



Ministry of Transport
and Communications

Finland State of Logistics 2012

Ministry of Transport and Communications

Vision

Well-being and competitiveness through high-quality transport and communications networks

Mission

The Finnish Ministry of Transport and Communications seeks to promote the well-being of our people and the competitiveness of our businesses. Our mission is to ensure that people have access to well-functioning, safe and reasonably priced transport and communications networks.

Values

Courage, equity, cooperation



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Abstract

This report is the English summary of the 7th national logistics survey commissioned jointly by the Ministry of Transport and Communications Finland and Finnish Transport Agency. This summary includes some minor updates compared to the original Finnish publication. The main focus in this report is in logistics costs, key performance indicators (KPI), logistics outsourcing and the operational preconditions in the location of Finnish manufacturing, trading and logistics companies.

The effect of logistics on the competitiveness is one of the current key themes of the report. Logistics is considered to have a great effect to the competitiveness of the company. Large trading companies report that in average as much as 43 % of the company competitiveness originates from logistics. In addition, some 40-50 % of company competitiveness can be affected by company's own actions and decisions.

Logistics costs of Finnish manufacturing and trading firms are on average 12.1 % of sales (11.9 % in 2009), including costs incurred in overseas subsidiaries. The share of transportation costs (at 4.6 %) has slightly increased, which is mainly due the significant decline in transport costs.

The industry weighted logistics costs in 2011 were € 33.1 billion in 2011 (€ 34.7 billion in 2009), of which over half was in-house costs. Without overseas subsidiaries, total logistics costs of Finnish firms equaled 8.6 % of GDP in 2011 (10.2 % in 2009). The decline is mainly caused by the diminishing share of manufacturing in the Finnish GDP. Low Cost Countries appear to be an attractive option for the sourcing and manufacturing activities of Finnish companies. 55 % of companies answering the question plan to expand their manufacturing in Low Cost Countries. The corresponding number for firms expanding their domestic manufacturing was 37 %.

Logistics KPI:s (delivery accuracy and days of sales and days of payables outstanding of Finnish firms) seem to be on a good level. The largest change from 2009 is the shorter cash to cash –cycle times of trading firms. Finland ranked third in World Bank's Logistics Performance Index (LPI) in 2012. The companies in South Finland seem to be most satisfied with their logistics preconditions. The second most satisfied are the companies in West Finland, and the third most satisfied in North Finland. The least satisfied companies are located in East Finland.

A total of 2,732 respondents answered the questionnaire (32 % manufacturing and construction, 28 % trade, 25 % logistics service providers, 5 % consultants and 10 % teaching) The response rate was 7.0 %. Measured by sales, however, the responses cover from 70 % to 90 % of Finnish manufacturing, trading and logistics firms. The data reported in 2006, 2009, 2010 and 2012 comprises the largest national logistics survey database in the world.

Key concepts

| | |
|--|---|
| 3PL, 4PL | Third or fourth party logistics services; activities undertaken by an external company, covering at least preparation for discharging a minimum of several logistics services. The services are provided as an integrated whole, and not as separate components. The partnership is intended to be a long-term one. |
| A company's competitiveness | Here: the ability to maintain and improve productivity and growth potential |
| A company's logistical competitiveness | Here: a company's ability to organise and implement its materials, information and money flows as reliably, efficiently and cheaply as possible to maintain competitiveness |
| ATO | Assembly-to-order. |
| Backshoring | Increasing manufacturing capacity in Finland while reducing it in low costs countries. |
| Capacity Selling | Selling production capacity to other companies. |
| CCFI | China Containerized Freight Index. |
| Domestic market company | Here: a company with at least 90% of sales coming from Finland. |
| DWT | Deadweight tonnage. |
| ETI | World Economic Forum's Enabling Trade Index. |
| Export company | Here: a company with at least 10% of sales coming from outside Finland. |
| ETO | Engineering-to-order. |
| FTK | Freight-Tonne-Kilometres, kilometres per tonne paid (especially in air traffic) |
| International company | Here: a company with at least one production facility outside Finland. |
| Large company | Here: a company with a turnover of more than EUR 50 million a year. |
| LCC | Low cost country. |
| Logistics | The management of companies' material and associated capital and information flows between companies operating in supply chains and supply networks. |

| | |
|--|--|
| LPI | Logistics Performance Index, World Bank's comparison of logistical 'facilitation' across 150 countries. |
| LS 2009 | Finland State of Logistics 2009 survey. |
| LS 2010 | Finland State of Logistics 2010 survey. |
| LS 2012 | Finland State of Logistics 2012 survey. |
| LSCI | The UNCTAD Liner Shipping Connectivity Index. |
| Medium-sized company | Here: a company with a turnover of EUR 10-50 million a year. |
| A country's logistical competitiveness | Here: logistical expertise, infrastructure, official functions and business environment, which enable the existence of reliable and efficient logistical functions at reasonable cost. |
| Micro-company | Here: a company with a turnover of less than EUR 2 million a year. |
| MTO | Make-to-order. |
| MTS | Make-to-stock. |
| NUTS | Nomenclature des Unités Territoriales Statistiques, EU regional classification system. |
| Offshoring | Reducing manufacturing capacity in Finland while increasing it in low cost countries. |
| PMI | Purchasing Managers' Index. |
| Productivity | The relationship between output the input needed to achieve it. |
| RPK | Revenue-Passenger-Kilometres, kilometres per passenger paid. |
| Small company | Here: a company with a turnover of EUR 2–10 million a year. |
| TOL | Classification of industries used by Statistics Finland. |

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Foreword

In the global economy, products and intermediate products are purchased and sold worldwide. The supply chains are getting longer and more complex. Companies are seeking competitive advantage by relocating production based on markets, labor costs and raw-material sources. At the same time, the supply chain costs and risks tend to increase. Managing the supply chain requires competence, collaboration and up to date information systems. Logistics costs tend to increase and the role of logistics as a source of competitive advantage is growing. Senior management of companies has learned to understand the development and emphasizes the role of logistics.

From the business perspective, the cheapest logistics is not always the best solution. The government has a remarkable effect on logistics operating environment as a regulator, supplier of the infrastructure and as the financier of education and research. For policy purposes, high quality information on the state of logistics is needed.

The state and costs logistics of the Finnish manufacturing and trading companies has been studied previously in 1992, 1997, 2001, 2006, 2009 and 2010. All previous surveys have provided new and valuable information on the state of logistics in Finland. They have also increased general knowledge on logistics, which has been even more valuable, for knowledge is the key factor in developing the policies to meet the modern standards. The reports have been widely used, and on their part increased the knowledge speeding up the development of the logistics industry.

The seventh national logistics survey was assigned in order to evaluate the current state and future trends of logistics in Finland. The previous survey took place in the end of 2009, when the world economy was unstable, and the financial crisis in Europe was still ahead. One of the findings of this report is that in 2006 and 2008, prior to the financial crisis, the share of logistics costs was higher than in 2009 and 2011.

This report has been financed by the Ministry of Transport and Communications and the Finnish Transport Agency, and it has been prepared by the Turku School of Economics. Tomi Solakivi has worked as the project manager under the supervision of Professor Lauri Ojala. Sini Laari acted as the research assistant. Juuso Töyli and Harri Lorentz from the logistics research team have also contributed to the report.

We thank all the company representatives who have enabled this report by responding the questionnaire. Finnish Association of Purchasing and Logistics (LOGY) Federation of Finnish Enterprises (SY) and Finnish Transport and Logistics (SKAL) played a vital role in providing contact details. We also thank the researchers for their good work.

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1. Summary

Key observations in brief:

Current status of logistics in Finland

- Compared internationally, Finland has excellent logistics in terms of function, viability and expertise
- As much as half of the competitiveness of large companies is due to logistics
- Production growth potential in Finland; demand and low costs abroad also make foreign countries an attractive prospect for procurement and production
- Companies in Southern Finland are the most satisfied with logistics conditions in the area in which they are located; growing difference compared with elsewhere

Logistics in manufacturing and trading

- Logistics costs of manufacturing and trading at the level of 2009, i.e. an average of 12.1% of turnover (11.9% in 2009)
- Logistics costs relative to GNP 8.6 %; lower than in previous years, mainly due to the fall in industry's share of GDP
- Logistics outsourcing has not increased to any great extent in recent years: less outsourcing than in competing countries
- Companies pay more attention to environmental issues internally than with suppliers and customers; responsibilities often unclear

Logistics service provision

- Greater concentration of the logistics industry, with logistics companies more dependent on their bigger customers than they used to be
- Increasing subcontracting with growth in size of companies
- Clear connection between size and efficiency of logistics companies

In the World Bank's Logistics Performance Index (LPI) 2012, which mainly measures the logistical viability of foreign trade, Finland came 3rd in a group of 155 countries. The ratings for the various elements that comprise the LPI are very much the same as those of the Finnish respondents in Finland: State of Logistics 2010 and 2012. However, the responses given by Finns are more critical than in the LPI (Figure 1). The greatest difference in the data collected in Finland relates to the punctuality of deliveries, while the smallest difference relates to the efficiency of customs clearance. (Figure 1)

The responses suggest that the importance of logistics for the competitiveness¹ of companies in the trading sector is greater than that for companies in manufacturing. In medium-sized and large companies, logistics is a rather more important factor in competitiveness than it is for small and micro-companies. A quarter of medium-sized and large companies in manufacturing and trading see logistics as accounting for as much as half of its competitiveness. (Figure 2)

¹ Definition in this context: the ability to maintain and improve productivity and growth potential

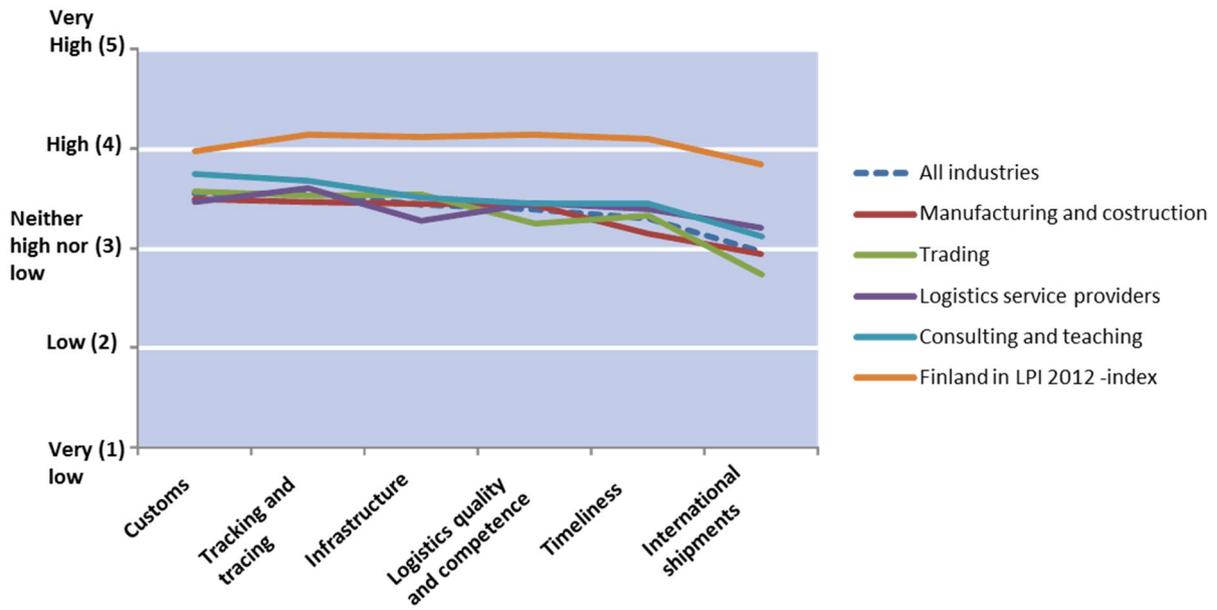


Figure 1 Finland in the Logistics Performance Index 2012 and ratings by 2,400 Finnish respondents in 2012. LPI =Arvis et al. 2012; Finland State of Logistics 2012

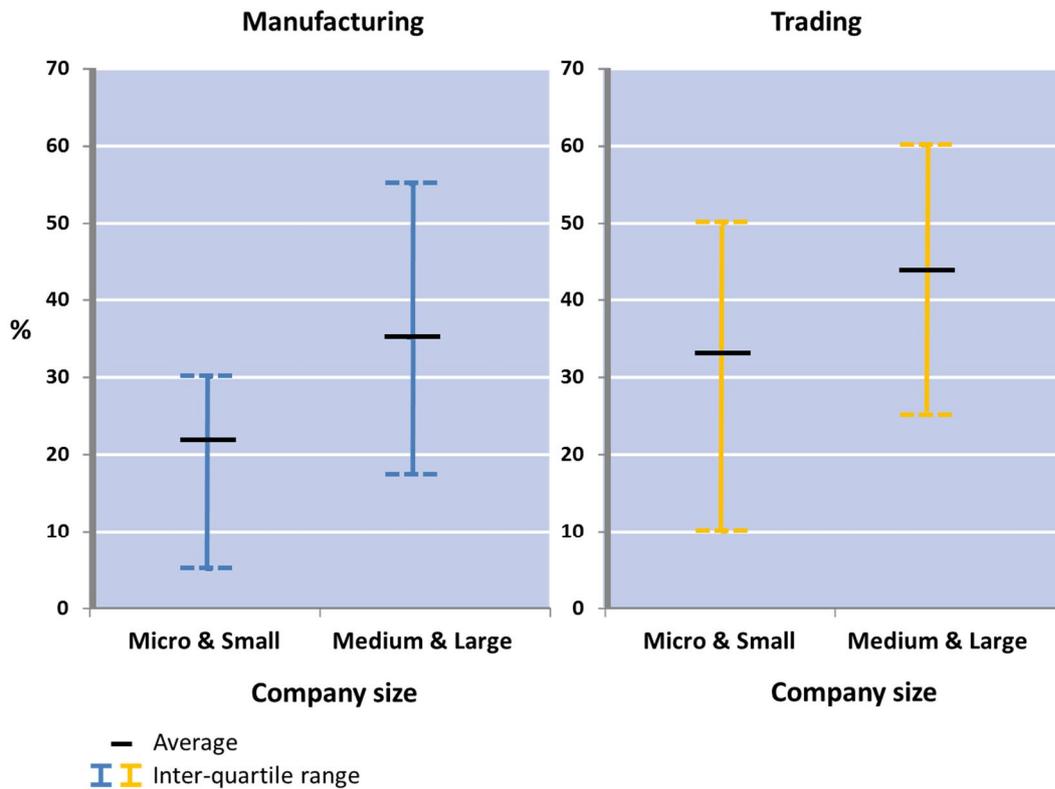


Figure 2 Ratings by respondent companies for logistics as a factor in competitiveness; average and interquartile range as a percentage

Since 2006, in the State of Logistics reports, companies have been asked to assess how well their operations fare taking account of five factors in their location: 1) general business perspective, 2) logistics competitiveness, 3) the availability of production facilities, 4) the transport infrastructure, and 5) the location of competitors. Back in 2006, companies in South Finland felt that they were doing better than those did elsewhere in Finland.

In 2012, the differences between South Finland and the rest of the country would appear to have increased. Of the five factors, the one rated best was business generally, and worst was conditions governing the location of competitors. Companies in East Finland, however, give lowest rating to transport infrastructure.

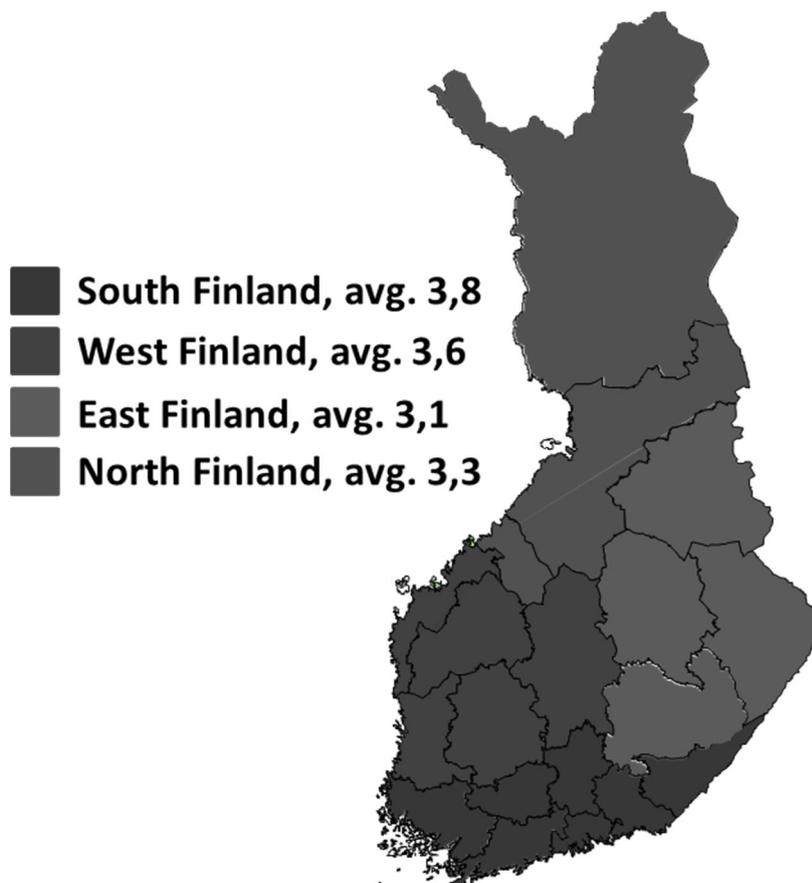


Figure 3 How companies rate logistics conditions; mean values for NUTS 2 level regions on a scale where 1=very poor and 5=very good; number of respondents = 2,283

Up until year 2010, the production capacity of companies operating in Finland has increased considerably, and that is also true of production in low cost countries. Just over a hundred replies suggest that low cost countries are attractive for the location of production plants and as target countries for procurement in the future. By 2015, 57% of respondents will be increasing their production capacity in low cost countries and 37% will be doing so in Finland. Some 25% of the companies that replied are planning to reduce production capacity in Finland. (Figure 4)

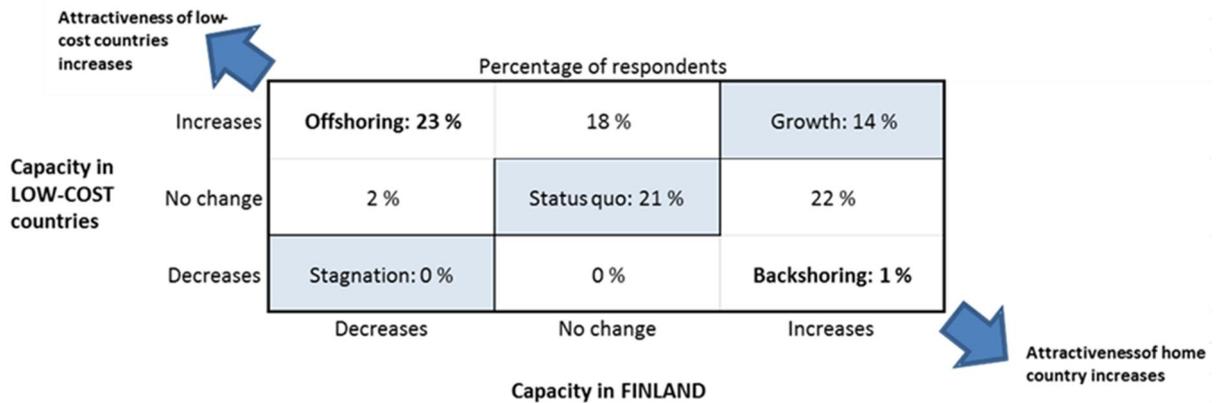


Figure 4 Cross-tabulation for the change in production capacity in Finland and low cost countries up to 2015

The logistics costs of manufacturing and trading companies in Finland in 2011 would seem to have remained at their level for 2009. The turnover-weighted logistics costs for companies and sectors were, on average, 12.1% of turnover in 2011 (12.0% in 2009). (Figure 5)

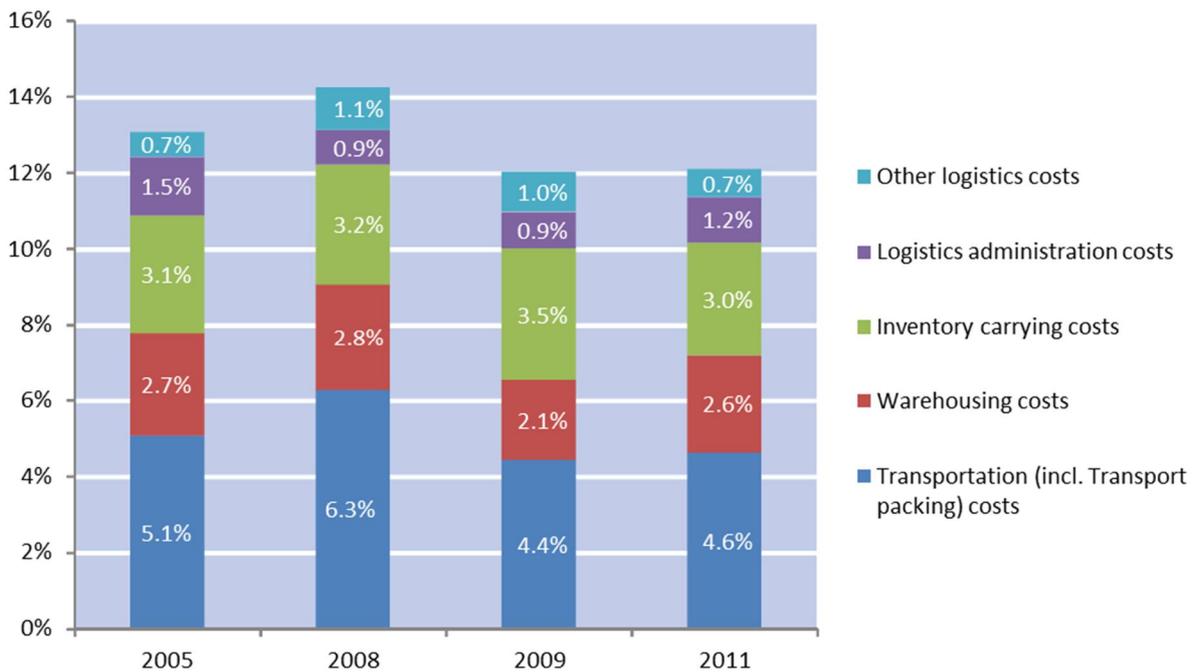


Figure 5 Logistics costs of manufacturing and trading companies in Finland as a share of turnover and company and sector turnover-weighted

Transport costs are still the largest single cost item, accounting for an average of 4.6% of turnover in 2011 (4.4% in 2009). The figures also include transport packaging costs. Despite the trends in fuel prices, fierce competition in transport prices and over-capacity will curb rises in transport costs in the future. (Figure 5 and Tables 1 and 2)

Table 1 Logistics and transport costs of companies in trading and manufacturing in Finland; time series from 1990 at 2011 prices (Sources 1990, 1995 and 2000: Ministry of Transport and Communications 1993, 1997 and 2001)

| Indicator/ Year | 1990 | 1995 | 2000 | 2005 | 2008 | 2009 | 2011 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Logistics costs (billion.€), Manufacturing and trading | 20,7 | 17 | 21,8 | 32,4* | 42,3* | 35,1* | 33,1* |
| Logistics costs, share of turnover | 11.0 % | 10.3 % | 10.2 % | 13.1 % | 14.2 % | 11.9 % | 12.1 % |
| Transportation costs, share of turnover | 4.8 % | 4.7 % | 4.5 % | 5.0 % | 6.3 % | 4.4 % | 4.6 % |

* New calculation method

Logistics costs in manufacturing and trading converted to euros amounted to 33.1 billion in 2011 (EUR 34.7 billion in 2009). Relative to Finnish GDP, logistics costs were around 8.6% in 2011 (around 10.2% in 2009). The figure for 2011 is the lowest recorded in State of Logistics reports since 2000. (Table 2)

Table 2 Logistics costs of companies in manufacturing and trading in Finland compared to GDP. (Sources for costs 1990, 1995 and 2000: Ministry of Transport and Communications 1993, 1997 and 2001); GDP data: Statistics Finland; foreign subsidiaries: Statistics Finland / Bank of Finland 2012

| | 1990 | 1995 | 2000 | 2005 | 2008 | 2009 | 2011 |
|--|---------|---------|--------|--------|--------|--------|---------|
| 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) | | | | 29.2 | 40.1 | 34.7 | 33.1 |
| GDP at market price, billion € | 89.3 | 96 | 132.1 | 157.3 | 184.2 | 172.3 | 191.6* |
| Foreign subsidiaries as a share of the turnover of Finnish companies | | 20.3 % | 42.6 % | 46.5 % | 49.6 % | 49.6 % | 50.0 %* |
| Logistics costs in relation to GDP (old calculation method) | 17-18% | 14-15% | 14-15% | 17 % | 19 % | 17.5 % | |
| Logistics costs in relation to GDP (new calculation method) | 12.2%** | 11.1%** | 7.8%** | 9.9 % | 10.9 % | 10.2 % | 8.6 %* |

* based on advance information

** calculation method changed

The low ratio of logistics costs to GDP, however, does not necessarily mean that there has been any increase in the efficiency of logistics operations. The change is mainly explained by the fact that industry, more than anything else, accounts for a smaller part

of Finnish GDP than previously, because of the economic downturn.² Furthermore, over-capacity on the transport sector has kept transport costs low since summer 2008.

The biggest changes in key indicators for companies between 2009 and 2011 were to be found in the cash-to-cash cycle. The median value for this in the retail trading fell from 21 to 13 days, and in wholesale, from 26 to 16 days. The changes in manufacturing were not as consistent. In the metal industry, the cash-to-cash cycle decreased from 35 to 30 days, but, for example, in the manufacture of machinery and equipment, there was an increase from around 30 days in the period 2008-2009 to 45 days in 2011.

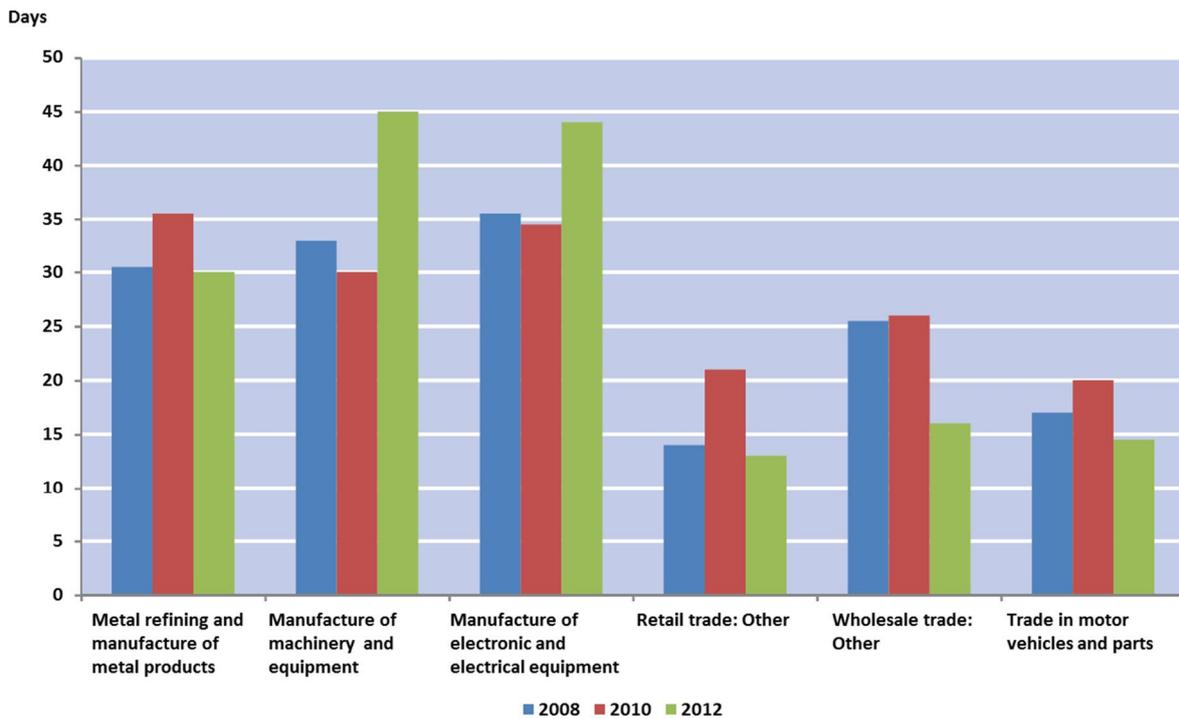


Figure 6 Trends in the cash-to-cash cycle in certain sectors of manufacturing and trading (median value in days)

The extent to which logistics functions have been outsourced is still at 2006 levels, with Finnish companies mainly outsourcing their transport services, and the majority, at least to some degree, also their return logistics and forwarding. The outsourcing of warehousing or logistics IT-systems has remained at the relatively low 2006 level. Finnish companies have outsourced their logistics functions to a lesser extent than key European and North American competitor countries.³ In Finland, the outsourcing of logistics would appear to have potential for improving company efficiency. (Figure 7)

² The results of this survey apply to logistics and the logistics costs of manufacturing and trading in Finland, and exclude the public sector and some primary production and some of the service sector, as well as their direct share of costs.

³ See, for example, Wilding and Juriado 2004 and Langley et al 2012

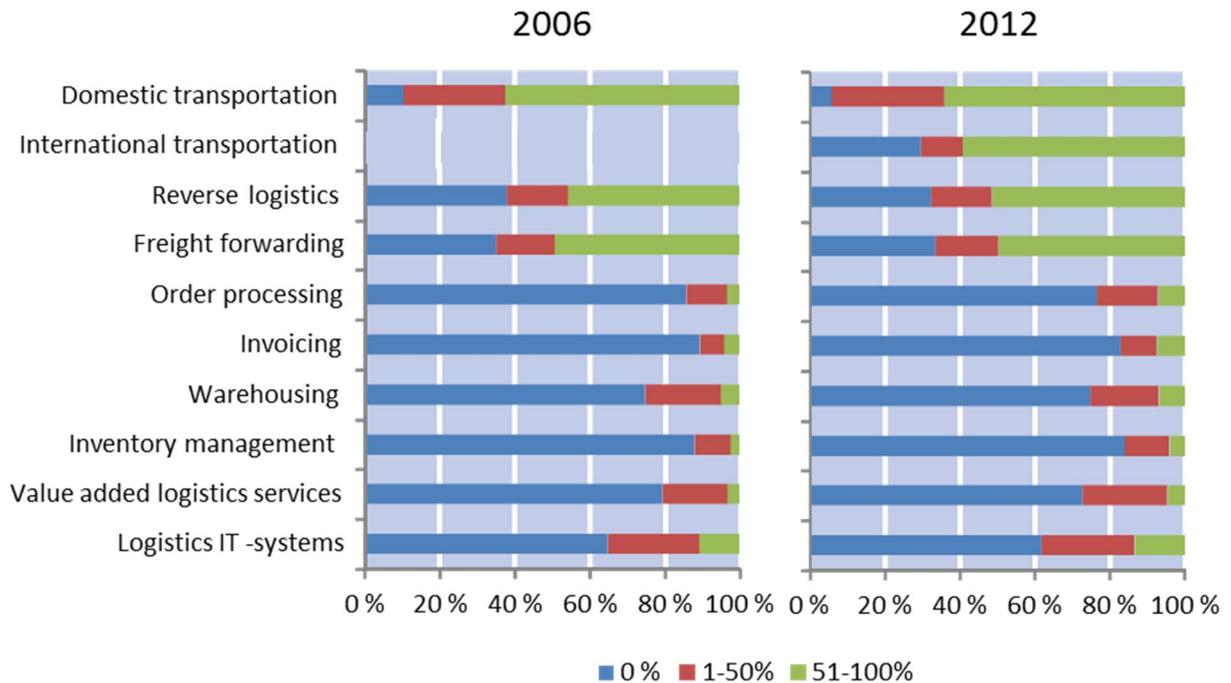


Figure 7 Outsourcing of logistics in companies in the manufacturing industry, 2006 and 2012

The essential factors upsetting the supply chain in manufacturing and trading in the years 2010-2011 were dramatic swings in demand and the difficulty in predicting demand, insufficient capacity on the part of material suppliers/sub-contractors or problems of the availability of materials, and poor on-time delivery performance. (Figure 8)

Companies operating internationally think that virtually all the drawbacks are greater than is the case with companies in the domestic market. The main drawbacks seem to be due to factors of uncertainty/unreliability connected with suppliers (of goods). In practice, it was thought that all the drawbacks mentioned in the survey would grow in scope in the near future. (Figure 8)

In a comparison of the five main drawbacks, it is manufacturing, construction and trading that draw particular attention to the drawbacks caused by members of the supply chain, while logistics companies point to the operating environment. Logistics companies also think that the impact of these drawbacks is greater than the extent to which the others do. (Figure 8)

The commitment that companies have to environmental issues was surveyed using statements on the subject of cooperation within the company, with its main suppliers and with its main customers. Cooperation on the environment would appear to be a lot more successful within the company than with suppliers and customers. (Figure 9).

