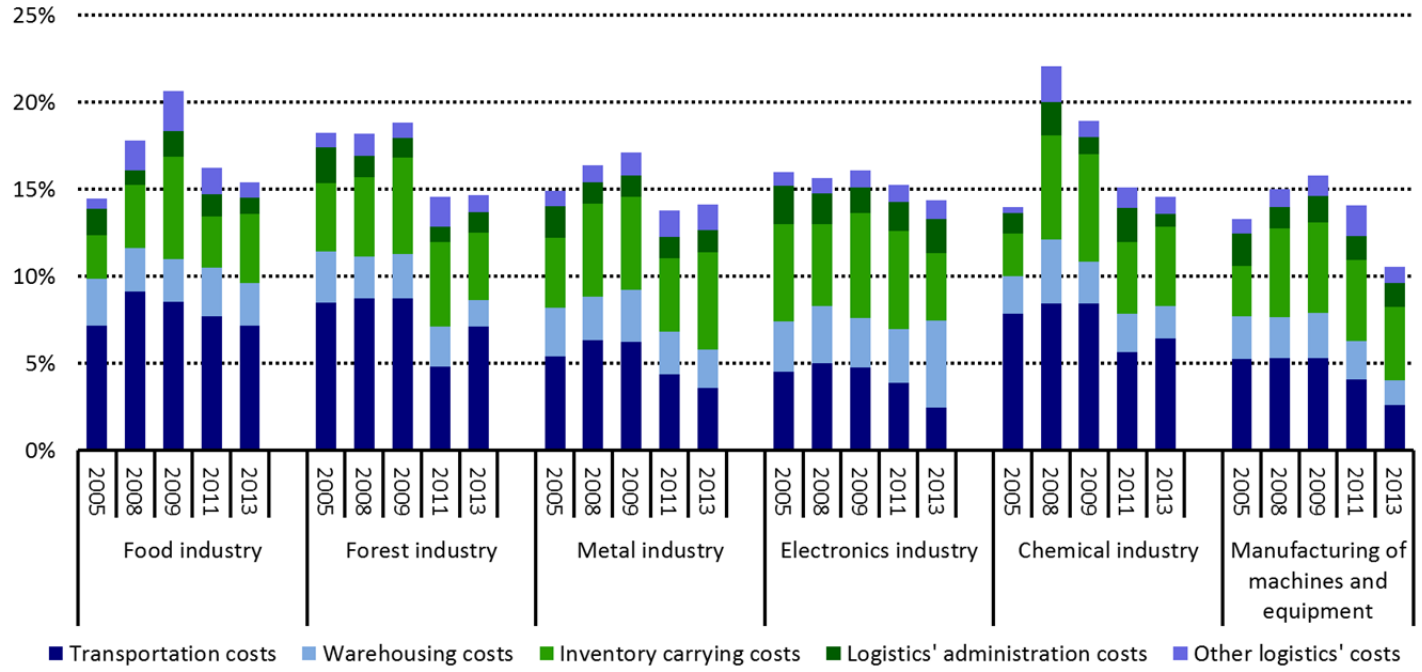

Figure 36: Logistics costs for selected manufacturing sectors (average) % of turnover in Accounting Years 2005–2013

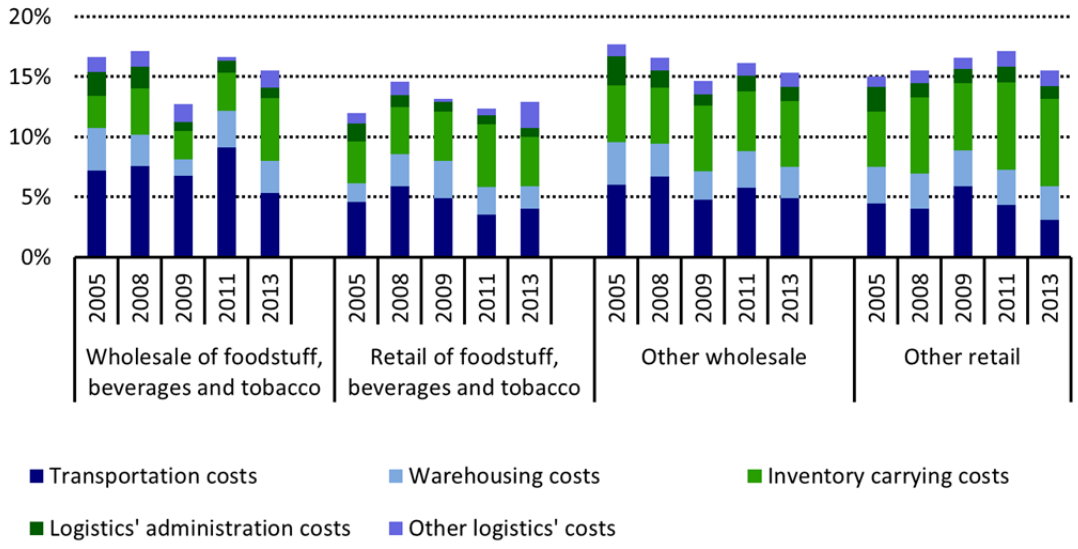

Figure 37: Logistics costs for trade industry sectors (average) % of turnover in Accounting Years 2005–2013

The seeming illogicality between weighted and non-weighted logistics costs requires a closer examination. The logistics costs weighted by firm and industry turnovers have increased, whereas logistics costs by pure averages appear to have decreased. In practice this incongruence is explained by changes in the Finnish economy. The key explanatory variable in this case is the change in the structure of the whole economy. The share of the electronics industry and of other high value added production has decreased. At the same time the internal structures of economic sectors have changed and the importance of firms previously in key positions within their own industries has changed dramatically. Combined, these factors for their part account for the fact that aggregated and weighted logistics costs act somewhat differently than estimates based on individual firm's numbers.

9.2 Key indicators in manufacturing and trade

Firms measure and follow the development of their performance by various indicators. Some of these indicators focus on performance e.g. in light of service level. This chapter presents the development and current status of some indicators. The indicators included are related to payment times and working capital efficiency as well to delivery timeliness from both supplier and customer points of view.

9.2.1 Payment times and cash-to-cash cycles

The efficiency of firm operations can e.g. be measured based on the cash-to-cash cycle and its components. The Cash-to-cash cycle consists of three components; customers' actual payment times to the firm (+), the actual payment times of the firm to its suppliers. (-), and days the material is in inventory (+).

A firm's need of working capital is directly linked to customer payment times. The longer the payment times, the more working capital is needed and the longer the material sits in inventory. Longer payment times to suppliers then again indicate less need for working capital.

Figure 38 shows that the cash-to-cash cycle for manufacturing firms has lengthened from 2006 to 2014 when considering averages. In 2006 the average cash-to-cash cycle was 43 days, when in 2014 it was 62 days. The time that the material spends in inventory has increased in particular (43 days in 2006, 59 days in 2014).

