



Future of Logistics

Opportunities and Threats

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DEGREE THESIS	
Arcada	
Degree Programme:	International Business
Identification number:	7194
Author:	Visa-Tarkko Leinonen
Title:	Future of Logistics Opportunities and Threats
Supervisor (Arcada):	Robert Henriksson
Commissioned by:	
<p>The subject of this thesis is the future of logistics and external opportunities and threats related to it. The aim is to explore the future of logistics and the external opportunities and threats involved in logistics from a political, economic, socio-cultural, technological, environmental and legal perspective. Three research questions are presented for the study.</p> <p>The qualitative method is used as a method in the thesis. Six open-ended, semi-constructed questions are asked from six experts selected from four different areas of logistics, and the author seeks to answer the research questions by examining and analyzing the answers. One expert has been selected from trade, one from industry, three from transport sector and one from authorities. The choice has been purposeful and some areas have been deliberately excluded, such as the medical field.</p> <p>The analysis uses the external opportunities and threats of the SWOT analysis, which is examined from the political, economic, socio-cultural, technological, environmental and legal levels presented in the PESTEL analysis. In addition, the results are considered in terms of the simplified Du Pont model and the three driving forces of logistic development, as well as the CSR (Corporate Social Responsibility).</p> <p>The presented conclusions are made by analyzing data collected from telephone interviews and email interviews. The interviewees are asked the same six questions.</p> <p>The results are not surprising in themselves, as many of the responses are well known and have been in the public knowledge for a long time. There also seems to be little difference between different sectors. The differences between sectors will become larger if the results are considered separately for each aspect. However, the differences are reduced if the answers are considered as a whole. The clearest unifying factor is clearly the environment. The biggest surprise on the air freight side is that no one mentions drones. Opportunities generally considered include global markets, e-commerce, a secure operating environment, new technologies, alternative fuels, bio-fuels and electricity. Inequalities, the EU, increased protectionism, the negative effects of immigration and aging are seen as threats. On the technical side, many interesting solutions are too limited, either because technological</p>	

advancement is lacking or infrastructure is too small, and thus do not yet offer a real breakthrough.

Due to its scope, the work offers good opportunities for further research. One alternative is to investigate how the burden of logistics upon environment could be reduced.

Keywords:	Future of logistics, logistic opportunities, logistic threats
Number of pages:	90
Language:	English
Date of acceptance:	24.2.2020

OPINNÄYTE	
Arcada	
Koulutusohjelma:	International Business
Tunnistenumero:	7194
Tekijä:	Visa-Tarkko Leinonen
Työn nimi:	Future of Logistics Opportunities and Threats
Työn ohjaaja (Arcada):	Robert Henriksson
Toimeksiantaja:	
<p>Tämän opinnäytetyön aiheena on logistiikan tulevaisuus ja siihen liittyvät ulkoiset mahdollisuudet ja uhkat. Tavoitteena on tutkia logistiikan tulevaisuutta ja siihen liittyviä ulkoisia mahdollisuuksia ja uhkia poliittisesta, taloudellisesta, sosiokulttuurisesta, teknologisesta, ympäristöllisestä ja laillisesta näkökulmasta tarkasteltuna. Tutkimusta varten esitetään kolme tutkimuskysymystä.</p> <p>Metodina opinnäytetyössä on käytetty kvalitatiivista metodologiaa. Neljältä eri logistiikan alalta valikoidulle kuudelle asiantuntijalle esitetään kuusi avointa, ennalta lähetettyä semi-konstruoitua kysymystä, joista saatuja vastauksia tarkastelemalla ja analysoimalla kirjoittaja pyrkii vastaamaan esitettyihin tutkimuskysymyksiin. Asiantuntijoiksi on valittu yksi kaupan alalta, yksi teollisuuden alalta, kolme kuljetuksen alalta ja yksi viranomaispuolelta. Valinta on tehty tarkoituksenmukaisesti ja sen ulkopuolelle on tarkoituksella jätetty joitakin aloja, kuten esimerkiksi lääketieteellinen ala.</p> <p>Analyysiä varten käytetään SWOT-analyysin ulkoisia mahdollisuuksia ja uhkia, joita tarkastellaan PESTEL-analyysissä esitettyjen poliittisen, taloudellisen, sosiokulttuurisen, teknologisen, ympäristöllisen ja laillisen tason näkökulmasta. Näiden lisäksi tuloksia tarkastellaan yksinkertaistetun Du Pont-mallin ja kolmen logistiikan kehitystä ajavan voiman (Three driving forces of logistic development), sekä CSR:n (Corporate social responsibility) näkökulmasta.</p> <p>Esitetyt johtopäätökset on tehty analysoimalla puhelinhaastatteluista ja sähköpostihaastatteluista kerättyä dataa. Haastateltaville on esitetty samat kuusi kysymystä.</p> <p>Tulokset eivät sinänsä yllätä, sillä monet vastaukset ovat julkisesti varsin tunnettuja ja olleet julkisuudessa jo pidemmän aikaa. Myöskään eri alojen välillä ei näytä olevan juurikaan eroja. Alojen väliset erot nousevat suuremmaksi, jos tuloksia tarkastellaan erikseen jokaisen näkökulman kohdalla. Erot kuitenkin pienenevät, jos vastauksia tarkastellaan kokonaisuutena. Selkein näkökulmia yhdistävä tekijä on selkeästi ympäristö. Suurimmaksi yllätykseksi nousee lentorahtipuolelta se, ettei kukaan mainitse droneja. Mahdollisuuksina yleisesti nähdään muun muassa globaalit markkinat, internetkauppa, turvallinen toimintaympäristö, uusi tekniikka, vaihtoehtoiset polttoaineet, bio-polttoaineet ja sähkö. Uhkina</p>	

nähdään muun muassa epätasa-arvo, EU, lisääntynyt protektionismi, maahanmuuton negatiiviset ilmiöt ja ikääntyminen. Tekniikan puolella monet mielenkiintoiset ratkaisut ovat liian rajoitettuja joko teknisestä kehityksestä tai vähäisestä infrastruktuurista johtuen, eivätkä näin ollen nykyisenään vielä tarjoa varsinaista läpimurtoa.

Laajuudesta johtuen työ tarjoaa hyvät mahdollisuudet myöhempää tutkimusta varten. Yhtenä vaihtoehtona on tutkia kuinka logistiikan ympäristölle asetettua kuormitusta olisi mahdollista keventää.

Avainsanat:	Logistiikan tulevaisuus, logistiikan mahdollisuudet, logistiikan uhat
Sivumäärä:	90
Kieli:	Englanti
Hyväksymispäivämäärä:	24.02.2020

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FOREWORD

This thesis work is done for the purpose of research for future of logistics. Thesis examines future logistics opportunities and threats from a political, economic, socio-cultural, technological, environmental and legal perspective. The idea came as a result of brainstorming together with my supervisor Robert Henriksson whose passion for logistics and genuine desire to guide and support his students encouraged me to write this thesis.

I would like to dedicate this thesis work to my wife and children who have loved me and endured a lot while I have been working hard to finish my degree and get this thesis done. A lot of sacrifices have been required and I could have not been able to do it without all the help from people around me, for that I offer my deepest gratitude.

I would like to thank my supervisor Robert Henriksson who supported, inspired, guided and believed in me during my thesis writing.

I am most grateful for Nigel Kimberley and Christa Tigersted for preparing me for writing the thesis and offered a platform for peer-review.

I would like to express my thankfulness for all the lecturers in Arcada who have been available for questions during these years of studies and thesis writing, Linn Hongell, Mervi Hernberg, Janne Nyberg, Linda Puukko, Svein Eldon, Peter Milden, and Andreas Stenius.

I am especially thankful for my friends in Arcada for making it special, Ritva Hautsalo, Dennis Arnold, Mohamed Farah, Myles Klynhout and Johan Mattsson.

Finally, above all, I would like to thank God for being always there for me, leading me and granting me the opportunity to study again and to finish my courses with good grades. I cannot thank Him enough for what He has done in my life.

Helsinki

Visa-Tarkko Leinonen

1 INTRODUCTION

The chapter covers the background of the thesis and goes to explain the research aim. The chapter then continues to research questions, limitations of the research and finally to the structure of this thesis work.

1.1 Background

Moving robots, drones, artificial intelligence, autonomous supply chain, autonomous trucks, autonomous cranes, autonomous ships, truck swarms, and self-driving cars. These were the predictions of future logistics just few years ago. (Singh, 2016)

Drones have received a lot of attention in the logistics field previously because of the announcement of large online store having plans to use them in their logistics services in the future. In addition to drones, it is predicted that in 2030 the world would see autonomous trucks rolling down the streets as well as autonomous ships sailing in the seas. (Singh, 2016)

Another future scenario suggests the high increase of value of data. Not in terms of volume but significance. Large amounts of data is collected regarding consumer behavior with the future strategy plans to ship goods from the factory to a location near to the customer before the actual order is placed to save in delivery time. (Singh, 2016)

Furthermore, it is expected that in the future companies operating in the logistics field will offer logistics services such as trucking capacity to their customers without actually owning any assets. Advantage to this is the low maintenance costs compared to competition spending lot of money maintaining the fleet. (Singh, 2016)

In addition, prediction about the future is that uber-like companies will also infiltrate the logistics field offering mobile app services making freight brokerage companies obsolete in their current form. (Singh, 2016)

1.2 Research aim

Aim of this thesis is to research the future of logistics within the scope chosen to this thesis work. Political, economic, socio-cultural, technological, environmental and legal external factors cause uncertainty about the future. This uncertainty creates both external opportunities and threats in the logistics sector that this thesis seeks to explore. In addition to this, the thesis aims to find out how the opportunities and threats arising from external factors affect the companies' return on investment, the operating forces of logistics development and sustainable development.

1.3 Research questions

The thesis was carried out by presenting the following research questions:

- How does future logistics look like?
- What are the opportunities and threats and their implications in future logistics from political, economic, socio-cultural, technological, environmental, and legal point of view?
- Do the different public and private sectors, that use multiple logistics services at home and abroad, see the future threats and opportunities for logistics in the same way?

1.4 Demarcation

In view of the broad concept of logistics, which is constantly evolving and has a variety of factors affecting it, such as political, economic, socio-cultural, technological, environmental and legal factors, the thesis has been limited. This was done by focusing on the thesis only in the last two parts of the SWOT analysis, i.e. external opportunities and threats, not internal. The underlying reason to this is the author's desire to give the experts the opportunity to talk about the future of their own sector without worrying about revealing their internal strengths or weaknesses. Nevertheless, the author has reserved the right

to use, in this thesis, the internal strengths and weaknesses mentioned by the experts, which they have raised during the interview. The selection of experts was carried out by selecting companies or organizations from different sectors of logistics, both public and private. Within the delimitation, the trade, industry, transport and authorities in Finland were selected, but some sectors, such as the pharmaceutical sector, was excluded from the scope altogether.

1.5 Structure

The thesis consists of two main parts: a theoretical part and empirical part. The theoretical framework includes background information about the subject of the thesis, previous research information on the same subject, and theories of future opportunities and threats to logistics in the political, economic, socio-cultural, technological, environmental and legal areas.

Empirical research includes expert interviews about future opportunities and threats. The study was conducted using a qualitative method. In the study, the author presents the results obtained and analyzes the results based on the DuPont analysis, logistics development forces and Corporate Social Responsibility (CSR).

In the final part of the thesis, the author discusses and presents a view on the success of the research and the conclusions. Finally, mention is made of the possibilities for further research.

1.6 Terminology

Abbreviations Full Name

AI Artificial Intelligence

Brexit Great Britain's withdrawal process from the EU

CEM Customer Experience Management

CO2 Carbon dioxide

CSR Corporate Social Responsibility

EU European Union

IoT Internet of Things

LNG Liquefied Natural Gas is cooled down natural gas in liquid form

NOx Nitrogen Oxide as air pollution

PESTEL Political, Economical, Socio-cultural, Technological, Environmental and Legal analysis for external factors

ROE Return on Equity

R&D Research & Development

SOME Social Media

SWOT Strength, Weakness, Opportunity and Threat Analysis

2 THEORETICAL FRAMEWORK

This chapter covers the theoretical part of the thesis work. Chapter starts with history of logistics and continues to explain logistics and its importance further before continuing to national statistics of air, land and sea logistics. Chapter then goes on to cover the supply chain and supply chain management and its purpose before continuing to logistics calculation models. Chapter finishes by covering three driving forces in logistics development and logistics tech.