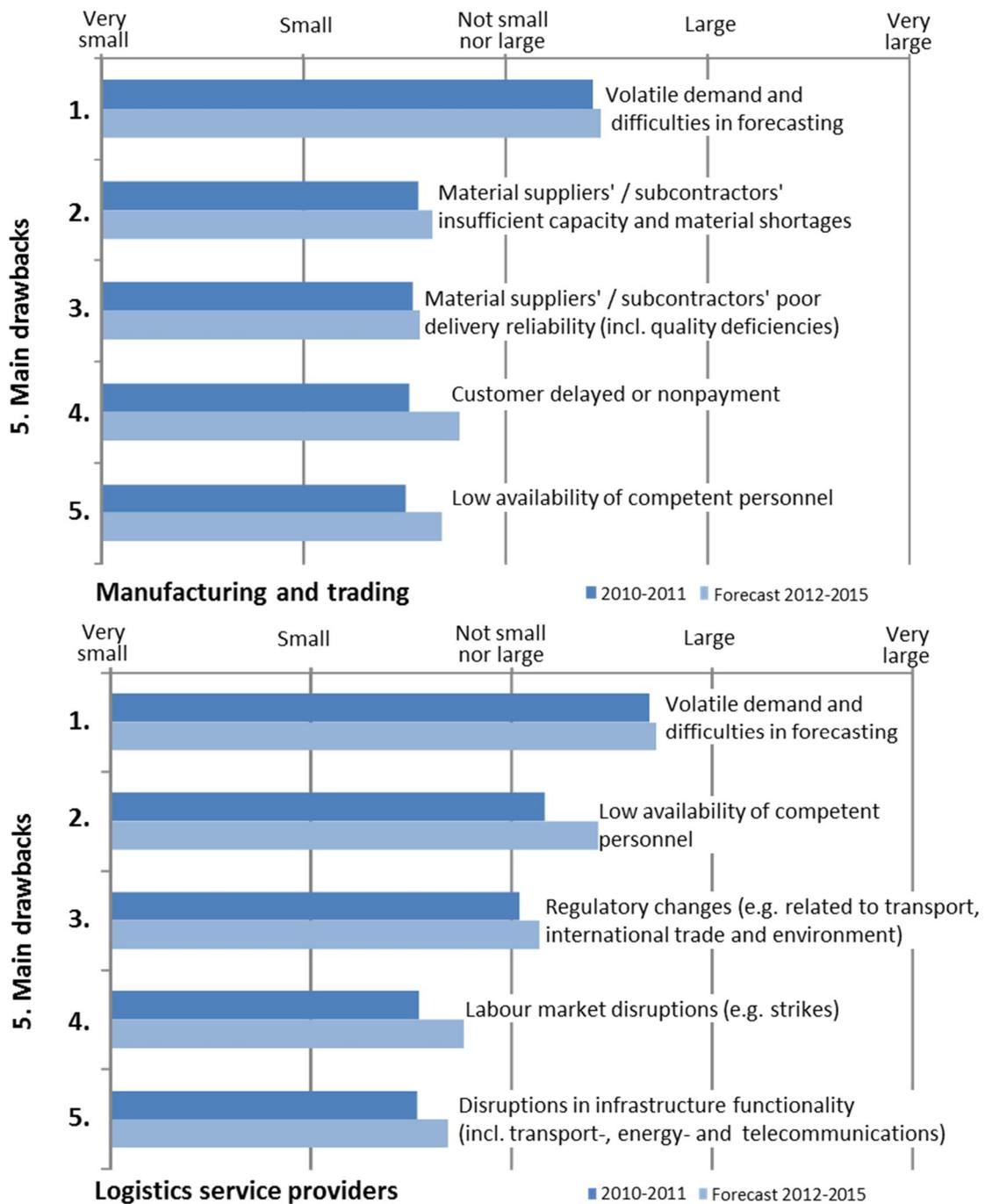


Figure 8 The five main drawbacks impacting on the supply chain by main sector of industry 2010-2011 and 2012-2015 (manufacturing and trading[top]; logistics service providers [bottom])

More than 60% of the respondents at least partly agree that cooperation on environmental issues works well within the company. Only about 40% enjoy good levels of cooperation with suppliers or customers. (Figure 9)

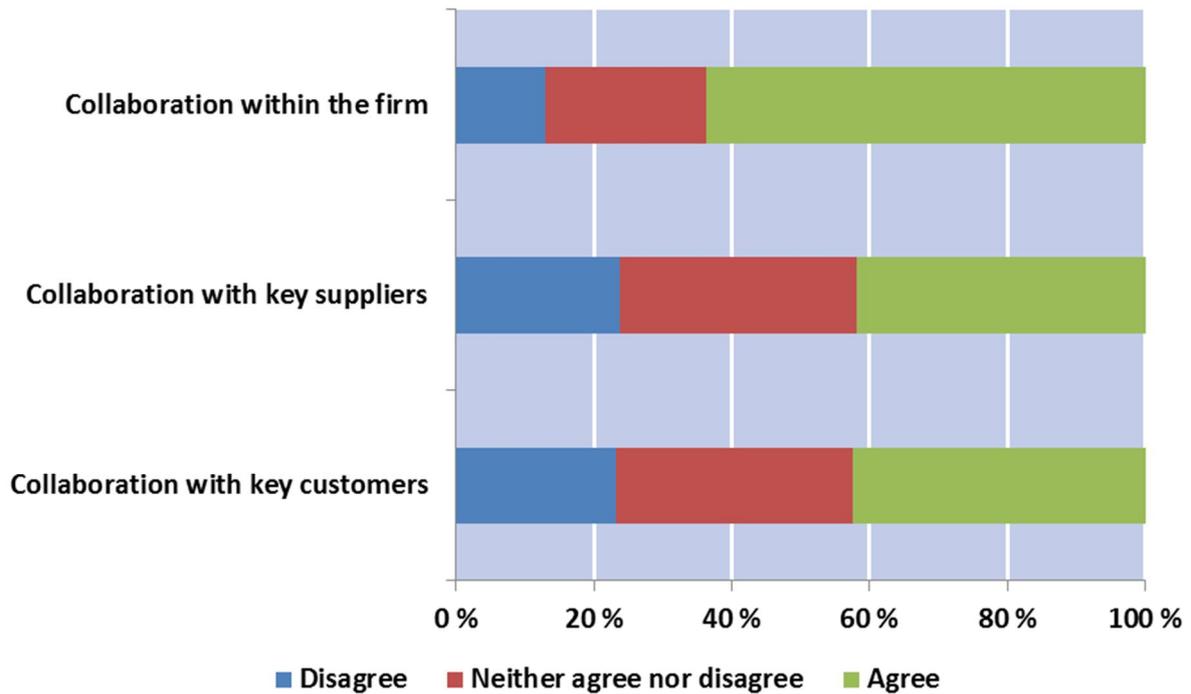


Figure 9 Views of respondents on the extent to which cooperation works well in environmental matters within the company and with main suppliers and customers

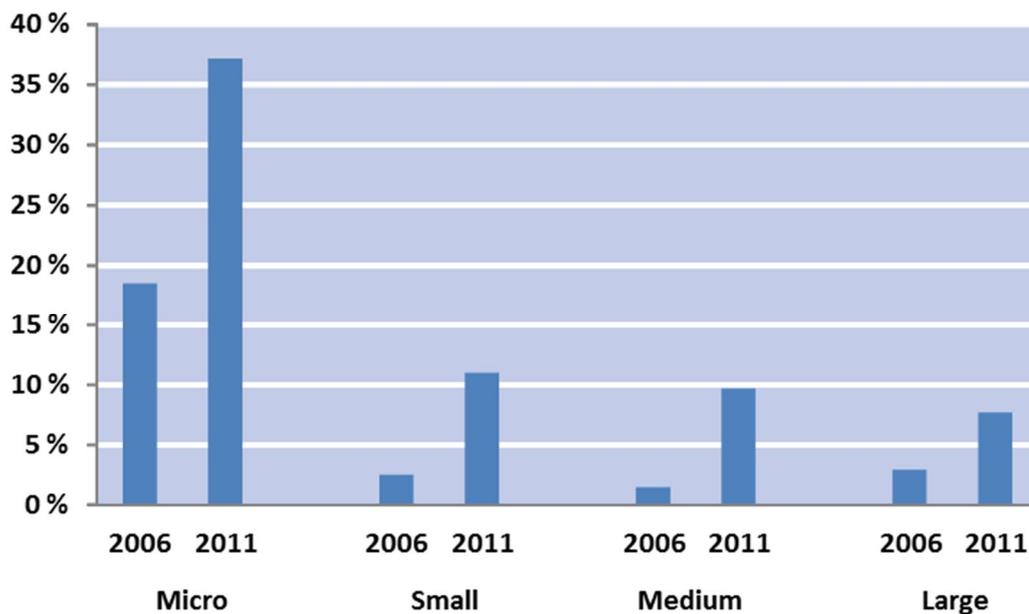


Figure 10 Share of logistics companies whose biggest customer represents more than 80% of turnover, 2006 and 2011

The extent to which the biggest customers account for the sales of logistics companies is growing: for almost four micro-companies and for under one large company in ten their biggest customer accounted for more than 80% of the sales. The equivalent figure for

2006 was considerably less. The change in customer strategies is clear: big customers in particular are concentrating their logistics operations with one or just a few service providers. (Figure 10)

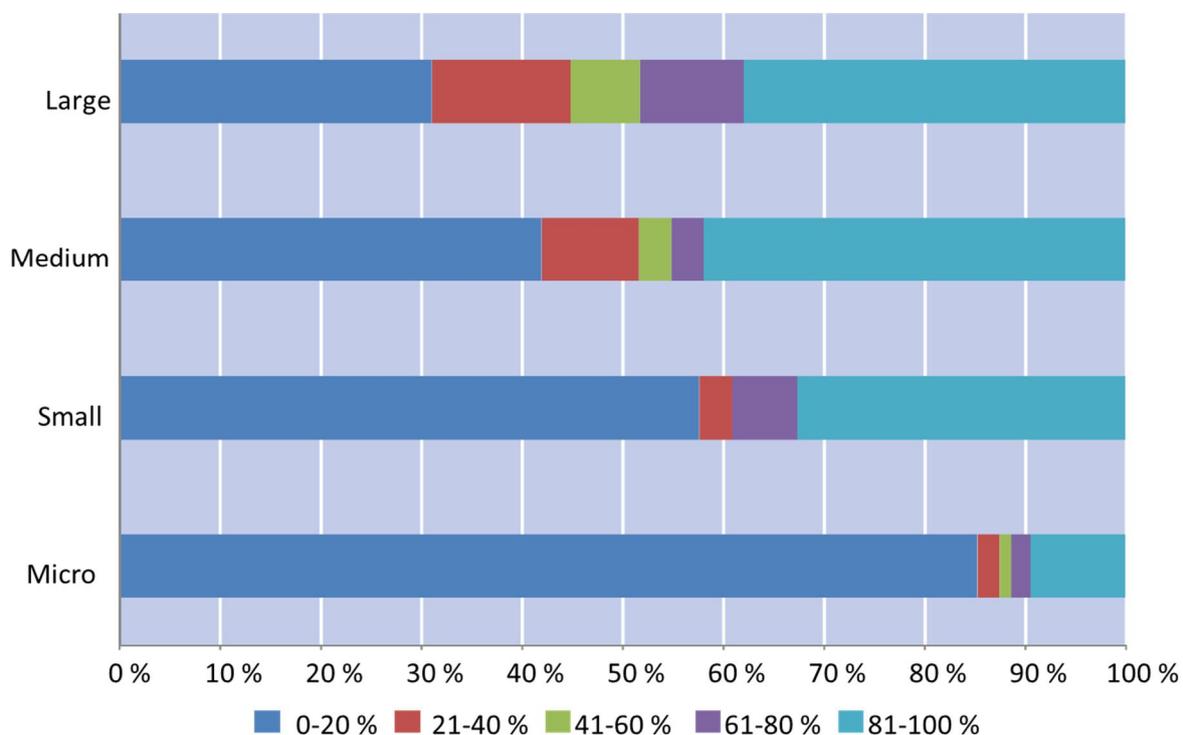


Figure 11 Extent of sub-contracting in transport services produced by transport companies, 2011

Large transport companies sub-contract a good deal of their operations. A total of 15% of micro-companies sub-contract at least a fifth of the transport service they sold. The equivalent figure for large transport was almost 70%. (Figure 11)

Some 28% of distances driven by micro, small and medium-sized transport companies was empty running. The corresponding figure for large companies was around 15%. The volumes handled by large companies allow them to combine shipments and organise return loads far more effectively than is the case with smaller companies.

The load factor is an important measure of efficiency in transport. For medium-sized transport companies in Finland, this was around 71% in 2011, and for the others it was 76-79%. For international shipments, the load factor for shipments for large companies was almost 90%, while for medium-sized companies it was 75%, for small companies 89%, and for micro-companies 81%.

2. Survey

2.1 The commission

Every few years since 1992, the Ministry of Transport and Communications has commissioned a report on the current situation with regard to logistics in Finland and the challenges that the industry faces in the future. This national survey, the seventh to be conducted, was commissioned by the Ministry and the Finnish Transport Agency.

The State of Logistics report for 2012 and its timing were also partly influenced by the drafting of a transport policy report overseen by the Ministry of Transport and Communications in spring 2012. The survey acquired additional questions relating to logistical competitiveness, in particular. Advance results of these were partly released at the end of February 2012 in a report that formed the background to the Ministry's report (Paavola, Vehviläinen and Ojala 2012).

As with the three previous surveys, this was the result of the work of a logistics research group from the Turku School of Economics. It is the fourth to be produced in terms of its approach and structure being very similar to the other reports published since 2006.

The similarity in the lay-out of questions and their topics has created 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. The time series also represent the most extensive national data on the subject in the world (see, for example, Rantasila and Ojala 2012).

The database with its large respondent base and comparable time-series has also enabled a wide range of academic research published in top refereed journals. For research in outsourcing and supply chain performance, see Solakivi et al. (2011) and Solakivi et al. (forthcoming) and for supply chain development priorities see Lorentz et al. (2011). The connection between the geographic dispersion of the supply chain and the supply chain performance is studied in Lorentz et al. (2012), and supply chain skills priorities in Lorentz et al. (forthcoming). A multiple method analysis of logistics costs of manufacturing and trading companies is presented in Engblom et al. (2012).

2.2 The individual contributions made by the research team

Mr. Tomi Solakivi (M.Sc.) acted as the Project Manager under the supervision of Professor Lauri Ojala. Mr. Solakivi has written a considerable part of the report and he also administered the on-line questionnaire. Ms. Sini Laari (B.Sc.) acted as research assistant. Both were responsible for collecting and editing the data. Other components were the work of Harri Lorentz (Ph.D.), and Juuso Töyli (Ph.D.).

The volume and nature of the response data enable it to be examined very precisely by company size, sector and location.

In this report, regional examination is mainly based on the NUTS-2 (Nomenclature des Unités Territoriales Statistiques) division, whereby Finland is divided into five areas: South Finland, West Finland, East Finland, North Finland and Åland Islands. As in previous years, the response data has been collected by postcode to enable more detailed regional analyses, if necessary.

Finland State of Logistics 2012 examines the following thematic areas, with the name of the researcher(s) mainly responsible for the analysis given for each:

Table 3 Themes covered in Finland: State of Logistics 2012, and the researchers responsible for them

| | |
|--|------------------------------|
| Finland's logistics performance | Lauri Ojala ja Harri Lorentz |
| Importance of location for logistics and economic activity | Tomi Solakivi |
| Significance of logistics for manufacturing and trading companies | Lauri Ojala ja Tomi Solakivi |
| Logistics costs | Tomi Solakivi |
| Key indicators of logistics performance | Juuso Töyli |
| Geographical location of business operations and of the supply chain | Harri Lorentz |
| Logistics outsourcing | Tomi Solakivi |
| Supply chain risks | Harri Lorentz |
| Logistics and sustainability | Tomi Solakivi |
| Markets for logistics service provision | Tomi Solakivi |
| Performance indicators of logistics service providers | Tomi Solakivi |
| Economic operating environment | Sini Laari |

2.3 Target group and sample

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

The term 'main industry' will be used here for these target groups. The data for the 2010 report was collected with reference to the TOL 2008 industry classification introduced in 2009, though, in order to preserve comparability, the results in Finland: State of Logistics 2010 were presented with reference to the old TOL 2002. The data in the survey was collected by means of an on-line questionnaire in January/February 2012.

Depending on the main sector of industry, the survey consisted of 23–26 groups of questions. Consultants and educational staff answered a shorter range of questions mainly focusing on regional operating conditions for logistics. This time too, 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 38,834 people. 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 2,732 approved replies were received, giving an overall response rate of 7%.

In Finland, as well as in other countries, over 90 %, or almost 270 000 companies are micro-sized companies. In the logistics survey, unlike in most of the other surveys, also the micro-sized companies were included, which affected the response rate significantly. Among the medium-sized and large companies the response rate is over 50 % and in trading, the coverage of the survey is even more than that.

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 lower the larger the number of respondents the questionnaire is sent to. (Figure 12)

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 12 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. 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 one week after that. Of those who replied, 32% (875) represented manufacturing and construction, 28.3% (773) trading, 25% (684) logistics service providers, 4.4% (121) consulting services, and 10.2% (279) educational services.

The number of respondents this time is greater than in 2010 and almost the same as in 2009. The distribution of respondents is mainly similar to that in 2010.

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

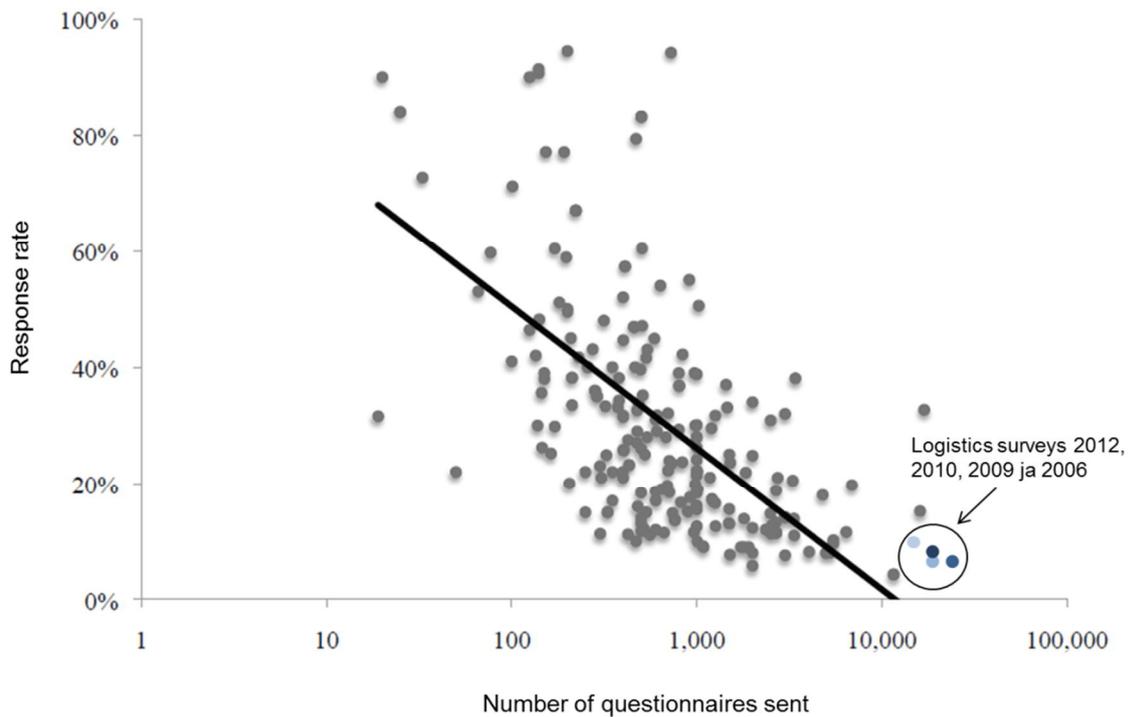


Figure 12 Finland: State of Logistics 2012: survey response percentages and number of questionnaires sent out compared to other studies in the sector (after Wagner and Kemmerling 2010)

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

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

Table 4 Respondent companies by main sector of industry and size

| Company size | Manufacturing and construction | Trading | Logistics service providers | Consulting | Teaching and research | N |
|-----------------|--------------------------------|---------|-----------------------------|------------|-----------------------|------|
| Micro | 648 | 576 | 474 | 94 | | 1792 |
| Small | 116 | 128 | 108 | 10 | | 362 |
| Medium | 52 | 36 | 41 | 8 | | 137 |
| Large | 59 | 33 | 61 | 9 | | 162 |
| Sixes not asked | | | | | 279 | 279 |
| Total | 875 | 773 | 684 | 121 | 279 | 2732 |

Table 5 Companies responding to logistics surveys by main sector of industry since 2006

| Logistics survey | Manufacturing and construction | Trading | Logistics service providers | Consulting | Teaching and research | Total |
|------------------|-----------------------------------|---------|--------------------------------|------------|--------------------------|-------|
| 2012 | 875 | 773 | 684 | 121 | 279 | 2732 |
| 2010 | 570 | 435 | 545 | 102 | 161 | 1813 |
| 2009 | 996 | 794 | 915 | | | 2705 |
| 2006 | 985 | 788 | 482 | | | 2255 |

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

The distribution of respondent companies with regard to pivotal background variables is presented in Table 4. The distribution of respondent companies in the previous logistics surveys by main industry is given in Table 5.

3. The economic operating environment when conducting the surveys

Key observations in brief:

- The uncertainty of the global economic situation is also reflected in Finland, on account of which the economic situation and immediate outlook were a lot gloomier when the data for the 2012 logistics survey was being collected than on the previous occasion.
- Economic indicators show that growth in Finland had virtually come to a halt at the end of 2011. There was a dramatic fall in exports, in particular.
- Confidence indicators and the Purchasing Managers' Index showed that future expectations for business had weakened since 2010.
- Fuel prices have risen since the previous survey. Sea freight container prices dropped considerably, but rose again at the start of 2012.

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. The data for State of Logistics 2012 was collected at a time when the global economy and immediate prospects were different from what they were when the 2010 survey was undertaken.

When the 2010 survey was being conducted, most indicators showed that the economy was recovering from the recession. When the current survey was undertaken, the economic climate had turned gloomier again.

3.1 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, economic growth in Russia 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 2011, domestic freight traffic totalled 37 billion tonnekilometres. Of this, road transport accounted for 38.7 billion tonnekilometres (64%), rail transport for 9.8 billion tonnekilometres (26%), and waterway transport for 3.9 billion tonnekilometres (10%).

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 the main markets form a definite disadvantage, reducing speed and adding to costs. Long transport journeys involving multiple legs are time consuming – and time is often the most 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 from the public domain website of the World Bank show the key indicators of Finland (World Bank 2012).

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

| | 1980 | 1990 | 2000 | 2005 | 2010 | 2011 |
|--|---------|---------|---------|---------|---------|--------|
| World view | | | | | | |
| Surface area (sq. km) | 338 150 | 338 150 | 338 150 | 338 150 | 338 420 | . |
| Population, total (millions) | 4.8 | 5.0 | 5.2 | 5.2 | 5.4 | 5.4 |
| Population growth (annual %) | 0.3 | 0.4 | 0.2 | 0.3 | 0.5 | 0.4 |
| GNI per capita, PPP (current international \$) | 8850 | 17110 | 25480 | 30850 | 37100 | 38500 |
| GDP (current US\$) (billions) | 53.0 | 138.8 | 121.8 | 195.8 | 236.4 | 266.0 |
| GDP growth (annual %) | 5.4 | 0.5 | 5.3 | 2.9 | 3.7 | 2.9 |
| Life expectancy at birth, total (years) | 73 | 75 | 77 | 79 | 80 | . |
| GNI per capita, Atlas method (current US\$) | 11 110 | 25 220 | 25 440 | 38 550 | 47 460 | 48 420 |
| GNI, PPP (current international \$) (billions) | 42.3 | 85.3 | 131.9 | 161.8 | 198.9 | 207.4 |
| GNI, Atlas method (current US\$) (billions) | 53.1 | 125.7 | 131.7 | 202.2 | 254.6 | 260.8 |
| People | | | | | | |
| Fertility rate, total (births per woman) | 2 | 2 | 2 | 2 | 2 | . |
| Adolescent fertility rate (births per 1,000 women ages 15-19) | . | . | 12 | 11 | 9 | . |
| Mortality rate, under-5 (per 1,000 live births) | 9 | 7 | 4 | 4 | 3 | 3 |
| Immunization, measles (% of children ages 12-23 months) | . | 97 | 96 | 97 | 98 | . |
| Primary completion rate, total (% of relevant age group) | . | 102 | 96 | 100 | 98 | . |
| Ratio of girls to boys in primary and secondary education (%) | 106 | 109 | 105 | 102 | 102 | . |
| Prevalence of HIV, total (% of population ages 15-49) | . | 0.1 | 0.1 | 0.1 | . | . |
| Environment | | | | | | |
| Forest area (sq. km) | . | 218 890 | 224 590 | 221 570 | 221 570 | . |
| Agricultural land (% of land area) | 8 | 8 | 7 | 7 | . | . |
| Improved water source, urban (% of urban population with access) | . | 100 | 100 | 100 | 100 | . |
| Improved sanitation facilities, urban (% of urban population with access) | . | 100 | 100 | 100 | 100 | . |
| Energy use (kg of oil equivalent per capita) | 5 147 | 5 692 | 6 231 | 6 524 | 6 640 | . |
| CO2 emissions (metric tons per capita) | 12 | 10 | 10 | 10 | . | . |
| Electric power consumption (kWh per capita) | 8 296 | 12 486 | 15 286 | 16 120 | . | . |
| Economy | | | | | | |
| Inflation, GDP deflator (annual %) | 10 | 5 | 3 | 0 | 0 | 4 |
| Agriculture, value added (% of GDP) | 10 | 6 | 3 | 3 | 3 | . |
| Industry, value added (% of GDP) | 38 | 34 | 35 | 32 | 29 | . |
| Services, etc., value added (% of GDP) | 52 | 60 | 62 | 65 | 68 | . |
| Exports of goods and services (% of GDP) | 31 | 23 | 44 | 42 | 40 | 39 |
| Imports of goods and services (% of GDP) | 33 | 24 | 34 | 38 | 39 | 40 |
| Gross capital formation (% of GDP) | 30 | 28 | 21 | 22 | 19 | 21 |
| Revenue, excluding grants (% of GDP) | . | . | 41 | 39 | 37 | . |
| Cash surplus/deficit (% of GDP) | . | . | 7 | 3 | -3 | . |
| States and markets | | | | | | |
| Time required to start a business (days) | . | . | . | 14 | 14 | 14 |
| Market capitalization of listed companies (% of GDP) | . | 16 | 241 | 107 | 50 | 54 |
| Military expenditure (% of GDP) | . | 2 | 1 | 1 | 1 | 1 |
| Fixed broadband Internet subscribers (per 100 people) | . | . | 1 | 22 | 29 | 30 |
| Roads, paved (% of total roads) | . | 61 | 62 | 65 | . | . |
| High-technology exports (% of manufactured exports) | . | 8 | 27 | 25 | 11 | . |
| Global links | | | | | | |
| Merchandise trade (% of GDP) | 56 | 39 | 66 | 63 | 58 | 61 |
| Net barter terms of trade index (2000 = 100) | . | . | 100 | 86 | 77 | . |
| Foreign direct investment, net inflows (BoP, current US\$) (millions) | 28 | 812 | 9 125 | 4 806 | 6 870 | -30 |
| Workers' remittances and compensation of employees, received (current US\$) (millions) | 106 | 63 | 473 | 693 | 826 | . |

Source: World Bank, World Development Indicators

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 main indicators for the Finnish economy.

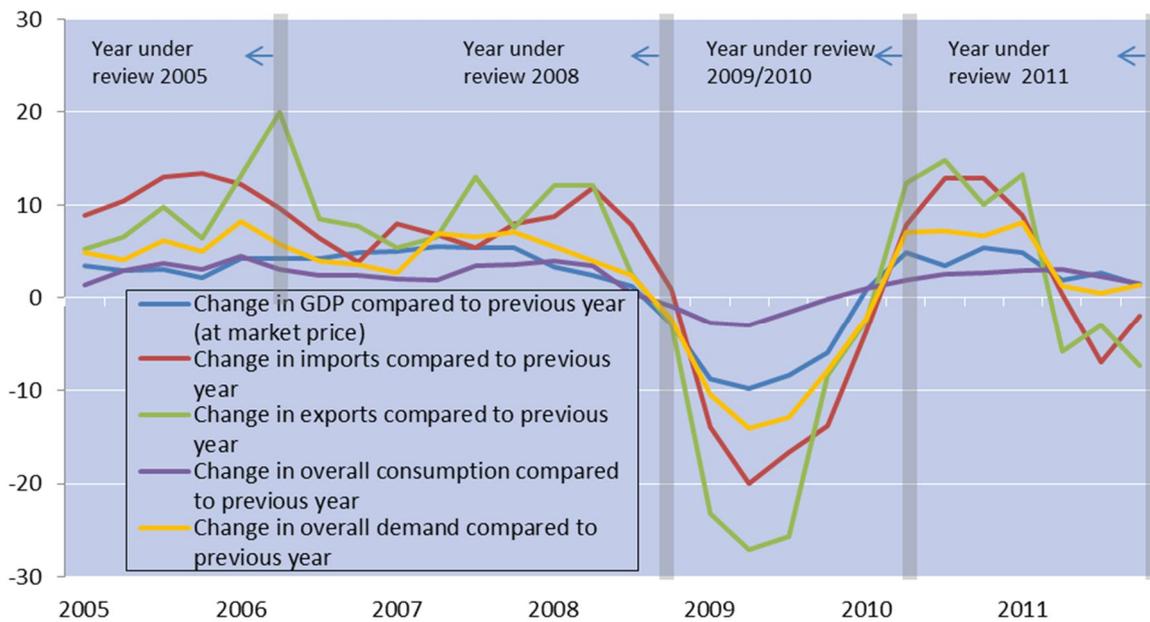


Figure 13 National account indicators quarterly, 2005–2011; percentage as the unit of change (Statistics Finland 2012); the columns show the times when the logistics survey were carried out

The Finnish economy grew in all areas almost continuously up until the latter part of 2008. From 2006 to 2008, the increase in overall consumption, demand and GDP, however, slowed down substantially. Volumes of exports and imports, in particular, fell sharply. According to GDP data published in February 2009, the Finnish economy, as in many other countries, officially went into recession.