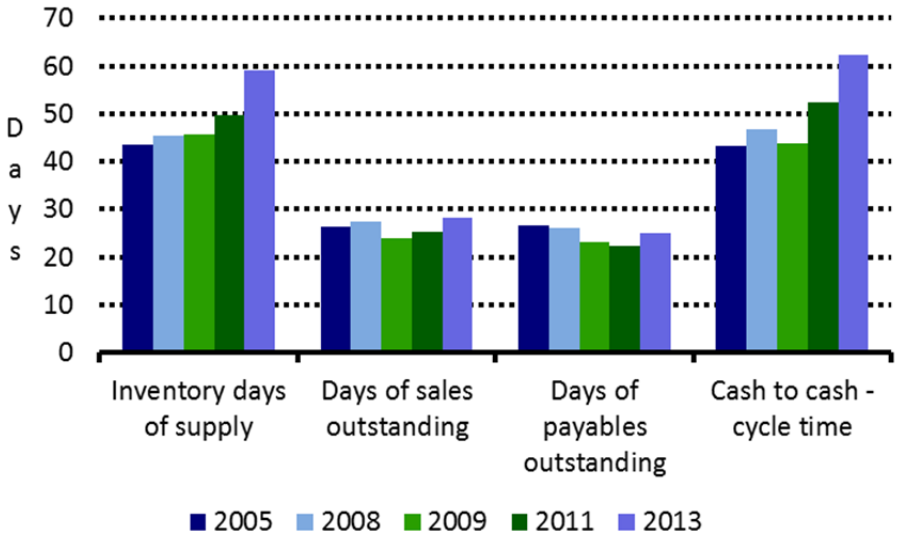

Figure 38: The development of payment times in manufacturing in Accounting Years 2005–2013

Also the actual customer payment times have grown longer. In 2006 the actual payment time for customers was on average 26 days, whereas in 2014 it was 28 days. The actual payment time to suppliers on the other hand has shortened for manufacturing firms from 27 days in 2006 to 25 days in 2014.

For firms in trade industry the cash-to-cash cycle, and its individual components, is on average shorter than the corresponding cycle in manufacturing (Figure 39). Despite that the cash-to-cash cycle has grown longer in trade as

well. In 2006 it was on average 32 days and in 2014 38 days. The growth is explained by the increase in the time the material is in inventory, which has increased from 39 days in 2006 to 43 days in 2014. The actual payment time of customers has remained the same in 17 days, whereas the actual payment time to suppliers has shortened from 24 days to 21 days.

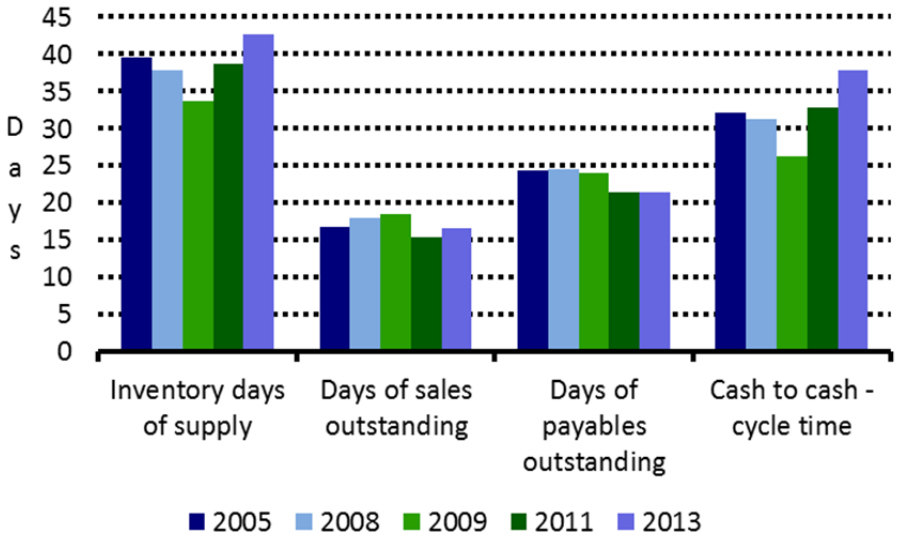

Figure 39: Development of payment times in trade in Accounting Years 2005–2013

Examining the cash-to-cash cycle and its components in light of firm internationalization level clarifies the factors impacting the cash-to-cash cycle (Figure 40). The average cash-to-cash cycle is longest for export firms (84 days) and shortest (51 days) for firms operating only on the domestic market. For an international firm the average cash-to-cash cycle is 63 days.

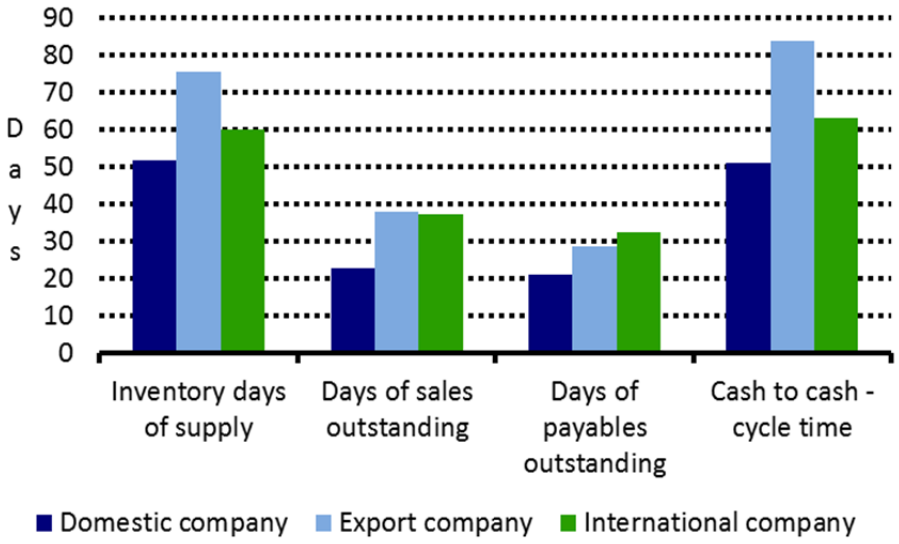

Figure 40: Payment times for firms based on internationalization level in 2013

Export firms have the material in their inventory for the longest time, 76 days. For firms operating only on the domestic market the time is 52 days on average and for international firms 60 days.

Customers' actual payment time is roughly as long for export firms as for international firms (38 days for export firms and 37 days for international firms). On the other hand for firms operating only on the domestic market the customers' actual payment time is 23 days. Actual payment time to suppliers is longest for international firms (33 days), whereas for export firms it is 29 days and for domestic market firms 21 days.

To summarize, the level of the components in cash-to-cash cycle depend on whether the firm operates on the domestic market or on the international market. The domestic firms operate with the Finnish payment terms, which are short in international comparison. In addition, when the customers are located close-by, there is less need for warehousing and transport times are shorter than for firms operating internationally.

The differences between export firms and international firms are derived from the level of internationalization and firm size. Related to payment times both operate in the international environment, but typically the larger international firms have better resources for negotiating payment terms than do smaller export firms. Additionally they can utilize production facilities closer to the customers and so require less warehousing capacity than do export firms, who serve their international customers utilizing domestic warehouses.

9.2.2 Firms' delivery timeliness

Regarding operative performance the respondents were asked to evaluate e.g. timeliness of deliveries, both of their own deliveries and of their suppliers' deliveries. Figure 41 depicts the assessments of manufacturing firms on the timeliness of their own deliveries and of those of their suppliers grouped by firm size. Internationally, the delivery timeliness of Finnish manufacturing firms appears to be on a high level. The delivery timeliness of 94% on average, which the large firms reported, can be considered high. Related to delivery timeliness the medium-sized firms appear to make an exception among all the respondents, since their timeliness in deliveries amounted to less than 88% only. On average level variation between individual firms is great. In total the delivery timeliness can be said to be on a good level.