2.1 Logistics

Logistics is the doctrine of creating as efficient flows as possible.

(Storhagen, 2018)

2.1.1 History

History of the word *logistics* dates as far back as ancient Greece and it is believed that the semantics of word *logistics* originates from the word *logistikos*, which was a military term meaning “science of computation”. In the beginning logistics did not refer to process of material management, distribution or transportation in business as it is today but rather referred to the people or “officers” of war making calculations for the war efforts. It was French army General Antoine-Henri Jomini that is believed to be the first in history to write a book about logistics in 1779-1869. (Farahani et al., 2011, p. 3)

Logistikos meant someone skilled in calculations. Jomini’s definition of logistics in his book *Summary of the Art of War (1838)* was “the practical art of moving armies”, which did not merely include the moving of the army itself but also all the supporting elements of it such as administration, building roads and bridges, reconnaissance and intelligence to name a few. (Leighton, 1999)

Logistics functions can be separated into four categories: “supply, transportation, facilities, and services”, however administration can also be included to the list, because it is considered essential in any activity (Leighton, 1999).

2.1.2 What is logistics

What is logistics and how to define it? Logistics have been defined many ways and one way to define it is logistics equals materials management plus distribution (Rushton et al., 2000, p. 4).

Other ways to define logistics:

Logistics is...”the overall process of managing how resources are acquired, stored, and transported to their final destination“(Kenton, 2019).

Logistics is...”the management of the flow of things between the point of origin and the point of consumption in order to meet requirements of customers or corporations” (Wikipedia, 2019).

Logistics is...”the art and science of obtaining producing and distributing material and product in the proper place and in proper quantities ”(AIMS Education - UK, 2016).

Logistics is...”the art and science of managing time, physical space, and location” (Witron Logistik, 2017).

Logistics is “the organized movement of materials, information, and sometimes, people” (Wood et al., 2002, p. 246).

Logistics is... “the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in - process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal” (Kacmary and Fedorko, 2014, p. 8)

As seen in these numerous definitions mentioned above, there is no single correct and strict way of defining what logistics is or is not, it is rather seen as a broad term. However, they all agree that logistics is about movement of something to somewhere. This should not strike as a surprise considering the history, background and origin of logistics, which was not in business at the time.

Logistics have several other logistic related activities closely connected to it, which require action and coordination for the procedure to be successful. The amount of action and coordination required depends on each logistics case individually, however generally cases that are considered international require more work and coordination than domestic cases. International cases for example require logistics professionals to consider things such as time zones, languages, currencies, and customs due to borders to name a few. (Wood et al., 2002, pp. 246-247)

Different fields or sections of logistics include areas such as:

Reverse logistics, which include areas such as recycling, remanufacturing, refurbishing, and repair to name a few (Kacmary and Fedorko, 2014, p. 8)

2.1.3 Importance of logistics

From a global point of view, countries around the globe are spending millions of dollars in logistics services. (Farahani et al., 2011, p. 3)

The share of logistics in production companies is significant. Today, companies have the opportunity to outsource their logistics services to a subcontractor who can also manage complex shipments from producer to customer. Within the EU, land transport is the most commonly used mode of transport. As a result, the good quality of the road network is in the interest of the EU countries, as this is reflected directly in the quality of transport. A good quality road, for example, reduces transport time and costs. This also affects the reliability of the service provider, which is a significant part of the logistics service. The importance of innovation in the field of logistics is not sufficiently emphasized. (Kacmary and Fedorko, 2014, p. 20)

In the logistics field of transportation and industries supporting transportation are employing roughly 10 % of workforce in Finland whereas the impact of Finnish economy is similarly roughly 10 %. (Solakivi et al., 2017)

In figure 1, according to Statistics Finland's results, the development of freight transport and GDP in Finland has been booming since the early 1990s. However, the development of freight transport has been much more moderate than GDP, and the movement has been bouncing. In terms of freight traffic, at the end of the 21st century (2009), there has been a significant dip in the statistics, preceded by a positive spike. After the dip, the situation improved somewhat, but not quite to the level before the dip. In the 2010s, the trend has been mainly downhill. The change for the better took place in the middle of the century (2015), when the development rose to the level of 2010, but still fell short of the 2008 positive peak. The development variations are shown in the table.

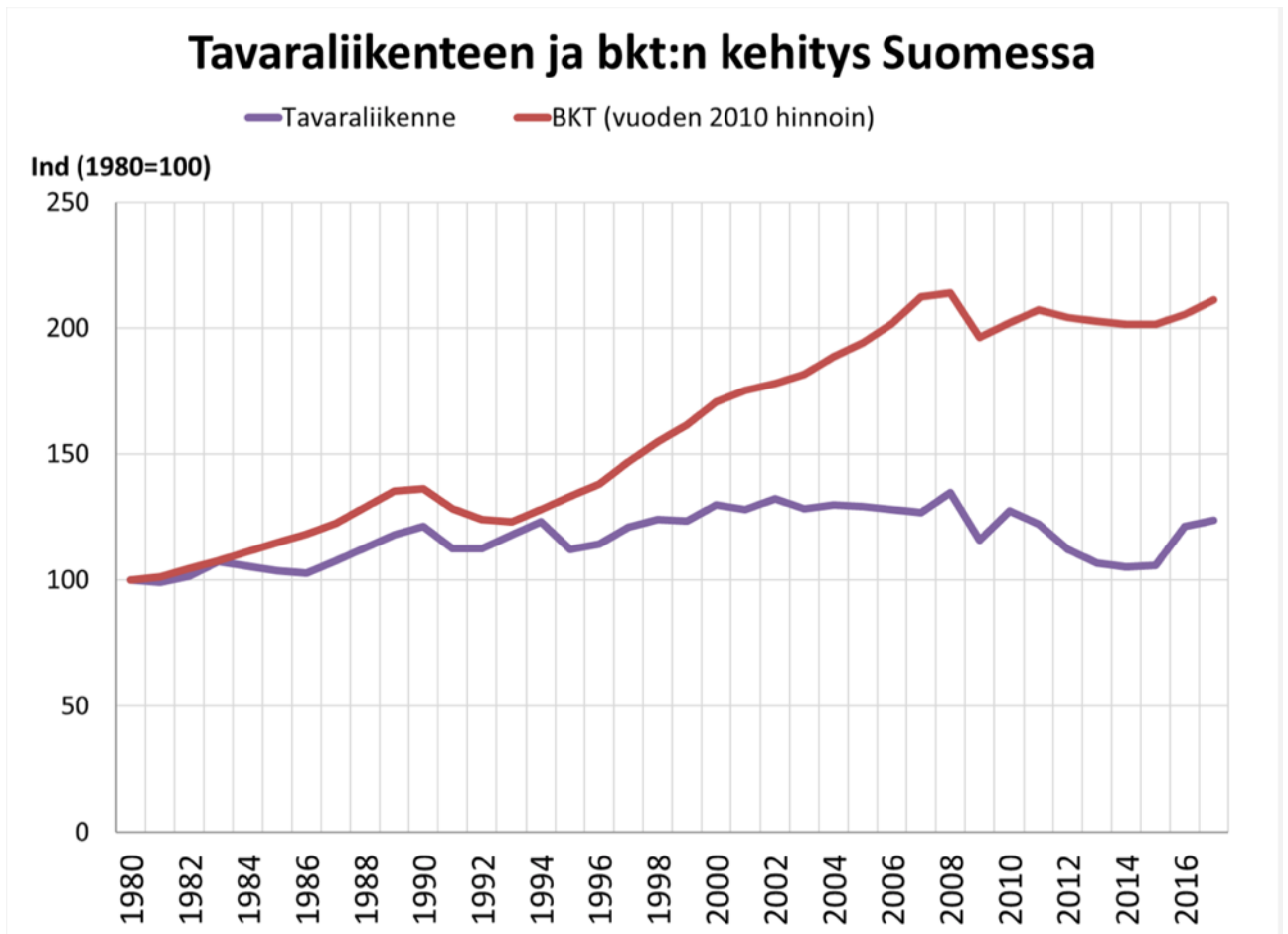


Figure 1 The development of freight transport and GDP in Finland by Liikennejärjestelmä. (Liikenne- ja viestintäministeriö et al., 2019)

2.1.4 Decoupling

Decoupling is a term used in transport politics, which refers to separating increase of GDP from increase of transport. Reasoning behind this is that transport politics does not want to restrict movement, however when movement is increased also the costs related to movement increase are increased. Decoupling is then used in these situations to clarify the conflict between these two events by preferring growth of GDP over the growth of transportation. (Liikenne- ja viestintäministeriö et al., 2019)

2.1.5 Statistics on Road Freight Transport

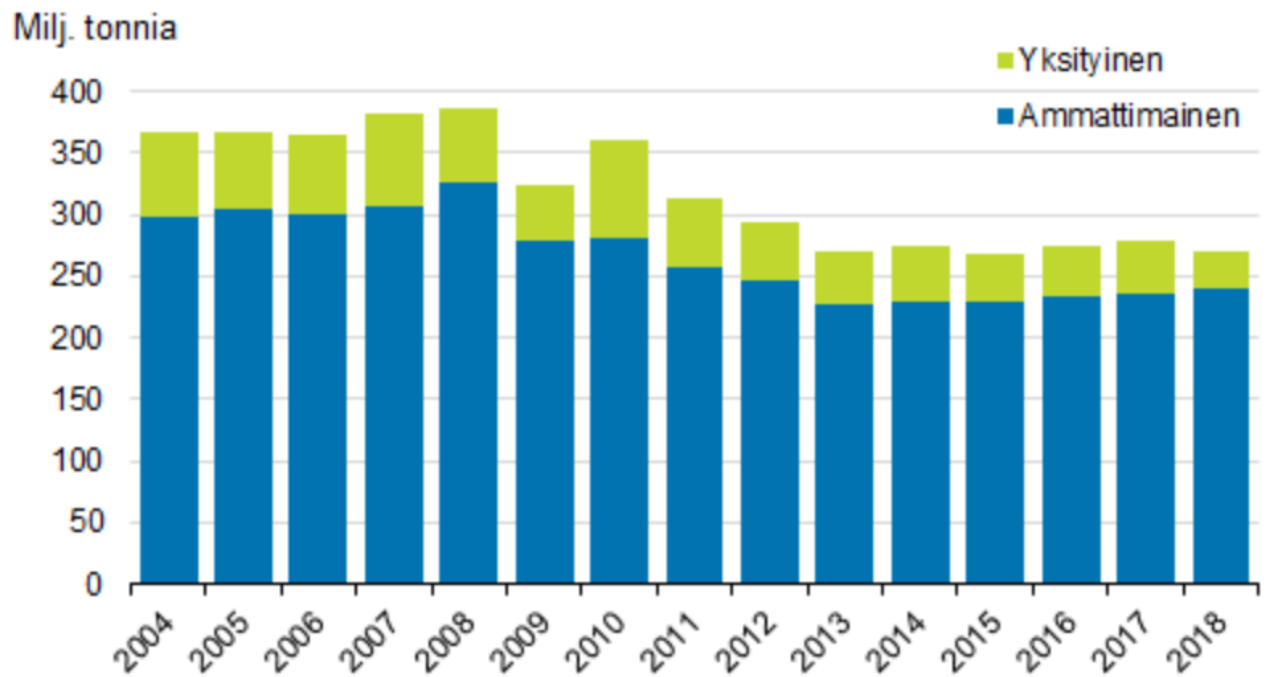


Figure 2 Freight transport of trucks in domestic traffic every year by Statistics Finland. (Tilastokeskus, 2019)

In Figure 2, according to Statistics Finland's Statistics on Road Freight Transport, the transport of goods carried by lorry has been variable throughout the last years. Over the last ten years (2008-2018), there has been a major downturn. This means a drop of over 100 million tons in comparison to the peak in 2008, given both the private and the professional side. In 2009, there was a significant drop in the previous year's (2008) figures, which, however, were partially recovered in the following year (2010). Regardless, recovery in 2010 was not high enough to reach the peak amounts of 2008. It is worth mentioning that in 2010 there was a significant increase in private sector whereas the professional side remained almost the same as in the previous year. In the next three years (2011-13), the volumes dropped significantly until 2014, when the volumes rose slightly compared to 2013. From then on until 2018, changes in volumes have been very moderate and have remained low compared to previous years. This was the case on both the private and the professional side.