When the previous logistics survey was conducted (in 2010), the economic climate was still a lot brighter, however. During the second quarter of 2010, the economy once again began to grow, and this trend continued steadily in the last quarter of that same year. The growth in exports, however, came to a halt in the second quarter of 2011.

The balance of trade in Finland in 2011 showed an unfavourable deficit, amounting to almost EUR 3.6 billion. In real terms, the same sort of deficit figures had not been seen since the oil crisis in 1974 and 1975 (Finnish Customs 2012a.) Indicators for the Finnish economy strengthen the notion derived from confidence and other indicators that, when the logistics survey for 2012 was being conducted, the economic climate was gloomier than when the previous survey was being carried out.

3.3 Interest rates

There are indications of the interest rate levels predominating at various times in the financial markets from the Euribor interest rate, which reflects banks' main lending practices. This rate is generally also used to determine interest rates in the private sector. Interest rates affect companies' capital costs, the cost of loans and the availability of finance, and, as a result, their investment, for example. The rate of interest affects logistics outlays, particularly via the costs of capital tied up in stock.

When the previous survey was being carried out, Euribor interest rates were at their lowest level for five years. When the financial crisis peaked, the European Central Bank

(ECB) dropped its reference rate to 1% in May 2009, and kept it there until April 2011 (Bank of Finland 2012). In early autumn, 2011, the rate rose steadily, until it eventually fell again (Figure 14).

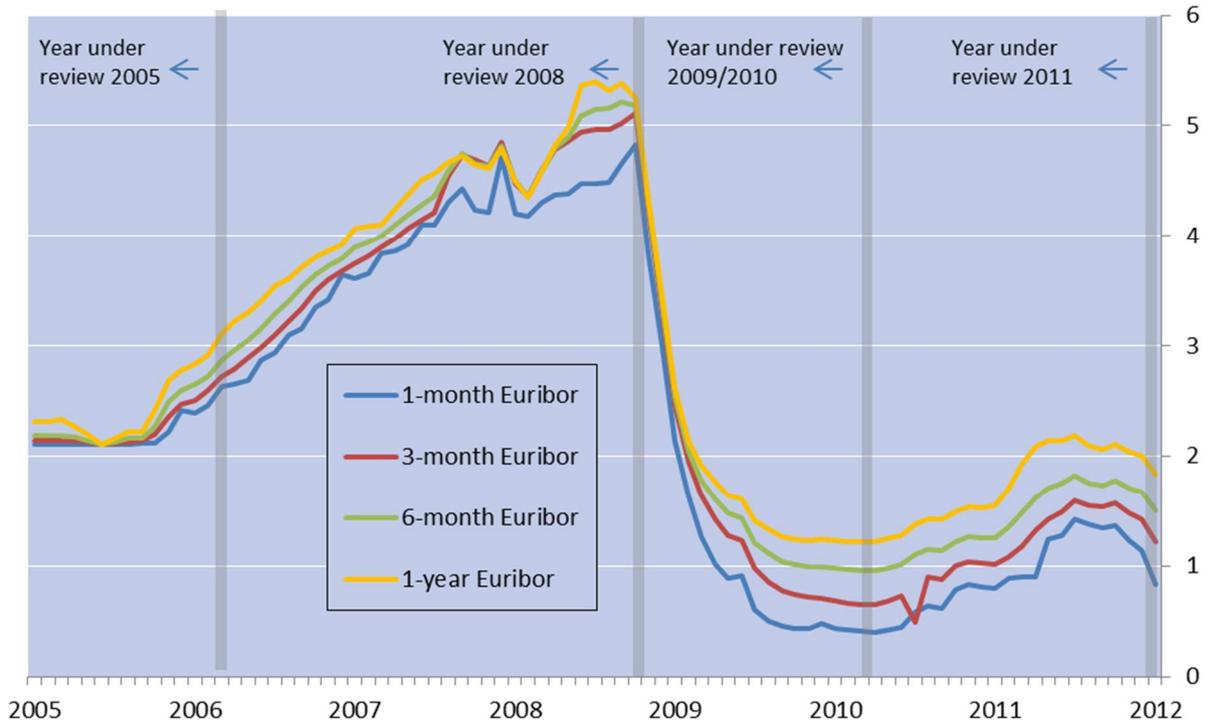


Figure 14 Trend in the Euribor interest rate 2005-2012 (ECB 2012); the columns show the times when the logistics survey were carried out

3.4 The impact on the logistics market of the internationalisation of Finnish companies

The swift rate at which Finnish business has internationalised has also had an impact on companies' logistics solutions and the demand for services. At the same time, subsidiaries abroad have accounted for more and more of companies' turnover. In 1996, this was at 20.3%, but by 2010 it had risen to 50% (EUR 180 billion) (Figure 15.) The highest figure for subsidiaries' share of turnover was in 2008, when it reached 54.3%.

This means that an ever larger part of the business operations of companies take place beyond Finland's borders. So far more logistics services that companies use are acquired and produced abroad too.

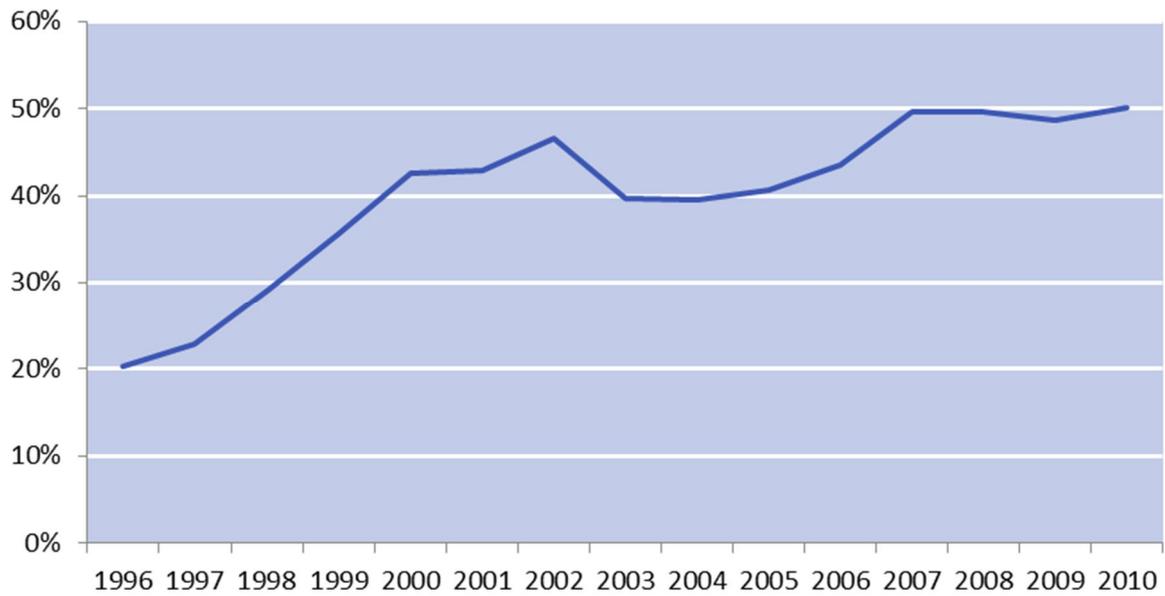


Figure 15 Share of Finnish companies' turnover represented by subsidiaries abroad, 1996–2010. (Statistics Finland 2012)

The change is also obvious when data on companies' logistics costs collected in the surveys is allocated to Finland, because logistics costs in the survey are indicated as a share of turnover. Although foreign trade has long accounted for a substantial part of the Finnish economy, the basic assumption is that approximately 80% of the logistics costs notified by companies in 1996 were for domestic production and trade. But by 2010, this had gone down to about a half. This ratio therefore also has an impact on logistics costs as an actual share of GDP.

4. The transport sector in the Finnish national accounts

4.1 Added value in the transport sector

Logistics is an important industry in Finland. According to Eurostat statistics, the total net sales of Finnish transport and logistics companies (including passenger traffic) in 2007 was almost EUR 20 billion, and the industry employed more than 122,500 staff in some 23,000 companies in 2008. Appendix 10 gives a comparison of the size, range and performance of transport and logistics companies that are Finnish or operate in Finland with the corresponding figures for certain other 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).

By 2007, 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 increment⁵ value (adjusted to the monetary value in 2002). With rapidly increasing 'value added'⁴, 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 (Ministry of Transport and Communications/Ramboll, 2009).

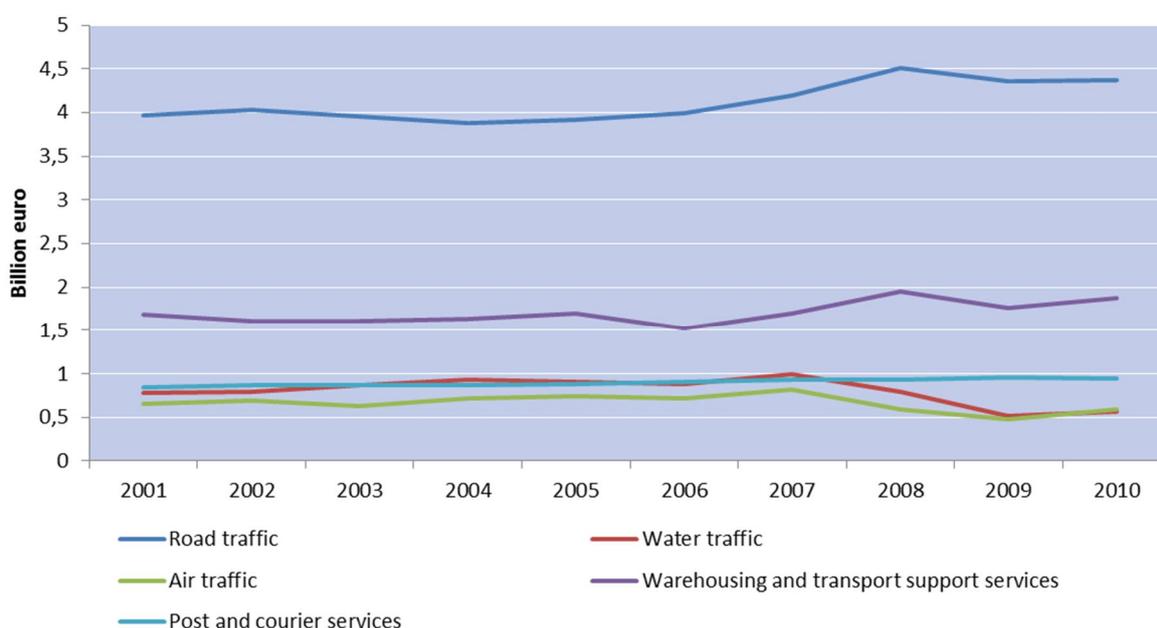


Figure 16 Added value in transport and transport support services in Finland according to TOL 2008 (billions of euros at current prices, including public sector) (Statistics Finland 2012).

⁴ Added value (gross) refers to the value generated a unit involved in production. It is calculated in market production by deducting the intermediates (goods and services) used in production from the unit's yield, and in non-market production by adding wages, fixed capital consumption and possible production-and import-related taxes.

The industrial structure and Finland's isolated position logistically 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 49 million import tonnes and 42 million export tonnes in 2009 (Appendix 10).

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 manufacturing and trading are included in the figures for the industries mentioned.

Statistics Finland has switched from the old industry classification system (TOL 2002) to the new TOL 2008 in the national accounts. Furthermore, there have been changes to the transport sector classification: formerly, telecommunications were included with transport and housing/storage. In TOL 2008, it mainly comes under 'Telecommunications', though this also includes categories from other operations that serve business.

Consequently, the entries for 'Telecommunications' in TOL 2008, on the one hand, and TOL 2002, on the other, are not fully comparable. According to the old category that includes telecommunications, added value for the entire transport sector in 2009 amounted to EUR 11.8 billion, while it was EUR 6.6 billion under the new classification system. In 2010, added value for the entire transport sector using the new calculation method was EUR 7.2 billion. Figure 16 gives the added value figures under TOL 2008.

The added value for traffic overland in 2010 was EUR 4,732 million. The figure includes both road and rail transport and a very small volume of pipeline transport. The added value for warehousing and transport support services in 2010 was EUR 1,880 million, mainly comprising warehousing, terminal, port, freight and forwarding services. Travel agencies also used to be included in this group, which explains why, under the old system for compiling statistics, added value for transport support services in 2009 was EUR 3,300 million, and only EUR 1,770 million using the current calculation method.

The added value for postal and courier operations in 2010 was EUR 942 million, for water traffic it was EUR 567 million, and for air traffic it was EUR 592 million. It is worth noting that the figures for water and air traffic halved in the period 2007-2010.

4.2 Industrial transport intensity and added value by sector

The importance of road transport is also evident when tonne-kilometre performance by industrial sector and corresponding added value for 2007 (Figure 17) are examined. The figures refer to transport performance in Finland and do not include foreign trade-related shipments. The figures for marine and air traffic are therefore low. Over 10% of the value of all Finnish exports is recorded in the statistics for foreign trade as air freight, of which the technology industry in particular uses a great deal.

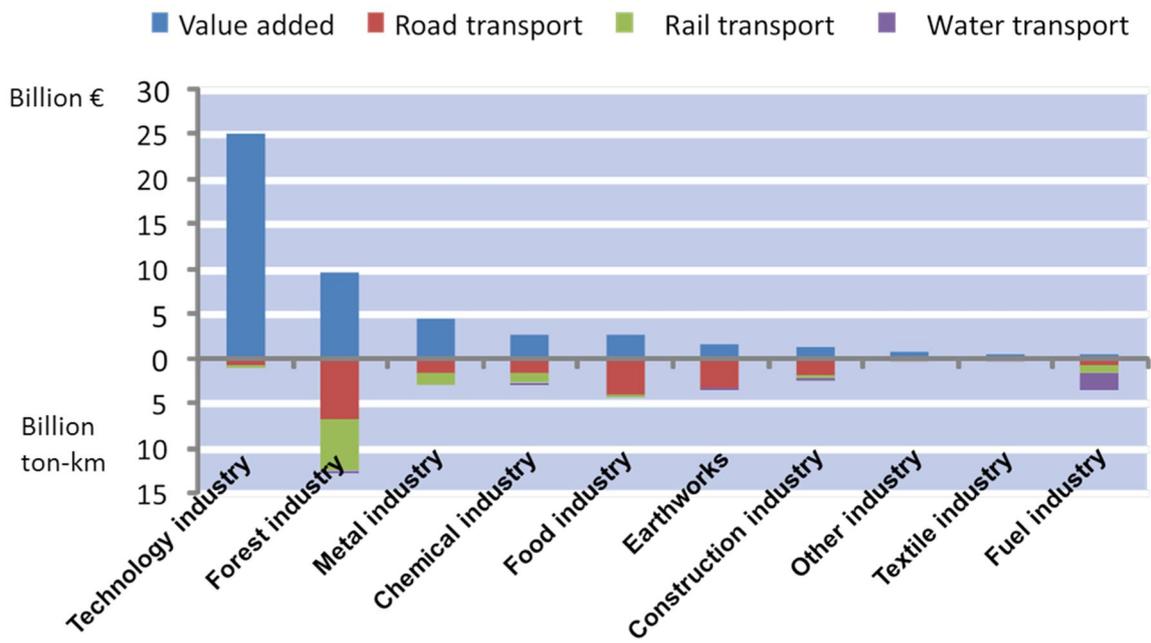


Figure 17 Added value in different industries and tonne-kilometres by different transport modes in 2007 (monetary value as at 2002) (Min. Transport and Comm./Ramboll 2009).

The forest industry utilised road and rail transport the most. Its share of industrial production was 19% in 2007. The technology industry, which produces the largest added value, generates little transport.

5. Finland's logistics performance

Key observations in brief:

- The viability of logistics and competence in the field of logistics in Finland compared globally are excellent
- The importance of logistics for the competitiveness of business is especially true for large companies (logistics accounts for about 50% of competitiveness)
- Although low costs countries are attractive, especially for procurement and location of production facilities, there is also clear growth potential in the home country
- Companies in SouthFinland are the most satisfied with logistics conditions in the area in which they are located; growing difference compared with elsewhere

5.1 Finland in global competitiveness indicators

Finland ranks fairly high in many international comparisons measuring competitiveness (Table 7). Of these, Finland came first for several years in a row in the Global Competitiveness Index compiled by the World Economic Forum (WEF), for example. In the index for 2011, Finland was placed seventh, and for 2011-2012, fourth, in a group of around 140 countries. In the IMD's World Competitiveness Report too, Finland ranked very high several years ago, but later fell to 19th out of 58 countries. Both indicators are based in part on interviews with representatives of the business world and in part on statistical data on the country's economy.

Finland also ranks high in the World Bank's Doing Business comparison, which assesses general conditions for, and barriers to, business. It is mainly conducted in the form of national interviews. In 2011, Finland's rank was 13, and in 2012 it was 11, in a group of 183 countries.

The World Economic Forum published a comprehensive comparison of the viability of foreign trade in different countries (Enabling Trade Index, ETI) in 2008 and in 2010. This involved the collection of a statistical data from a wide range of sources as well as available survey data on foreign trade-related transport, frontier crossings and customs, in addition to WEF's interview data. A total of 10 columns were drawn up from these, and were used to calculate the overall ranking of each country. Finland came 12th in the ETI comparison for 2010 out of 125 countries.

The ETI survey used the Logistics Performance Index (LPI) by The World Bank and the Liner Shipping Connectivity Index (LSCI) comparison, which is produced by UNCTAD and illustrates countries' ties with container line traffic.

The LSCI comparison is based on the database of Containerisation International magazine on the frequencies, size, transported volumes and total number of direct connections for container traffic vessels. It is worth noting that the database has no information on ro-ro traffic, which explains why Finland ranked only 80th out of 162 countries in 2011. Furthermore, the position of several other countries that rely heavily on ro-ro traffic (e.g. Norway and Ireland) was also low in the LSCI.

Other indices that compare competitiveness and social conditions include IBM's and the Economist Intelligence Unit's (EIU) Digital Economy Ranking. In that, 100 countries are ranked in order of superiority on the basis of how their information society and information and communications technology meet the challenges of the future. In 2009, Finland came tenth in the comparison and in 2010, fourth.

In 2010, Newsweek published its Best Countries in the World comparison, in which Finland came first. In addition to Finland's number one position, worthy of note was the fact that all the Nordic countries included were ranked in the first 10. Of the various indicators that Newsweek used, it was 'economic dynamism' that related most centrally to logistics and ease of economic activity. According to this indicator, Finland came eighth among the 183 countries included.

More recent indicators are the DHL Global Connectedness Index and the Air Connectivity Index. The index published by DHL at the end of 2011 measures the extent to which countries are connected to one another. The index takes account both of the depth of global connectivity (how much international contact there is), and its breadth (to how many countries the country concerned is connected, e.g. through contact/integration). The index is divided into trade, capital, telecommunications and people (immigrants, tourists, exchange students). Finland was ranked 18th.

The Air Connectivity Index (Arvis & Shepherd 2011) measures the extent to which countries are connected through air transport. One measure of connectivity here is how important a hub the country is in the global air transport system. Finland came 39th in the comparison.

The KOF Index of Globalisation published in Switzerland is a measure of the three dimensions of globalisation: economic, political and social. The economic dimension measures volumes of trade and investment, the political dimension political cooperation between countries, and the social dimension the dissemination of information and ideas. In this comparison, Finland was in 17th place.

Table 7 Finland and certain other countries compared for competitiveness and logistical viability

| | | Finland | Sweden | Germany | Estonia | Poland | Russia | Countries in comparison |
|-----------------------------------|-----------|---------|--------|---------|---------|--------|--------|-------------------------|
| Logistics Performance Index | 2010 | 12 | 3 | 1 | 43 | 30 | 94 | 155 |
| | 2012 | 3 | 13 | 4 | 65 | 30 | 95 | 155 |
| Liner Shipping Connectivity Index | 2010 | 71 | 31 | 7 | 88 | 74 | 45 | 163 |
| | 2011 | 80 | 38 | 4 | 112 | 43 | 59 | 162 |
| Enabling Trade Index | 2008 | 7 | 3 | 8 | 25 | 45 | 103 | 118 |
| | 2010 | 12 | 4 | 13 | 23 | 58 | 114 | 125 |
| Doing Business | 2011 | 13 | 9 | 19 | 18 | 59 | 124 | 183 |
| | 2012 | 11 | 14 | 19 | 24 | 62 | 120 | 183 |
| Global Competitiveness Index | 2010-2011 | 7 | 2 | 5 | 33 | 39 | 63 | 139 |
| | 2011-2012 | 4 | 3 | 6 | 33 | 41 | 66 | 142 |
| World Competitiveness Yearbook | 2010 | 19 | 6 | 16 | 34 | 32 | 51 | 58 |
| | 2011 | 15 | 4 | 10 | 33 | 34 | 49 | 59 |
| EIU Digital Economy Ranking | 2009 | 10 | 2 | 17 | 24 | 39 | 59 | 70 |
| | 2010 | 4 | 1 | 18 | 25 | 39 | 59 | 70 |
| Newsweek | 2010 | 1 | 3 | 12 | 32 | 29 | 51 | 100 |
| DHL Global Connectedness Index | 2011 | 18 | 7 | 13 | 37 | 30 | 66 | 125 |
| Air Connectivity Index | 2011 | 39 | 26 | 3 | 37 | 20 | 47 | 211 |
| KOF Index of Globalization | 2012 | 17 | 6 | 22 | 26 | 25 | 47 | 187 |

5.2 Finland in the Logistics Performance Index by The World Bank

Since 2007, the World Bank has published its global Logistics Performance Index (LPI) developed in collaboration with the Turku School of Economics. Its purpose is to assess the logistic viability or facilitation of countries' foreign trade.

In 2007, the LPI covered 150 countries, the LPI 2010, published in January that year, covered 155, and the latest, published in May 2012, covered also 155 countries.

The LPI survey was answered by more than 900 international forwarding and logistics professionals from around the world in the period 2007-2012. The on-line survey was available in English, French, Spanish, Chinese and Russian.

Each respondent had eight countries to assess in addition to their own. The practical areas for assessment in this international component (the International LPI, as it is known) were border crossings and customs, the transport and telecommunications infrastructure, the availability of international shipments, logistics expertise, ease of tracking consignments and on-time delivery performance (Table 8). The ratings for these areas were therefore given outside the country under scrutiny.

Table 8 LPI survey: international component dimensions

| Areas for assessment in the International LPI | Variable name in figures |
|---|--------------------------|
| a) Efficiency of the clearance process by customs and other border agencies | Customs |
| b) quality of transport and information technology infrastructure for logistics | Infrastructure |
| c) Ease and affordability of arranging international shipments | International shipments |
| d) Competence and quality of logistics services | Competence |
| e) Ability to track and trace international shipments | Tracking & tracing |
| f) Timeliness of shipments in reaching destination | Timeliness |

Respondents were also asked to rate their own country's operating environment (Domestic LPI) from the perspective of the following areas of foreign trade and transport, among others: quality of the infrastructure, service provider capability and efficiency of border crossings. Questions about the time taken to cross a frontier and the costs involved were asked in several different ways. Finland was among the most efficient and successful of the countries included in the comparison.

The LPI is based on the ratings of the actors in the field with regard to the viability of foreign trade logistics for each country. A total of over 5,500 national assessments make up a comprehensive database, which correlates very well with existing comparison and statistical data describing economic development. The interactive statistics data and reports for LPI 2007, 2010 and 2012 (Arvis et al. 2007, 2010 and 2012) can be found at www.worldbank.org/lpi.

Because of the way it is carried out and the target group it uses, the LPI represents a country's efficiency particularly as utilised in the trade in transported, refined products, where logistics and forwarding are often crucial.

With a ranking of 3rd in 2012, 12th in 2010 and 15th in 2007, Finland was within the best tenth on all three occasions, as were the other Nordic countries (excluding Iceland), which is an excellent achievement. Absolute differences in the scores in the group of the ten best countries are nevertheless tiny (Figure 18).

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 2012 was 1 and the lower limit was 15 (see Arvis et al. 2012.)

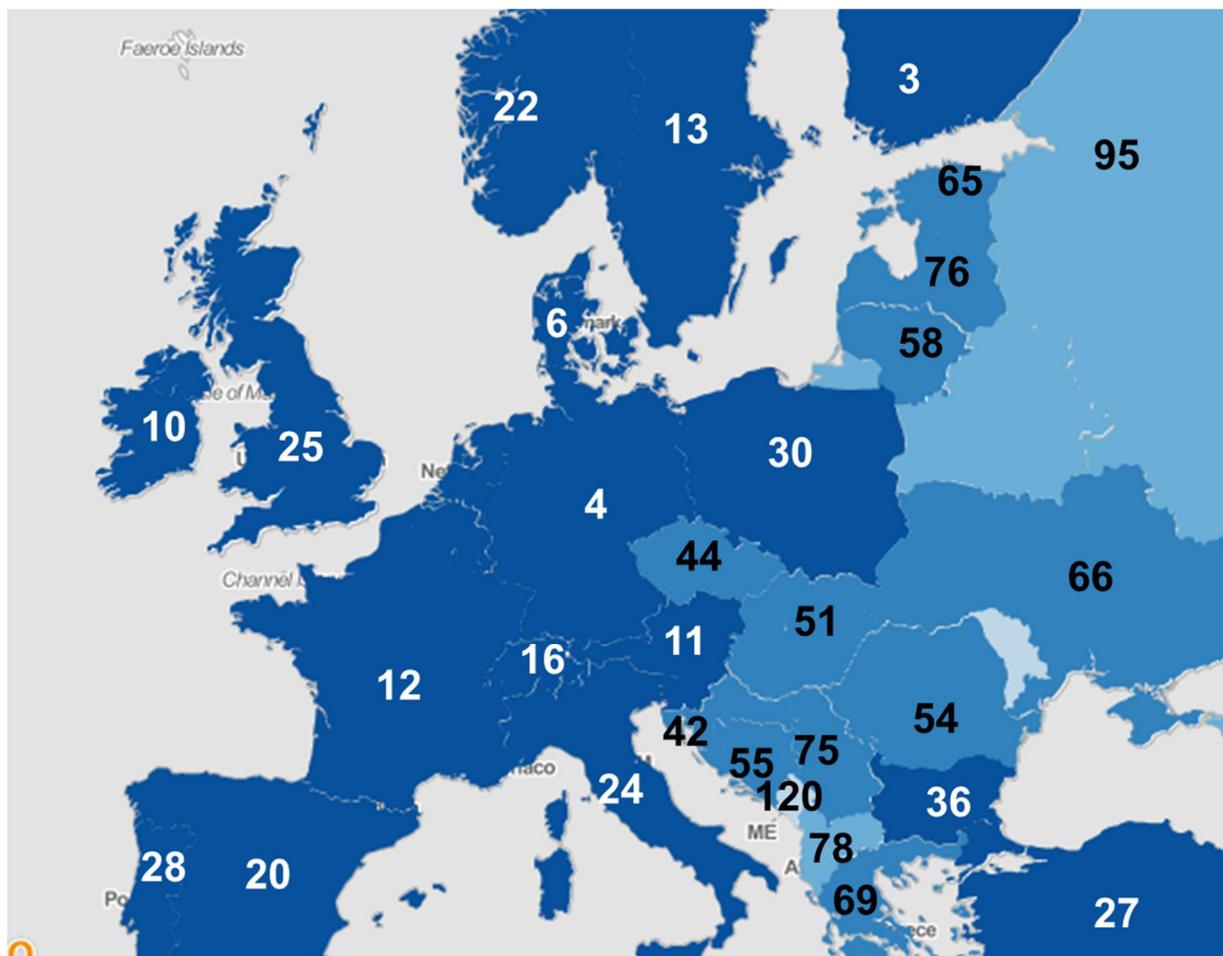


Figure 18 Logistics Performance Index 2012 rankings for certain European countries in a comparison of 155 countries in all. Mapping template colours according to LPI score quarter (quartile). (Arvis et al. 2012)

In the 2010 International LPI, the lowest scores out of the six dimensions for Finland were in timeliness of deliveries (15) and availability of international shipments (25). In other dimensions it was ranked between 7th (customs clearance) and 11th (tracking and tracing shipments).

In the latest LPI 2012, Finland came out within the top 10 in 5 out of 6 dimensions, occupying the 1st place in logistics competitiveness and tracking and tracing. In customs the rank of Finland was 2nd, in international shipments 4th and in infrastructure 6th. The only dimension where Finland was evaluated outside the top 10 was the timeliness of transports (Figure 19).

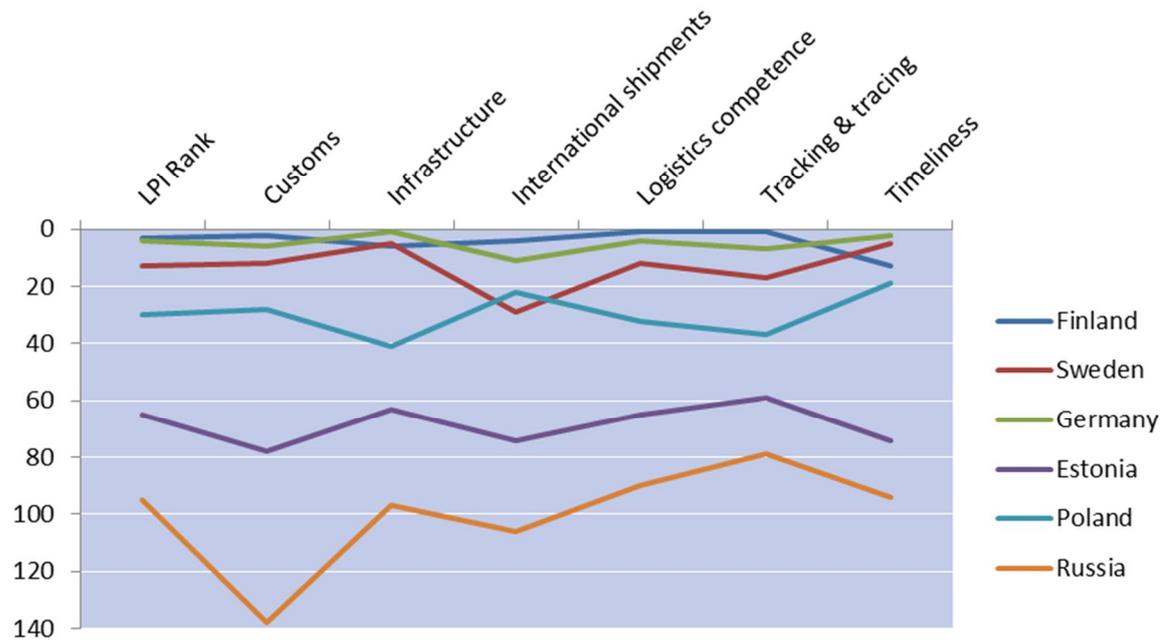


Figure 19 Logistics Performance Index 2012: overall LPI rank and the rank of the six LPI components for Finland and some of its neighbours out of 155 countries in the survey (Arvis et al. 2012)

Singapore was ranked first in the LPI 2012 overall comparison, and the developed industrialised countries came out generally well. Five European Union Member States were among the top 10 countries. The absolute difference in scores between the top 20 countries is small. This means that even minor changes in actual scores may cause substantial changes in a country's rank. This is particularly true with countries occupying LPI ranks between 30 and 90.