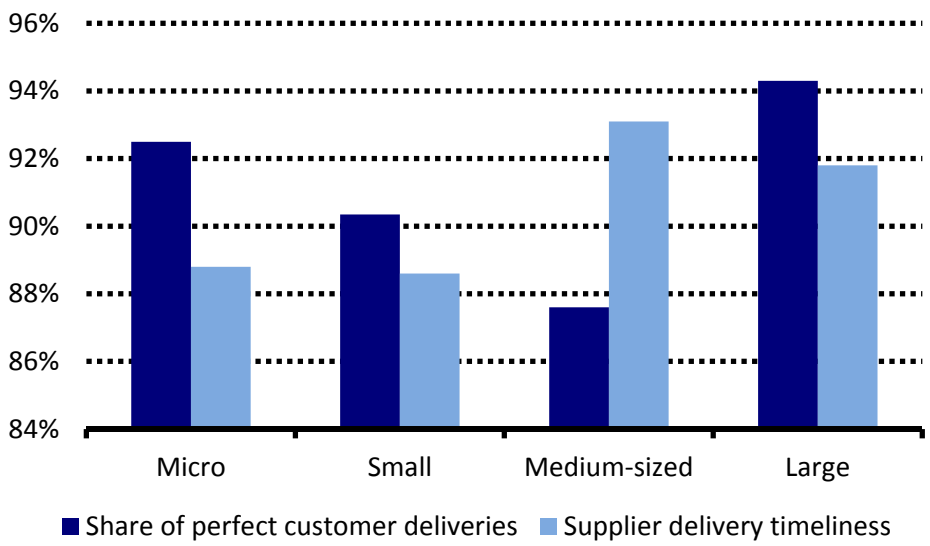

Figure 41: Assessments of manufacturing firms of their own and supplier delivery timeliness as % of deliveries in 2013

For firms in trade the delivery timeliness (Figure 42) appears to be on a slightly higher level than for manufacturing firms. This is at least partially explained by the fact that for trade firms the timeliness is not tied to the production process like it is in manufacturing firms. Additionally, the customer relationships in trade differ from those in manufacturing. Thus comparing manufacturing and trade delivery timeliness directly is not meaningful.

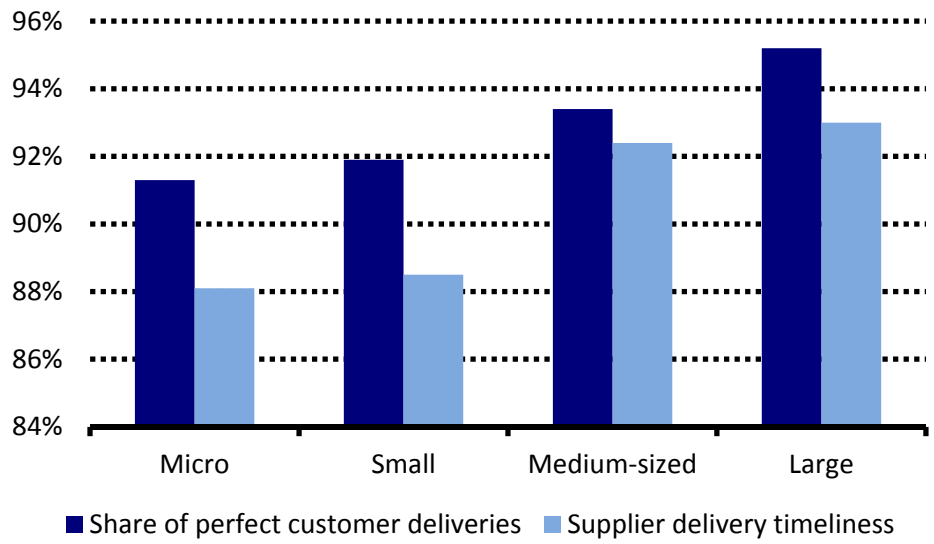

Figure 42: Assessments of trade firms of delivery timeliness of their own deliveries and of those of their suppliers as % of deliveries in 2013

Generally speaking the delivery timeliness appears to be on a relatively high level for trade firms. Even micro firms reach a timeliness of over 90%. For large firms the delivery timeliness is even 95%. For trade firms the size of the firms appears to impact timeliness of deliveries. The larger the firm the better the delivery timeliness appears to be.

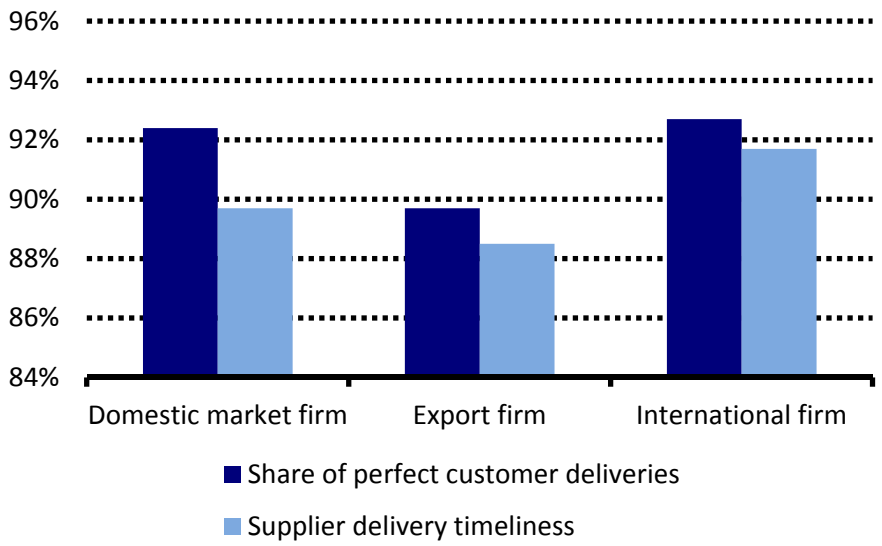

Figure 43: Firms' assessments of delivery timeliness of their own and their suppliers' deliveries as % of deliveries in 2013 by firm internationalization level

Figure 43 shows the delivery accuracy for manufacturing firms by level of internationalization. Domestic market firms and international firms deliver their customer orders perfectly by 92% certainty, whereas for export firms the timeliness of deliveries is below 90% on average. One possible explanation for export firms' lower delivery timeliness is their distance from customers. Domestic market firms operate near their customers to begin with and international firms can deliver orders from production facilities nearer to the customer, but export firms need to serve their customers from production facilities situated in Finland.

9.3 The performance of logistics firms

As the international economic situation has continued to be challenging for several years, the logistics industry has also faced some difficulties. As a result of the rapid economic growth in the early 2000s the logistics industry invested heavily to respond to equally rapidly growing demand. When the economic growth slowed down, it created overcapacity in the industry. In recent years this has tightened the competition and influenced profitability in the logistics industry. In order to survive the weaker profitability and the tighter competition, logistics firms have sought to improve their performance.