Number-wise, the total amount of goods transported by lorry in 2018 was 271 million tons. Compared to the previous year (2017), this is about 3 % less. There has also been a decrease of about 4 % in kilometers driven.

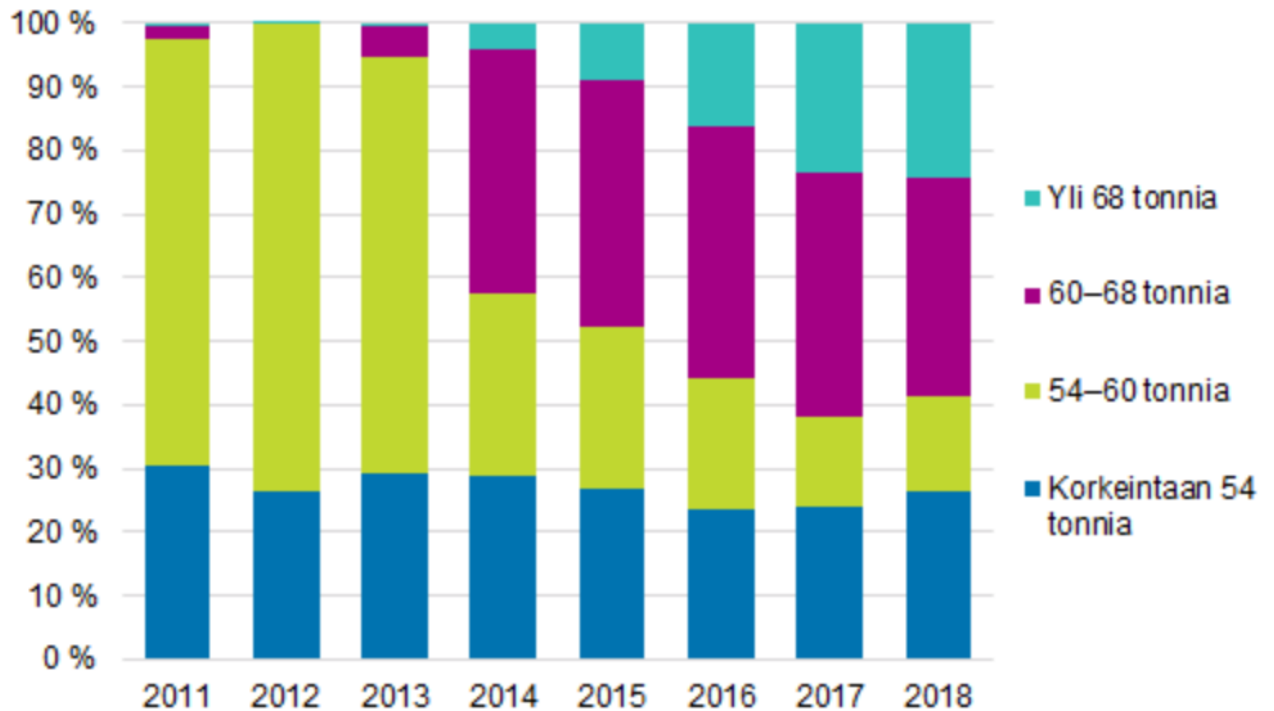


Figure 3 Share of total weight of goods transported by Statistics Finland. (Tilastokeskus, 2019)

Changes in weight categories are due to changes made in 2013 in the user settings for dimensions and masses of vehicle combinations. (Tilastokeskus, 2019)

In Figure 3, looking at the overall weight class from 2014 onwards, there is a significant increase particularly in the 68-tonne and 60-68-tonne truck categories. Similarly, the lighter category of 54-60 tons and maximum of 54 tons has been decreasing since 2014. Before 2014, there was practically no category of truck with more than 68 tons, or they had a marginal percentage of freight.

In 2014, trucks weighing more than 68 tons accounted for about 5 %, compared with almost 10 % in the following year (2015). The growth continued in 2016 with a share of about 15 % and in the following year (2017) it was already over 20 %. In 2018, the growth of more than 68 tons of trucks stopped at least for a moment.

In Figure 3, similarly, the 60-68-ton truck class was in a small position before 2014 along with the heavier over 68-tonne category. However, the difference is that already in 2013, there was about 5 % in the 60-68-tonne category, which increased in the next year (2014) with about 40 % share. Similarly, the smaller 54-60-tonne class decreased by about 40 %. It is noteworthy that while there has been an increase of over 68-tonnes a year from 2014 until 2017, the smaller 60-68-tonne class has remained at around 40 % share until 2017.

In 2018, a truck class of over 68-tonnes carried 24 % of the total amount of goods transported. In tons, this means roughly 65 million tons. (Tilastokeskus, 2019)

2.1.6 Statistics on domestic waterborne traffic in Finland

In Table 1, the change in 2018 compared to the previous year is slightly falling for oil products. In percentage this means a modest drop of just under 2 %. For other goods, the amount has increased significantly and the change has been over 65 %. The total quantity of goods is well on the plus side, although the slight decline in oil products is somewhat affecting it. Regardless, in percentage this means more than 24 % growth in quantity.

Table 1 Goods volumes in domestic shipborne traffic, 2008–2018 by Traficom. (Traficom, 2019)

Vuosi År Year	Tavaramäärä Godsmängd Goods volume		
	Öllytuotteet Oljeprodukter Oil products	Muu tavara Övrigt gods Other goods	Yhteensä Totalt Total
Milj. tonnia • Mn ton • Million tons			
2008	4,52	1,93	6,45
2009	4,12	1,45	5,57
2010	4,29	4,02	8,31
2011	4,07	4,73	8,80
2012	4,17	2,25	6,42
2013	2,95	1,91	4,86
2014	3,02	1,87	4,89
2015	3,49	1,90	5,39
2016	3,50	1,98	5,48
2017	3,55	2,29	5,84
2018	3,49	3,78	7,27

In Figure 4, the Finnish Transport and Communications Agency's (Traficom) statistics are domestic Waterborne traffic in Finland, volumes of goods have fluctuated over the last decade. The peak of the quantity of goods was seen in 2011, which started drooping a few years back (2009). The dip in that time was significant, but statistically close to the same figures as in 2015. In 2011, a deep fall began, which hit the bottom a couple of years later (2013). In the following year (2014), growth was marginal compared to the previous year, but has continued to rise since then. The rise has been slow compared to the sharp decline in previous years. The five-year continuous rise has still not raised the figures to where they were at their best.

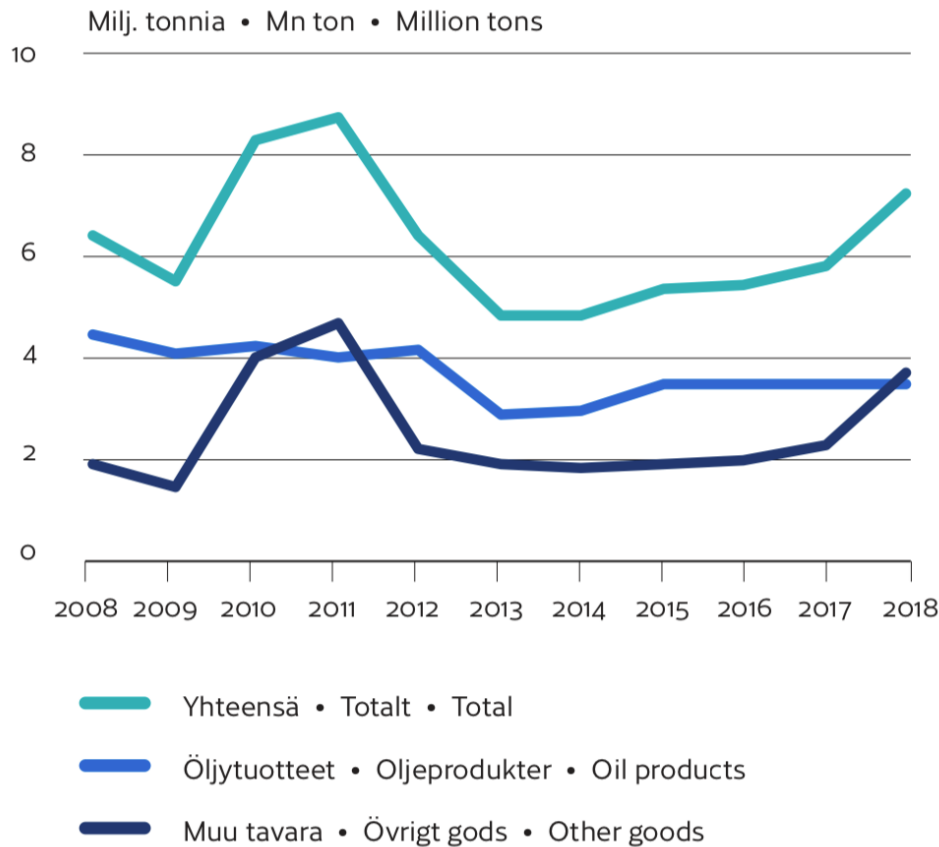


Figure 4 Goods carried in domestic shipborne traffic, 2008–2018 by Traficom. (Traficom, 2019)

In Figure 4, since the peak in 2008, the volume of oil products has dropped significantly less and fluctuations have been smaller than in other goods. It is also noteworthy that the decline in oil products occurred at a different time from other goods. On the other hand, the rise also occurred at a different time. There is no actual peak in oil products after 2008, when it was at its highest. A clear dip is visible in 2013. The decline was preceded by a rising and falling season that lasted for several years. After 2013, the number increased during the following years until 2015, after which the amount has remained steady. After the dip, the number has not risen to the same level before the dip, and even after five years, the peak in 2008 could not be reached.

In Figure 4, the number of other goods has risen over the decade. In 2008, the number started dropping and dropped to its lowest in 2009, but rose significantly in the coming years. The highest peak was reached in 2011, after which the number dropped sharply again. However, the decline did not fall to readings like 2009. The years 2012-2016 were

relatively flat. In 2017, the volume increased significantly, which had already started in 2016, albeit at a more moderate pace.

2.1.7 The Finnish Railway Statistics

In Figure 5, the Finnish Transport Agency's statistics about the Finnish Railway Statistics, tonnage of train freight traffic dropped sharply after 2008. Regardless, the fall in 2009 did not decrease the tonnage as low as in 2015, when the number dropped even further. In the following year (2010), the situation picked up from the previous year, even though the peak figures for 2008 were not reached. In 2010-2012 a slight decrease occurred, which was corrected in the following years (2012-2014). Overall, fluctuations were relatively small and no major changes were seen. In 2014, there was a new downturn until 2015, when the figures declined to the lowest in the decade. In subsequent years (2016-2017), the situation picked up and the volumes increased significantly, even near the peak year 2008 figures.