6. Results from manufacturing and trading

Key observations in brief:

- Importance of logistics for company competitiveness is major, especially for large companies (around half of a company's competitiveness is due to logistics)
- Although low costs countries are attractive, especially for procurement and location of production facilities, there is also potential for growth in Finland
- The logistics costs of manufacturing and trading are the same as in 2009
- The outsourcing of logistics has not increased substantially in recent years, level is low, compared internationally
- Environmental issues within companies at a better level than with stakeholders, division of responsibilities often unclear

6.1 Importance of logistics for companies in manufacturing and trading

Companies responding to the survey questions were asked to assess how much logistics accounts for competitiveness. In this report, company competitiveness was defined as the *ability to maintain and improve productivity and growth potential*.

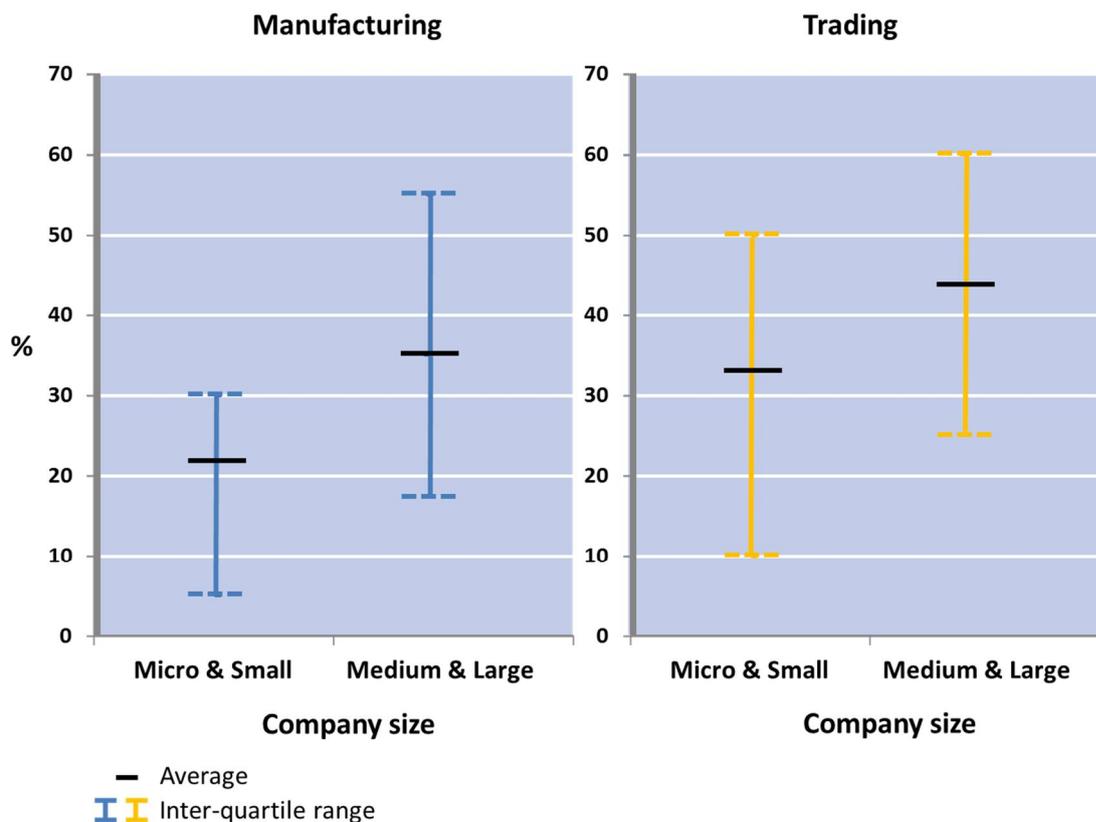


Figure 20 Assessments by respondent companies of how much logistics accounts for their competitiveness

The response data for the importance of logistics for company competitiveness gives rise to two observations: firstly, trading companies see logistics as accounting for a larger proportion of their competitiveness than is the case with companies in manufacturing. Secondly, the importance of logistics for competitiveness seems to become greater the larger the company.

Average estimates for the extent to which logistics accounts for company competitiveness vary between 35% (manufacturing) and 43% (trading) in medium-sized and large companies, and between 22% (manufacturing) and 33% (trading) in micro-companies and small companies. Figure 20 also shows that the estimates for the importance of logistics vary enormously. A quarter of medium-sized and large companies in both manufacturing and trading even believe that logistics accounts for more than half of the company's competitiveness.

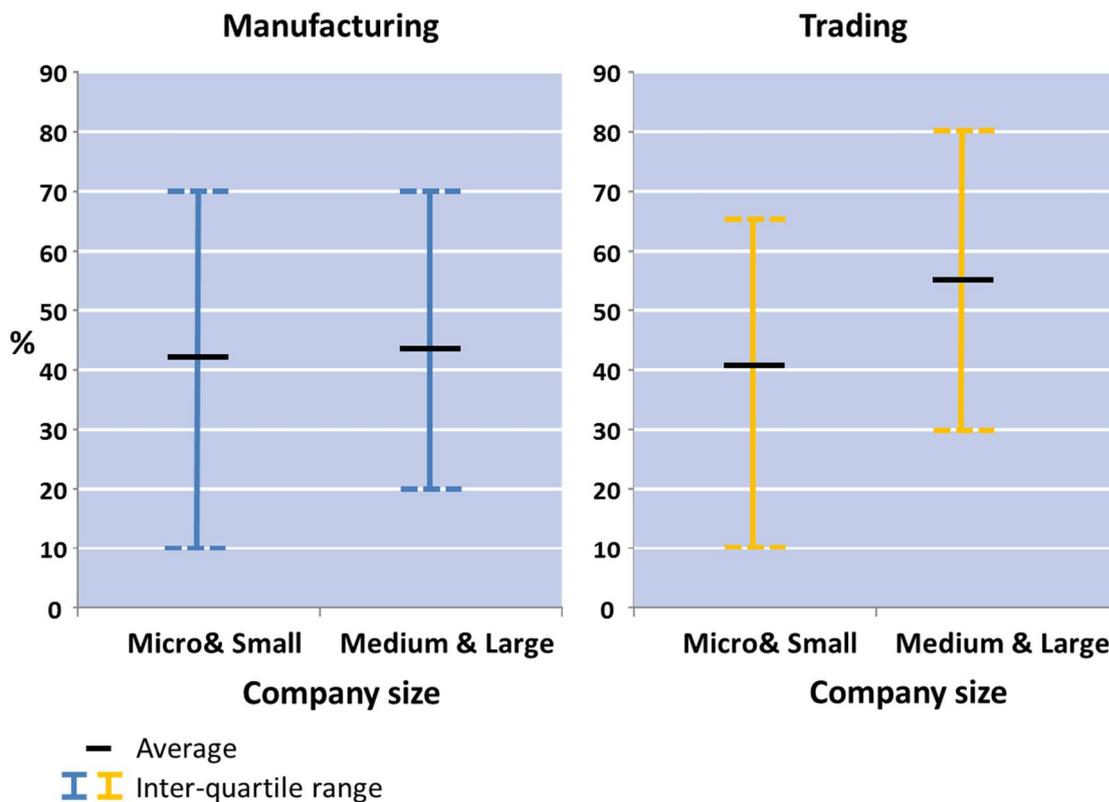


Figure 21 Assessments by respondent companies of how much of its logistical competitiveness the company can have an influence over

The survey also explored to what extent a company could have a direct influence over its logistical competitiveness. We defined this as *a company's ability to organise and implement its material, information and money flows as reliably, efficiently and cheaply as possible to maintain competitiveness.*

On average, micro- and small companies in both trading and manufacturing believe they are able to influence just over 40% of their logistical competitiveness. There were, however, differences between medium-sized and large companies in manufacturing and trading: medium-sized and large manufacturing companies also believe they can influence approximately 43% of their logistical competitiveness, while companies in trading believe they are able to have an influence over as much as 55% of their logistical

competitiveness. It is also interesting that 25% of companies think they can influence as much as 70-80% of their logistical competitiveness (Figure 21).

6.2 The logistics costs incurred by companies

The results suggest that the logistics costs of companies in manufacturing and trading in Finland were at almost the same level in 2011 as they were when the previous survey was conducted in 2009 (Figure 22). Company turnover- and sector turnover-weighted logistics costs in 2011 were at an average of 12.1% of turnover, while the figure for 2009 was 12.0% exactly. There was therefore hardly any discernible difference in the absolute figure for logistics costs. It nevertheless makes sense to examine the relationship between various cost items and changes to them.

The biggest cost item this time was still transport, whose share of companies' turnover averaged 4.6% in 2011 (4.4% in 2009). However, the figure also includes transport packaging costs, which previously was treated as a separate item, though as one closely connected to transport. There have thus been no major changes in transport costs, even though the figure is slightly up on that for 2009. The conclusion is that fierce competition and overcapacity in the transport market are keeping pressures on rises in transport costs under control, despite the trends in the price of fuels.

Nevertheless, there have been changes in warehousing costs. These have risen by 0.5%, and in 2011 they accounted for an average of 2.6% of company turnover. The change is at least partly explained by the fact that the rate to which storage facilities are used and, at the same time, the costs involved, have started to increase since their fall back in 2009. Warehousing costs as a share of company turnover would seem to have returned almost to the levels for 2005 and 2008.

Inventory carrying costs have fallen since 2009, and now represent, on average, 3% of company turnover. The increased inventory carrying costs back in 2009 were partly explained by the fact that a dramatic decline in demand meant that companies' inventory levels were higher than usual and therefore resulted in higher costs.

Since 2009, demand has recovered to some extent, and, more than anything else, companies have had time to adapt their inventory levels to the new situation. This has naturally also led to lower inventory carrying costs. Another factor that explains the fall in costs is interest rates. The uncertainty that has existed in the international financial markets for so long now has kept the reference rate low and allowed, at least some companies, to benefit from moderate interest rates. It needs to be realised, however, that the uncertainty has meant that bank margins have been increasing and have made financing more expensive, at least for some companies.

With regard to two other costs items, administration costs and other logistics costs, both the share of turnover and changes since the previous survey are minor. Logistics administration costs for 2011 averaged 1.2% of company turnover, and other logistics costs accounted for just 0.9%.

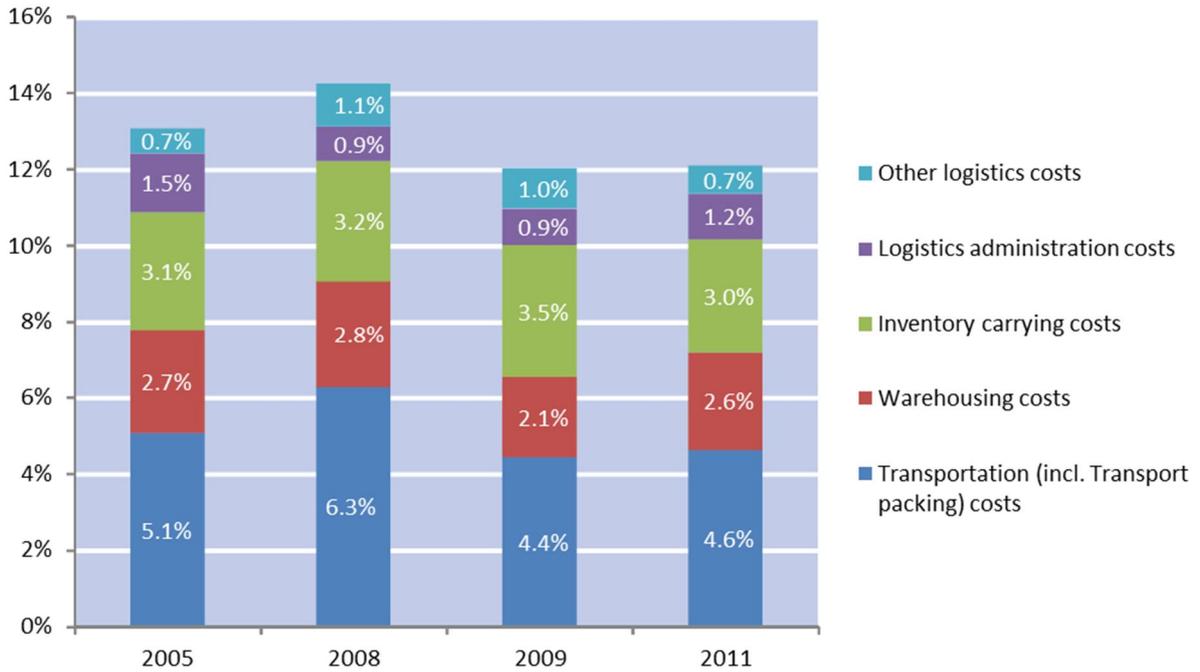


Figure 22 Logistics costs of manufacturing and trading companies in Finland as a share of turnover. The average shares by main industries are weighted by turnover by sub-industry, and firms within each sub-industry.

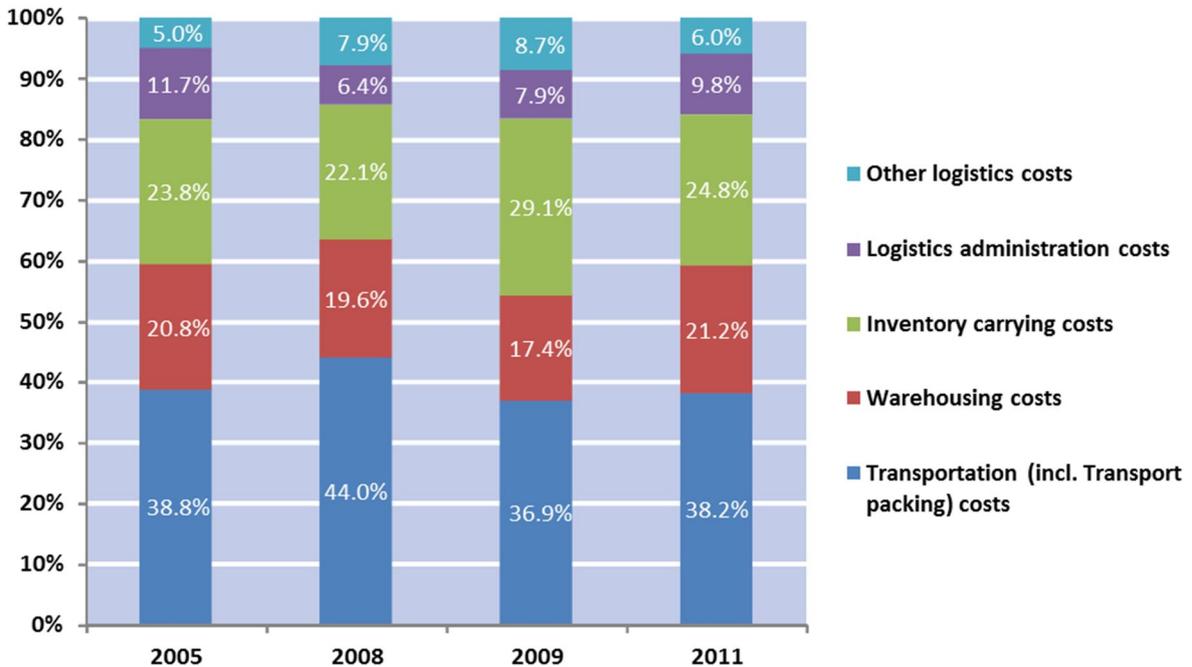


Figure 23 Cost items in logistics and their share of overall logistics costs for companies in manufacturing and trading 2005-2011

Figure 23 shows costs components in logistics and their share of logistics costs for the period 2005-2011. Transport costs were the biggest single cost item in all years. Their share of overall logistics costs was greatest in 2008, when as much as 44% of logistics costs in trading and manufacturing were incurred in transport. They reached their lowest point in 2009, when they accounted for 36.9% of all logistics costs. The inventory carrying costs were at their greatest when the share of transport costs was at its lowest. This fits well with the notion that at least to some extent there really is a trade-off between transport costs and inventory carrying costs.

When the relative share of costs is examined, however, it is worth remembering that their behaviour is very largely determined by phenomena in the international economy, such as the situation in the transport market and the demand for company products, which, at least in the short term, can significantly impact on the relation between the various cost items involved.

6.2.1 Logistics costs levels in companies in manufacturing and trading

An examination of company logistics costs by company size leads one to conclude that overall costs for manufacturing companies have fallen in all size categories. They vary between 15.2% of company turnover for micro-companies and 13.8% for small companies. In medium-sized companies they were an average of 14.5% of turnover, while the figure for large companies was 14.8%. The biggest changes in logistics costs compared to the results from the previous survey in 2009 were in the small and medium-sized group, where average logistics costs went down by 4.6-3.3%, and even fell to below the level for 2008.

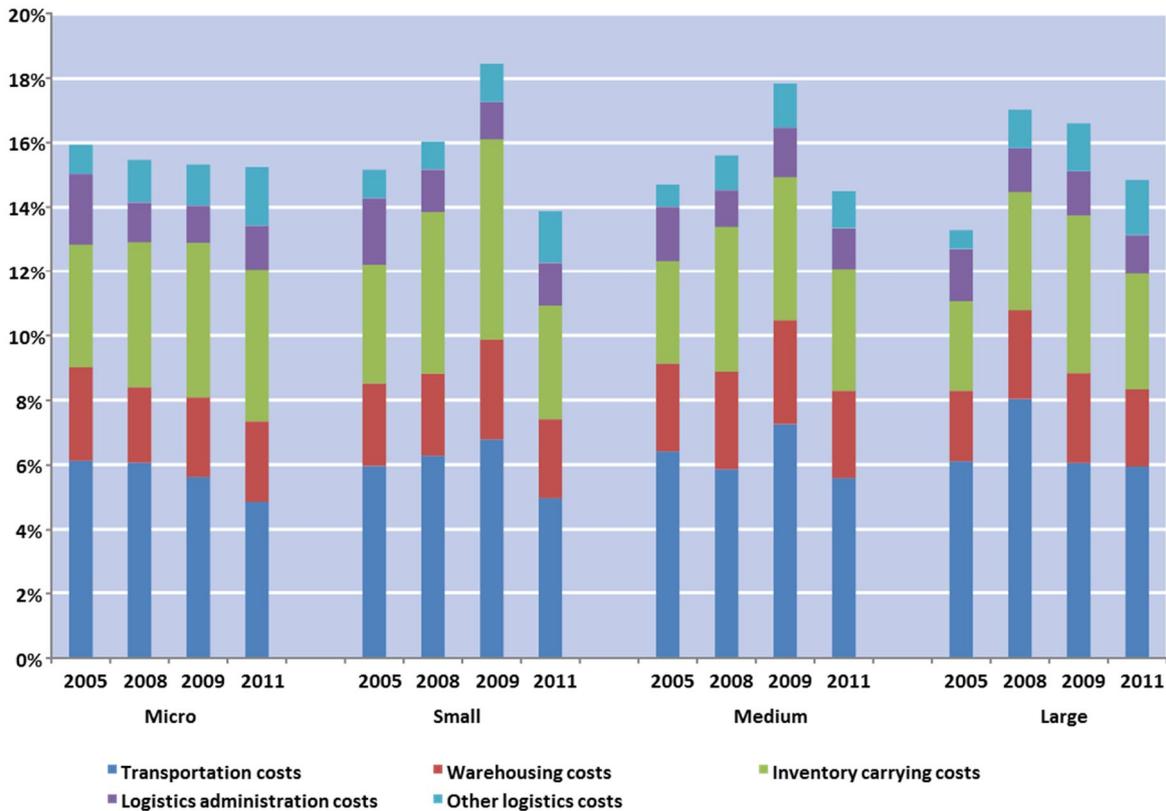


Figure 24 Average logistics costs for manufacturing companies as a per cent of turnover grouped by size of company 2005-2011

When changes in logistics costs are examined over time, the effects of the business cycle on companies of different sizes are very evident (Figures 24 and 25). The logistics costs of large companies rose dramatically between 2005 and 2008, while those for medium-sized companies did not alter greatly. Between 2008 and 2009, the logistics costs of large companies fell again, while those for the small and medium-sized companies increased considerably. The business cycle would thus appear to affect large companies first, with SMEs following on behind.

The relative shares represented by single cost items have remained virtually the same. In 2011, transport costs, including transport packaging costs, varied between 4.8 and 5.9 %, depending on the size of the company. In all size categories, however, transport costs have gone down since the time of the last survey. The demand bubble in the transport market in 2008 has since burst, and freight costs have continued to remain at a reasonable level. Nor have there been any major changes to warehousing costs.

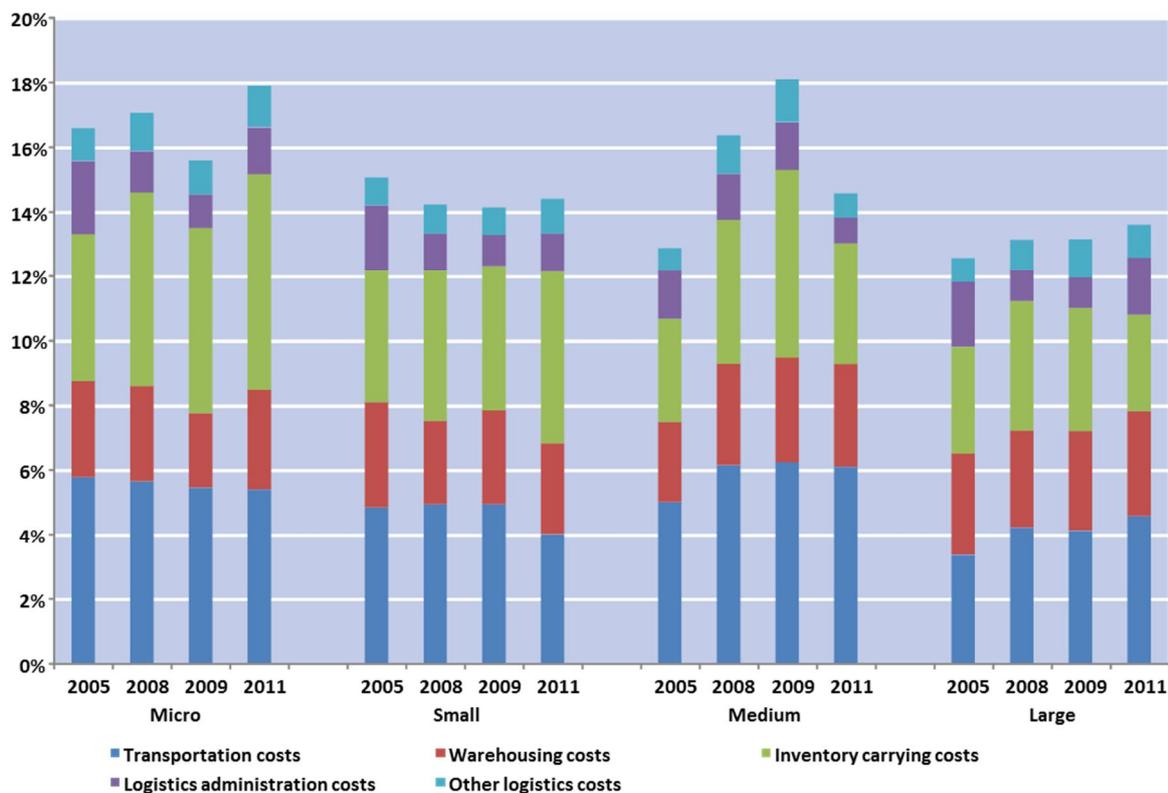


Figure 25 Average logistics costs for companies in trading as a per cent of turnover grouped by size of company 2005-2011

Inventory carrying costs have fallen, however, in small, medium-sized and large companies they have gone down by 0.7 to 2.8 %. This might be explained by the fact that the uncertain situation with respect to the global economy has kept interest rates low, which in turn has brought down the cost of capital. Furthermore, companies have been able to adapt their inventory levels to reflect the situation regarding demand. Logistics administration costs and other logistics costs are also categories that have remained almost the same as previously.

Changes in the logistics costs in companies in trading are not quite as consistent as those for manufacturing companies. Average logistics costs for micro-, small and large

companies would appear to have risen somewhat since the time of the previous survey. However, the changes are minor, except for micro-companies. They have gone up by 0.3% for small companies and by 0.4 % for large companies. But for medium-sized companies in trading they have fallen by 3.5 %.

Transport costs have fallen in all size categories except for large companies, where they are presently 4.6 % of turnover. Warehousing costs have remained virtually the same since the previous survey, except for micro-companies. As for the inventory carrying costs, there have been two main trends. The costs for micro-companies and small companies have risen, it would appear, since 2009, to some extent at least. In 2011, they were 6.7% of turnover for micro-companies and 5.3% for small companies. But medium-sized and large companies have succeeded in lowering their inventory carrying costs: in medium-sized companies they represent 3.8% of turnover (5.8% in 2009), and in large companies they are 3% (3.8% in 2009) of turnover. As for logistics administration costs, the biggest change since 2009 is the rise in these costs for large companies, from 1% to 1.8%.

6.2.2 Logistics costs and internationalisation

Logistics costs examined by a company's degree of internationalisation also appear to be lower than in the previous 2009 survey (Figure 26). The logistics costs of international companies have decreased the most, by as much as 2 percentage points. Those for export companies have remained at their previous level, going down by just 0.3 percentage points. The logistics costs of companies in the domestic market are still lower than companies in the other two categories.

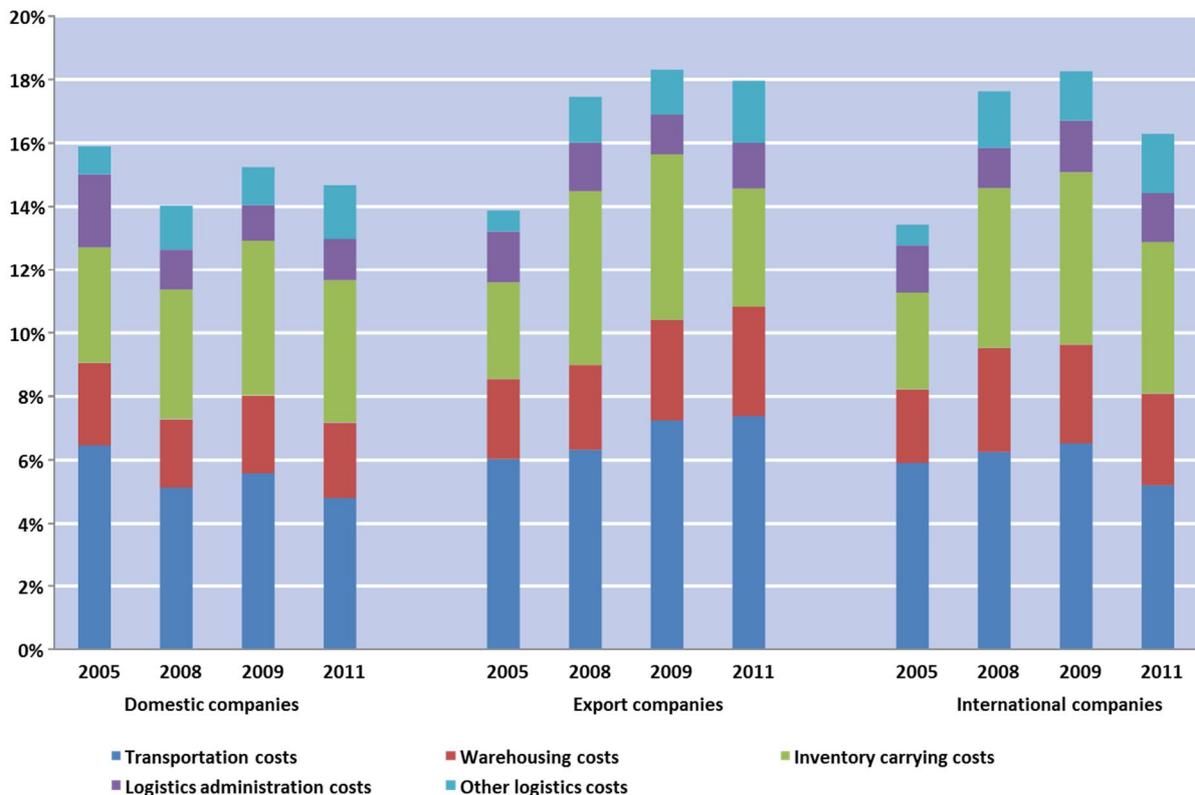


Figure 26 Average logistics costs for companies in manufacturing as a per cent of turnover by degree of internationalisation 2005-2011

Of all the single cost items, it is mainly transport costs for international companies that have fallen. They are down by almost 1.3 percentage points compared to when the previous survey was carried out. By contrast, the transport costs for export companies have gone up slightly since 2009. The biggest change for export companies has been in inventory carrying costs, down by 1.4 percentage points since 2009 and approaching levels for 2005. Logistics administration costs and other logistics costs have stayed almost at the same level when examined by a company's degree of internationalisation.

6.3 Key indicators in logistics

Figures 27 and 28 illustrate seven key indicators in logistics by main sector of industry for 2008, 2010 and 2012.⁵ Figure 27 shows perfect order fulfilment⁶ and deliveries received that were error-free in terms of their documentation and billing details⁷ as percentages of all equivalent deliveries (for 2008 and 2010).

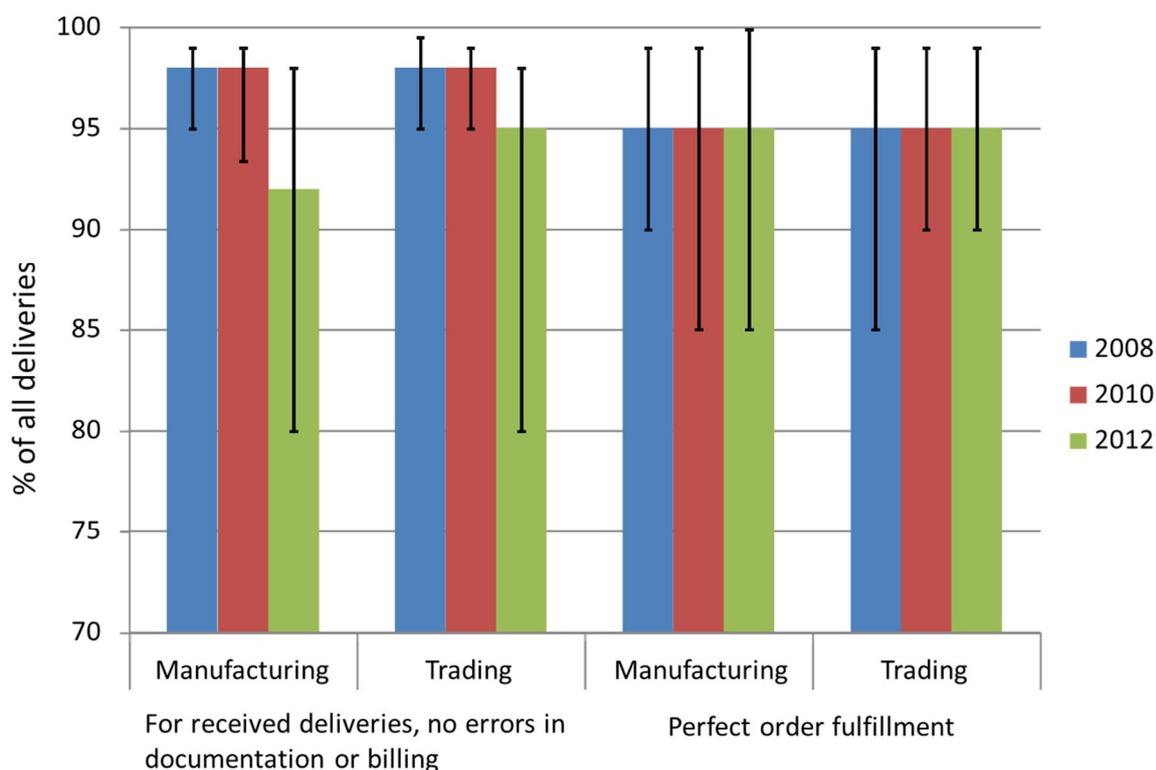


Figure 27 Perfect order fulfillment and received deliveries with no errors in documentation or billing as a share of all deliveries 2008-2012

⁵ The column in the diagram represents the median for the sector, i.e. the level that half the respondents get to. The line segment drawn on the column represents the upper and lower fifth, i.e. the interquintile range. The segment's range covers 60% of all companies that responded. The upper quintile limit represents the level of the indicator that the highest 20% of companies in the sector has reported. The lower quintile limit, on the other hand, indicates that 20% of companies in the sector have reported a lower value for that indicator.