Transportation firms can improve their performance by e.g. decreasing the empty mile percentage in their vehicle mileage or by improving the average load factor for transports. Figure 44 shows transportation firms' assessments

of empty mile percentage of total mileage in 2012 and 2014. Based on the figure, logistics firms have been able to decrease their empty mile percentages. On average the empty mile percentage in 2014 was 24%, when in 2012 it was 3 percentage points higher at 27%.

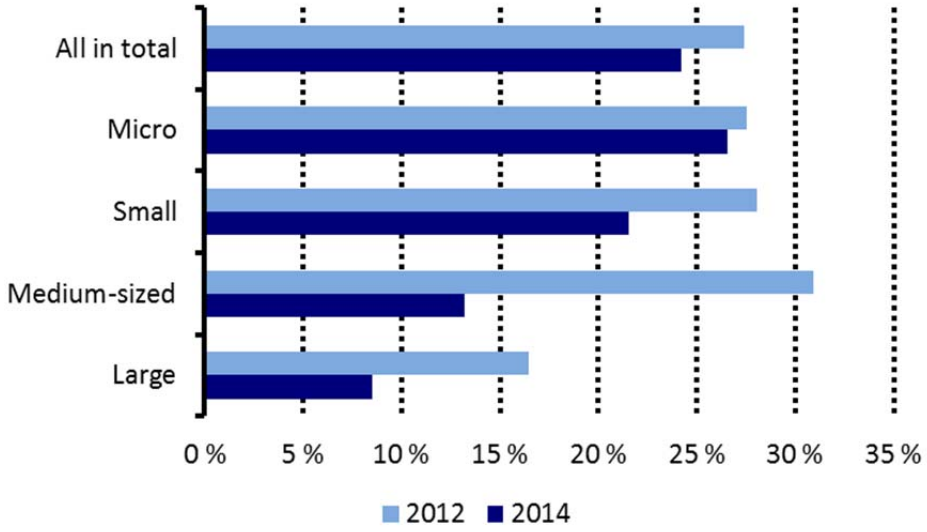

Figure 44: Empty mile percentages of total mileage for transportation firms in 2012 and 2014

Firms appear to be able to utilize economies of scale when striving to decrease the empty mile percentage. For micro firms the empty mile percentage was highest at 27% on average. The corresponding share for small firms was 22% of total mileage. On the other hand the empty mile percentage was 13% for medium-sized firms and only 9% for large firms. Thus the link between firm size and empty mile percentage is negative. The larger the firm the less empty miles there appears to be. Provided that larger firms are able to improve their performance more than smaller firms due to economies of scale, this might impact the competition in the transportation industry and through that also change the structure of the transportation market in the long run.

Figure 45 depicts the average load factors in domestic transports in 2012 and 2014. Figure 46 shows the corresponding numbers for international transports. In domestic transports the development in the average load factor has been consistent. Average load factors are higher for firms of all sizes in 2014 than in 2012. The average load factor in domestic transport was 83% in 2014 (80% in 2012).

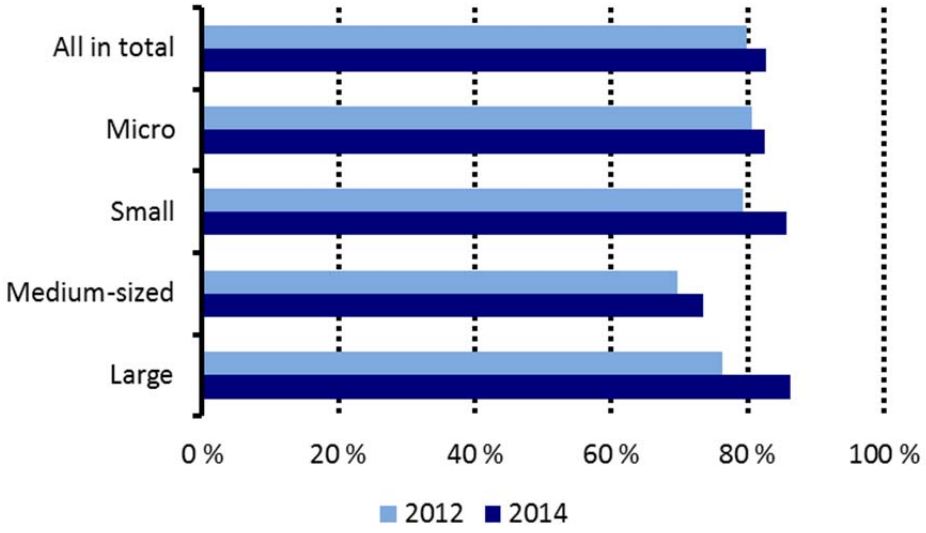

Figure 45: The average load factor in domestic transport in 2012 and 2014

The load factor was highest, on average 86%, in domestic transports for large firms and for small firms. Micro firms reached an average load factor of 82%, whereas medium-sized firms only obtained an average load factor of 74%. The structure of the transport industry might partially explain the differences in load factors in different sized firms. Large firms are able to consolidate transport flows due to their size better than smaller firms can. On the other hand, micro firms often operate as subcontractors for large firms and are thus able to enjoy the same economies of scale in combining transport flows. Small and medium-sized firms operate independently more often and are thus unable to reach the same economies of scale as large firms.

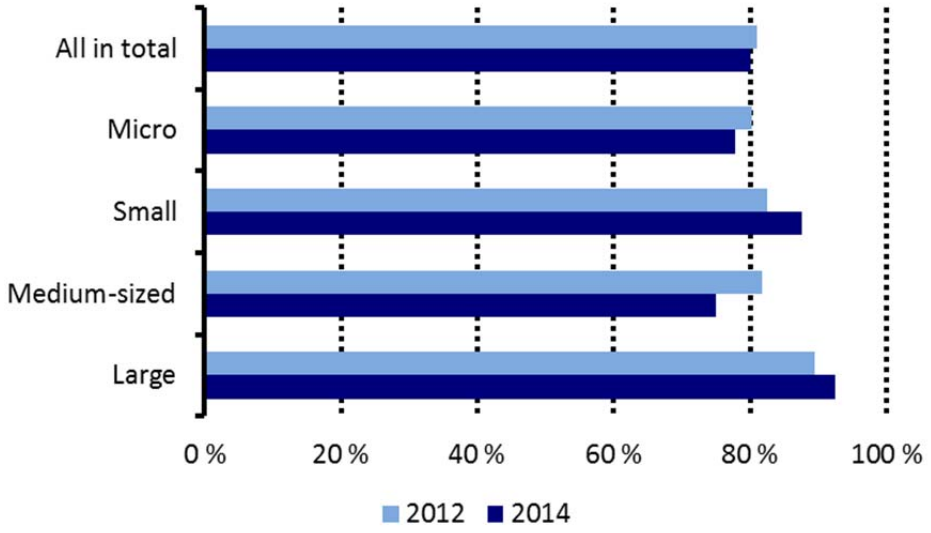

Figure 46: Average load factors in international transports in 2012 and 2014

On average, transport firms are able to operate in international transports on a similar load factor of approximately 80% than in domestic transports. The changes in load factors in international transports are less unambiguous than changes in domestic transportation load factors. Large and small firms appear to be able to operate on higher average load factors in international transports than micro and medium-sized firms. Additionally, unlike micro and medium-sized firms, large and small firms have managed to increase their average load factors from 2012.