4.2 Tavaraliikenteen tonnit vuosina 2008–2017 • Godstrafikens ton åren 2008–2017

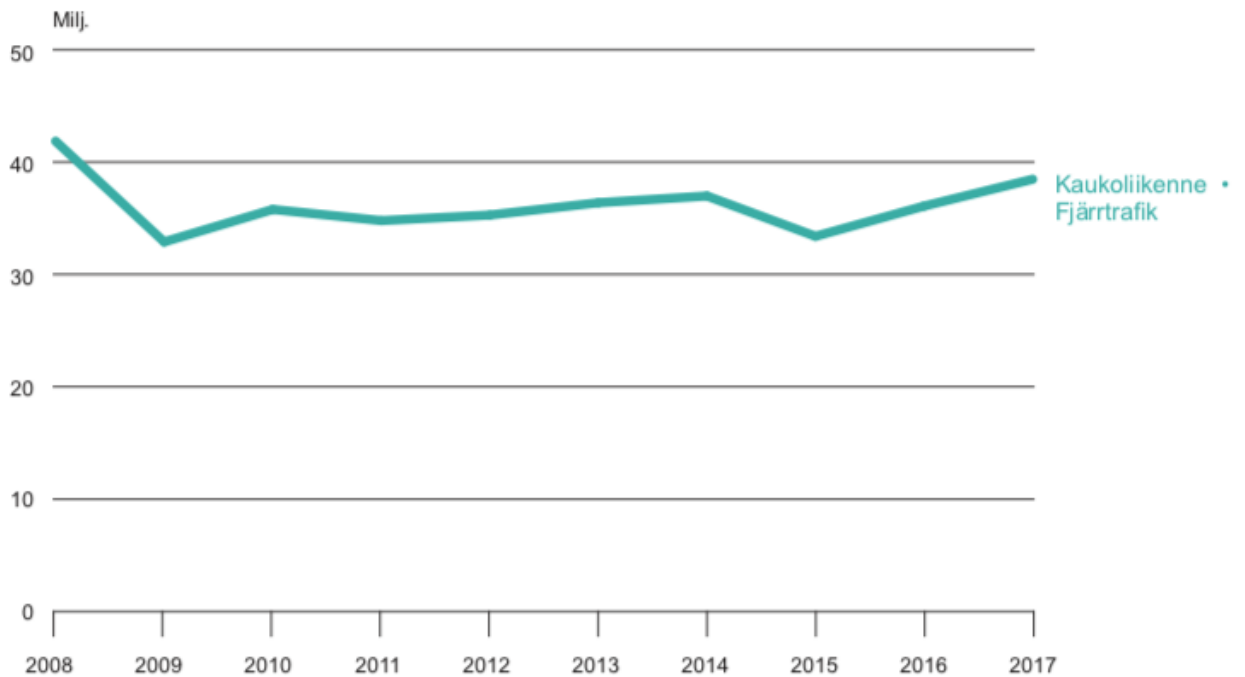


Figure 5 Tons of train freight traffic in 2008-2017 by the Finnish Transport Agency. (Liikennevirasto, 2018)

In Figure 5, the Finnish Transport Agency's statistics about the Finnish Railway Statistics, tonne-kilometers of train freight traffic followed the development of tonnage of freight traffic very closely. It should be noted, however, that the number of tonne-kilometers increased faster than the tonnage in the years following the 2015 drop. In addition, the result for 2017 was higher for the tonne-kilometers than in tonnage.

4.3 Tavaraliikenteen tonnikilometrit vuosina 2008–2017 • Godstrafikens tonkilometer åren 2008–2017

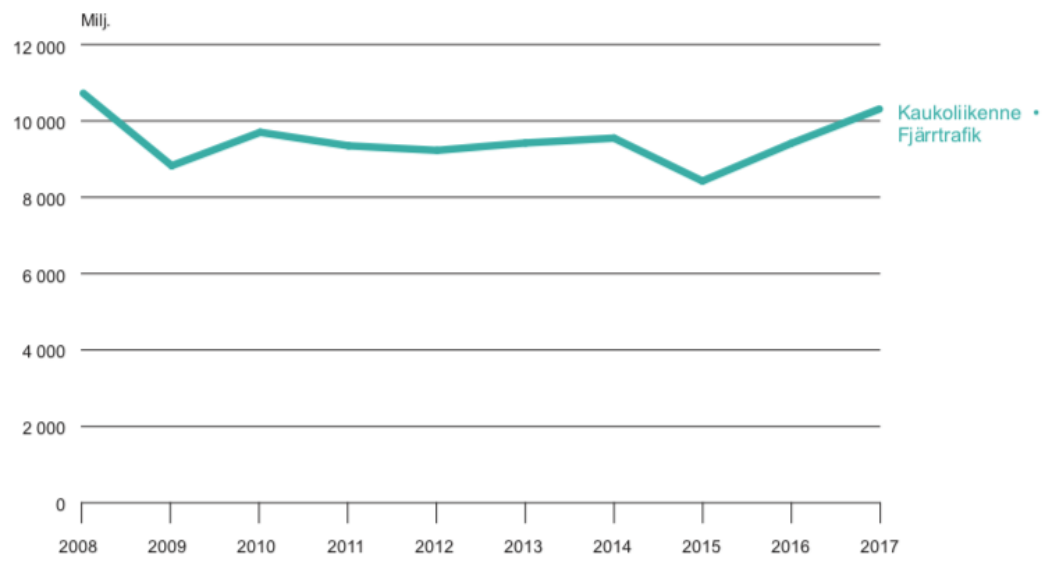


Figure 6 Tonne-kilometers of train freight traffic in 2008-2017 by the Finnish Transport Agency. (Liikennevirasto, 2018)

2.1.8 Air Freight Statistics

Table 2 Freight and mail tonnes of domestic and international air transport 1998-2018 by Finavia. (Finavia, 2019)

Tonnia	Kotimaa			Kansainvälinen			YHTEENSÄ	
	Rahti	Posti	Yhteensä	Rahti	Posti	Yhteensä	Tonnia	Muutos-%
1998	9 958	8 837	18 795	81 515	12 819	94 333	113 129	/0
1999	10 679	7 530	18 209	76 398	13 107	89 504	107 714	-4,8
2000	12 676	7 444	20 120	79 486	12 595	92 081	112 201	4,2
2001	7 869	6 524	14 393	71 093	11 788	82 881	97 274	-13,3
2002	7 492	6 434	13 927	70 817	11 514	82 331	96 257	-1,0
2003	6 324	5 576	11 900	99 641	10 625	110 266	122 166	26,9
2004	5 363	5 222	10 585	112 270	9 861	122 132	132 717	8,6
2005	4 692	5 251	9 942	115 734	9 627	125 361	135 303	1,9
2006	4 145	5 469	9 614	126 332	9 098	135 430	145 044	7,2
2007	3 171	5 676	8 847	136 669	9 285	145 954	154 801	6,7
2008	2 980	4 549	7 529	142 106	9 533	151 639	159 168	2,8
2009	2 600	4 828	7 428	118 056	8 250	126 307	133 735	-16,0
2010	1 971	3 966	5 937	154 432	7 800	162 232	168 169	25,7
2011	1 329	5 133	6 461	165 651	9 974	175 625	182 086	8,3
2012	3 528	4 035	7 564	188 782	8 108	196 890	204 453	12,3
2013	2 200	3 524	5 724	185 274	7 714	192 988	198 711	-2,8
2014	1 671	3 247	4 918	179 028	10 986	190 013	194 932	-1,9
2015	1 413	3 009	4 422	170 508	9 185	179 693	184 115	-5,5
2016	1 796	2 966	4 762	174 678	8 987	183 665	188 427	2,3
2017	2 111	1 454	3 565	187 797	9 133	196 929	200 494	6,4
2018	2 166	327	2 493	195 792	9 077	204 868	207 361	3,4

Finavia publishes freight statistics monthly.

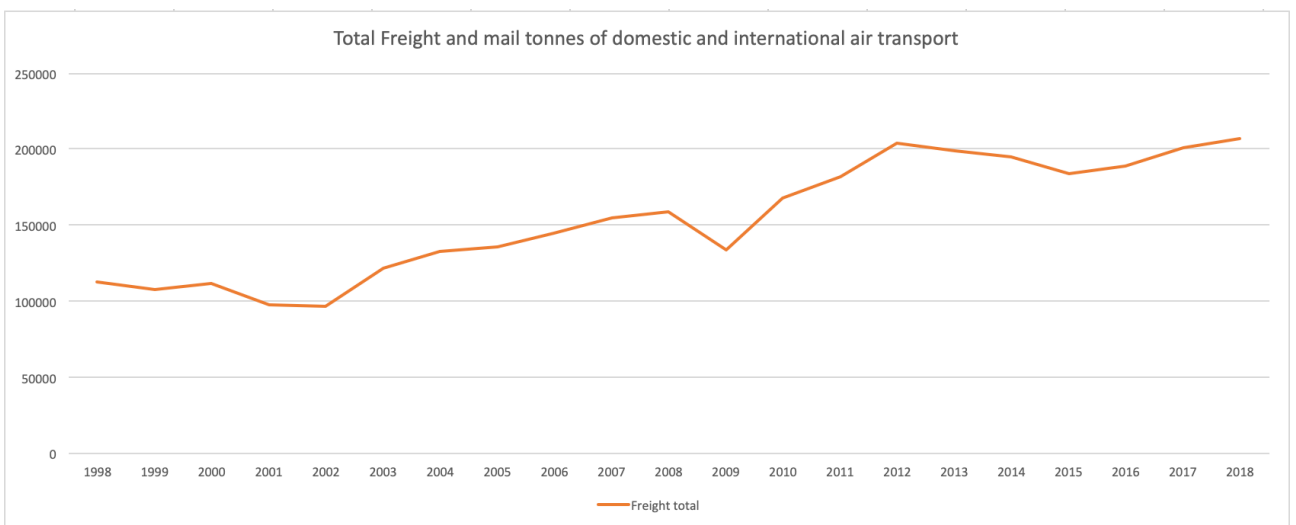
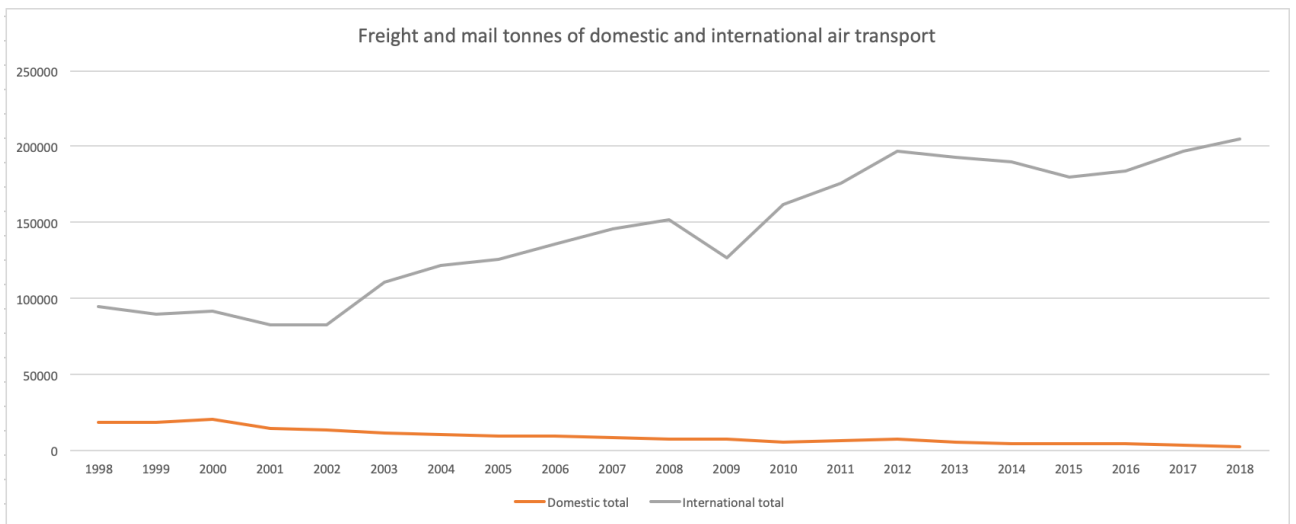
Table 3 Freight and mail tonnes of domestic and international air transport by Finavia. (Finavia, 2019)

			01/19	02/19	03/19	04/19	Vuoden alusta
Kotimaa	Rahti	Tonnia	219	173	195	176	764
		Edv. Tonnia	176	151	165	171	663
		Muutos-%	24,3	15,1	18,3	3,0	15,2
		Kum. muutos-%	24,3	20,0	19,4	15,2	15,2
	Posti	Tonnia	11	11	13	11	47
		Edv. Tonnia	31	36	43	30	139
		Muutos-%	-62,4	-69,6	-69,7	-62,2	-66,5
		Kum. muutos-%	-62,4	-66,3	-67,6	-66,5	-66,5
	Yhteensä	Tonnia	231	184	208	188	810
		Edv. Tonnia	207	186	208	201	802
		Muutos-%	11,5	-1,1	0,1	-6,8	1,0
		Kum. muutos-%	11,5	5,5	3,6	1,0	1,0
Kansainvälinen	Rahti	Tonnia	15 573	14 910	17 665	16 369	64 517
		Edv. Tonnia	12 597	12 359	15 566	15 981	56 503
		Muutos-%	23,6	20,6	13,5	2,4	14,2
		Kum. muutos-%	23,6	22,1	18,8	14,2	14,2
	Posti	Tonnia	1 331	1 133	1 306	605	4 374
		Edv. Tonnia	916	596	697	683	2 892
		Muutos-%	45,3	89,9	87,5	-11,5	51,2
		Kum. muutos-%	45,3	62,9	70,6	51,2	51,2
	Yhteensä	Tonnia	16 904	16 043	18 971	16 973	68 892
		Edv. Tonnia	13 514	12 955	16 262	16 664	59 395
		Muutos-%	25,1	23,8	16,7	1,9	16,0
		Kum. muutos-%	25,1	24,5	21,5	16,0	16,0
YHTEENSÄ	Tonnia	17 135	16 227	19 179	17 161	69 702	
	Edv. Tonnia	13 721	13 142	16 470	16 865	60 197	
	Muutos-%	24,9	23,5	16,4	1,8	15,8	
	Kum. muutos-%	24,9	24,2	21,3	15,8	15,8	

In Table 3, freight traffic, the first quarter of 2019 totaled about 70 tonnes, including domestic and international freight and mail. The change was almost 16 % on the plus side.