⁶ Perfect customer deliveries means one delivered on time, to the right place, with the right documentation, in the right volume, and undamaged.

⁷ In the surveys in 2008 and 2010, respondents were asked about the number of erroneous deliveries they had received. Here the scale has been inverted in this respect.

The error-free factor for deliveries in 2012 was expanded to cover delivery time, place, volume and quality. Consequently, the comparison with earlier situations can only be made cautiously with regard to this matter.

There were no great changes between the years in which the surveys were conducted as regards customer deliveries by main sector of industry. The majority of companies have good indicators for each (Figure 27). There is little international comparable data, though, in general, most companies come out well, even if the worst companies still have much room for improvement. The difference between the best and the worst has changed little.

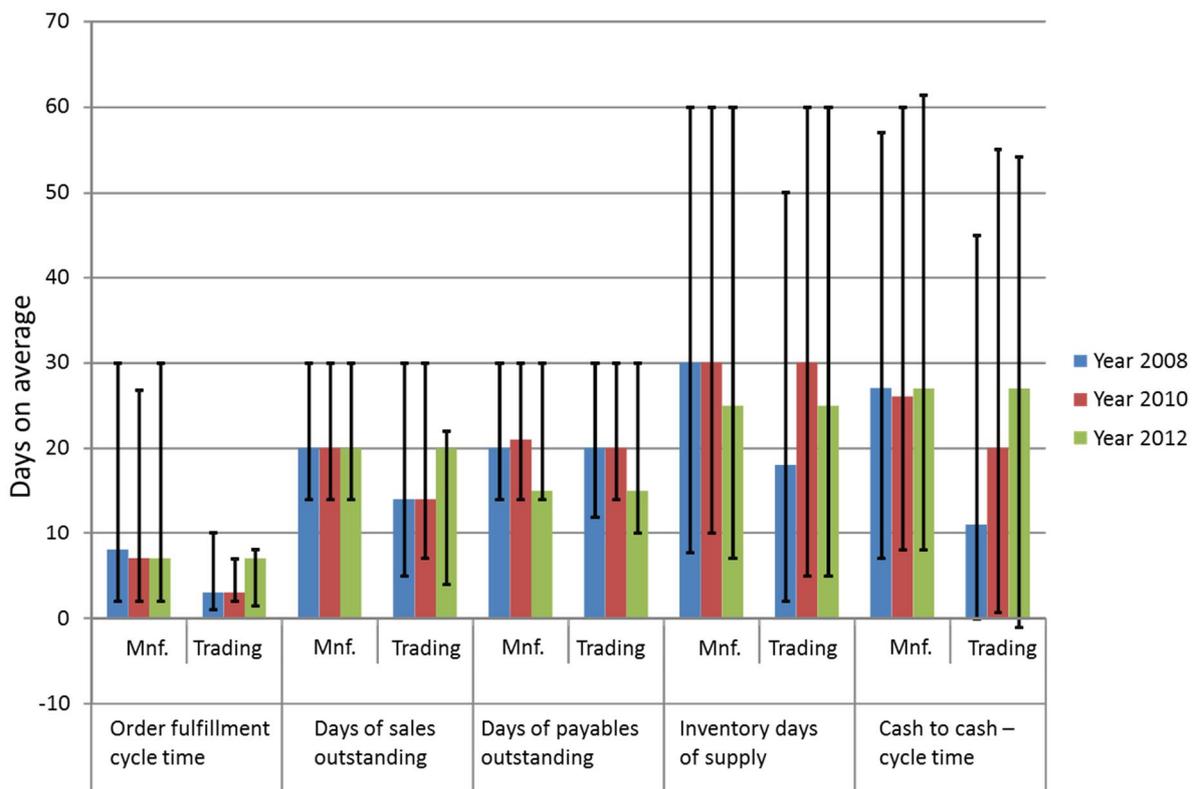


Figure 28 Indicators for customer orders and deliveries 2008-2012

There have been no major changes in the indicators in Figure 28. Days of payables outstanding in each main industry have shortened slightly, and materials remain in the possession of the company for a slightly shorter period of time. There is a clear increase in the median values for cash-to-cash cycle time in trading, but there is no discernible corresponding trend for the best and worst companies. The distribution is more symmetric than before.

What is striking about the indicators is the huge variations within sectors. These are partly explained by differences in the nature of the activity. Some companies need to improve quite a lot, although the level, when compared internationally, is generally good. Payment times especially are still fairly short compared to many other countries.

6.4 Geographical location of industrial and commercial business operations and of the supply chain

An analysis of the geographical location of business operations and the supply chain is based, in the first stage, on the responses given by 415 companies (micro-companies are excluded). Table 9 shows the number and sample percentage for companies in trading and manufacturing in each geographical region (apart from Finland). Because the distributions are skewed, the table also gives the median values for shares of sales, production capacity and procurement for companies in the region.

Table 9 Supply chains in seven regions abroad for companies in manufacturing (including construction) and trading

| | Sourcing | | | Production capacity | | | Sales | | |
|---|--|--|---|--|--|---|--|--|---|
| | %-share of companies operating in the area | Frequency of companies operating in the area | share for companies operating in the area | %-share of companies operating in the area | Frequency of companies operating in the area | share for companies operating in the area | %-share of companies operating in the area | Frequency of companies operating in the area | share for companies operating in the area |
| Manufacturing | | | | | | | | | |
| North, West and Southern Europe | 62.7 % | 138 | 20 % | 29.1 % | 64 | 20 % | 56.4 % | 124 | 20 % |
| Eastern Europe (e.g. Poland, Russia, Baltic States) | 34.5 % | 76 | 7 % | 28.6 % | 63 | 10 % | 47.7 % | 105 | 5 % |
| Developing Asia (e.g. China, India) | 21.8 % | 48 | 9 % | 13.2 % | 29 | 10 % | 20.5 % | 45 | 5 % |
| Developed Asia (incl. Japan, S-Korea, Australia) | 14.5 % | 32 | 5 % | 6.4 % | 14 | 5 % | 18.6 % | 41 | 6 % |
| USA and Canada | 9.1 % | 20 | 5 % | 5.5 % | 12 | 5 % | 19.5 % | 43 | 5 % |
| Middle East (incl. Turkey) and Africa | 3.2 % | 7 | 5 % | 3.6 % | 8 | 5 % | 15.5 % | 34 | 5 % |
| South and Central America (incl. Mexico) | 3.2 % | 7 | 4 % | 3.6 % | 8 | 5 % | 13.2 % | 29 | 5 % |
| Trade | 220 | | | 220 | | | 220 | | |
| North, West and Southern Europe | 60.5 % | 118 | 30 % | | | | 28.7 % | 56 | 5 % |
| Eastern Europe (e.g. Poland, Russia, Baltic States) | 29.7 % | 58 | 10 % | | | | 29.7 % | 58 | 4 % |
| Developing Asia (e.g. China, India) | 26.2 % | 51 | 10 % | | | | 6.7 % | 13 | 10 % |
| Developed Asia (incl. Japan, S-Korea, Australia) | 18.5 % | 36 | 5 % | | | | 3.6 % | 7 | 5 % |
| USA and Canada | 13.8 % | 27 | 5 % | | | | 5.1 % | 10 | 4 % |
| Middle East (incl. Turkey) and Africa | 6.7 % | 13 | 2 % | | | | 1.5 % | 3 | 1 % |
| South and Central America (incl. Mexico) | 2.6 % | 5 | 3 % | | | | 2.6 % | 5 | 3 % |
| Manufacturing and trade | 195 | | | | | | 195 | | |
| North, West and Southern Europe | 61.7 % | 256 | 25 % | | | | 43.4 % | 180 | 15 % |
| Eastern Europe (e.g. Poland, Russia, Baltic States) | 32.3 % | 134 | 10 % | | | | 39.3 % | 163 | 5 % |
| Developing Asia (e.g. China, India) | 23.9 % | 99 | 10 % | | | | 14.0 % | 58 | 5 % |
| Developed Asia (incl. Japan, S-Korea, Australia) | 16.4 % | 68 | 5 % | | | | 11.6 % | 48 | 5 % |
| USA and Canada | 11.3 % | 47 | 5 % | | | | 12.8 % | 53 | 5 % |
| Middle East (incl. Turkey) and Africa | 4.8 % | 20 | 4 % | | | | 8.9 % | 37 | 5 % |
| South and Central America (incl. Mexico) | 2.9 % | 12 | 4 % | | | | 8.2 % | 34 | 5 % |
| N= | 415 | | | | | | 415 | | |

Note: analysis includes large, medium and small firms (i.e. excluding micro-sized firms)

International elements in the supply chains of Finnish companies in manufacturing and trading are more often than not located in Europe and developing Asia. The degree of importance of geographical regions at different parts of the supply chain is virtually identical. Furthermore, the median percentages are clearly relatively low, except perhaps in Northern, Western and Southern Europe. This reflects Finland's huge share of the operation or the decentralisation of portfolios. The number of manufacturing companies involved in international production is obviously smaller than those selling and buying internationally. It is the sales portfolios that divide up the most evenly. There is a considerable number of companies that buy and sell internationally. One explanation for this may be that, among the respondents, there are a lot of companies in trading that engage in sales activities mostly in the home country.

The following analysis deals with the extent to which companies have intentions of moving their production capacity and whether these changes would take place in the home country or in low cost countries. The analysis focuses on the largest companies and SMEs in the manufacturing industry (i.e. it excludes construction companies and micro-companies). A total of 115 companies for which the subject was relevant answered the question on changes to production capacity by the year 2015.

Figure 29 shows the percentage of respondents in cross-tabulations with regard to two variables: the predicted change in capacity in Finland and that in low cost countries on a simple scale: will fall, no change, will grow. In all, 23% of respondents plan to cut

production capacity in Finland and increase it in low cost countries ('offshoring') by 2015. At the other extreme, only around 1% of companies plan to increase capacity in Finland and reduce it in low costs countries ('backshoring').

Some 18% believe that their capacity in Finland will not change, but will not grow in low cost countries either. With 22%, capacity will increase in Finland but stay the same in low cost countries. 'Growth companies' (14%) are planning to increase their capacity both in the home country and in low cost countries. Some companies predict that their capacity will remain at the level it is now.

The conclusion is that low cost countries are on average more attractive prospects for increased production capacity than Finland is (23% + 18% + 2% = 43% vs. 1% + 22% + 0% = 23%). The positive message, however, is that 37% of respondents are planning an increase in capacity in Finland by 2015.

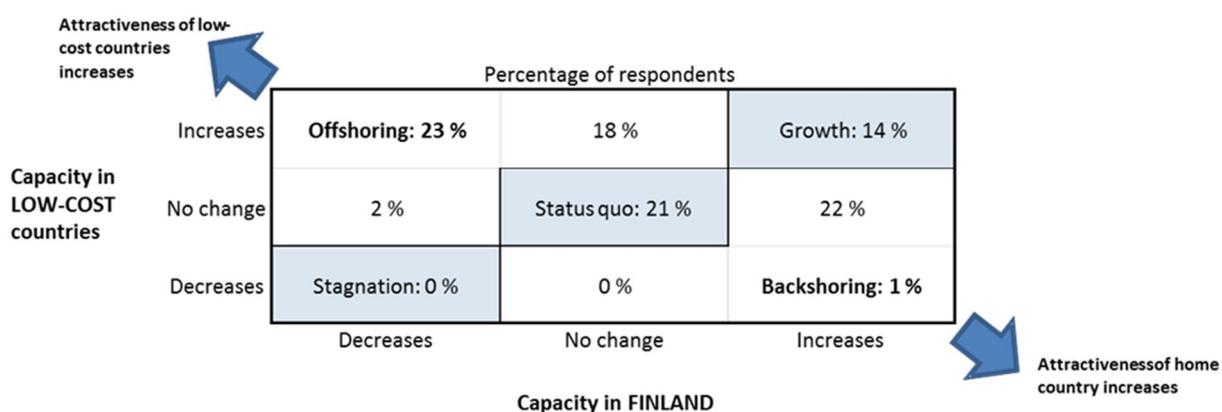


Figure 29 Cross-tabulation of change in capacity in Finland and in low cost countries by 2015 (115 respondents)

Companies that think that low cost countries are a more attractive prospect than the homeland with respect to locating production facilities fall evenly into three categories: large, medium-sized and small companies. These companies also tend to manufacture metal products or other machinery and equipment (in 50% of cases).

Figure 30 shows the percentage of respondents in cross-tabulations with regard to two variables: the predicted change in procurement in Finland and that in low cost countries on a simple scale: will fall, no change, will grow. It can be seen that the number of companies that plan to reduce procurement in Finland and increase it in low cost countries (the 'LCC procurement strategy') by 2015 corresponds to 27% of respondents. At the other extreme, it is clear that those planning to increase procurement in Finland and reduce it in low cost countries ('homeland procurement strategy') by 2015 corresponds to just 1% of respondents.

Also noticeable is the considerable number of companies that will not be altering their procurement strategy in Finland but will be increasing it in low cost countries (21%), and the number of those whose procurement will increase in Finland but remain as before in low cost countries (12%). In addition, growth companies (17%) are planning to increase their procurement in both areas. A total of 17% of companies predict that they will preserve the status quo with regard to procurement.

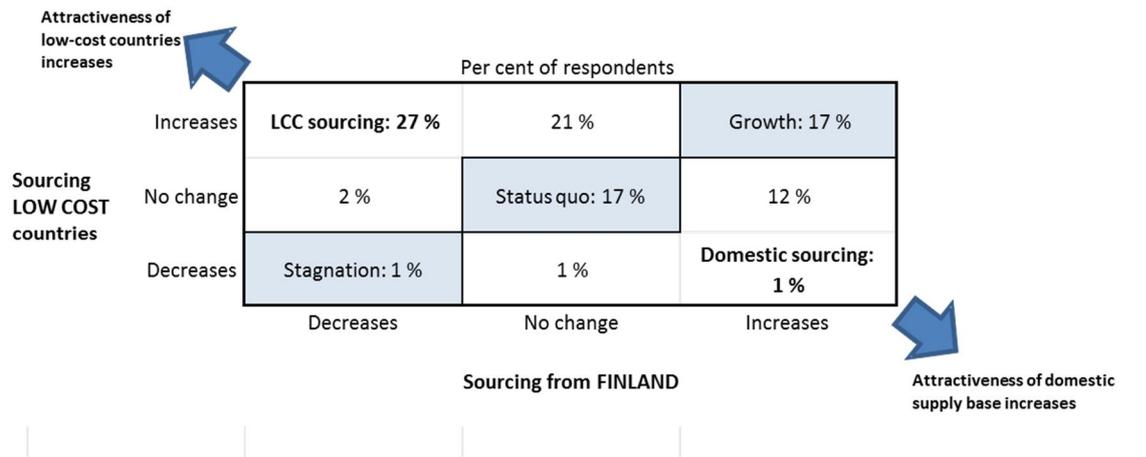


Figure 30 Cross-tabulation of change in procurement in Finland and in low cost countries by 2015 (139 respondents)

The conclusion may be that low cost countries are now on average more significantly attractive for increased procurement than Finland is (27% + 21% + 2% = 50% vs. 1% + 12% + 1% = 14%). Low cost countries come out as a more attractive prospect for procurement than for production capacity. However, 30% of companies are planning to increase procurement in Finland.

Companies that think that low cost countries are a more attractive prospect than the homeland with respect to procurement and the location of suppliers are often large companies (some 48% of cases). These companies also tend to manufacture metal products or other machinery and equipment (in 60% of cases).

6.5 The outsourcing of logistics operations

Companies that responded to the survey were asked the same question since 2006 on the outsourcing of logistics operations. This enables a comparison to be made of trends in outsourcing among the various logistics functions. Figures 31 and 32 show the extent to which various logistics functions and operations were outsourced by companies in manufacturing and trading in 2006 and in 2012. The main observation to be made here is that changes to the outsourcing of logistics operations have only been minor in recent years.

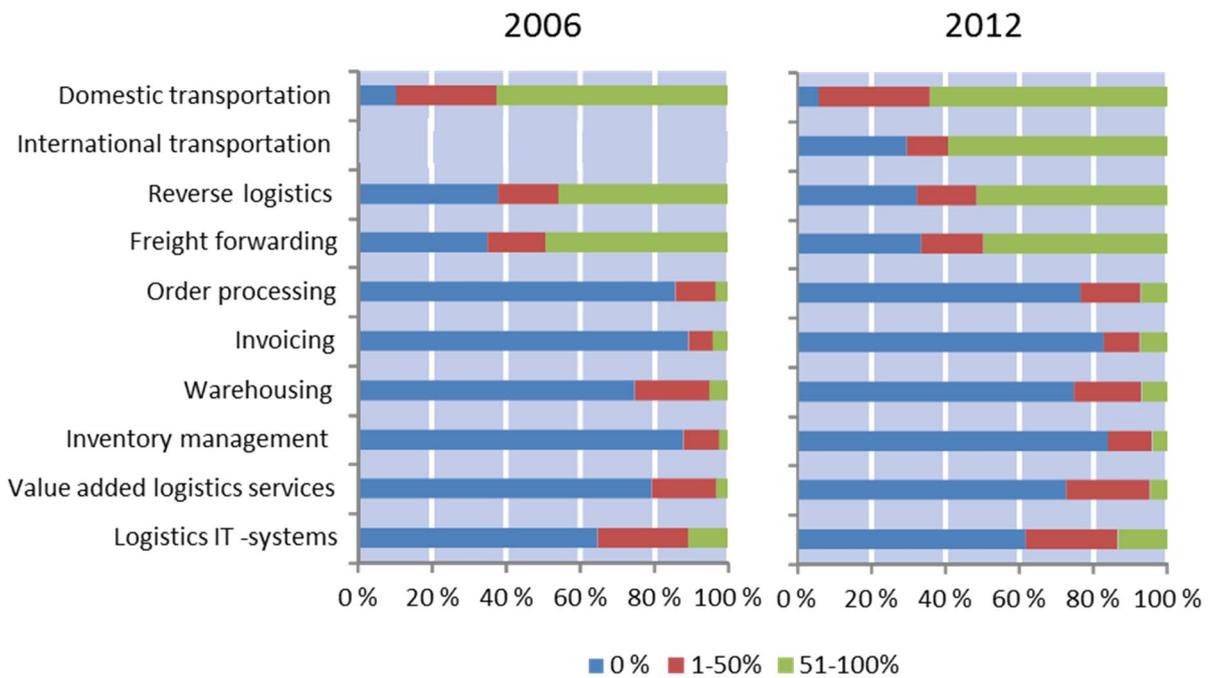


Figure 31 Trends in the extent to which logistics is outsourced in manufacturing companies 2006–2012

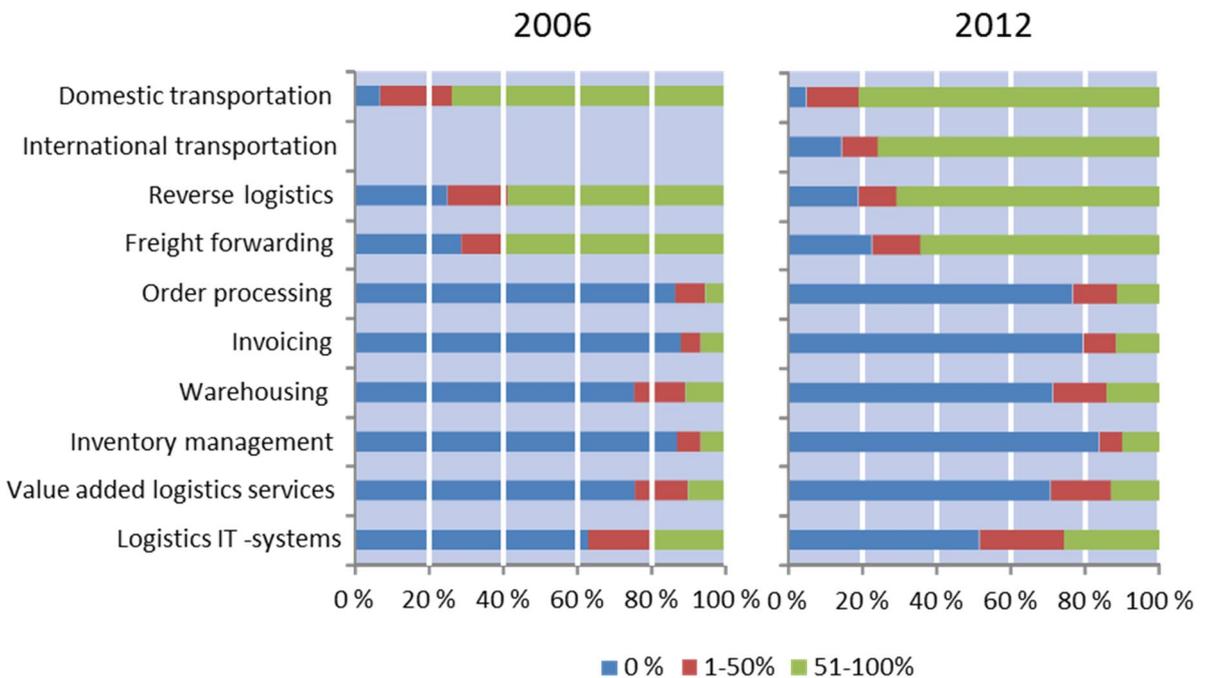


Figure 32 Trends in the extent to which logistics is outsourced in companies in trading 2006–2012

In 2006, over 90% of the companies in manufacturing and trading had outsourced at least part of their transport services, and in 2012 the situation was fairly similar. The same is true, furthermore, for reverse logistics and freight forwarding. There has been

some development in the outsourcing of logistics IT -systems with regard to companies in trading. The number of companies that take care of their logistics information systems themselves overall fell from more than 60% in 2006 to around 50% in 2012.

A key observation to be made here is that, except in the case of transport services, the outsourcing of logistics operations has not progressed as expected in Finland. Earlier logistics surveys suggested that outsourcing was expected to increase in scope, especially in the areas of information logistics (handling of orders, billing and logistics information systems) and materials management, but the development has been slower than what was foreseen.

An international comparison (see, for example, Langley 2005) would show that Finnish companies, except for transport services, outsource less than those elsewhere. Consequently, the logistics services market would appear to have rather a lot of unused potential. Many manufacturing and trading companies would benefit from concentrating on their core operations and outsourcing their logistics operations, for example. At the same time, logistics service providers would benefit from developments in new services and their supply.

6.6 Supply chain risks as seen by companies

The findings for manufacturing (including construction) and trading are based on 1,347 responses. Figure 33 gives a general picture of the views of respondents with regard to how grave the risks in the supply chain are and will be, now and in the future. Only one risk factor on the scale 1-5 goes beyond the mid-point (3. 'neither slight nor great') in terms of the problems it might cause: Dramatic swing in demand or demand difficult to predict, where the average value is 3.44.

On average, supply chain risks have not caused any major drawbacks, then, for the respondents in 2010-2011. Something else worth noting is that the respondents see that drawbacks caused by risk factors will increase in number and scope in the future (2012-2015) in every area included in the questionnaire.

The five principle risks in the supply chain from the point of view of manufacturing and trading in 2010-2011 are:

1. Volatile demand and difficulties in forecasting
2. Material suppliers' / subcontractors insufficient capacity and material shortages
3. Material suppliers' / subcontractors poor delivery reliability (incl. quality deficiencies)
4. Customer delayed or nonpayment
5. Low availability of competent personnel

The list reflects the importance of downstream and upstream risk management in the supply chain with regard to information, materials and money flows. The respondents predict that the following drawbacks will grow in scope most significantly by 2015:

1. Financial difficulties of material suppliers / logistics service providers (incl. bankruptcy)
2. Political instability (e.g. unrest, terrorism, war)
3. Customer delayed or nonpayment
4. Regulatory changes (e.g. regarding transport, international trade and environment)
5. Labour market disruptions (e.g. strikes)

The message in the responses can be summarised in this way: the economic crisis may cause customers and suppliers to suffer from financial problems, and this might affect company cash flow, working capital management and the availability of materials and

components generally. Moreover, the operating environment will cause ever more problems for supply chains, in the form, for example, of losses and uncertainty owing to unrest, strikes and regulations. The drawbacks caused by supply chain risks are expected in the future to be slight or medium on average.

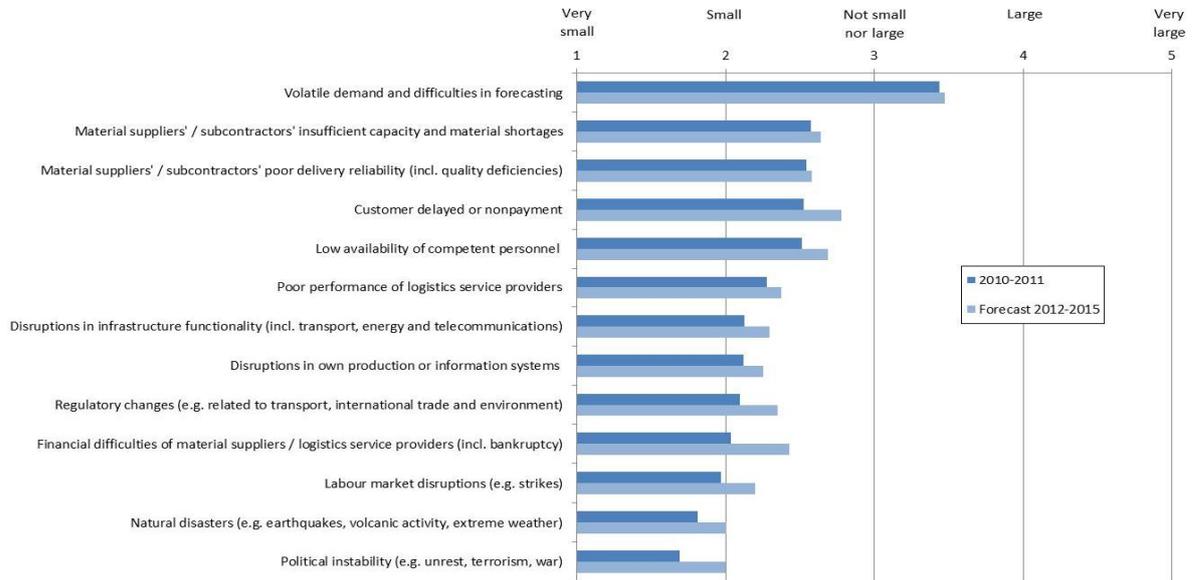


Figure 33 Drawbacks due to supply chain risks in the past two years (2010–2011) and in the future (2012–2015); average values for manufacturing and trading (number of respondents = 1,347)

Both international companies and export companies in manufacturing and trading feel, without exception, that drawbacks due to risks in the supply chain for the period 2011-2011 are greater than do companies in the home market. Figure 34 shows how there are areas (e.g. dramatic swing in demand or demand difficult to predict and supplier capacity) where international companies do not see such risks increasing in number or scope during the period under review.

In ten areas (out of a total of 13), the difference between international companies and home market companies is statistically significant. The five greatest differences are in the following supply chain risk areas:

1. Volatile demand and difficulties in forecasting
2. Regulatory changes (e.g. regarding transport, international trade and environment)
3. Material suppliers' / subcontractors' insufficient capacity and material shortages
4. Material suppliers' / subcontractors' poor delivery reliability (incl. quality deficiencies)
5. Disruptions in own production or information systems

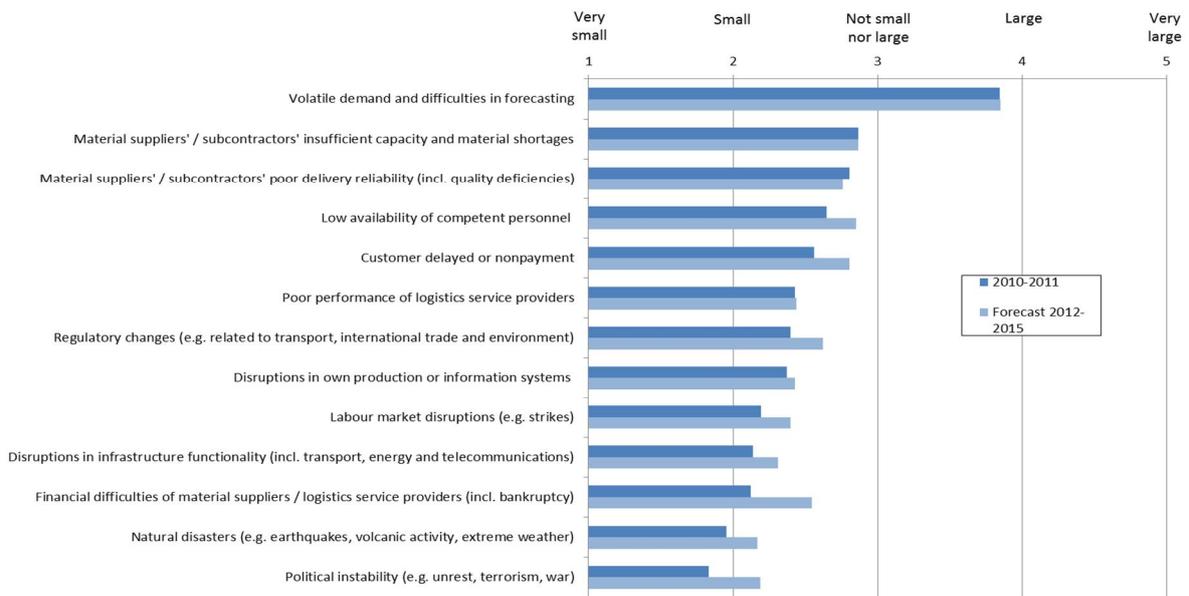


Figure 34 Drawbacks due to supply chain risks in the past two years (2010–2011) and in the future (2012–2015); average values for international and export companies (number of respondents = 218)

The results for international companies reflect the whole spectrum of the supply chain field, from the challenges of predicting demand in the international context. International companies suffer more than other businesses from changes in regulation and the problems that accompany them (e.g. higher administrative costs), as well as the problems of coordinating and controlling their own internationally dispersed supply chain (including production). Furthermore, it is to be assumed that international procurement, for example in low cost countries, increases the risks associated with procurement and makes risk management a more challenging business.

7. Results for logistics service providers

Key observations in brief:

- The logistics sector is increasingly concentrated, with companies more dependent than previously on their larger customers
- Economies of scale in the logistics sector are important, with small companies often acting as sub-contractors for larger logistics companies
- The majority of logistics companies only operate in the domestic market, with international actors accounting for just a third of the market
- A positive link between company size and the efficiency of logistics companies exists
- Dramatic swings in demand, availability of skilled staff and changes in regulation

7.1 The customer structure for companies that responded to the survey

In recent years, there has been much talk of the concentration of the logistics industry, and the results of the survey also support this trend. Regardless of size, companies' biggest customers seem to account for most of the sales of logistics service providers (Figure 35).