Both based on empty mile percentage and average load factors in domestic and international transports it appears that transportation firms are able to utilize economies of scale in improving efficiency. Thus the results indicate that the transportation industry will continue to develop towards an all the more centralized market, where the weight of large firms increases. At the same time it should be noted that the economies of scale and the competition setting depend on what kind of market the firms are operating on. In the transportation market there appears to be that kind of sub markets (e.g. the LTL market), where economies of scale matter, and those markets, where also the small firms can operate competitively.

10 GREEN LOGISTICS AND GREEN SUPPLY CHAIN MANAGEMENT

Key findings:

- Environmental issues are an integral part of the corporate culture for most manufacturing, trade and logistics firms, but their implementation and follow-up continues to be challenging
- Firm size affects observing environmental issues significantly; large firms in all industries rated their success in the field higher than did smaller firms
- Regardless of firm size it appears to be easier to execute actions directed at decreasing the environmental impact in the logistics industry, whereas in manufacturing and trade executing the changes requires more resources
- The firms that have managed to improve their logistics performance and their cost efficiency have also been able to reduce the environmental impact of their operations

This chapter examines how Finnish firms utilize green supply chain management. Internal green supply chain management stands for practices, which the firm can execute and manage by itself. External green supply chain management on the other hand requires some level of co-operation with parties external to the firm, like suppliers and customers. (Zhu, Sarkis & Lai 2013.) In addition, this survey reports on how well the firms have succeeded in decreasing their environmental impact.

10.1 Internal operations

Based on the survey responses, environmental issues are an integral part of the corporate culture in most manufacturing, trade and logistics firms, but that their execution and monitoring the realization of goals set continues to be challenging. Manufacturing firms are slightly ahead of trade and logistics firms when it comes to paying attention to environmental issues. It is noteworthy, that firm size has a significant impact on actions concerning environmental issues. Large firms in all major industries appear to agree with the survey statements more than small and medium-sized firms do. This means they appear to be further along in executing their environmental objectives. As

an example, only 42% of small manufacturing firms and 57% of medium-sized firms make internal environmental audits, whereas the corresponding number for large firms is 87%.

Paying attention to environmental issues in internal operations appears also to be linked to the economic situation of the respondent firms (Figure 51). Of all respondents in manufacturing and trade 41% as well as 36% of respondents in logistics, informed that they had paid attention to environmental issues in internal operations. These respondents all belonged to the group, which informed that their economic situation had improved within the last two years. This survey does not examine, which is the cause and which the effect in this case: Are firms in good economic situations better able pay attention to environmental issues or does taking environmental issues into account improve the economic results of the firm?

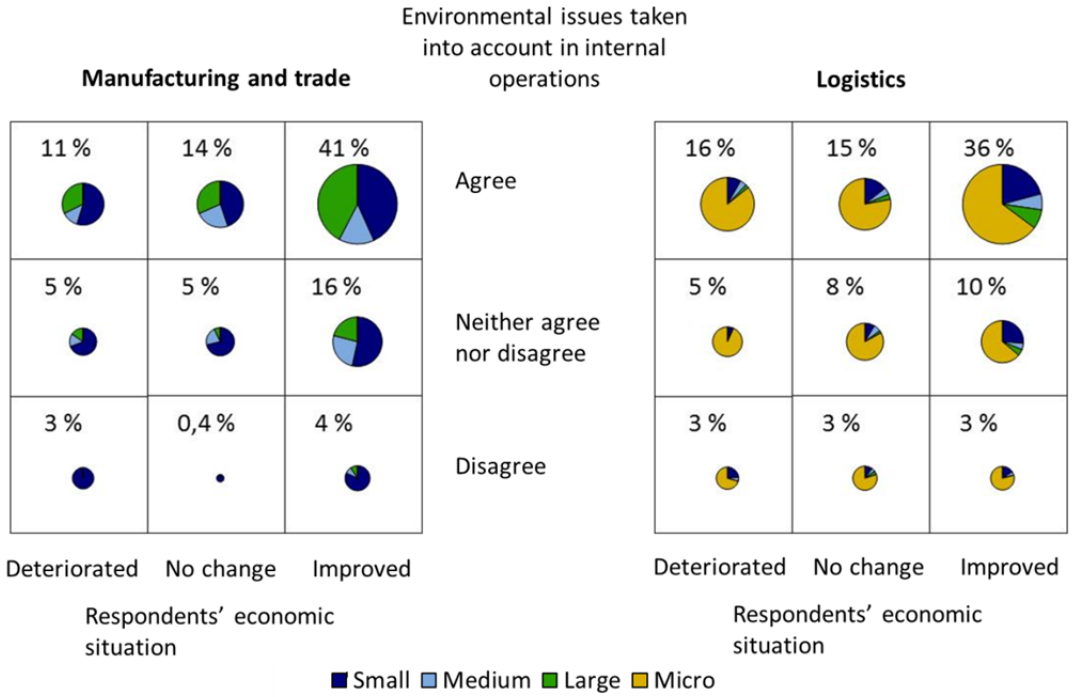

Figure 47: Cross-tabulation of internal actions in environmental issues and the change in firm economic situation in the last two years, manufacturing and trade (N=270) and logistics firms (N=599)

Figure 47 shows that the relative share of large firms is big in the group informing that their economic situation has improved and that they are paying attention to environmental issues in internal operations compared to the group, which informs that the economic situation has deteriorated and that environmental issues are not taken into account. Instead, the share of large firms in the

group not paying attention to environmental issues internally is small in both manufacturing and trade as well as logistics industry.

10.2 Operations with customers and suppliers

A considerable share of respondents takes environmental issues into account also when dealing with goods and service customers and suppliers, not just in their own operations. Even though more than half of manufacturing firms and more than one third of trade and logistics firms require environmental responsibility from their suppliers, majority of respondents have not asked their suppliers to get a formal certificate, such as ISO or EMAS, for their operations. Using environmental impact as an essential criterion, when selecting suppliers, is not evident in the responses to the survey. This means that the more traditional criteria, such as price, are still emphasized in goods and services supplier selection.

Based on the survey responses, firms pay on average more attention to environmental issues in their internal operations than they do when co-operating with customers and suppliers. These results confirm the findings in the 2012 Finland State of Logistics, which stated that firms seek to reduce the environmental impact of their operations, but that internal operations are still ahead of external operations, even though e.g. many manufacturing firms say they co-operate with their customers and suppliers in product development.

10.3 Firms’ environmental performance

Based on the survey responses, firms of all sizes have succeeded comparatively well in decreasing the environmental impact of their operations. Large firms in all industries estimated the level of their improvements as higher than smaller firms did. Additionally, according to figure 48 a slightly larger share of logistics firms than of manufacturing and trade firms reports improvements in their environmental performance regardless of the economic development in the last two years.