In Table 3, domestic cargo accounted for 764 tonnes for the first quarter of 2019 and a change of around 15 %. In terms of domestic mail, the quarter was 47 tonnes, but in percentage terms about -66 %. A total of 810 tonnes and a change of 1 % were seen.

In Table 3 Internationally, freight was about 64.5 million tonnes in the first quarter of 2019. The change was just under 15 %. In the case of mail, the amount was just over 4.3 million tonnes and the change was about 50 %. Overall, the figure was just under 68.9 million tonnes and the change was 16 %.



2.2 Supply Chain Management

2.2.1 Definition of the Supply Chain

A supply chain and Supply Chain Management (SCM) have both been defined several different ways throughout the history. A supply chain has in some cases been defined rather narrow, while in other cases the definition is very broad and even the end user is included in the supply chain (Mentzer et al., 2001).

In Mentzer's (Mentzer et al., 2001) view, a supply chain has more definitions than SCM and, taking into account various definitions throughout the history and related aspects, defines a supply chain as follows:

“A set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.”

Based on the above definition Mentzer (2001) points out division of a supply chain into three apparent layers or levels, each consisting of different elements. The levels or layers are named:

1. Direct
2. Extended
3. Ultimate

1. In the direct supply chain (figure 7) the “set of three or more entities” directly involved are the company, a supplier and the customer (Mentzer et al., 2001).



Figure 7 Modified from Types of Channel Relationships figure – Direct Supply Chain in Defining Supply Chain Management. (Mentzer et al., 2001)

2. In the extended supply chain (figure 8) more elements are added to the direct as it is a more complex entity consisting also the supplier's supplier(s) and customer's customer(s) (Mentzer et al., 2001).



Figure 8 Modified from Types of Channel Relationships figure – Extended Supply Chain in Defining Supply Chain Management. (Mentzer et al., 2001)

3. In the ultimate supply chain (figure 9) even more elements are added to the chain. In addition to the company, a supplier and their suppliers, the customer and their customers but also finance, marketing and third party logistics supplier (Mentzer et al., 2001).

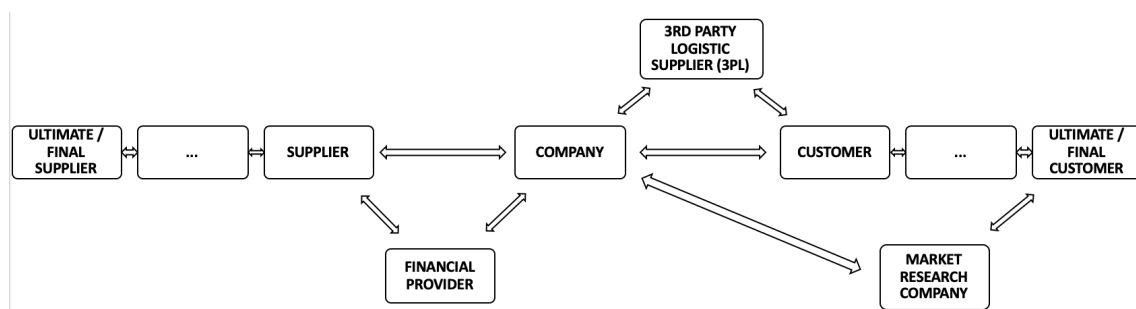


Figure 9 Modified from Types of Channel Relationships figure – Ultimate Supply Chain in Defining Supply Chain Management. (Mentzer et al., 2001)

Third Party Logistic supplier (3PL) are logistics service providers, such as forwarders, that for a fee manage their customer's material flow and/or operations related to that ("Logistiikan Maailma," 2019).

2.2.2 Definition of Supply Chain Management

Christopher (Christopher, 2011, p. 3) defines Supply Chain Management as follows:

The management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole.

(Christopher, 2011, p. 3) points out, as his definition could suggest, that it is about the “relationship” between those who are involved and reaching the best possible end result for all parties.

Although it may not be the most used definition on supply chain management, if compared to some other definitions made by Mentzer (Mentzer et al., 2001, pp.3-6) for example, it is however considered to be a reference point in history, according to Morana (Morana, 2013, p. 3).

Mentzer (2001) lists out several definitions for SCM from known authors such as La Londe and Masters, Stevens, Houlihan, Jones and Riley, to name a few but concludes to divide them into three distinct groups.

These three separate views or groups are clearly seen in table 4.

Table 4 Three ways to look at Supply Chain Management by Mentzer. (Mentzer et al., 2001)

Management philosophy	<ol style="list-style-type: none">1. Systems approach is directed to see a supply chain as a single unit, rather than multiple individually operating and scattered units. All involved stakeholders work together as one to assure complete flow of goods from start to finish while affecting positively each other's performance along the chain.2. Strategic orientation is directed to combining operational functions and strategies into one throughout the supply chain.3. Customer focus is directed to reaching customer satisfaction by using methods specifically designed for each customer.
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Implementa- tion of a man- agement phi- losophy	<ol style="list-style-type: none"> 1. Expansion of integrated behavior to remain competitive. 2. Mutual exchange of information especially for the monitoring and planning purposes. 3. Long-term risk and reward sharing among all stakeholders of the supply chain to reach advantage over competition. 4. Cooperation among all stakeholders of the supply chain in planning, controlling, inventory and cost efficiency, as well as, product development, product selection, quality control and delivery systems, to monitor performance of each chain and the whole supply chain. 5. Unified goal and focus on customer service across all supply chain stakeholders through compatible culture and management methods to eliminate unnecessary redundancy or duplication to achieve efficiency at lower cost. 6. Process integration in sourcing, manufacturing, and distribution across all supply chain stakeholders. 7. Long-term relationships across all stakeholders in the supply chain, consisting of a small number of partners to ensure maximum cooperation and the longest possible relationship.
A set of man- agement pro- cesses	Specified series of ordered activities with a time, place, beginning, and an end that consists of clear contribution and effect, as well as structure.

After considering the three ways to view the SCM, Mentzer (2001) comes to conclude that for the sake of research and practice it would actually be better to have a single definition for the SCM to avoid confusion:

The systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

2.2.3 Purpose of SCM

According to Mentzer (2001) the reason for SCM to exist, is for the stakeholders in the supply chain to gain competitive edge. These edges could either be cost leadership or to differentiate from the competition. Customer satisfaction increases as the customer value increases. This in turn increases competitive edge, which eventually leads to increase of profitability of all stakeholders in the supply chain.

Mentzer (2001) points out that the aim of SCM is:

1. to provide high enough level of customer service with as low cost as possible.
2. to provide their customers with higher stock availability and lower stock cycle, thus increasing quality of customer service.
3. to provide competitive edge through low cost and tailored service

2.3 Logistics Calculation Models

2.3.1 DuPont –model (Figure 10)

The DuPont model is a calculation model that allows companies to isolate and view the share of factors that affect return on equity (ROE). Other names for the model are also used, such as DuPont identity or DuPont analysis. This breakdown enables companies to identify the positive and negative factors that influence profitability. (Hargrave, 2019)

Benefit over ROE

Return on equity (ROE) is calculated by dividing net income by equity. ROE alone reveals how well equity has been used in the company, but does not explain more about what makes ROE change or why ROE is high or low. The DuPont model allows the company to go further and determine whether ROE is profitable through debt or asset utilization. (Hargrave, 2019)

Limitation

DuPont relies on company accounting, which is as manipulative as any piece of information. In addition, DuPont itself does not contain context for high or low values, or whether values as such should be considered high or low. (Hargrave, 2019)

The income statement shows the company's income and expenses. The balance sheet, in turn, shows the value of the company's inventory, receivables, cash and assets. Neither of these, in itself, reveal profitability. To determine profitability, it must be calculated separately and always reported as a ratio. The model used by the author is simplified, where

profitability is expressed in percentage points as the overall rate of return "Return Rate %".

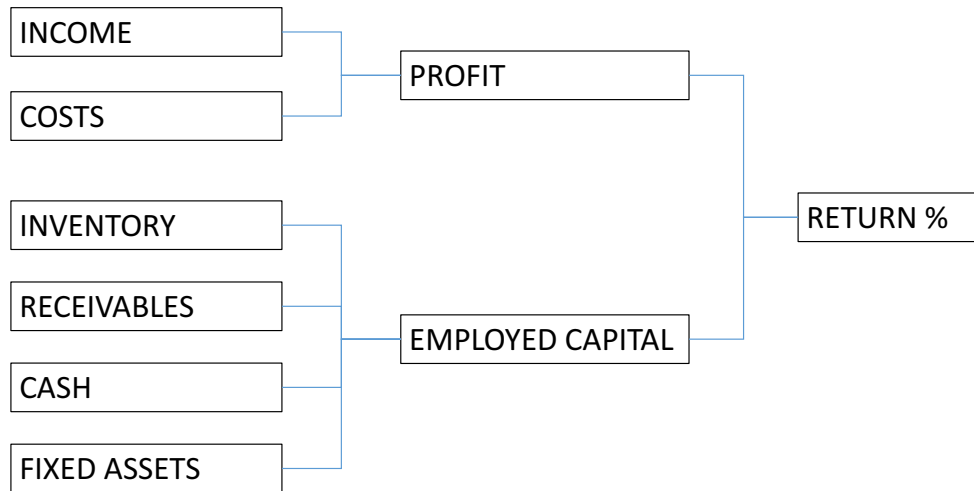


Figure 10 Modified from Du Pont diagram example in Logistik p. 47 (Storhagen, 2018)

Example

According to the income statement, Logistics Company Y had income of 100.000 € in the past quarter, costs of 90.000 €. These make a profit of 10.000 €.

$$\text{Profit} = \text{Income} - \text{Costs} = 100.000 \text{ €} - 90.000 \text{ €} = 10.000 \text{ €}$$

According to the balance sheet, the company had 40.000 € in inventories, 30.000 € in receivables, 20.000 € in fixed assets and 10.000 € in cash. These make a total capital of 100.000 €.

$$\begin{aligned} \text{Employed capital} &= \text{Inventory} + \text{Receivables} + \text{Fixed Assets} + \text{Cash} \\ &= 40.000 \text{ €} + 30.000 \text{ €} + 20.000 \text{ €} + 10.000 \text{ €} = 100.000 \text{ €} \end{aligned}$$

Profits divided by total capital we get a return of 0.1 which means that return % is 10 %.

$$\text{Return \%} = \left(\frac{\text{Profit}}{\text{Employed capital}} \right) \times 100 = \frac{10.000 \text{ €}}{100.000 \text{ €}} = 0.1 \times 100 = 10 \%$$

2.3.2 Three Driving Forces in Logistics Development

Revenue stream increase

To increase company's revenue stream or to bring in more money there are four things to make it happen according to Kaufman. (Kaufman, 2012)

1. More customers. More customers mean more transactions and more money for the company.
2. Increase transaction size. Increasing transaction size mean buying more to spend more. The more each customer spends at each time they use the company's services or buy their products the more the company makes. This is done through *upselling* where the company does not only sell them one product but attempt to sell anything and everything that goes along with it. For example, customer comes to buy a hammer, so the company offers nails to go with it.
3. Increase transaction frequency. Increasing transaction frequency mean that same customer uses the company's services or buys their items regularly. Basically the shorter the time between transactions the better, since every time this happens the company's revenue will increase.
4. Raise prices. Simply by raising prices, the company makes more money than before, each time a customer buys something.