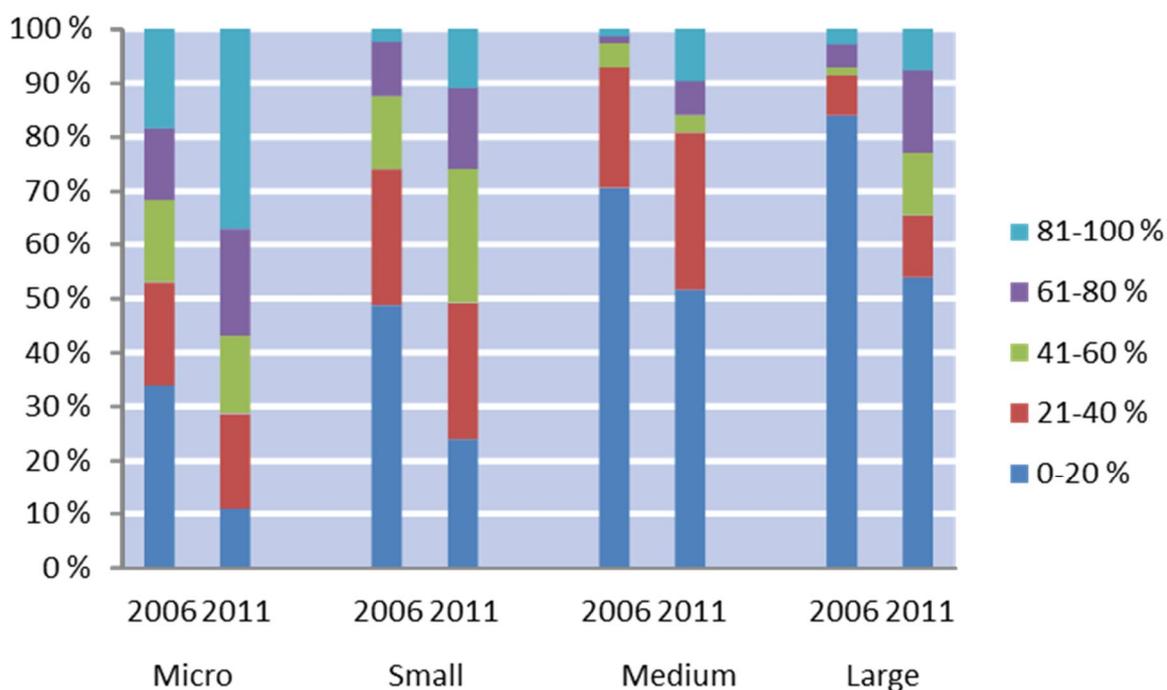


Figure 35 The single largest customer's share of turnover for logistics service providers in 2011

In all, 37.5% of micro-companies derive more than 80% of their sales from the company's biggest customer. Other companies have a larger spread of customers, but even with these, the extent to which largest customer accounts for overall company sales has increased since 2006. It is the situation with the large companies that would seem to have altered mostly. While in 2006, 83.8% of these were ones where the largest

customer accounted for less than 20% of the company's sales, in 2012 that was true of just 53.8% of companies in this category. All company size categories have thus undergone concentration.

The concentration of the markets can also be seen by examining the role of five largest customers of the logistics service providers. In nearly half of micro- and small companies, the five largest customers accounted for more than 80% of sales. The figure was also greater for medium-sized and large companies. Five years ago, 60% of large companies were such that the five largest customers accounted for less than 20% of sales. In 2012 only 36% of companies belonged into this category. Only 20% of large companies are such that the five largest customers account for over 80% of sales (Figure 36).

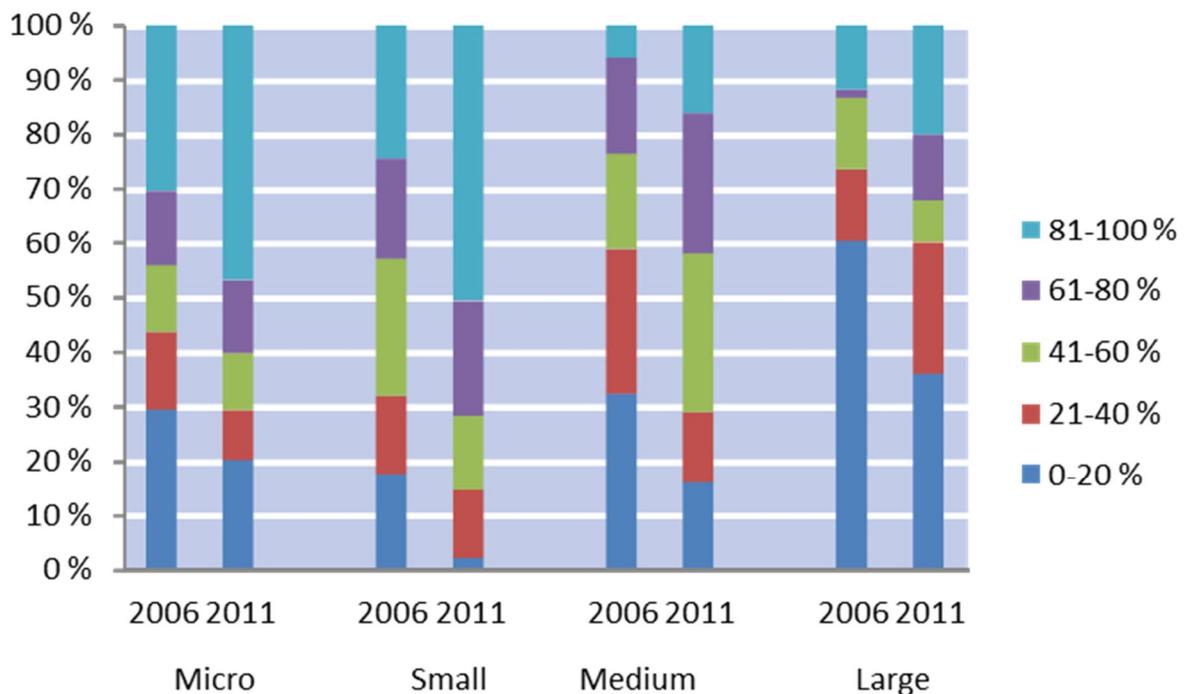


Figure 36 The five largest customers' combined share of turnover for logistics service providers in 2011

The extent to which there was concentration of activity in the transport sector and the prevalence of sub-contracting were both explored by asking how much of a company's transport service was produced by other companies acting as sub-contractors. The question was also asked as to how much of the transport fleet the company uses is owned by the company or is in its possession on the basis of a long-term leasing agreement. As is clear from Figure 36, company size correlates closely with both the amount of sub-contracting and whether the company owns a transport fleet, with smaller companies typically owning much of the fleet they use and producing most of their transport services themselves, as opposed to bigger companies. In all, 68.8% of micro-companies own more than 80% of the fleet they use, while the equivalent figures for small companies are 45.6%, for medium-sized companies 46.9%, and for large companies just 14.3%.

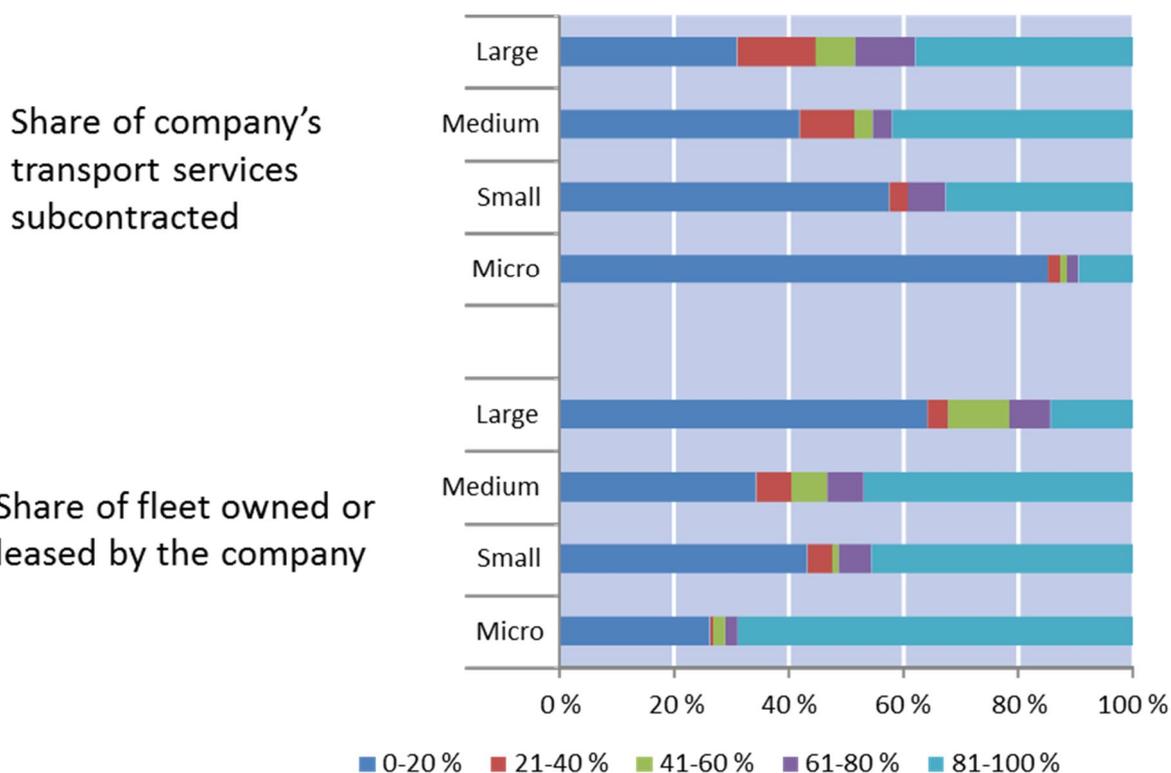


Figure 37 Extent to which transport companies' services are sub-contracted and the fleet/equipment sub-contracting structure in 2011 by respondent company size

The extent to which a company's transport services are sub-contracted increase with the size of the company. In all, 85.3% of micro-companies are those where under 20% of its transport services are produced by sub-contractors, while the equivalent figures for small companies are 45.6%, for medium-sized companies 41.9%, and for large companies just 31%. (Figure 37.)

Sub-contractors produce over 80% of transport services in 41.9% of medium-sized companies and in 37.9% of large companies. In the future, it will be interesting to see how dramatically sub-contracting increases and whether the transport market will become polarised between large independent companies and small companies operating as their sub-contractors.

7.2 Indicators for logistics service providers

The survey examined some key indicators, for road transport companies in particular, such as average transport performance per vehicle, the empty mile percentage, the average length of haul, and the average load factor for shipments both for domestic and international consignments. Average transport performance per vehicle was around 102,000 kilometres among the companies that responded. Altogether, 25% of road transport companies say their annual transport performance is 50,000 kilometres or less, and 25% say theirs is more than 140,000 kilometres per vehicle.

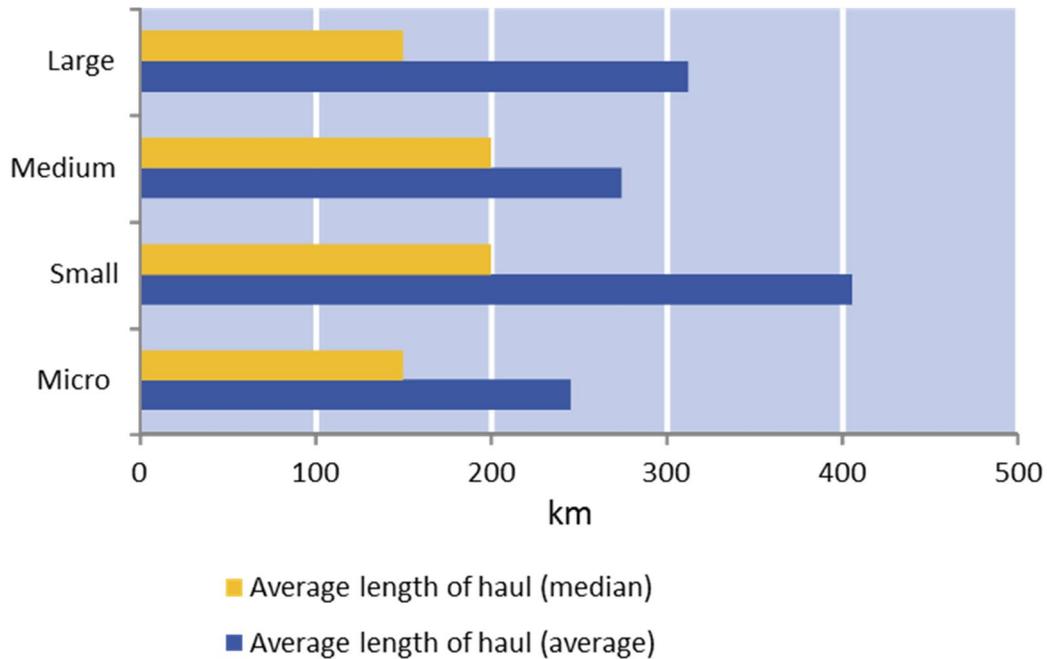


Figure 38 Average length of haul of road transport companies (average and median) in 2001 by respondent company size

Figure 38 shows the average length of haul as median and average values reported by companies responding to the survey. The median value for journeys for half of the large and micro-companies is no more than 150 kilometres. The figure for SMEs is no more than 200 kilometres. The lengths of haul are significantly higher in all company size categories than the median values. The skewed distribution in the length of haul indicates in practice that, although the majority of companies have concentrated on consignments covering a distance of only 150 to 200 kilometres, included in the survey are companies whose journeys are considerably longer. For example, a quarter of large companies are those where the normal length of the journey is more than 375 kilometres.

If transport companies are to make a profit, it is crucial to consider how much of their transport performance they can bill customers for. Empty mile percentage say the same thing: the less they account for overall transport performance, the more kilometres the company can derive an income for. With regard to empty mile percentage, large companies would seem to differ from the rest. The share of unloaded journeys for micro-companies is 26.7%, for small companies 27.4% and for medium-sized companies 27.9% of distances in kilometres driven. The equivalent figure for large companies is much lower at just 15.1% (Figure 39). There is a logical explanation for this, of course: the volumes carried by large companies allow them to combine shipments and organise return loads more successfully than smaller companies can.

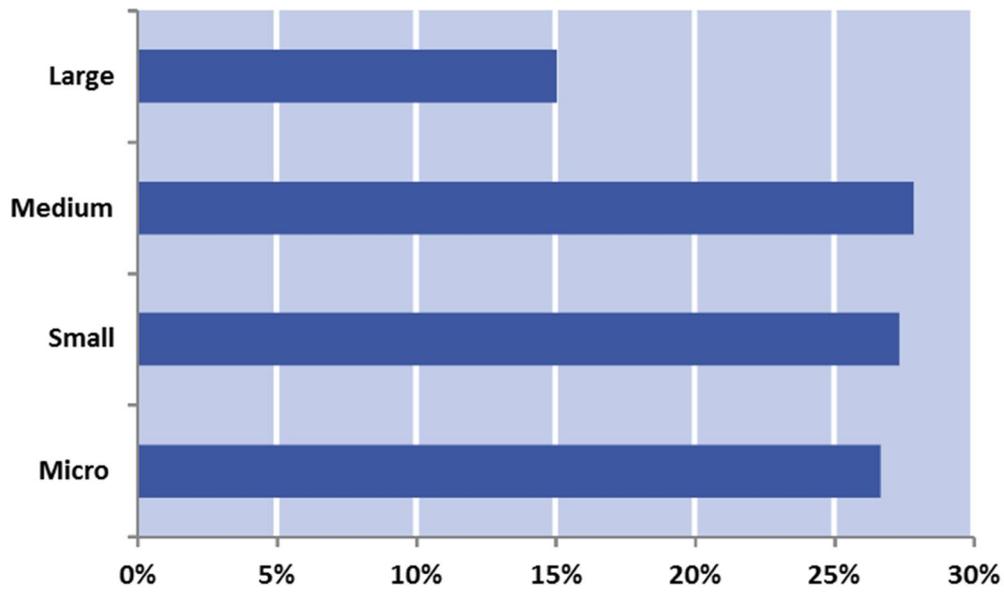


Figure 39 Empty mile percentage in the transport performance of road transport companies in 2011 by respondent company size

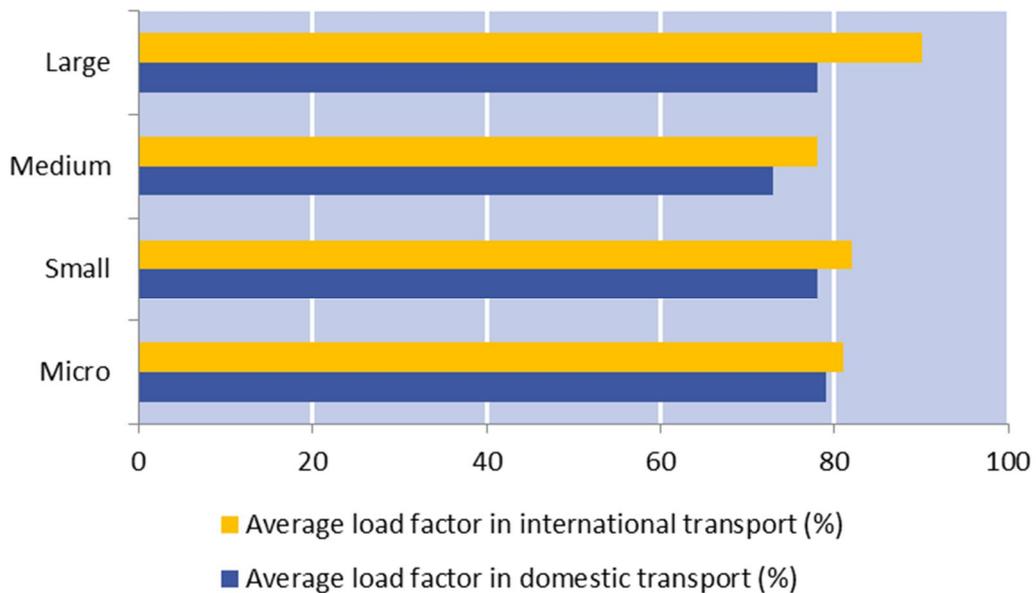


Figure 40 Average load factor for consignments by road by company size in 2011

Furthermore, the load factor in shipments is an important measure of transport efficiency and economy. Figure 40 shows the average shipment load factors reported by companies for transport companies of different sizes. Company size would appear to be more significant for load factors for international rather than domestic consignments. The figure for domestic loads was 78.6% for micro-companies, 78.1% for small companies, 71.3% for medium-sized companies and 76.3% for large companies.

Large companies involved in international shipments, as opposed to those delivering consignments in Finland, would appear to be able to achieve rather higher load factors than smaller companies. The load factor for international transport achieved by large companies averaged 89.5%; for medium-sized companies it was 75.4%, for small companies 82.8% and for micro-companies 80.6. It is also worth noting that load factors for foreign consignments are consistently higher than is the case with shipments within Finland.

7.3 Logistics service providers and their international business

There follows an analysis of the geographical distribution of the turnover of logistics service providers. Table 10 gives the number and percentage of companies that reported their turnover for various geographical regions (except Finland). In addition, and because the distributions are skewed, the median values for those reporting turnover for each region are shown. As with the supply chains for Finnish manufacturing and trading, the turnover abroad for logistics service providers is mainly in Europe and Asia. However, it is more evenly distributed among the regions. The number of international actors is relatively small, but the median values for turnover for each geographical region are relatively high compared to sales in commercial and manufacturing sectors. The figures suggest that actors in the sector are typically those specialising in either domestic or foreign logistics services. The sector also includes actors with no turnover at all coming from Finland (7.6%).

Table 10 Distribution of the turnover of logistics service providers for Finland and seven regions abroad in 2011

| | Turnover | | |
|---|--|--|---|
| | %-share of companies operating in the area | Frequency of companies operating in the area | Median of %-share for companies operating in the area |
| Finland | 92.4 % | 595 | 100 % |
| North, West and Southern Europe | 27.8 % | 179 | 20 % |
| Eastern Europe (e.g. Poland, Russia, Baltic States) | 12.9 % | 83 | 10 % |
| Developing Asia (e.g. China, India) | 5.3 % | 34 | 20 % |
| Developed Asia (incl. Japan, S-Korea, Australia) | 5.1 % | 33 | 10 % |
| USA and Canada | 5.0 % | 32 | 6 % |
| Middle East (incl. Turkey) and Africa | 3.7 % | 24 | 5 % |
| South and Central America (incl. Mexico) | 3.4 % | 22 | 9 % |
| N= | 644 | | |

Most of the respondents (64%) derive their turnover purely from one market, typically Finland. There are 13 (2% of the group) global actors operating in all the eight geographical regions defined here. The average number of regions where companies derive turnover is shown in Figure 41. The diagram provides evidence of the fact that the bigger a company is, the wider its field of operations from the geographical perspective.

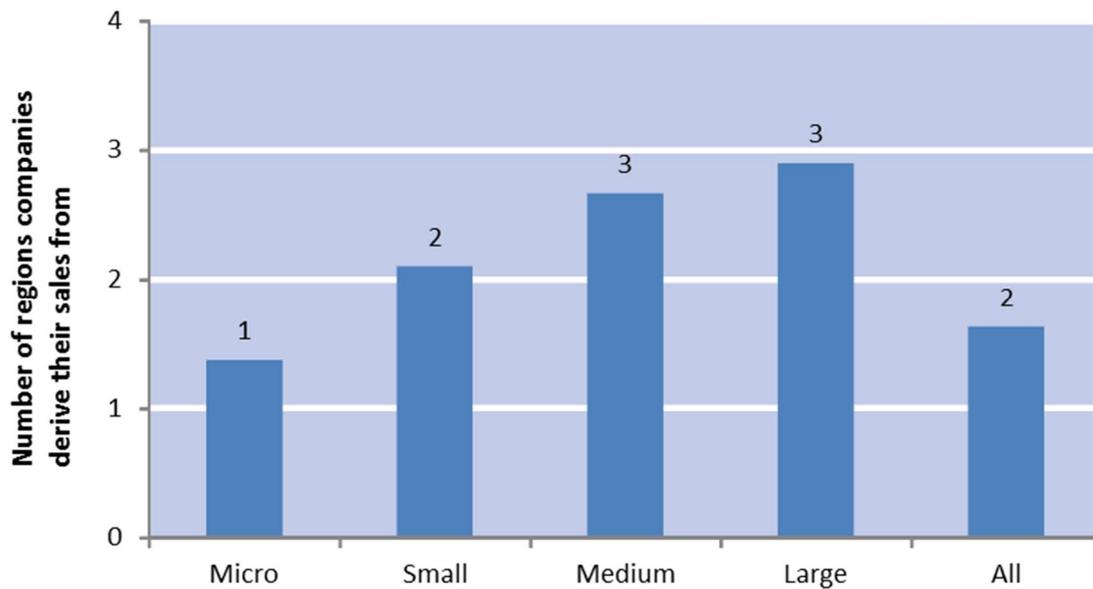


Figure 41 Average number of regions logistics companies derive their turnover from in 2011 by company size (number of respondents = 615; eight regions; Finland and the rest of the world divided into seven areas abroad)

7.4 Supply chain risks faced by logistics service providers

The findings for supply chain risks faced by logistics service providers are based on 542 replies. Figure 42 gives a general picture of the views of respondents with regard to how grave the risks in the supply chain are and will be, now and in the future.

Three risk factors on the scale 1-5 go beyond the mid-point (3. 'neither slight nor great') in terms of the problems they might cause: Dramatic swing in demand or demand difficult to predict (average value 3.69), Poor availability of skilled staff (3.17), and Changes in regulation (3.04). Generally speaking, logistics service providers feel that the drawbacks caused by risks in the supply chain are greater than is the case with companies in manufacturing and trading, even if the problems are not normally major. Another general point to note is that the respondents say that drawbacks caused by risk factors will increase in number and scope in the future (2012-2015) in every area included in the questionnaire.

The five principle risks in the supply chain from the point of view of logistics service providers in 2010-2011 are:

1. Volatile demand and difficulties in forecasting
2. Low availability of competent personnel
3. Regulatory changes (e.g. regarding transport, international trade the environment)
4. Labour market disruptions (e.g. strikes)
5. Disruptions in infrastructure functionality (including transport, energy and telecommunications)

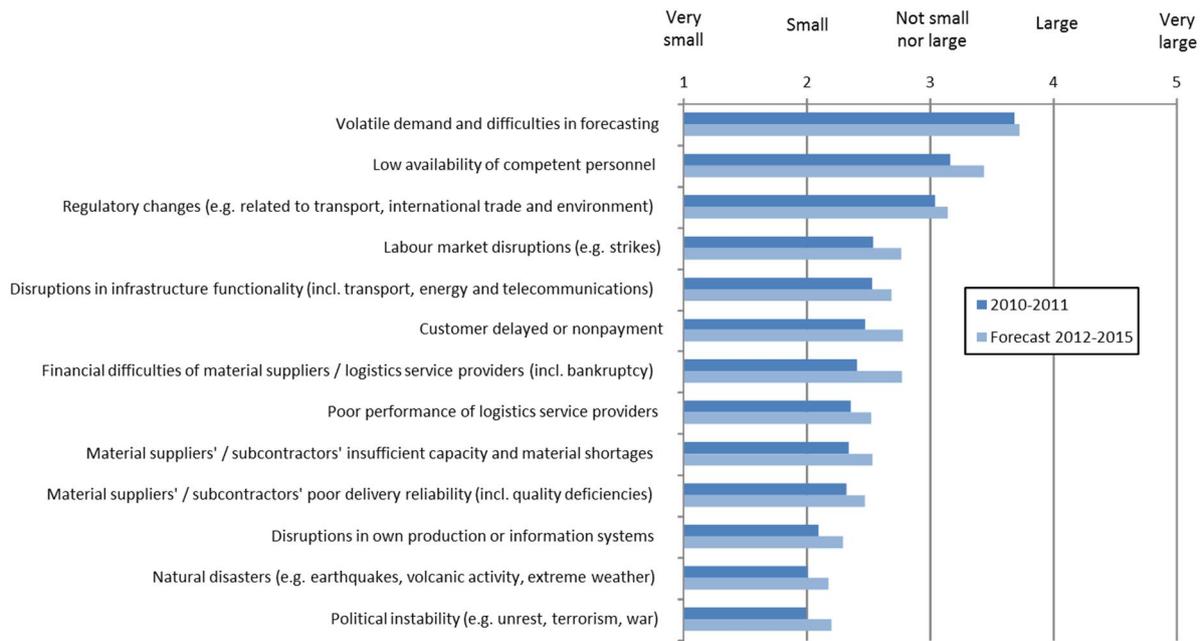


Figure 42 Drawbacks due to supply chain risks in the past two years (2010–2011) and in the future (2012–2015) from the perspective of logistics service providers (number of respondents = 542)

The list reflects the major significance not only of uncertainty in connection with demand but also the challenges and risks connected with the logistics operating environment. The respondents predict that the following drawbacks caused by risks in the supply chain will grow in scope most significantly by 2015:

1. Financial difficulties of materials suppliers / logistics service providers (including bankruptcy)
2. Customers' payment difficulties
3. Availability of skilled staff
4. Labour market disruptions (e.g. strikes)
5. Political instability (e.g. unrest, terrorism, war)

The message in the responses can be summarised in this way: the economic crisis may cause customers and suppliers to suffer from financial problems, and this might affect company cash flow and sub-contractors. Moreover, the operating environment will cause ever more problems for supply chains, in the form, for example, of availability of labour and losses and uncertainty owing to unrest and strikes. It has to be said, however, that these problems are expected mostly to be slight or medium in the future.

8. Logistics in the Finnish economy and business in 2012

The internationalisation of companies and the growing demands of customers have steadily made logistics ever more important for company competitiveness. The geographical expansion of production, procurement and sales operations has made company supply chains longer and more complex, exposing business to more factors of uncertainty than before.

Up to half of the competitiveness of large companies, in particular, is based on management of the supply chain. The large number of (tariff heading) designations that big actors in trading have, the global procurement markets and, on the other hand, the thin and, at the same time, swift flows of goods have, in practice, turned companies into 'logistics centres', in a way.

8.1 Logistics hugely important for competitiveness; Finland ranks high

Companies believe that they can have an influence on around 40-50% of their logistical competitiveness, depending on the size of the company: it is mainly external factors that impact on the rest. Besides market actors, the logistical competitiveness of companies is affected by social measures and national and international regulation, among other factors.

Finland comes out well in international comparisons measuring both global competitiveness and logistics viability. For example, the World Economic Forum's Global Competitiveness Index puts Finland among the ten best countries in the world. In the World Bank's Doing Business report, which assesses the general business environment, Finland was ranked 11th in 2012 among a group of 183 countries.

The World Bank's Logistics Performance Index (LPI) measures the logistical viability of countries' foreign trade on the basis mainly of a large volume of questionnaire data for forwarding and logistics companies. In the last available report, LPI 2012, Finland was 3rd out of a total of 155 countries.

The Finns themselves judge logistical viability in Finland far more critically than the LPI. With respect to the LPI scores, a similar phenomenon is discernible in other high income countries, where ratings of one's own country's performance are generally less kind than external judgements. In high income countries, the demands on quality of services are very great, and the scope for what is considered 'acceptable' is often limited. The very successful countries, such as Finland on the LPI index, stand out to their advantage in the broader context.

8.2 Logistics in Finland is on a good level, but differences across the country continue to grow

In the logistics surveys (2006-2012), Finnish companies have tended to give a very high score for logistical viability in the region in which they are situated. The companies said that the best areas for consideration⁸ were conditions for business generally and logistical viability. The worst criticism concerned location of competitors. Logistical conditions in South Finland would seem to be better than elsewhere in the country in all the areas considered. In second place came West Finland, in third North Finland, and in fourth East Finland. The greatest differences between the various parts of the country are in opinions on the transport infrastructure.

⁸ 1) for business generally; 2) for logistical viability; 3) for location of production; 4) for the transport infrastructure; 5) for location of competitors.

The ratings given by those in East Finland, in particular, differ enormously from those in South Finland, and they average out at below the neutral point. It is an interesting result, since, according to the European Union Regional Competitiveness Index (Annoni and Kozovska 2010), the differences in the level of the transport infrastructure among the different regions of Finland were minor: the best region, South Finland, scored 79 on the index, and the worst, North Finland, scored 70 on a normalised scale of 0 to 100. Furthermore, East Finland was among the best regions in Europe on the index that measures the efficiency of the railway network.

The difference between the European survey based on statistics and the regional viewpoint is considerable. Moreover, in interviews with researchers who have examined logistics competitiveness in Finland, the Finnish transport infrastructure, almost without exception, received a score of 8 or over (Paavola et al. 2012). This raises the question of to what extent this is about actual defects in the infrastructure and the need to put them right, and how much it is about channelling other factors into the debate on the infrastructure.

8.3 Finland remains an attractive prospect for the location of production facilities

The production capacity of companies in Finland has grown rapidly, as it has too in low cost countries. The responses suggest that low cost countries will continue to attract the location of production facilities and procurement in the future, though over a third intend to increase their production capacity in Finland by 2015. Only around a quarter of respondents are planning to cut production capacity in Finland.