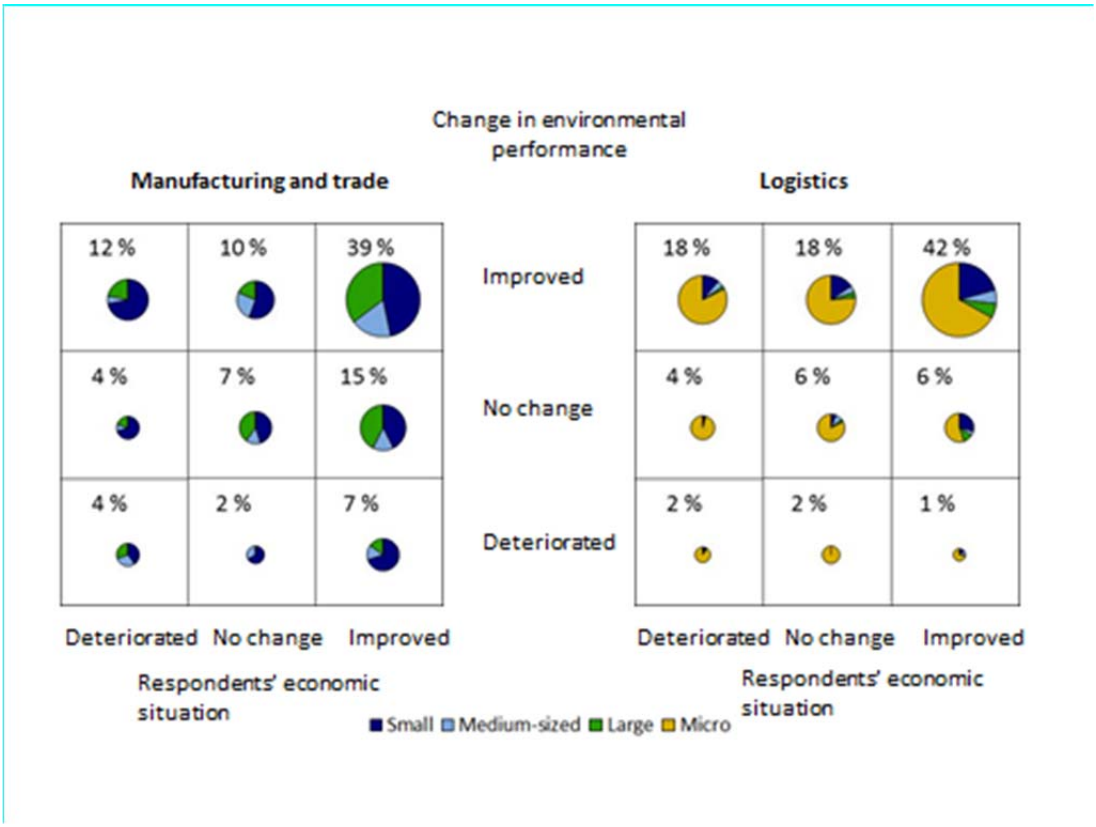

Figure 48: Cross-tabulation of respondents' environmental performance and change in their economic situation in the last two years, manufacturing and trade (N=270) and logistics firms (N=599)

In light of the results it appears to be easier to execute actions aiming at reducing the environmental impact regardless of firm size in the logistics industry, whereas in manufacturing and trade the execution of desired changes requires more resources, which smaller firms do not necessarily have. The share of logistics firms mostly or partially agreeing with the survey statements is in majority of the cases bigger than for manufacturing firms. For instance only 26% of small manufacturing firms estimated they had succeeded in reducing their carbon dioxide emissions, whereas for micro and small logistics firms 68% and 78% respectively estimated they had reduced carbon dioxide emissions in relation to total haulage.

11 THE STATE OF LOGISTICS IN THE FINNISH ECONOMY IN 2014

Finland State of Logistics 2014 –survey took place at a time when the economic situation of Finland has been challenging for a long time. The GDP of Finland has declined for two years and turnovers of manufacturing and trading industries are yet to return to the pre- financial crisis levels of 2008. The decline of the ICT-sector combined with the challenging market situation of the forest industry, both central to the Finnish economy have been seen as the main culprits. As the manufacturing and trading industries are yet to recover, the situation is clearly visible in the development of the logistics industry as well,

The staggering economic growth is combined with a challenging outlook of the financial markets. Even as the interest levels have been on a record low levels and brought relieve into the costs of financing for some firms, the tightening rules of financing have in practice meant higher costs for many firms and industries. Recently, the price of energy has declined rapidly, relieving some of the cost pressure. However, at the time of the survey the energy prices were significantly higher, affecting the outlook of the firms.

11.1 In 2014, challenging economic development is affecting the performance of Finnish firms

From the perspective of international trade, Finland has often been called an island, because of the long distance to main markets, and the dominating role of maritime transport in international trade. Combined with the central role of heavy, transport intensive industries in the Finnish manufacturing, The logistics costs, especially the transportation costs of Finnish firms have been on a higher level than in other European economies. The average logistics costs of the manufacturing and trading industries measured as a share of turnover have increased in comparison with the year 2012. Of the key cost components, the transportation costs have remained on the same level. Partially, the transportation costs have been affected by the remaining overcapacity in the transport sector. The freight rates, both domestically and internationally have remained on a relatively low level. At the same time, the

low freight rates and rising costs have forced the transport industry to seek efficiency in their operations.

The transport industry, especially the road haulage industry has managed to increase the load factor and decrease the empty mile percentage both in domestic and international transport. Because of this, the operational efficiency of the Finnish transport firms is on a very high level, when compared internationally. At the same time, the limits of efficiency are coming closer. In practice this means that in case the costs such as energy prices and labor costs continue to rise, at some point the increasing costs will reach the shippers as well.

The staggering economic growth of the Eurozone has kept the interest rates on a low level and according to the Bank of Finland, also the interest rates for loans for Finnish firms have remained on a lower level. At the same time, the warehousing costs and inventory carrying costs of the Finnish manufacturing and trading firms have increased. An explanation to this lies in a combination of higher inventory levels, slower inventory turns and high warehousing rents. The rising costs of manufacturing industry reflect the rapid structural change of the Finnish manufacturing. The turnover of ICT-sector has declined significantly in just a few years, and been replaced by more traditional industries such as forest industry and fabrication of metal products.

11.2 Operating conditions for logistics are good in Finland, even as regional differences are significant

The operating conditions for logistics are good in international comparison, even though the ranking of Finland in the World Bank Logistics Performance Index dropped from the 3. place in 2014 into 24. place in 2014. The absolute differences in the LPI survey are small, so the ranking may alter significantly even though there had been only minor changes in the operating conditions. In the combined results of 2007–2014, Finland is still among the top 10% among 166 countries.

Of the individual metrics of the LPI, Finland receives the highest marks in the functioning of the customs and other border authorities. At the same time, the worst marks are given from the availability of competitive transport services. The results of Finland State of Logistics 2014 -survey are well in line with the results of the LPI. Of the operating conditions, general business environment and functioning of logistics are given the higher marks. At the same time, the differences within Finland are relatively large. Of the NUTS2 – regions, the firms in the Helsinki-Uusimaa region are most satisfied with the

operating conditions, whereas the firms in North and East Finland are most dissatisfied. The largest differences between the regions seem to be in the transport infrastructure.

11.3 Logistics market continue to concentrate, outsourcing has reached the saturated level

Largest customers form even higher share of the turnover of the Finnish LSP:s. This kind of concentration is potentially increasing the bargaining power of the largest customers even more, reducing the possibility of the LSP:s to negotiate and transfer the effect of rising costs to their customers. Similarly, the large LSP:s subcontract an increasing share of their operations. These observations support the previous views about structural changes in both domestic and international logistics markets.