Everything above is based on the ideal situation that nothing changes. In real life, however, not all customers are the same and some are good customers and some are not. In order to grow revenue, a company needs as many good customers as possible. (Kaufman, 2012)

Cost reduction

Reducing costs is a systematic way of doing things that will result in a reduction in the so-called running costs of the company. The total revenue of a company increases as the cost of producing a service or service decreases. (Business Jargons, 2017)

Tied capital reduction

According to Tuovila, the company's working capital is formed by current liabilities minus current assets. Current liability is a liability of a company that falls due within the next 12 months and includes, for example, operating expenses and payments of long-term debt. Current assets, on the other hand, are everything that can be converted into cash within 12 months and include, for example, cash, accounts receivable, inventories and current investments. (Tuovila, 2019)

$$\text{Working capital} = \text{current assets} - \text{current liabilities}$$

According to Tuovila, working capital management requires the company to follow three things:

1. Monitor working capital ratio
2. Monitor collection rate
3. Monitor stock/inventory ratio

The working capital ratio of a company has to be compared to competitors operating in the same industry, as good ratios vary from sector to sector. Generally speaking, a ratio of 1.0 or less indicates a company's difficulty in paying its short-term obligations on time. Similarly, a ratio of 2.0 or above indicates a company's problems in investing wisely. (Tuovila, 2019)

Collection rate refers to a company's ability to collect accounts receivables. By calculating the collection rate, the company will find out how long it will take for the company to get its accounts receivables from its credit sales. If the company has a low collection rate, it means that the company is efficient in collecting its accounts receivables. A high

collection rate, in turn, means that the company has problems collecting its accounts receivables. In other words, the lower the collection rate, the more efficient the firm's cash flow is. (Tuovila, 2019)

$$\begin{aligned} \textit{Collection ratio} &= \frac{\textit{average outstanding accounts receivables}}{\textit{net credit sales}} \times 365 \\ &= \textit{Average number of days to receive payment} \end{aligned}$$

According to Lewis, companies should not give credit to companies that have a bad credit history. To do this, the company should do a credit history check before granting credit. In addition to checking the history, the company finance department must have an efficient collection process to avoid payment delays. (Lewis, 2019)

According to Tuovila, inventory turnover ratio refers to how quickly a company's inventory is sold and replenished. (Tuovila, 2019)

$$\textit{Inventory Turnover ratio} = \frac{\textit{sales}}{\textit{inventory}} \textit{ or } \frac{\textit{Cost of Goods Sold}}{\textit{Average Inventory}}$$

Again, the turnover ratio must be compared to the turnover ratio of competitors in the same industry. According to Tuovila, a low inventory turnover ratio indicates that the company has an excessively high inventory level. In turn, a high turnover ratio may indicate that the company has too low inventory level (Tuovila, 2019). Fuhrmann points out that a high inventory turnover ratio is better because it implies that the company's products are selling well. The low turnover rate, in turn, suggests that the company is having trouble selling its products (Fuhrmann, 2019).

Ideally, a company should have enough products in stock that it can meet the needs of its customers, but no more that unnecessarily binds the company's working capital (Tuovila, 2019).

Economically sound companies make sure they have enough, but not too much, working capital to pay their bills on time. Unnecessary excess working capital can weaken a company's efficiency by relieving the company of the pressure to improve efficiency to guarantee its ability to cover all operational costs. (Wei, 2019)

According to Wei, it is possible for a company with a low working capital to keep selling on credit. However, it requires that the collection process be kept short, for example by using On-Demand or Just-In-Time (JIT) functions. This can even allow the company to operate a zero-inventory operation, whereby working capital is not unnecessarily tied up in inventory at all. Direct deliveries to and from production to the customer without unnecessary storage require a functioning supply chain. The company can use the released funds more efficiently somewhere else. (Wei, 2019)

2.4 Logistics Tech

2.4.1 Platforms

According to Choudary, digitalization is expected to significantly change the logistics industry. Platforms such as Uber and Deliveroo are already on the market, but a more complex platform solution involving more players is expected for logistics centers. According to Choudary, three things are driving the industry forward:

1. New infrastructure and technology
2. More visible logistics data
3. Pressure to lower costs

The platform-based business model enables more efficient use of free capacity without anyone having to own the entire chain. (Choudary et al., 2019)

- TradeLens blockchain-based platform from Maersk and IBM
- Singapore's Transport Integrated Platform (TRIP)

- Cainiao data platform from Alibaba
- Ware2Go platform and project44 from UPS
- Delivery drones from Amazon for last mile
- Six-wheeled delivery robot for urban environment from Amazon owned Dispatch for last mile
- Self-driving cars from Uber for last mile

(Choudary et al., 2019)

New technologies such as cloud services, new platform solutions and blockchain are creating many new opportunities that also involve many challenges and risks. However, the trend is currently moving in that direction. According to Choudary, the risk involved in a trend is less than staying on the sidelines, be it an existing operator or a new one. (Choudary et al., 2019)

2.4.2 Vehicles

Electric vehicles

Tesla Cybertruck

According to Tesla, the cybertruck has a towing capacity of over 14,000 pounds or 6,350 kg, a carrying capacity of 3,500 pounds or 1,587 kg, and a driving range of 500+ miles or 804+ km. However, Tesla mentions that all configurations are for the US market only and how the rest of the world will be developed on a demand basis. (Tesla, 2020)

Gas powered vehicles (LNG – Liquefied Natural Gas & CNG – Compressed Natural Gas)

Scania LNG/CNG

According to Scania, their 410 horsepower six-cylinder gas-powered truck will reduce CO2 emissions by 90 percent compared to a comparable diesel truck. A typical semi-trailer truck with a single LNG tank weighing up to 40 tonnes can drive about 1,100 kilometers. In the case of a rigid truck with two LNG tanks, the distance increases to about 1,600 kilometers. A semi-trailer truck equipped with a CNG tank has a range of 500

kilometers. The range differences of LNG and CNG tank trucks are explained by the ability of LNG tanks to contain larger amounts of gas. (Scania, 2017)

Iveco LNG Stralis

According to Iveco, their cursor 8, 330-horsepower, manual gear, gas-powered engine is designed for 18- to 40-tonne loads. A gas-fueled truck saves 10,000 to 20,000 euros per year at 40,000 kilometers per year and engine running noise is 3 to 6 decibels less than that of a comparable diesel engine. (Iveco, n.d.)

Iveco's new cursor 13 engine with 460 horsepower, 2,000 Nm of torque and 71 decibels of sound delivers the same power and torque as the equivalent Euro 6 class diesel engines. Nevertheless, the new cursor 13 produces 60 percent less NOx (nitrogen oxide), 80 percent less CH₄ (methane), and 99 percent less PM (particulate matter) than Euro 6 diesel engines. The use of CNG or LNG reduces CO₂ emissions by 95%. The gas truck, equipped with a CNG tank, has a range of approximately 570 kilometers. Combining both CNG and LNG tanks will result in a distance of 280 + 800 kilometers. A gas truck equipped with one LNG tank can run 800 kilometers and with two LNG tanks approximately 1 600 kilometers without refueling. (Iveco Publication, 2017)

Volvo LNG

The Volvo gas engine provides 420 or 460 horsepower and the same performance as the corresponding Volvo diesel engine. CO₂ emissions are 20 % lower when compared to conventional LNG and 100 % lower when using bio-LNG. The operating range is the same as for diesel. The savings come from the lower price of LNG. (Volvo Trucks, 2020)

2.4.3 Energy sources

Diesel technology

NESTE MY renewable diesel

According to NESTE, renewable diesel is a product developed and patented by NESTE. In practice, this is a hydro treated vegetable oil (HVO). NESTE MY renewable diesel can be made from any organic material. Not only vegetable oil but also various waste and

residues are suitable for this purpose. Due to the manufacturing process, the end result is always a product of the same quality and with the same characteristics, regardless of what ingredients the product is made from. NESTE MY renewable diesel can be blended with unlimited amounts of conventional fossil diesel without compromising the quality of the blend and can be used alone instead of regular diesel. As with regular diesel, long-term storage of renewable diesel is possible without fear of loss of product quality, as renewable diesel does not accumulate any water. (NESTE, 2014)

NESTE points out that WWFC 5 (Worldwide Fuel Charter) does not allow the use of conventional biodiesel, but the use of renewable diesel due to its high cetane number (over 70) is recommended. Renewable diesel is cleaner, resulting in lower particulate emissions, hydrocarbon emissions and NOx emissions. As a result, the car's particle filters and engine oil remain cleaner for longer. (NESTE, 2014)

Biodiesel

According to NESTE, the term biodiesel refers to diesel made from Fatty Acid Methyl Ester (FAME). Biodiesel sold on the market is made from vegetable oil such as rapeseed oil and soybean oil. The end result of the manufacturing process and the characteristics of the product depend on the raw materials used. If biodiesel is blended with conventional diesel, the blending quality will be lower. The maximum concentration of biodiesel is 7 % and its properties are not suitable for long-term storage. The reason for this is the potential accumulation of water and the growth of microbes that impair the quality and properties of the product. Biodiesel should be used within six months of production. According to NESTE, the use of conventional biodiesel is not permitted under WWFC 5. The biodiesel cetane number is somewhere between 50 and 60, and its properties in cold weather are limited and depend on the raw material used. Compared to conventional fossil diesel, biodiesel produces more NOx emissions, which can also have a detrimental effect on vehicle engine oil and particle filter purity. (NESTE, 2014)

Electricity

Powerwall battery storage system from Tesla

Powerwall is a lithium-ion battery pack developed by Tesla and is designed for households, businesses and utilities. The product can be used, for example, during a power

failure. Tesla is supposed to remotely control the technology via the Internet. The size of the package is about 1.2 meters times a meter and would allow more efficient use of the energy collected from the solar panels, especially during a power outage. For companies, the product offers the ability to use less electricity from the power grid, but it also provides security, for example, to data centers that cannot be cut off. (Cardwell, 2015)

Unlike Powerwall, the power storage batteries that preceded Powerwall are not easy to use, easy to install, good looking, and relatively cheap to maintain. However, the popularity of the product is very much linked to the popularity of solar power. This product might bring the best benefit to customers who already have solar panels installed or a Tesla electric car. (Battisti and Giulietti, 2015)

3 METHOD

The chapter covers research approach for the thesis to investigate the research questions. It begins with an overview of the method and motivation to use it in this thesis. Chapter then continues to data collection process and finally data analysis.

3.1 Research approach

In order to investigate the research questions, the author has chosen to use an interview, which is believed to be the most common method in qualitative research. Interview as a method is usually very time-consuming due to the fact that the interview needs to be transcribed and analyzed. In return, the interview offers great deal of flexibility for the researcher. Moreover, qualitative research typically include ethnography or participant observation as part of qualitative interviewing but these were not included in this research (Bryman, 2012, p. 383).

The author chose to use semi-structured interviews as a qualitative research method with open-ended questions. Other interview types could have been used also but semi-structured interview was more suitable for this purpose. Predetermined questions in a form of interview guide are possible to send to the responders before the actual interview thus

allowing them to think and prepare themselves for the questions to come up during interview.