Factors connected with logistics are not the main motivation for the location of production facilities in the years to come - not, at least, based on this survey - because they tend to come second-to-last among the options given. The reasons are more to do with markets: Finnish companies are interested in the lower production costs in the target country, satisfying the demand for new markets, and the availability of raw materials and components.

Company priorities will not necessarily remain the way they are now, so a matter for concern in the future will be the presence of a good logistical operating environment, for example, in matters relating to regulation at home and abroad.

8.4 Logistics costs have remained proportionately the same – but the trend is upward

The logistics costs of companies in manufacturing and trading remained virtually what they were in 2009 in relation to their turnover. In 2011 the figure averaged 12.1% of turnover, while in 2009 it was 11.9%.

Transportation costs are still the largest single cost item, at present averaging 4.6% of company turnover, or a good third of company logistics costs overall. Almost 57% of respondents in manufacturing and almost 65% of those in trading thought that their transport costs would rise by 2015.

Fierce competition in the transport market and the decrease in freight rates as a result of a fall in demand have kept transport costs moderate, but, as the global economy picks up and volumes of transported goods increase once again, it may be assumed that transport costs will go up again. Furthermore, numerous decisions have been taken in the areas of taxation and the environment, both in Finland and at EU level, and these will

push up transport costs. In the short term, they represent a major challenge for the transport sector and Finnish business.

The costs of warehousing and inventory carrying have more or less remained at the level they were before. Companies have been able to adjust their inventory levels to the new market situation, though economic uncertainty has kept interest reference rates low. Average figures, however, hide a more complex reality.

Some companies have managed to acquire financing at low interest rates, while for others the lending margins have increased considerably. For some companies it is even impossible to obtain finance at market rates because of tighter terms and conditions and gradings. The future will therefore be challenging for many reasons. Reference rates have but one direction to follow, and that is upward, which over time will also probably serve to increase the inventory carrying costs. The challenge in the shorter term is to ensure that financing is available on the markets for as many companies as possible.

The results of this survey indicate that logistics costs as a proportion of GDP would seem to have fallen to 8.6, which is 1.6% less than in 2009. Much of the difference is explained, however, by the fact that the extent to which manufacturing accounts for GDP is still at a lower level than previously.

8.5 The potential for outsourcing logistics for Finnish companies

Against all expectations, the outsourcing of logistics has made barely any progress in the last few years. Finnish companies have mainly outsourced their transport operations to external service providers, but other logistics operations and functions are still mainly taken care of by the companies themselves. Compared internationally, Finnish companies have been more reluctant to outsource their logistics than companies in countries in similar economic situations, such as those in Western Europe and North America. This dearth of outsourcing might well be seen as an opportunity for companies to make their operations more efficient by concentrating on their core business.

Outsourcing should not be seen purely as a way to get something done more cheaply: often its benefits are derived more from the fact that the company's focus improves, and there are more savings made and greater efficiency mainly because the company is able to focus on its own areas of expertise, such as production, instead of wasting limited resources trying to control all functions and operations itself. Obviously, if there is to be more outsourcing of logistics, there will need to be an adequate range of good quality services on offer, as well as seamless cooperation in the management of both material and information flows between customer and service provider.

8.6 Environmental matters a competition factor in the future

Companies would appear to be quite widely interested in what the impact their operations and activities have on the environment. More than 70% agree, at least partly, with the statement "We have tried to reduce the environmental impact of our business". There has also been an attempt to reduce the environmental impact the company's products have on the environment on the part of 60% of respondents. But the division of labour and share of responsibility in environmental issues often seems unclear, both within the company and with main suppliers and customers.

Attention to environmental issues is obviously a positive thing. Environmental management should not be seen merely as a way to boost the company image. It is also a chance to clarify and improve the company's business activities and processes both internally and externally. Studies show that improved approaches to environmental

issues have leverage effects on other aspects of the company's business (see, for example, Vachon and Klassen 2008).

8.7 The current state of logistics in Finland is excellent, though attention needs to be paid to competitiveness in the future

Logistical viability in Finland would generally seem to be very good – even excellent when compared globally. Although logistics and supply chain management have continuously grown in importance for the competitiveness of companies in Finland, the greatest challenges they face come from places other than the realm of logistics.

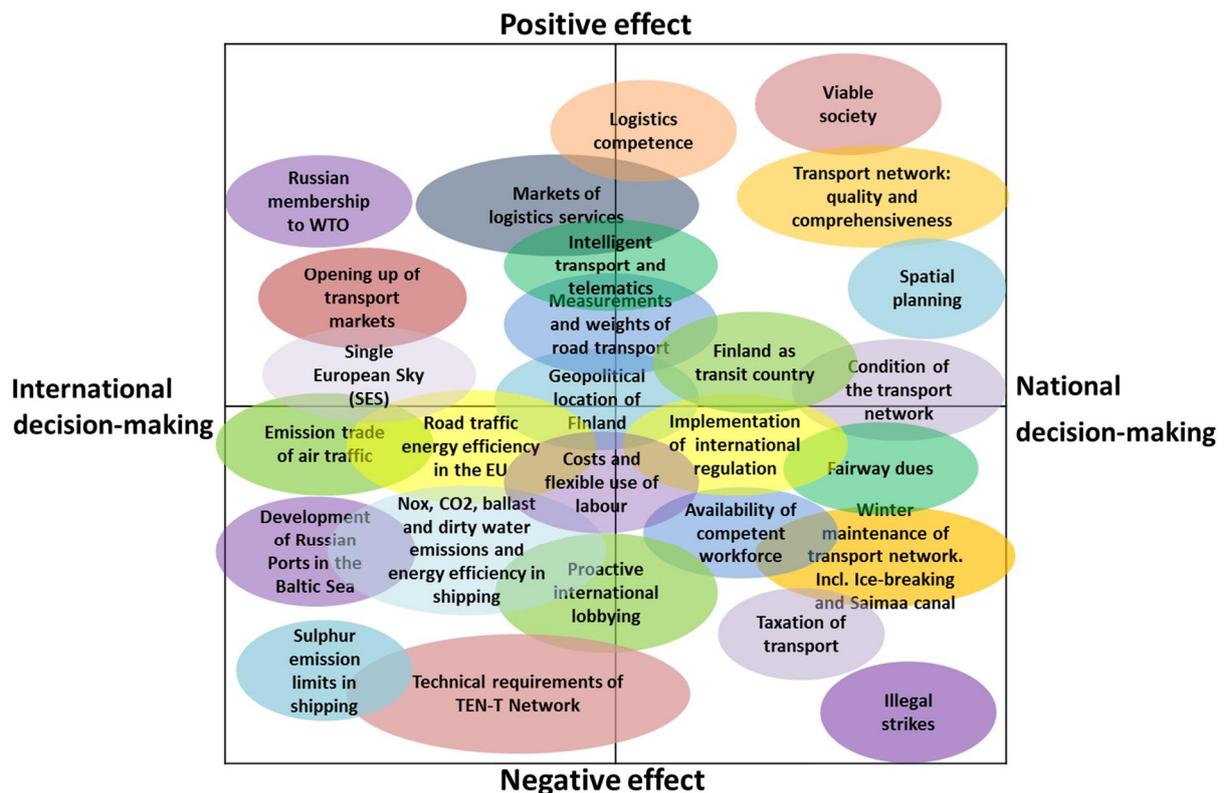


Figure 43 Assessment by researchers of the factors that affect logistical competitiveness in Finland in 2012-2015 according to their impact (+/-) and where decisions are taken (nationally/internationally)
Source: Paavola et al. 2012

Very efficient logistics has been one of the factors enabling companies in Finland to achieve success. Unlike with many other factors in competitiveness, it is also possible to influence logistical viability and the logistical conditions that exist for business by means of social remedies.

The development of logistical competence and building up adequate resources for maintaining and improving the physical operating environment will also be key factors in sustaining competitiveness in business, the export industry and the Finnish economy in the future. In short, there is a need to ensure adequate supplies of labour, skills and expertise, and first-rate training and research. The research report by Paavola et al. in 2012 summarised the main factors affecting logistical competitiveness in Finland in the way illustrated in Figure 43.

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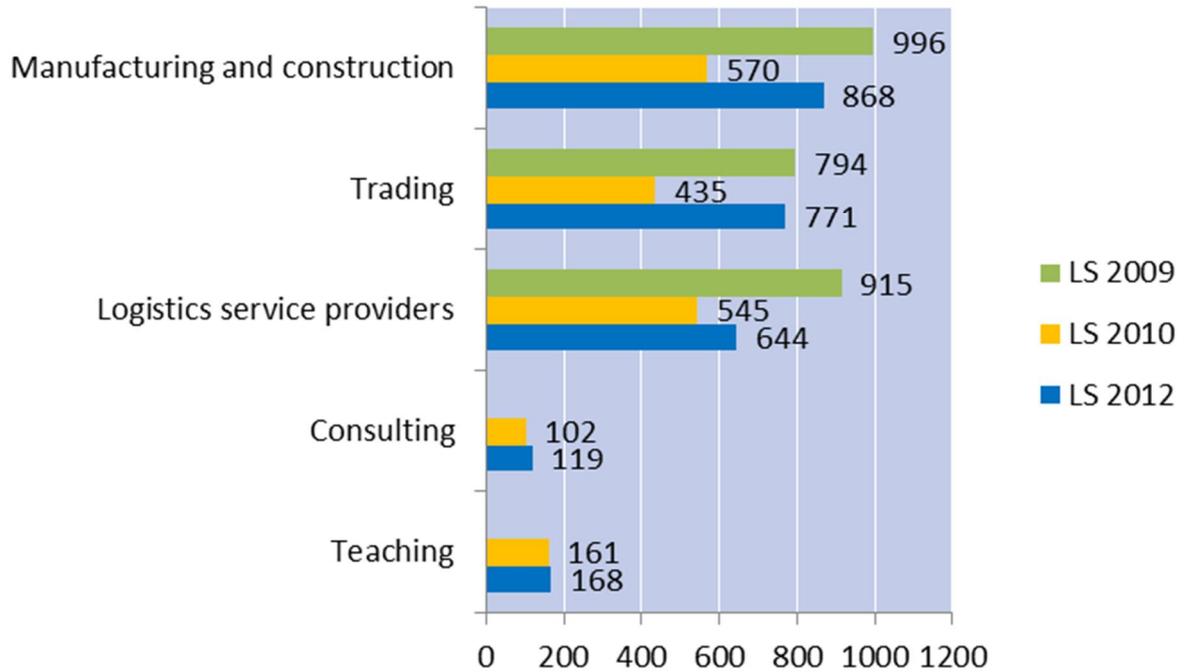
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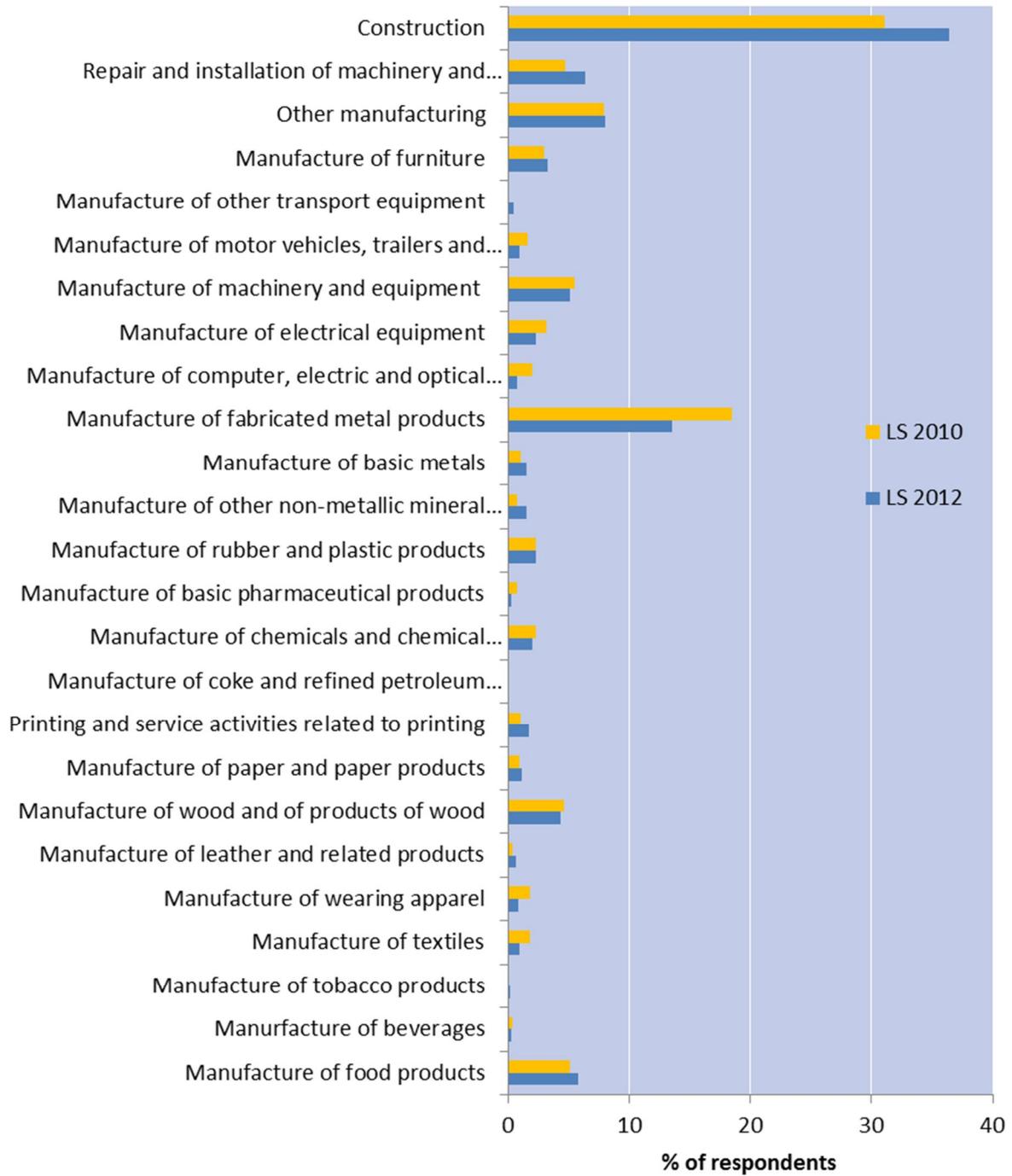
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Appendices

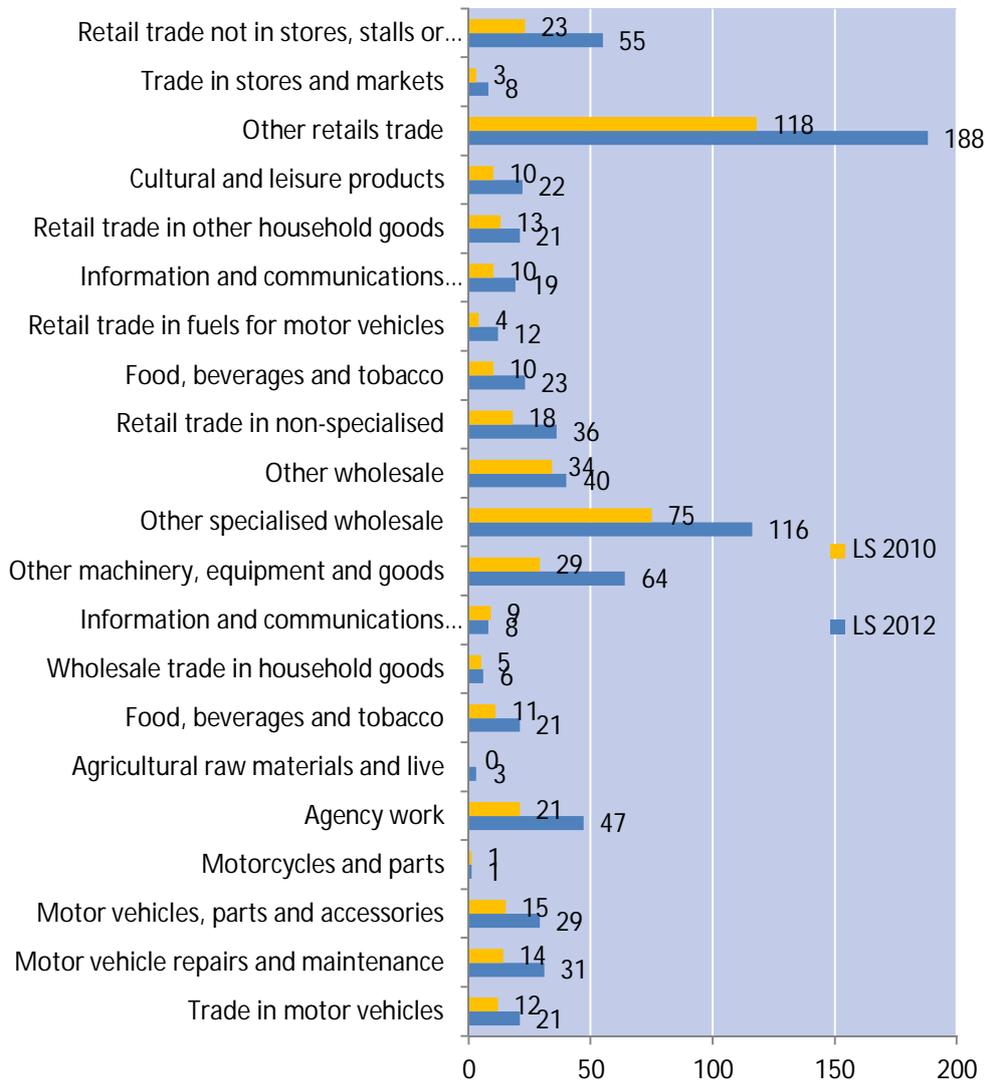
Appendix 1 Companies responding to the survey by main sector of industry
(LS=Logistics Survey)



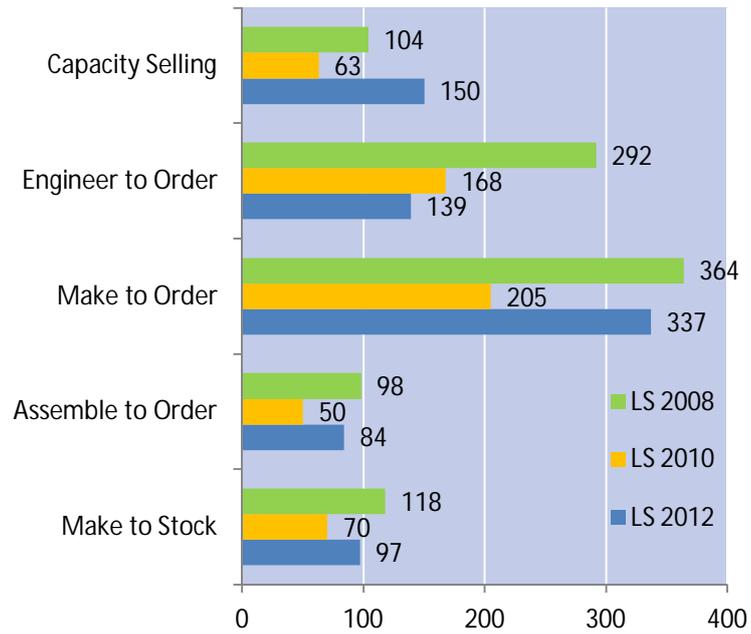
Appendix 2 Companies in manufacturing/construction by sector (TOL 2008)



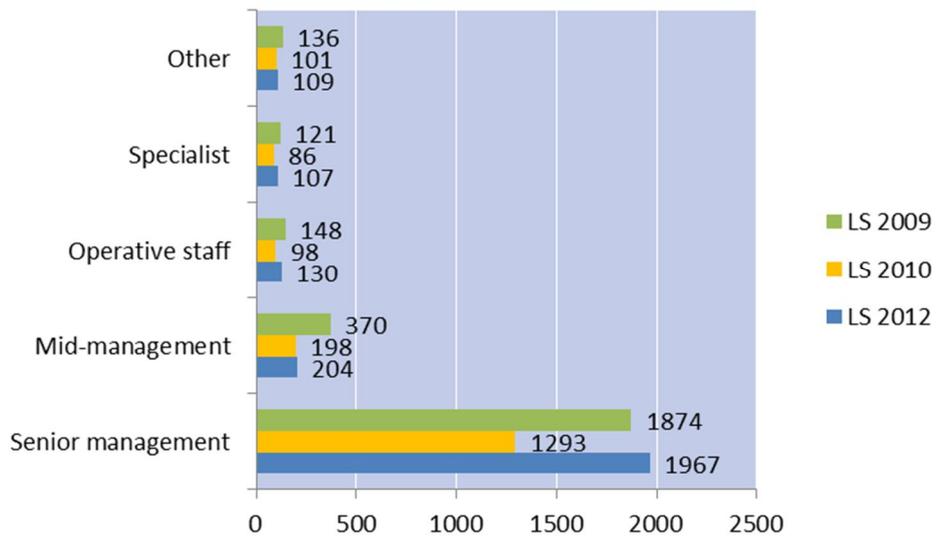
Appendix 3 Companies in trading by sector (TOL 2008)



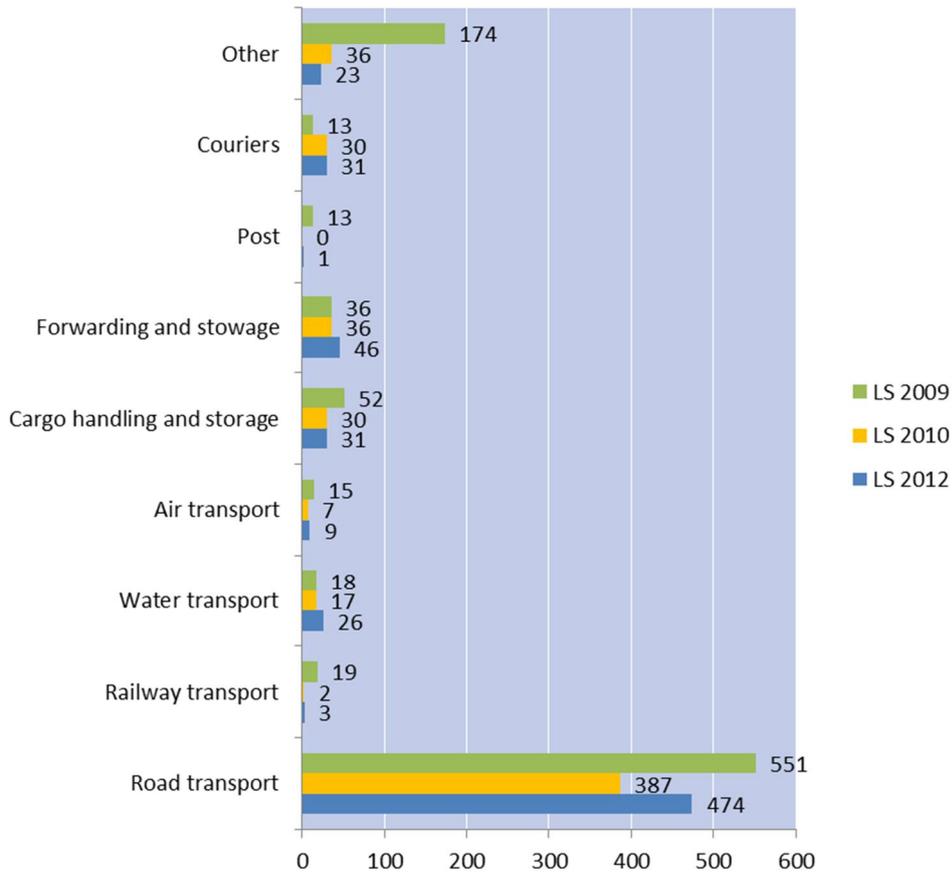
Appendix 4 Companies in manufacturing / construction by form of production



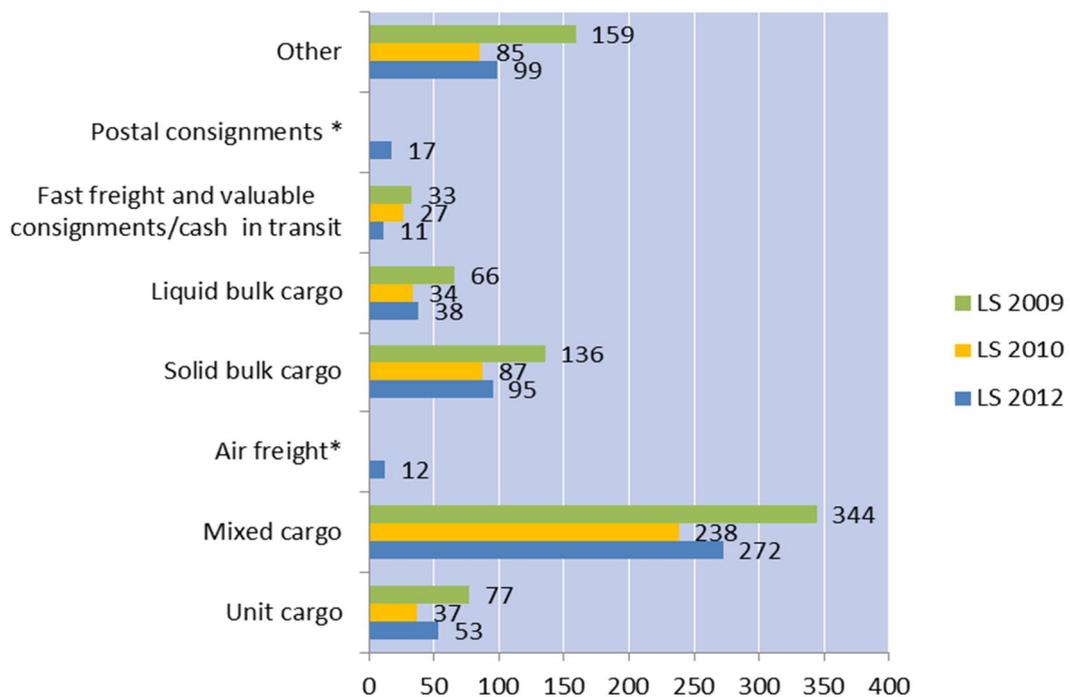
Appendix 5 Position in company of respondent



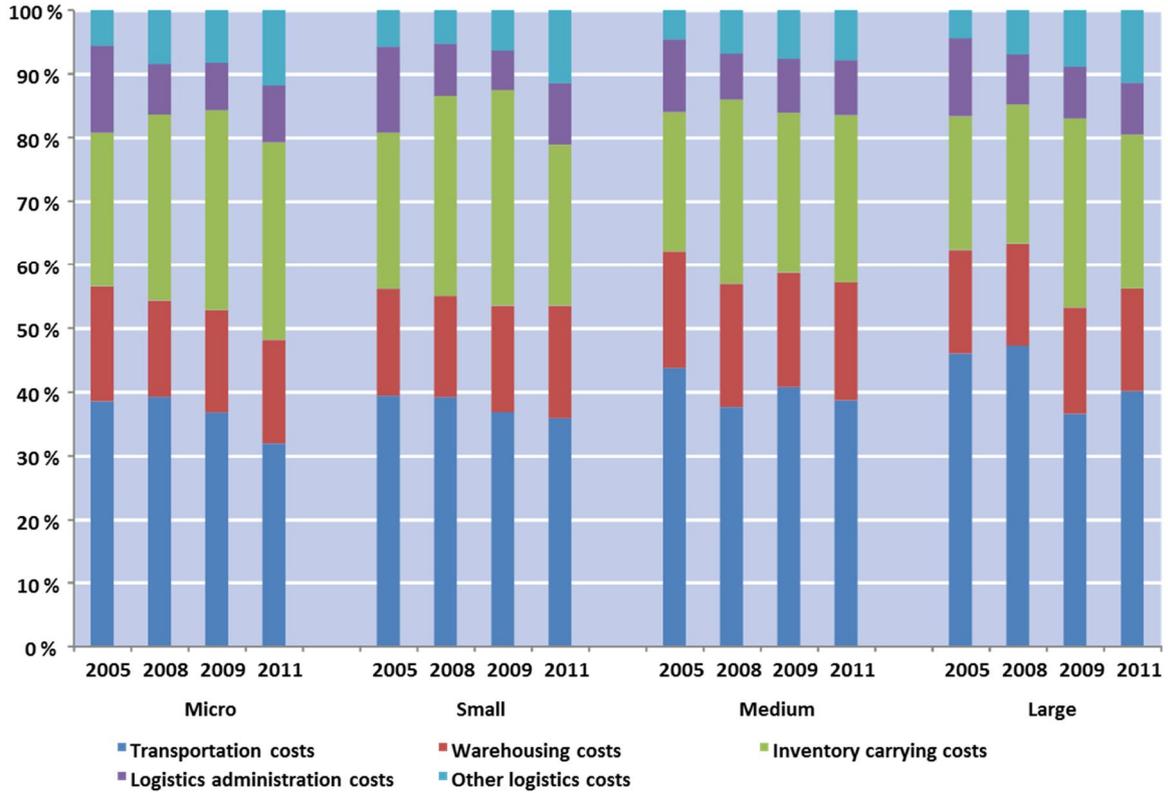
Appendix 6 Logistics service providers by sector (TOL 2002)



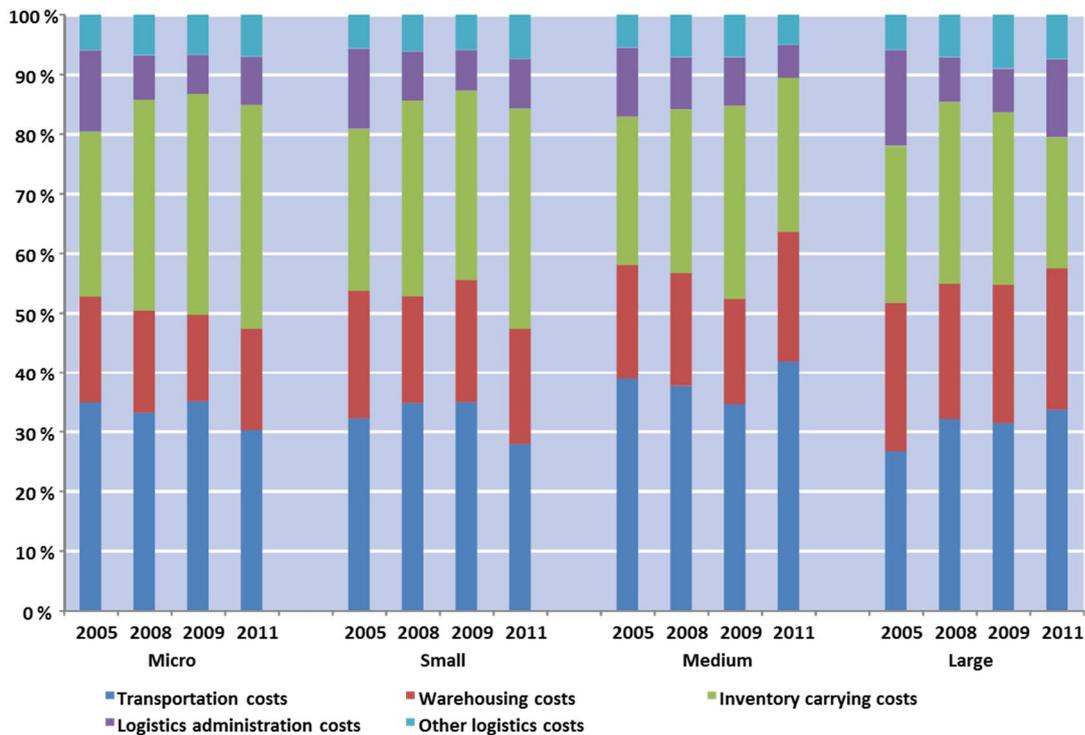
Appendix 7 Logistics service providers by cargo type