Outsourcing of logistics operations, on the other hand, has not increased significantly between 2012 and 2014. The Finnish manufacturing and trading firms have outsourced most of their transportation, but otherwise organize most of their logistics operations themselves. It would seem that the previous estimates on the increase of outsourcing especially in warehousing and IT-services have been overoptimistic.

The slow growth in outsourcing may be due to the increased experience about the true benefits and challenges of outsourcing, as the previous expectations about cost cutting and increased efficiency have been replaced by the challenges to control the outsourced activities. As the level of outsourcing has remained on a similar level for a long time, it would seem that outsourcing of logistics has reached its peak, at least considering the current structure of the Finnish economy.

11.4 Environmental questions already an integral part of corporate culture

The majority of Finnish firms consider environmental questions as an integral part of their operations. At the same time, firms consider target setting and monitoring challenging.

The results of the survey indicate that especially the LSPs are considering environmental questions in their operations. Similarly, it would seem that large firms are more advanced in their environmental policies than the SME’s. Currently most of the environmental efforts take place within the firms,

whereas the coordination on a wider scale in the supply chain is still considered challenging.

Also, it would seem that the Finnish firms have been successful in reducing the environmental effects of their operations. Regardless of firm size, reducing the environmental impact of operations is considered to be easier in the logistics service provision, than in the other industries. The explanation may be that the environmental actions in the logistics, especially in the transport sector are concrete such as replacing the old equipment with new one, following tighter norms or eco-driving, whereas the actions of manufacturing and trading firms may be harder to define and measure.

11.5 Logistics has an active role in competitiveness

The slow economic growth of the economy has meant staggering growth for many industries. At the same time, many of the key cost components have kept on rising, forcing the firms to improve their efficiency. According to previous estimates in Finland State of Logistics 2012, the role of logistics in maintaining competitiveness is central. For the large trading firms 43% and large manufacturing firms 35% of competitiveness is coming from logistics. As many of the cost components are dependent on external factors such as oil price and labor costs, the Finnish firms have turned their attention to supply chain management and logistics. Especially the operational efficiency of road transport has improved, reducing the effects of cost increases.

For the manufacturing and trading firms, the focus has been especially on the internal processes. The top firms of most of the industries have been able to reduce the cash to cash -cycle times either by active monitoring of days of payables and sales outstanding, or by improving the inventory turns, both of which have already been on a low level in international comparison . At the same time, the average inventory levels and payment times of the Finnish firms have been on the rise, meaning the division between the top firms and the rest of the firms larger than before Some of the firms have been seeking improved efficiency either by pushing their inventories to their suppliers, or by outsourcing.

With the economic outlook still looking shaky, the Finnish firms will be forced to seek efficiency in order to maintain competitive. So far the firms have mainly sought after efficiency by improving internal processes and by using the suppliers and customers as their buffers, when possible. As the top firms have been able to be efficient, the “average joes” are yet to do so. However, in the globalized world the competition takes place between supply

chains, not between individual firms. For the Finnish firms, as for the Finnish economy as a whole, this means that the future success lies in supply chain management, by taking the whole supply chain along, and improving the performance of the entire supply chain instead of individual firms in it.

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APPENDICES

Appendix 1 Indicators of the transport sector and comparison to other Baltic Sea region countries in 2010 (EU energy and transport in figures 2013)

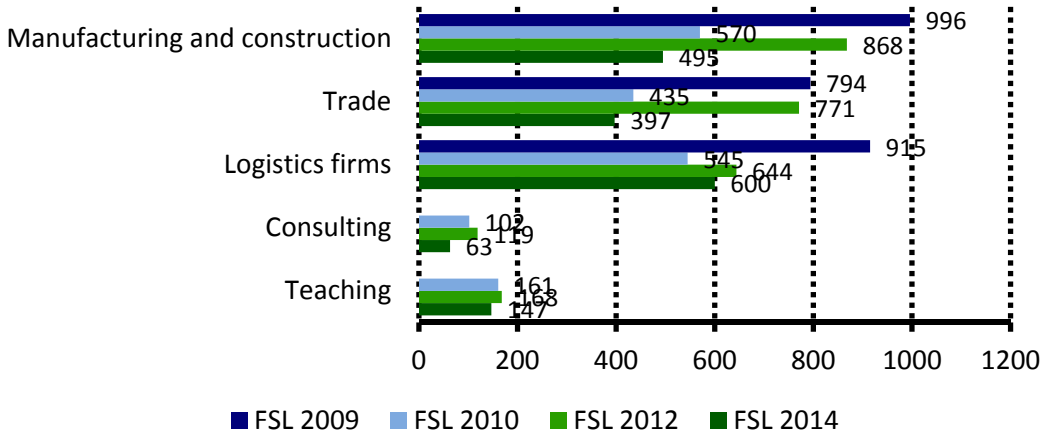
	EU27	DK	DE	EE	PL	FI	SE
Number of employees	10 449 100	131 400	1 880 600	36 900	727 800	148 100	269 000
Number of companies	1 120 153	12 481	87 534	4 027	138 649	23 030	29 401
Turnover M€ per annum	1 249 602	44 666	236 525	4 085	35 975	20 684	43 120
Domestic transport performance 1000M tonne-kilometres	1 177	11	253	1	86	25	33
International transport performance 1000M tonne-kilometres	579	4	61	4	125	4	4
Rail transport performance 1000M tonne-kilometres	391	2	107	7	49	10	24
Sea traffic, imports (1000 tonnes)		47 430	175 759	11 795	33 297	58 032	86 032
Sea traffic, exports (1000 tonnes)*		36 348	113 014	33 897	23 976	51 298	75 850
Number of commercial aircrafts **	3 953	88	648	15	77	86	81
Number of goods wagons			108 840	2 958	68 151	10 464	
Road fleet suitable for transport of goods (1000)	33 604	485	2 619	81	2 982	464	526
Merchant fleet, national flag, number (over 1000 registered tonnes)*	3 524	315	406	19	8	80	102
Merchant fleet, foreign flag, number (over 1000 registered tonnes)*	8 245	549	3 351	72	104	50	189

* 1.1.2011

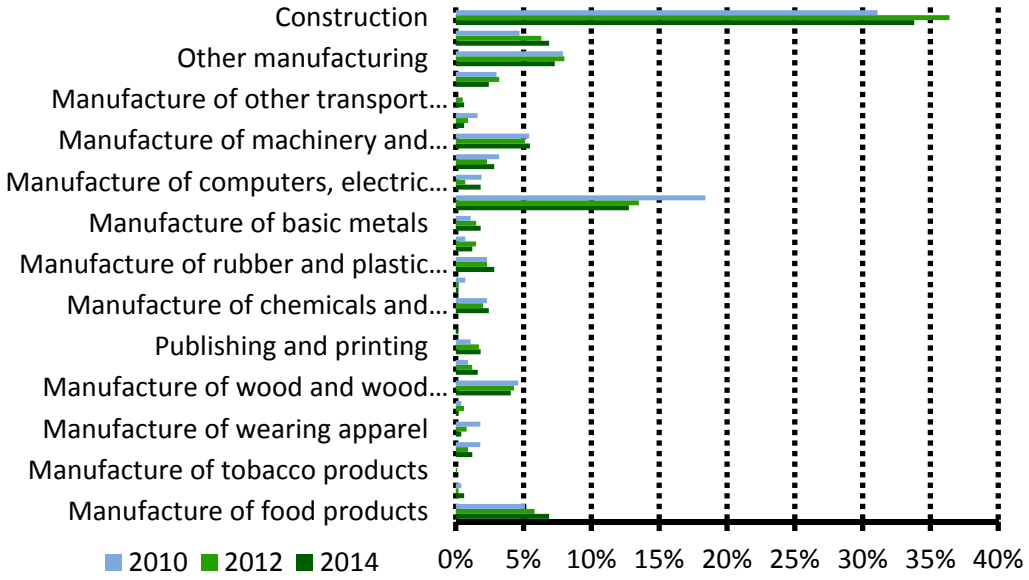
** 31.12.2012

http://ec.europa.eu/transport/facts-fundings/statistics/doc/2013/pocketbook2013.pdf