The qualitative research method itself has been criticized as too subjective, based on the argument that researchers using qualitative methods are prone to influence the results they believe are important and significant in their research. Critics concern is valid as the researcher himself is seen as the most important tool for collecting data in qualitative research. During the interview, there will be a connection between the interviewer and the respondent, who, according to critics, determine which things get attention in relation to others. The structure of the interview allows this to happen since questions usually start from the general level, but are more detailed towards the end in order to collect the data needed for the research (Bryman, 2012, pp. 385-386).

With the help of the interview guide, which includes the list of topics or questions intended to be asked during interview, researchers can keep track of the interview. In semi-structured interview interviewer has room to maneuver but all the questions on the interview guide is meant to be asked in one way or another depending the responder (Bryman, 2012, p. 472).

According to Bryman (2012) primary data refers to data that has been collected by the researcher or researchers themselves who are also conducting the data analysis. The investigation and collecting primary data can be expensive and time-consuming process (Bryman, 2012, p. 312).

According to Bryman (2012) secondary data refers to data that has been collected by someone else than the researcher or researchers who are doing the data analysis. Higher educational institutions for example encourage their researchers to archive the collected data so that it is available to other researchers as a secondary data (Bryman, 2012, p. 13).

3.2 Data collection and analysis

Interviews were conducted in two ways. Some respondents were interviewed on the phone at a specific time of the day. Some respondents, however preferred to respond back via email by answering to the questions presented on the interview guide. All respondents were sent an interview guide with the same questions well before the actual interview so they had enough time to prepare. All of the questions were open-ended questions to prohibit respondents from answering only “yes” or “no”, as this kind of answer would not provide sufficient data. Semi-structured interview with half a dozen open-ended questions were formed based on external part of SWOT –analysis and PESTEL -analysis to cover respondents’ views about opportunities and threats regarding future of logistics from political, economic, socio-cultural, technological, environmental and legal point of view. Rather than forming interview guide with a dozen questions, thus making the interview more structured but longer, it was found more convenient, for the sake of respondents, to combine questions together. Combining opportunities and threats together with each part of PESTEL allowed respondents to answer and cover both parts as a whole.

Invitation for interview and interview guide was sent to multiple companies from various sectors. These companies were selected from the four main logistics sectors chosen for this research thesis:

- One company was selected from trade:
 - A Finnish Trading company
- One company was selected from industry:
 - A Finnish Industrial company
- Three companies were selected from transportation:
 - A Finnish Transportation company
 - A Transportation company X
 - Air Transportation company
- One organization was selected from authorities:
 - Tulli (*customs* in English)

Most interviewees and their respected companies, interviewed by the author, insist on staying anonymous. The reasons for the requests were not defined individually by each

interviewee, but one mentioned the reason for wanting to be anonymous to avoid media attention and another said anonymity was the company's policy.

It is understandable that while the interview and the questions it raises are about external threats and opportunities related to the future of logistics, not internal, companies do not want to give their competitors a competitive edge by disclosing what they have mentioned in a post-publication material.

Of the companies and / or organizations interviewed, only the interviewee of the Finnish customs said their name could be used as such and did not see any reason for anonymity. The author's questions were answered by Jarkko Fagerström, Senior customs Officer of Finnish customs, who has previously given interviews in the public media.

Due to semi-structured interview with open-ended questions each interview turned out to be unique with the difficulty of replicating precisely although attempt to this was made for the sake of comparing final data (Bryman, 2012, p.405). Interviews were grouped based on four main fields and individually transcribed. The data collected were interpreted and analyzed and compared to determine whether the data collected were consistent or contradictory. This in turn was used to answer research questions. A detailed transcript for each interview and a copy of the interview guide can be found in the appendices because the author has included these in the thesis for later review.

3.3 SWOT analysis

SWOT analysis is “a method of assessing a person, company or product by considering their Strengths, Weaknesses and external factors which may provide Opportunities or Threats to their development.” (Collin, 2007 p. 406)

The SWOT analysis is meant to be based on facts and real data, not theories or suspicions. Although SWOT was originally designed for business use, it is increasingly used by governments, non-profit and private companies. Analysis allows users to make plans and

changes in areas that require development. It also makes it possible to exclude unfavorable and, instead, guide towards favorable strategies. An independent analysis consultant can also show them strengths, weaknesses and related reasons, for example in the product range. (Grant, 2019)

Strength

Describes the company's strengths compared to its competitors, such as good product, good service, loyal customers, strong brand and advanced technology. However, things that are believed to be strengths need to be compared to what competitors in the industry generally offer. If the industry's overall level of technology is advanced compared to other sectors, it may not be possible to speak of strength but rather the condition for survival. (Fallon, 2018) (Grant, 2019)

Weakness

Describes the company's weaknesses compared to competitors such as the new industry, large amounts of debt, poor production quality or a supply chain, low capital, low volume, expensive prices and old technology. These or some other thing can put them in a seemingly bad position, but it has to be compared to other competitors in the industry. An expensive product or high service price does not automatically mean weakness if it does not expel customers. An expensive price can be combined with good quality, from which a price conscious customer is willing to pay a premium price. (Michalowicz, 2017) (Fallon, 2018) (Grant, 2019)

Opportunity

Describes the company's external, i.e. independent, opportunities compared to competitors such as tariff elimination, environmental constraints, political changes and laws, ecological and social-cultural trend changes, technological and market changes or demographic changes. For example, the aging of the population can provide benefits to service providers in a given sector, as the number of consumers is growing steadily. (Fallon, 2018) (Grant, 2019)

Threat

Describes the company's external, i.e. independent, threatening factors such as climate change, weather, market changes and trends, inflation, competitors' behavior and the proliferation of players, international standard changes, suppliers and partners, financiers and investors. Changes in consumer spending habits, such as the growing trend of eating organic food or vegetarian food, may pose a threat to companies offering and manufacturing meat products. (Fallon, 2018) (Grant, 2019) (Furgison, 2015) (Peterson et al., 2013)

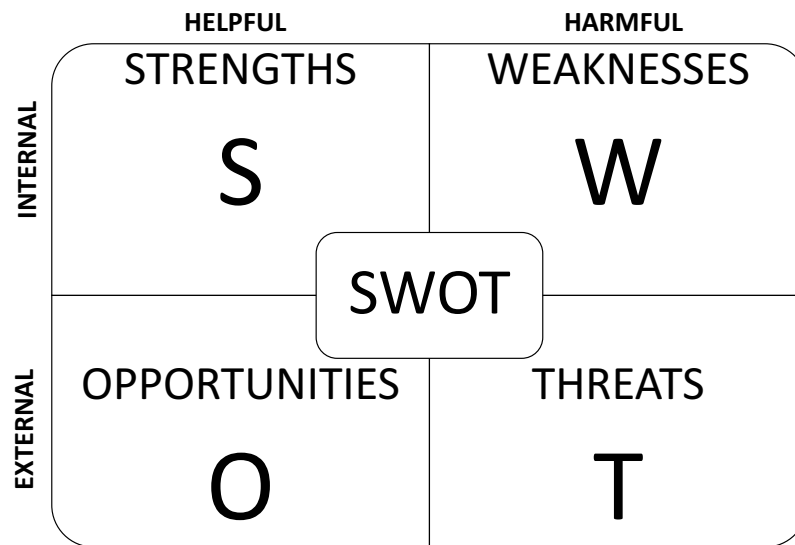


Figure 11 Modified from SWOT analysis in Study.com (LeRon, n.d.)

3.4 PESTEL analysis

PESTEL is a tool used to analyze external factors affecting the organization. The letters stand for Political, Economic, Socio-cultural, Technological, Environmental and Legal. (“What is a PESTEL analysis?,” 2016)

The standard form of the tool is PEST. (Markwell and Leigh-Hunt, 2010)

PESTEL or PESTLE, as referred to by some, is a modification of the basic PEST model, which consists of the same original four factors but in addition to those adds also environmental and legal factors to the analysis. Due to relevance the author decided to include also these two factors to the analysis because both the environmental and legal factors are significant considering the future possibilities and threats of logistics.

Political

This part of the analysis includes policy-related factors such as taxation, labor law, legislation, trade-related restrictions and official charges or tariffs. In addition to these, it is possible to include public sector services such as education, health and social and technical infrastructure or infrastructure in society. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019)

Economic

This part of the analysis includes economic issues such as economic growth, currency value changes, interest rate fluctuations, changes in price levels or changes in the purchasing power of money, i.e. inflation and deflation. The foregoing has an impact on decisions made by both companies on long and short-term prospects and on consumer decisions. For example, the weakening of purchasing power will have a downward effect on consumer consumption patterns, which in turn will have a negative impact on business sales and economic growth. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019) (Chen, 2019)

Socio-cultural

This part of the analysis includes things such as social trends and attitudes and lifestyles, age distribution, family demographics, educational levels, as well as rising or falling trends in population. For example, cultural trends in society affect seasonal sales peaks or holiday recessions in certain business sectors at different times. These contribute to the plans and strategies of the companies. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019)

Technological

This part of the analysis includes technology-related issues such as technological innovation, research and development (R&D). These may include automation technology, artificial / virtual intelligence, or augmented intelligence, virtual or augmented reality to name a few. These can have significant market effects on companies, for example in terms of quality, control, security and safety, price and cost, production, distribution or service. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019) (Hall, 2019)

Environmental

This part of the analysis includes issues related to the environment and environmental science or ecology, such as climate, weather, environmental constraints and laws, carbon footprint, recycling and sustainability. The environment has a direct impact on practitioners in some fields, such as tourism or farming. Indirectly, each company contributes to the environment either positively or negatively, which in turn affects the way businesses operate in the market. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019) (Hall, 2019)

Legal

This part of the analysis goes closely together with the political part and includes matters such as legislation on discrimination, consumer protection, competition, workers' rights, workers' health and worker safety and health. From a business perspective, the legal part is divided into two parts; external and internal. The external part consists the laws, requirements and restrictions from outside the company that contribute to the company's operations in that region, but possibly also globally, such as the Working Time Act. The internal part consists a business-to-business policy that dictates the company's internal operating environment, such as safety regulations and practices. The ethical issues of the company are not directly covered by the legal part of the analysis, but for practical reasons they can be included under the legal part. (“What is PESTLE Analysis? A Tool for Business Analysis,” 2019) (“What is a PESTEL analysis?,” 2016) (Post, 2018) (“PEST analysis,” 2019) (Hall, 2019)

P E S T E L					
P O L I T I C A L	E C O N O M I C A L	S O C I O - C U L T U R A L	T E C H N O L O G I C A L	E N V I R O N M E N T A L	L E G A L

Figure 12 Modified from PESTEL Analysis in Business-to-you (de Bruin et al., 2016)

4 EMPIRICAL STUDY

The chapter covers the results of the thesis and goes to explain the answers that the author received from the interviews.

In this part of the thesis, the author presents a list of interviewees and their responses received during email and telephone interviews. It is worth mentioning that almost all interviewees insist on staying anonymous, so the author must respect this request and not disclose information that may inadvertently reveal the company represented by the interviewee.

4.1 Phone interview overview

This section consists of a brief introduction to the interviewees and their organization. The results of the interviews are presented and analyzed.

4.1.1 Interview 1: Logistics Manager, A Finnish Trading company

The author interviewed the interviewee and a representative of a Finnish trading company by telephone on September 9, 2019. The interview lasted approximately 30 minutes and was conducted at 12:49 pm. With the consent of the interviewer, an application called TapeACall Pro, available on the iPhone SE, was used for the interview. The interviewee's consent to the recording had been requested in advance by e-mail, at the same time as a questionnaire was sent to him / her about his / her willingness to participate in the interview. At the same time, the interviewee was sent a list of questions that the interviewer wanted to ask during the interview.

During the interview, the interviewer took notes on the computer in addition to recording. The interviewer had also asked for consent to take notes both by email and at the beginning of the interview. Both had been agreed.

About the company, the author may disclose that this is a large Finnish trading company with operations all over Finland and with purchases both in Finland and abroad. The interviewee is the Logistics Manager of the company and is also responsible for the development of the company's logistics.