Appendix 8 Different costs component shares (%) of the logistics costs of companies in manufacturing by company size 2005-2011



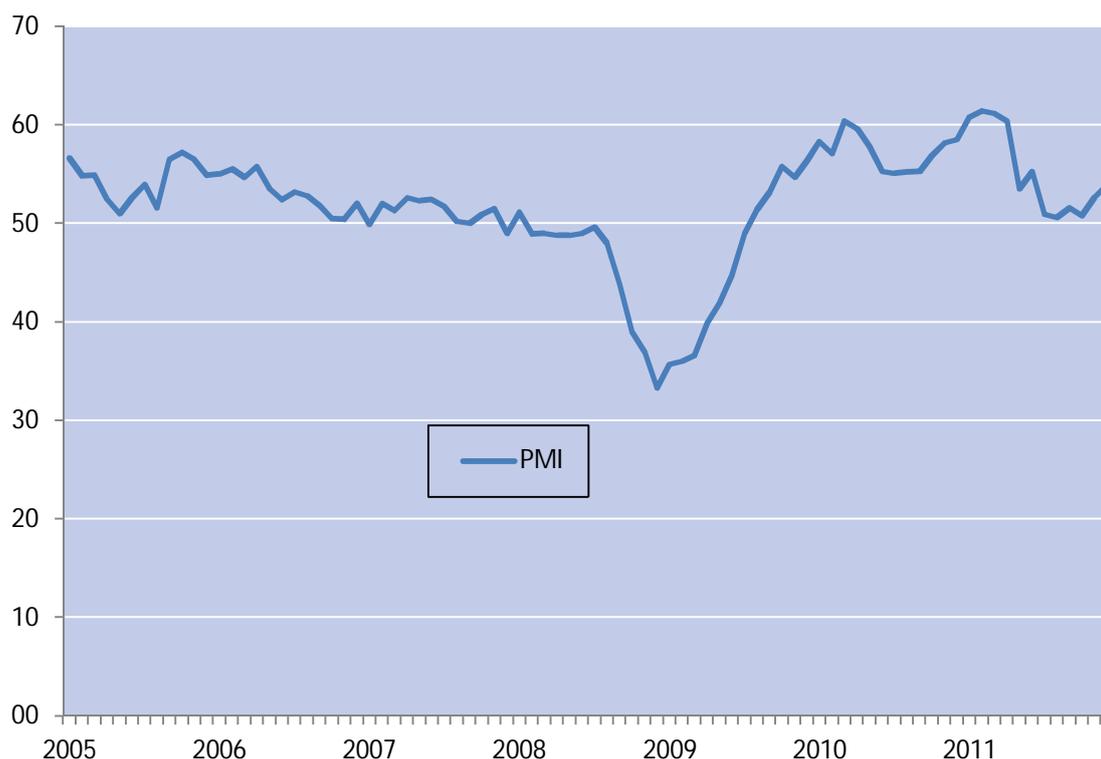
Appendix 9 Different costs component shares (%) of the logistics costs of companies in trading by company size 2005-2011



Appendix 10 Indicators for the transport sector and comparison with other countries in the Baltic Sea area in 2008 (EU energy and transport in figures 2011)

| | EU27 | DK | DE | EE | PL | FI | SE |
|--|-----------|---------|-----------|--------|----------|---------|---------|
| Number of employees | 9 086 500 | 124 500 | 1 432 300 | 36 300 | 646 300 | 122 500 | 223 400 |
| Number of companies | 1 064 696 | 12 615 | - | 3 800 | 147 580 | 23 040 | 28 702 |
| Turnover M€ per annum | 1 210 000 | | 218 217 | 3 849 | 33 306 | 19 996 | 46 944 |
| Domestic transport performance 1,000M tonne-kilometres | 1 154.3 | 10.00 | 245.57 | 1.33 | 79.21 | 24.39 | 32.12 |
| International transport performance 1,000M tonne-kilometres | 537.1 | 6.87 | 61.98 | 4.01 | 101.53 | 3.41 | 2.92 |
| Rail transport performance 1,000M tonne-kilometers | 361.6 | 1.70 | 95.83 | 5.95 | 43.45 | 8.87 | 19.41 |
| Sea traffic, imports (1,000 tonnes) | | 45 276 | 158 868 | 7 815 | 22 927 | 48 676 | 76 229 |
| Sea traffic, exports (1,000 tonnes) | | 36 556 | 100 831 | 26 626 | 22 023 | 41 861 | 71 814 |
| Number of commercial aircrafts | 4 105 | 100 | 670 | 10 | 67 | 94 | 103 |
| Number of goods wagons | | | 113 657 | 2 982 | 72 725 | 10 524 | |
| Road fleet suitable for transport of goods (1,000) | 33 840.40 | 507.90 | 2 556.00 | 81.10 | 2 796.80 | 443.90 | 514.60 |
| Merchant fleet, national flag, number (over 1,000 registered tonnes) | 3 538 | 289 | 442 | 21 | 13 | 85 | 136 |
| Merchant fleet, foreign flag, number (over 1,000 registered tonnes) | 8 083 | 514 | 3 034 | 87 | 102 | 48 | 211 |

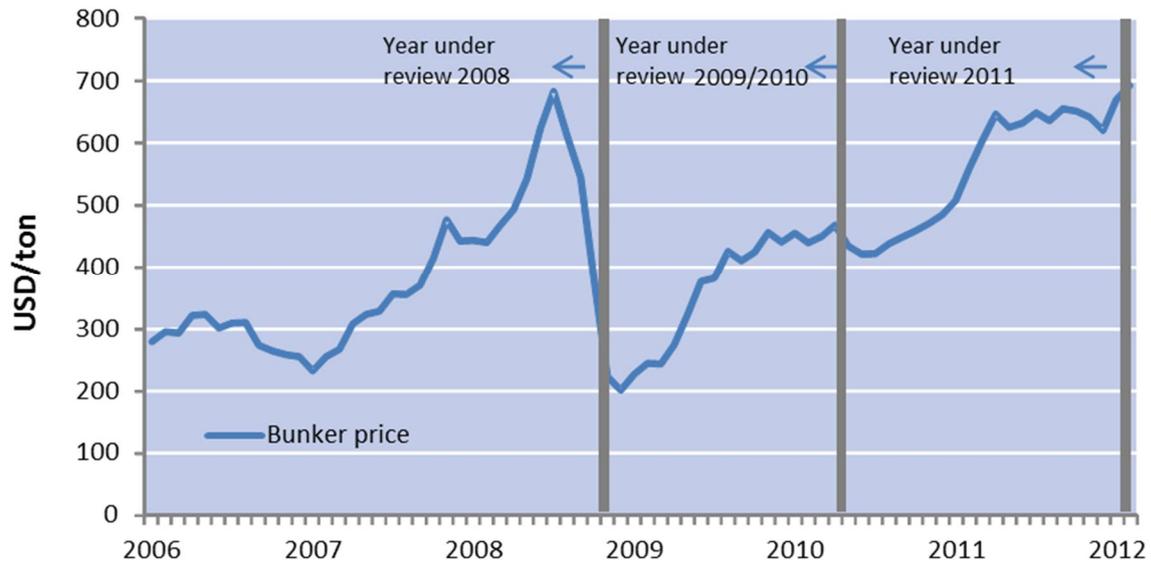
Appendix 11 US PMI for 2005-2012. PMI=Purchasing Managers' Index (Institute for Supply Management) (Institute for Supply Management 2012)



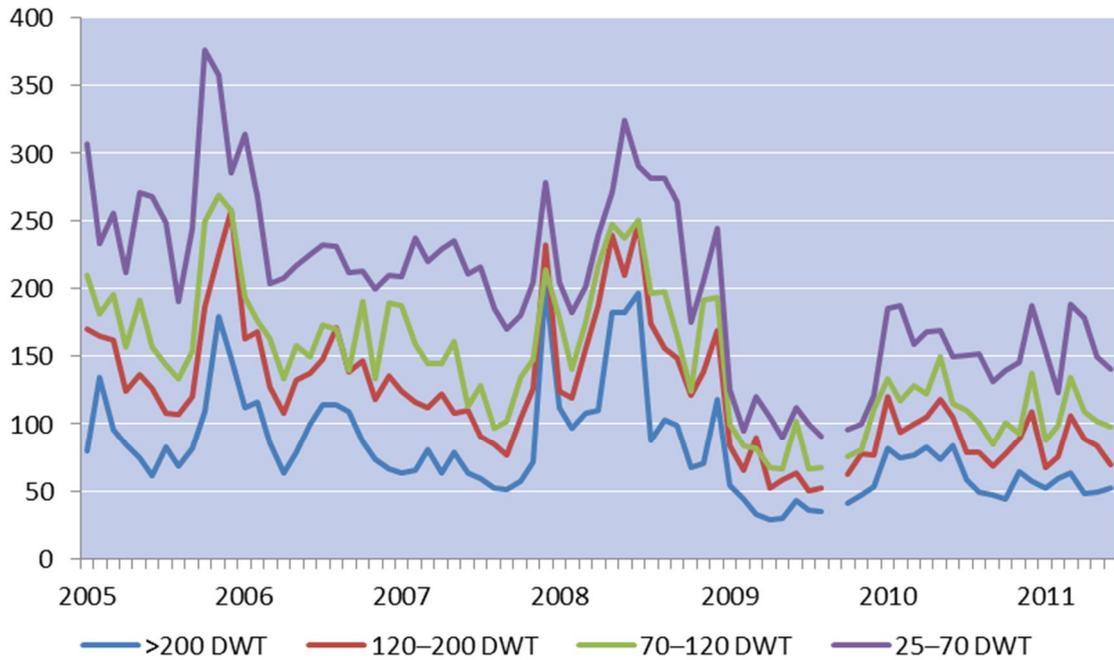
Appendix 12 Prospects for the German economy as reflected in the Ifo Business Climate for Germany index 2005-2012 (CESifo Group 2012)



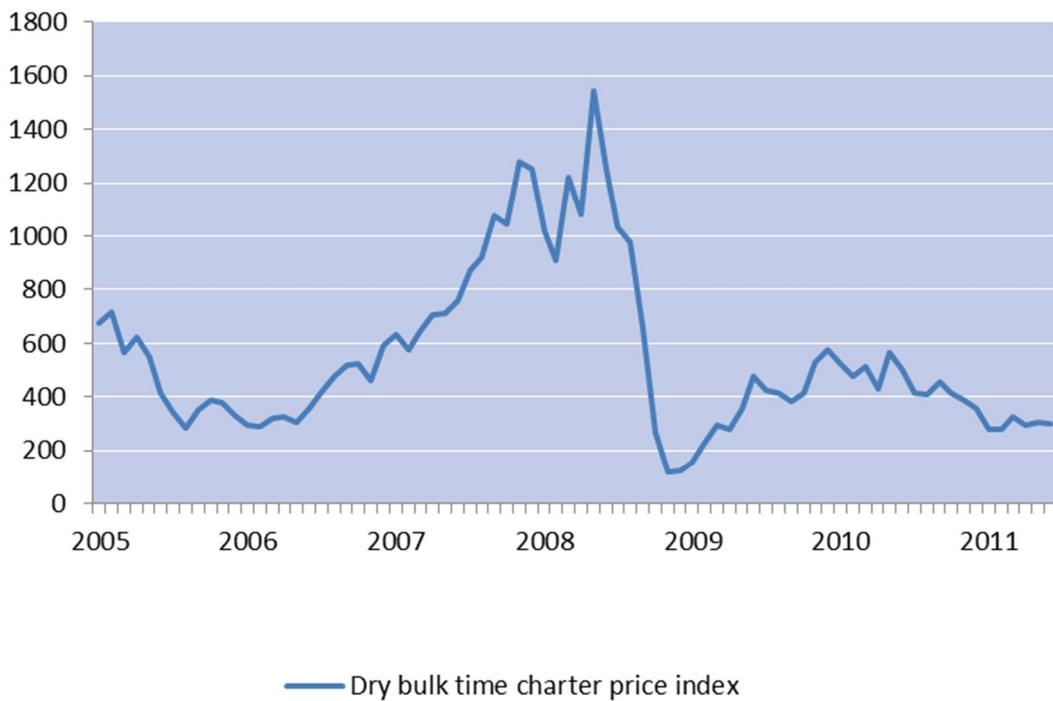
Appendix 13 Marine bunker prices USD/tonne 2005-2012 (Bloomberg (2012) & Bunkerworld(2012))



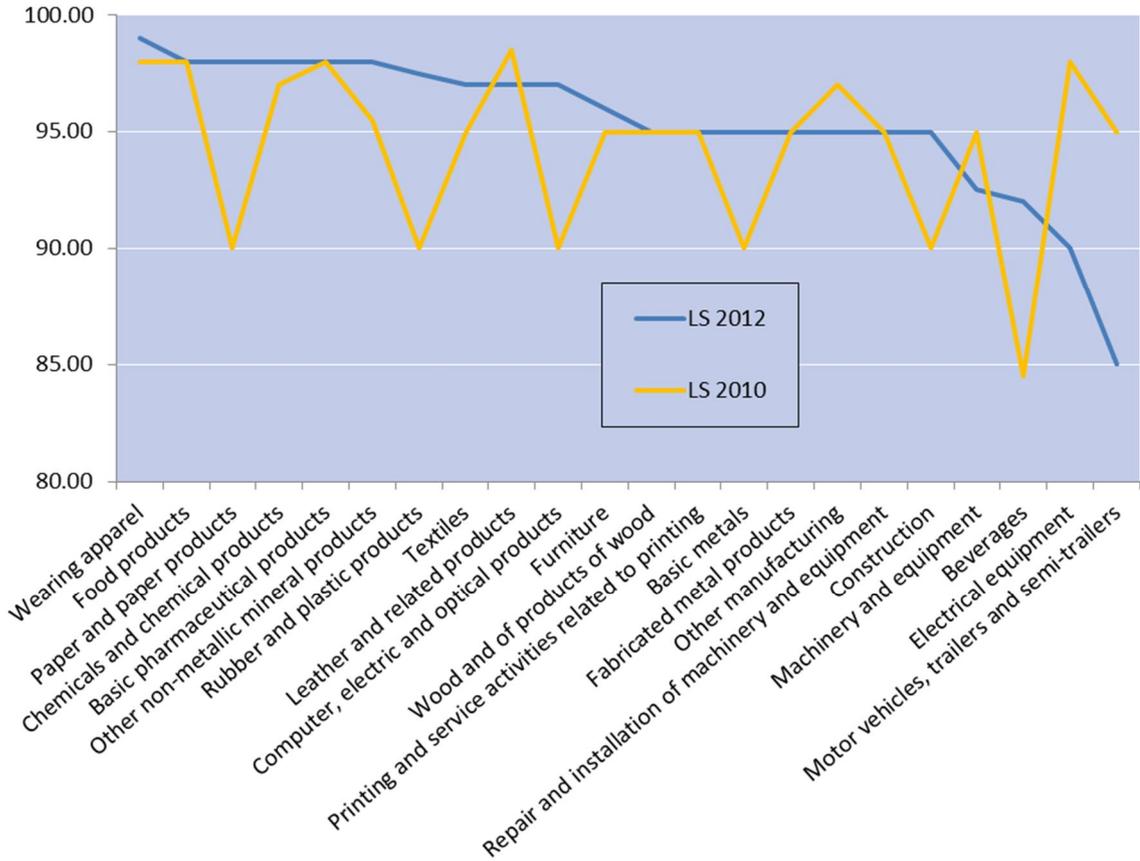
Appendix 14 Indexed trend in tanker freight costs by size of vessel 2005-2011 (DWT=Deadweight tonnage) (Review of Maritime Transport, UNCTAD, over several years)



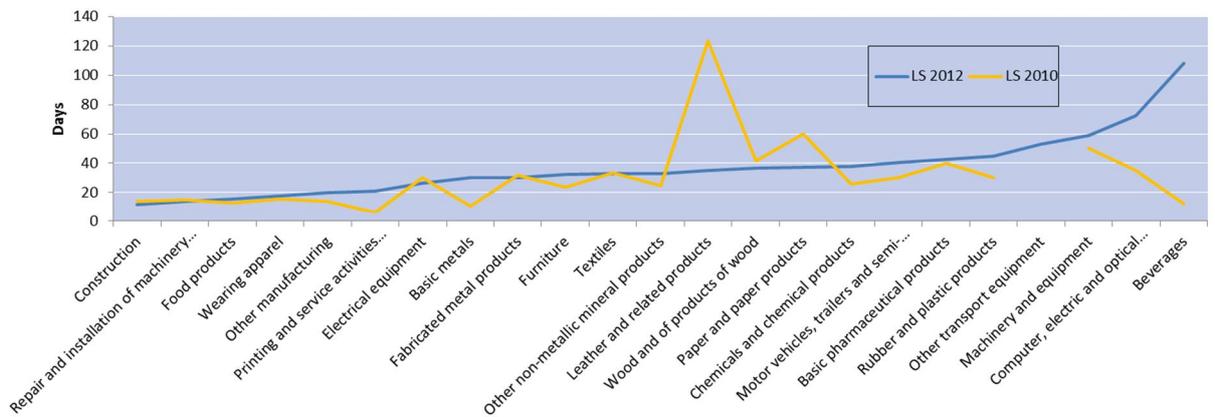
Appendix 15 Price index for dry freight chartering 2005-2011 (1985=100) (Review of Maritime Transport, UNCTAD, over several years)



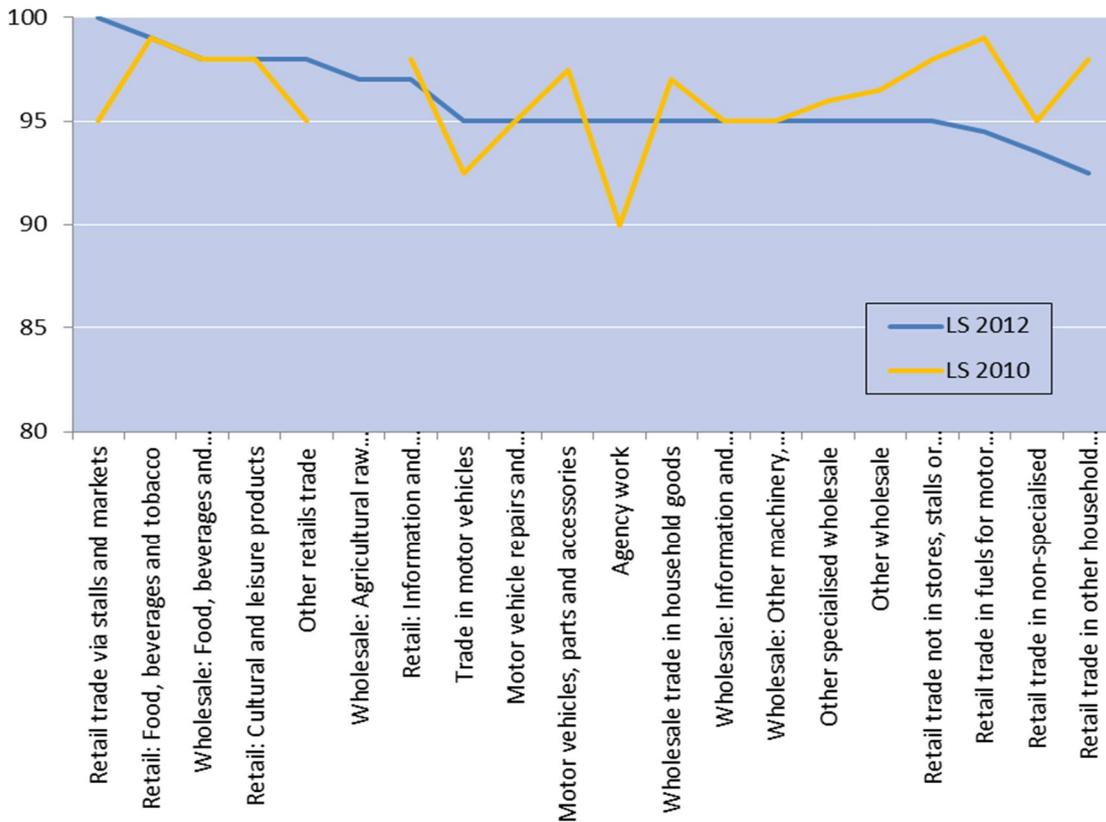
Appendix 16 Percentage of perfect deliveries by companies in manufacturing in the Logistics Surveys for 2010 and 2012



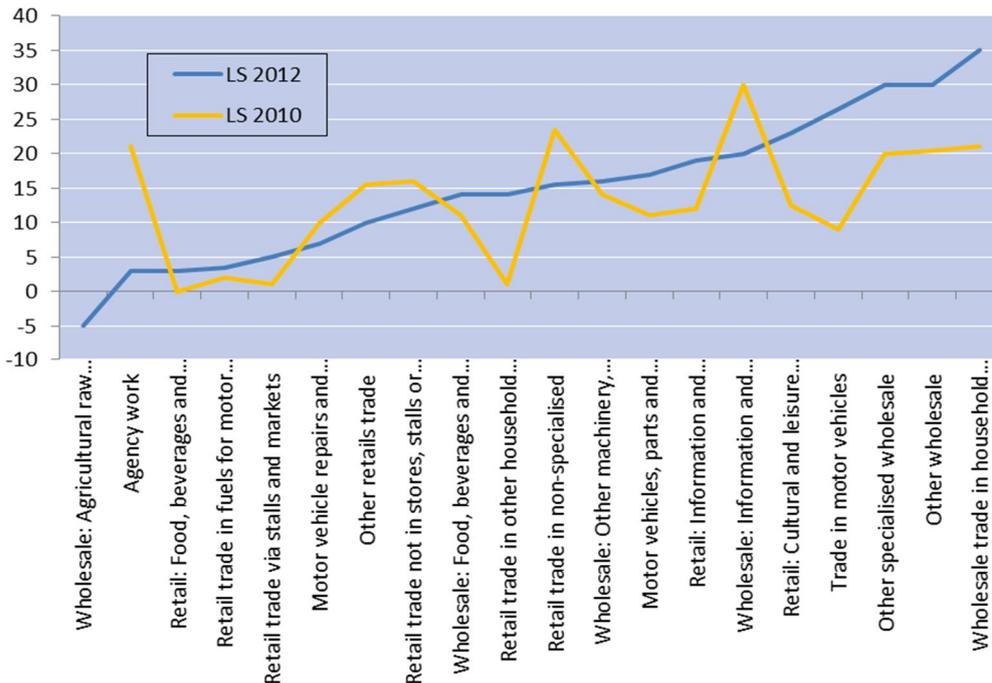
Appendix 17 Cash-to-cash cycle (in days) in companies in manufacturing in the Logistics Surveys for 2010 and 2012



Appendix 18 Percentage of perfect deliveries by companies in trading in the Logistics Surveys for 2010 and 2012



Appendix 19 R Cash-to-cash cycle (in days) in companies in trading in the Logistics Surveys for 2010 and 2012



Appendix 20 A comparison of indicators for manufacturing and trading between the Logistics surveys for 2009, 2010 and 2012

| Industry | Year | N (industry*) | Perfect order fulfillment rate | | | Order-delivery cycle time | | | Inventory days of supply | | | Days of sales outstanding | | | Days of payables outstanding | | | Cash to cash-cycle time (days) | | |
|---|------|---------------|--------------------------------|------|-------|---------------------------|------|------|--------------------------|------|------|---------------------------|------|------|------------------------------|------|------|--------------------------------|------|------|
| | | | 20% | 50% | 80% | 20% | 50% | 80% | 20% | 50% | 80% | 20% | 50% | 80% | 20% | 50% | 80% | 20% | 50% | 80% |
| Manufacturing | 2012 | 867 | 85 | 95 | 99.9 | 2 | 7 | 30 | 7 | 25 | 60 | 14 | 20 | 30 | 14 | 15 | 30 | 8 | 27 | 61.4 |
| | 2010 | 570 | 85 | 95 | 99 | 2 | 7 | 26.8 | 10 | 30 | 60 | 14 | 20 | 30 | 14 | 21 | 30 | 8 | 26 | 60 |
| | 2008 | 996 | 90 | 95 | 99.92 | 2 | 8 | 30 | 7.7 | 30 | 60 | 14 | 20 | 30 | 14 | 20 | 30 | 7 | 27 | 57 |
| Food, beverages and tobacco | 2012 | 53 | 90 | 98.5 | 99.92 | 1 | 2 | 4.6 | 3.2 | 14 | 39.6 | 14 | 21 | 30 | 13.4 | 14 | 28 | 5.6 | 18 | 56.4 |
| | 2010 | 31 | 90 | 98 | 99.1 | 1 | 2 | 3 | 4.6 | 14.5 | 30 | 14 | 18 | 21 | 14 | 20 | 30 | 3 | 14 | 30 |
| | 2008 | 55 | 95 | 98 | 99 | 1 | 2 | 4.2 | 2 | 14.5 | 30 | 14 | 14.5 | 30 | 14 | 15 | 30 | 1.4 | 16.5 | 32 |
| Wood and wood products | 2012 | 37 | 90 | 95 | 99 | 5 | 15 | 35 | 14 | 35 | 70 | 14 | 16.5 | 30 | 14 | 15 | 30 | 14 | 39 | 80 |
| | 2010 | 26 | 85 | 95 | 99 | 3 | 15 | 40 | 20 | 43 | 90 | 14.8 | 21 | 30 | 14 | 21 | 30 | 14 | 42 | 86.8 |
| | 2008 | 74 | 90 | 95 | 99 | 3 | 14 | 20.6 | 13.2 | 30 | 60 | 14 | 18 | 30 | 14 | 14 | 30 | 11.4 | 30 | 72.8 |
| Basic metals | 2012 | 130 | 85 | 95 | 99 | 4.8 | 11 | 30 | 14 | 30 | 60 | 14 | 21 | 33.8 | 14 | 20 | 30 | 13 | 30.5 | 75 |
| | 2010 | 111 | 85 | 95 | 99 | 4.4 | 14 | 31.8 | 14 | 30 | 60 | 14 | 24.5 | 40 | 14 | 30 | 14 | 35.5 | 63.4 | |
| | 2008 | 152 | 90 | 95 | 98 | 4 | 12 | 30 | 14 | 30 | 56 | 14 | 25 | 30.5 | 15 | 25 | 30 | 14 | 30 | 52 |
| Machinery and equipment | 2012 | 99 | 90 | 95 | 99 | 3 | 10 | 30 | 5.8 | 27.5 | 72 | 14 | 25 | 38.4 | 14 | 15 | 30 | 10 | 33 | 84 |
| | 2010 | 58 | 83 | 95 | 98 | 2 | 6 | 50 | 17 | 30 | 86 | 14 | 20 | 33 | 14 | 21 | 37.6 | 12.4 | 30 | 82.6 |
| | 2008 | 105 | 80 | 95 | 99 | 7 | 30 | 100 | 21 | 40 | 90 | 14.8 | 30 | 45 | 16 | 30 | 32 | 21.4 | 45 | 84.8 |
| Computer, electric and optical products | 2012 | 26 | 90 | 95 | 99 | 5.2 | 12 | 30 | 12 | 35 | 60 | 14 | 30 | 38 | 14 | 21 | 30 | 10.8 | 35.5 | 84 |
| | 2010 | 29 | 90 | 95 | 98.8 | 5 | 14 | 30 | 15 | 30 | 66 | 14 | 27.5 | 37 | 14 | 30 | 30 | 16.6 | 34.5 | 61.6 |
| | 2008 | 47 | 85 | 93 | 99 | 5 | 14 | 20 | 21 | 45 | 90 | 21 | 30 | 56 | 20 | 30 | 45 | 24 | 44 | 85 |
| Other manufacturing | 2012 | 97 | 90 | 95 | 99.36 | 3.8 | 8 | 21.8 | 7.8 | 30 | 60 | 14 | 15 | 30 | 14 | 14 | 30 | 7.4 | 30 | 67.2 |
| | 2010 | 62 | 86 | 95 | 99 | 3 | 10 | 25.2 | 7 | 27.5 | 78 | 14 | 20 | 30 | 14 | 20 | 30 | 10 | 28 | 76.8 |
| | 2008 | 102 | 90 | 95 | 99 | 2 | 6 | 17.2 | 7 | 21 | 45 | 14 | 17 | 30 | 14 | 18 | 30 | 5.4 | 20 | 47.6 |
| Construction | 2012 | 316 | 80 | 95 | 100 | 2 | 5 | 21 | 5 | 15 | 30 | 12 | 14 | 21 | 11.9 | 14 | 21 | 5 | 16 | 36 |
| | 2010 | 177 | 80 | 90 | 99 | 2 | 4 | 10 | 5 | 14 | 30 | 14 | 14 | 21 | 14 | 14 | 21 | 3 | 15 | 33 |
| | 2008 | 299 | 85 | 95 | 99 | 2 | 5 | 21 | 3 | 14 | 30 | 14 | 14 | 25 | 14 | 14 | 21.2 | 2 | 14 | 32 |
| Trade | 2012 | 771 | 85 | 95 | 99 | 1.5 | 7 | 8 | 5 | 25 | 60 | 4 | 20 | 22 | 10 | 15 | 30 | -1 | 27 | 54.2 |
| | 2010 | 435 | 90 | 95 | 99 | 2 | 3 | 7 | 5 | 30 | 60 | 7 | 14 | 30 | 14 | 20 | 30 | 0.66 | 20 | 55 |
| | 2008 | 794 | 85 | 95 | 99 | 1 | 3 | 10 | 2 | 18 | 50 | 5 | 14 | 30 | 12 | 20 | 30 | 0 | 11 | 45 |
| Retail: Other | 2012 | 316 | 90 | 97 | 99.58 | 1 | 3 | 5.4 | 5 | 20 | 60 | 1 | 8 | 14 | 7 | 14 | 30 | -3 | 14 | 46 |
| | 2010 | 195 | 90 | 97 | 99 | 2 | 3 | 7 | 7 | 30 | 60 | 2 | 10 | 17.4 | 10 | 14 | 30 | 1 | 21 | 51.6 |
| | 2008 | 309 | 85 | 95 | 99 | 1 | 3 | 7.7 | 2 | 20 | 50 | 2 | 14 | 20 | 10 | 14 | 30 | 0 | 13 | 40 |
| Wholesale: Other | 2012 | 220 | 89.4 | 95 | 98 | 2 | 4 | 14 | 7.2 | 30 | 88 | 14 | 21 | 30 | 14 | 30 | 40 | 2.2 | 25.5 | 75.4 |
| | 2010 | 152 | 90 | 95 | 99 | 1 | 3 | 7 | 7 | 30 | 60 | 14 | 21 | 30 | 14 | 30 | 41.2 | 2 | 26 | 60 |
| | 2008 | 253 | 90 | 95 | 99 | 1 | 3 | 14 | 5 | 30 | 60 | 14 | 21 | 30 | 14 | 30 | 44.6 | 0 | 16 | 60.6 |
| Motor vehicles and automotive parts | 2012 | 71 | 80 | 95 | 98.2 | 1 | 3 | 7 | 4.2 | 25 | 45 | 3 | 14 | 20 | 7 | 14 | 30 | -0.6 | 17 | 51.2 |
| | 2010 | 42 | 86.6 | 95 | 99 | 1 | 2 | 4.6 | 5 | 15 | 60 | 7 | 14 | 25 | 11.6 | 14.5 | 30 | 5 | 20 | 55.4 |
| | 2008 | 66 | 90 | 95 | 99 | 1 | 2.25 | 10.5 | 2 | 25.5 | 60 | 5 | 14 | 24 | 10.5 | 14 | 30 | 0 | 14.5 | 46 |