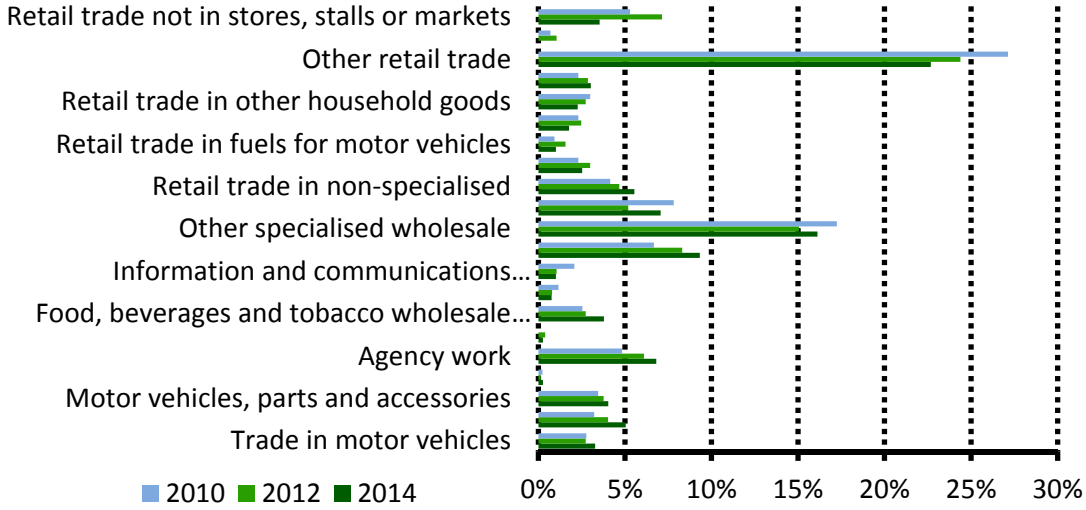
Appendix 2 Respondent firms by main industries (FSL=Finland State of Logistics)



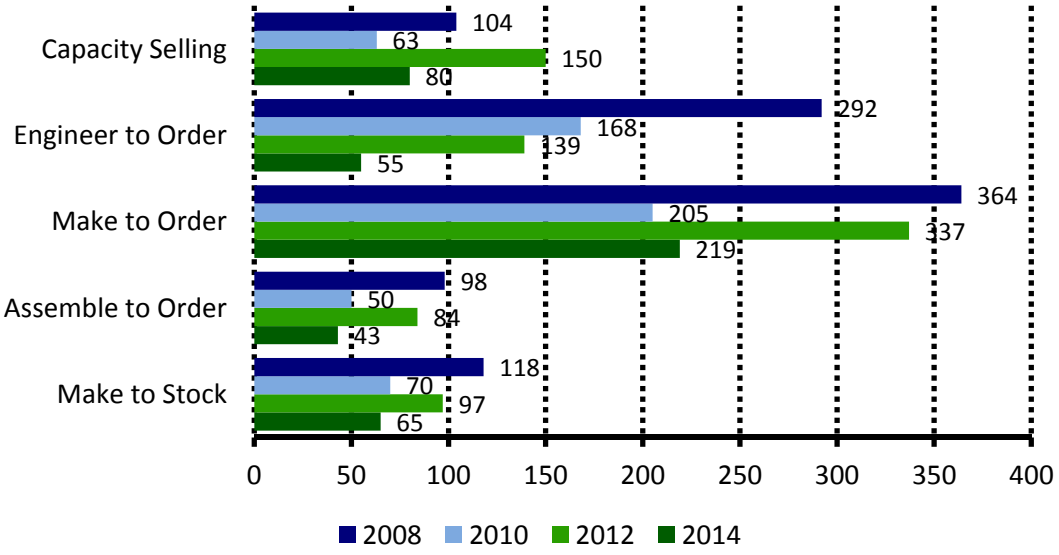
Appendix 3 Manufacturing/construction firms by industry



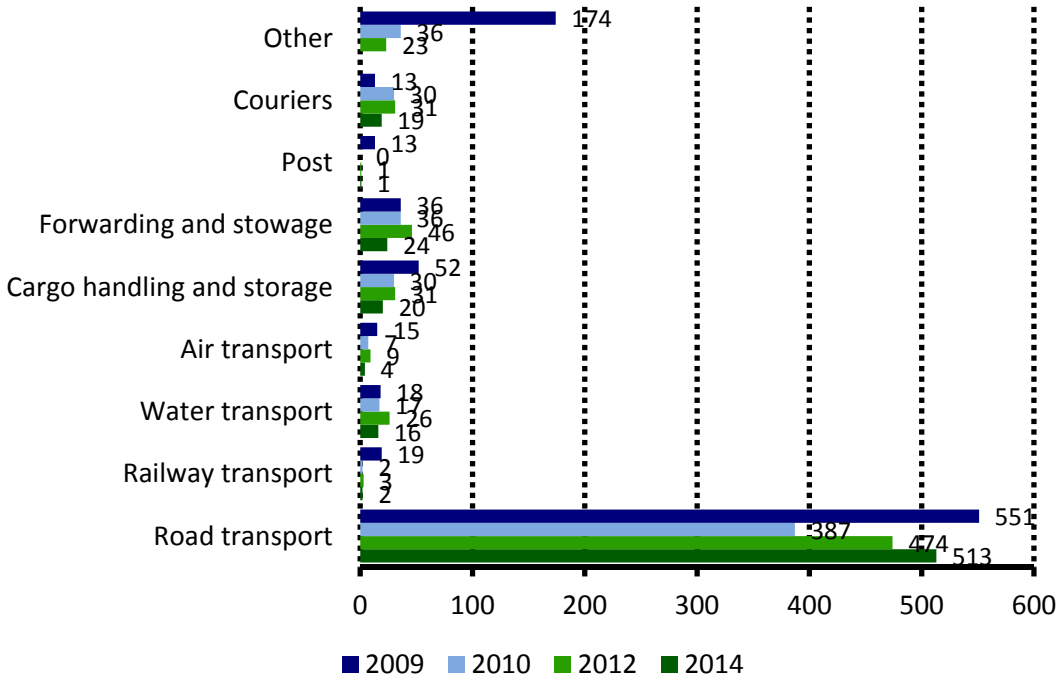
Appendix 4 Trade firms by sector



Appendix 5 Manufacturing/construction firms by production mode



Appendix 6 Logistics firms by sector



Appendix 7 Transport firms by cargo type