4.1.2 Interview 2: A Finnish Transportation company

The author interviewed the interviewee and a representative of a Finnish transportation company by telephone on September 5, 2019. The interview lasted approximately 30 minutes and was conducted at 3:06 pm. With the consent of the interviewer, an application called TapeACall Pro, available on the iPhone, was used for the interview. The interviewee's consent to the recording had been requested in advance by e-mail, at the same

time as a questionnaire was sent to him / her about his / her willingness to participate in the interview. At the same time, the interviewee was sent a list of questions that the interviewer wanted to ask during the interview.

During the interview, the interviewer took notes on the computer in addition to recording. The interviewer had also requested consent to take notes both by email and at the beginning of the interview. Both had been agreed.

About the company, the author may disclose that this is a large Finnish transportation company with operations all over Finland but also abroad. The interviewee is the Logistics, Development and Technology Director of the company.

4.2 Email interview Overview

4.2.1 Interview 3: A Finnish Industrial company

The author interviewed the interviewee and a representative of a Finnish industrial company by e-mail on 4 September 2019. The interview was conducted at 1:41 pm. The interviewee was sent a list of questions that the interviewer wanted to ask during the interview, at the same time as he was asked about his willingness to participate in the interview.

About the company, the author may disclose that this is a large Finnish industrial company with operations all over Finland. The interviewee is the Logistics Director of the company.

4.2.2 Interview 4: A Transportation company X

The author interviewed the interviewee and a representative of a foreign haulage company by e-mail on September 6, 2019. The interview was conducted at 8:10 am. The interviewee was sent a list of questions the interviewer wanted to ask during the interview, while being asked about his or her willingness to participate in the interview.

From the company, the writer can reveal that this is a large European transport company with operations all over Finland and Europe. The interviewee is the director of company sales, marketing and customer experience management (CEM).

4.2.3 Interview 5: Air Transportation company

The author interviewed the interviewee and a representative of a foreign haulage company by e-mail on 11 September 2019. The interview was conducted at 8:10 am. The interviewee was sent a list of questions the interviewer wanted to ask during the interview, while being asked about his or her willingness to participate in the interview.

About the company, the author can reveal that this is a large European airline with operations in Finland, Europe and around the world. The interviewee is the Director and Head of Sales and Handling of the company in Finland and the Baltic countries.

4.2.4 Interview 6: Tulli (*Customs* in English)

The author interviewed the Finnish customs representative, Senior customs officer Jarkko Fagerström, by email on 7 October 2019. The interview was conducted at 8:46 am. The interviewee was sent a list of questions that the interviewer wanted to ask during the interview, while being asked about his or her willingness to participate in the interview.

The duties of the Finnish Customs are manifold. The duties of Customs include ensuring the smooth and fair trade of goods and providing customer-oriented services. In addition, customs help to protect citizens, the environment and society. From a strategic point of

view, the objectives of customs include combating the black economy and protecting society by combating cross-border crime and ensuring the safety of goods. Customs activities are based on close cooperation at both national and international level. From a customs perspective, the most important objectives of the Government Program are, inter alia, sustainable growth, fiscal austerity and digitalization. In addition, from the operating environment point of view, the most important factors affecting customs operations include the development of information systems under the influence of EU-origin reforms, the impact of Russia on security and trade, the impact of terrorism on internal border control within the EU and the impact of increased online trade (Tulli, 2019).

4.3 Results and analysis

In Table 5, the author has compiled short answers based on interviews, which make it easy for the reader to quickly view and compare the answers given. The interviewees and the companies or organizations they represent are numbered to make the table easier to understand. The number and its explanations are given first, and the mere number is entered in the table to save space.

1. A Finnish Trading company
2. A Finnish Transportation company
3. A Finnish Industrial company
4. A Transportation company X
5. Air Transportation company
6. Tulli (*customs* in English)

Table 5 Interview response maps for opportunities and threats

	Political	Economic	Socio-cultural	Technological	Environmental	Legal
1.Oppor-tunities	Domestic prod-ucts	Domestic products	SOME	Platform	Energy effi-ciency	Authorities
2.	Global trade	Global trade	Circulation	Autonomy, AI, plat-forms, digi-talization	Electricity, LNG, bio-diesel	CO2 legisla-tion, EU inte-gration
3.	-	Global inter-net trade	Logistics car-rier concept	Eco tech & mobile Apps	-	Local & re-gional logis-tics
4.	China, India	Globalization	Internet trade	R&D, Bio-tech	-	Labor legis-lation
5.	EU-Japan, EU-Latin America	US, China, India	Africa & China middle class	E-commerce, digitalization	CO2 com-pensation, new tech	Free trade legislation
6.	More stability, more opportuni-ties	Advanced equipment & tech	Legal immi-gration	Autonomous machines	Non-fossil fuels, alterna-tive energy	Safe operat-ing environ-ment

	Political	Economic	Socio-cultural	Technological	Environmental	Legal
1.Threats	Brexit, Trade war	Brexit, Trade war	Labor force	Tracking, platform	Infrastructure	Arbitrary, EU
2.	Brexit, Trump, Italy	Brexit, Trump, Italy	Protection-ism	Fossil fuels, employment	Fossil fuels, scarce & Pricy raw materials	Trade policy, protection-ism
3.	CO2	Competition	logistics car-rier concept	-	Carbon foot-print, CO2	Environment fee or tax
4.	Brexit, Strikes, Russia	Competition	Aging popu-lation	IoT	Scarce & pricy raw ma-terials	Russian sanc-tions,
5.	Brexit, Trade War	Italy, Germany, EU	-	System com-patibility	EU CO2 sanctions	Trade embar-gos
6.	Global instability	Inequality	Migration side effect	infrastructure	Costs, regula-tions,	Global vs. Local ine-quality

4.3.1 A Finnish Trading company (Mr. Q)

Political field:

From a political point of view, Mr. Q sees Brexit as an active situation that creates uncertainty and raises questions about the future, as everyone is just speculating on what Britain's resignation from the EU will bring, but no one really knows.

In addition to Brexit, other global world policies and trade wars also have an impact. If the foregoing has a negative impact, Mr. Q sees positively the opportunity to turn sourcing to countries with less or no negative impact.

As an opportunity, Mr. Q. also sees their strategy of having about 80% domestic production. Marketing will be modified as needed.

Economic field:

Events in the political field also affect the economic field. An example is the economic crisis in Finnish exports. However, Mr. Q sees positively that they will not be negatively affected by the export crisis unless people stop eating altogether. It can even have a positive effect on them, as people tend to skip restaurant dining and eat better at home.

From a logistical point of view, the cost of transport can of course increase whether it is sea freight or truck freight. Mr. Q sees the large number of contracts with various carriers, in Europe and locally, as a positive thing, as it gives them the flexibility they need.

However, Mr. Q does not believe that the political or economic field is currently in any kind of crisis. On the other hand, the situation may change rapidly if, for example, EU agricultural subsidies or other types of subsidies are declining.

Socio-cultural field:

Mr. Q is very concerned about personnel, labor availability and related issues now and in the future. The company has already had to struggle to get enough good employees who are ready to continue and make a career with them.

Mr. Q sees labor availability as more of a problem on the transportation side, where truckers in particular are hard to find. There are not enough truck drivers, so companies have to fight to get drivers. Indeed, students in the field of transportation are hired for work almost after the second year. Mr. Q believes that the physically and mentally demanding job of a truck driver is the reason why so few truck drivers are available at the moment. The situation may be even worse in the future. Bunker freight is 8 hours of sitting, at its worst, and departures at night or early in the morning. All this makes the truck driver work, according to Mr. Q, a calling.

It is not difficult to find experts or management personnel, but logistics employees are difficult to find. This is despite the fact that the company has mainly switched to automation. Labor turnover has fallen below 3% on an annual basis. According to Mr. Q, job satisfaction and work intake have certainly contributed to this.

The company has had immigrants at its best from 48 different nationalities, but Finnish has always played an important role because of common safety and processes. Mr. Q sees both opportunities and threats here.

According to Mr. Q, new things such as SOME and the company's external communications are an opportunity to reach a workforce that has not previously been needed due to its high supply. In the past, labor has always been plentiful.

Mr. Q emphasizes how important it is to the company that all their products are ethically produced. If negative cases arise, they are addressed immediately. The company has a high morale and does not intend to lower the bar on ethical production of its products.

Technological field:

On the technology side, Mr. Q lists SOME, automation, e-commerce, platforms and practices that are commonplace on the consumer side, but new to companies like them. The aforementioned are not new in themselves, but have emerged as a result of consumers. Transmission and follow-up are particularly important. Mr. Q believes in legacy standards and existing systems or relying on platform-free solutions. Of the available options, Mr. Q lists NFC, RFID, Wi-Fi, Bluetooth and cloud services. However, a solution that is

platform-free so that the end user does not have to make separate purchases is extremely important, even if the company's own IT is opposed.

Ease and smoothness are important to the customer. It is important for a company to choose the right platforms and systems to deliver the performance and balance capabilities it needs. At worst, choosing the wrong platform and / or system can result in the company not staying on par with its competitors. According to Mr. Q, this may be due either to the fact that the selection was made too late or that it was wrongly selected, compared to competitors. However, switching to another platform or system would be prohibitively expensive, leaving the company with no choice but to stay with it.

Environmental field:

Mr. Q attaches great importance to reducing emissions and increasing energy efficiency for the company. This is clearly evident in the solutions used in the company's logistics centers and in the same way on the transport side.

The company has been wondering for a while whether they would be able to support even more suppliers who make environmentally important decisions. Mr. Q raises the question of the state of the biofuel distribution infrastructure as well as the availability of biofuel fleet. Many companies think the same at the moment. At least for the time being, biofuel fleet engines are not big enough for frame distribution, only for local distribution. From an economic point of view, Mr. Q believes in LNG, or gas cars, and the company also uses gas cars. The company's young clientele is already environmentally critical, so the company must also go in that direction in the future. The environment is important for the company anyway, but considering the large masses and expensive investments, the company has to think a lot about it.

On the energy side, there is a lot of renewable energy available. From the company's point of view, this is an investment issue and a payback, but in the last 4-5 years, Mr. Q does not recall any cases where energy efficiency investments have come back empty. Energy consumption is on the rise and there are no longer businesses that can do without electricity. Everyone has something. Maybe it's just a laptop or phone, but it also has a battery that needs charging.

Legal field:

In Mr. Q's opinion, there is too much arbitrariness in Finland, on the authority side, which creates a hate-love relationship with the authorities. The authorities have been involved in many projects with the company and at present the authorities have free access to the company's premises for inspection. Arbitrage is a problem with building permits and environmental permits. In practice, this means a lack of country-wide policy on many issues. Without a separate, universally binding decision, the company would have to seek permits from different officials in each municipality, and the decisions could be completely opposite and contradictory. Mr. Q strongly believes that there should be a clear authority in Finland, such as EVIRA, which gives decisions on foodstuffs throughout Finland. If decisions are to be sought separately from each municipality, this will make the operation considerably more difficult or even impossible.

At the governmental level, the company is called a "big player" compared to other, much larger, foreign players in the industry, with almost 10 times the purchasing power. In return, foreign actors are called "small players" by the authorities. Mr. Q does not see this as a negative thing, but definitely as a thing that distorts competition. Such views from the authorities are difficult to understand.

Mr. Q mentions that the EU is constantly throwing sticks at the wheel of a company. By this he refers to an EU mandatory traceability regulation for tobacco, which requires product traceability and information flow from the manufacturer to the end user. The EU justifies the need for the legislation to reduce the sale of illicit tobacco, but Mr. Q believes the regulation will have exactly the opposite effect. Neither the company nor any competing grocery operator has sold illicit tobacco, but the regulation may well increase the sale of illicit tobacco at smaller points for which it will be impossible to trace the product and track the flow of information. It all sounds easy on paper, but it's going to be challenging.

4.3.2 A Finnish Transportation company (Mr. Y)

Political field:

Mr. Y mentions that events in the political field are long-term developments. World trade is constantly increasing. This is mainly due to the industrialization and development of developing countries. This clearly creates a long-term need for logistics and is supported by fundamental analysis (suom. Perusteanalyysi). The amount of logistics will increase.

Economical field:

At present, the political and economic spheres are completely intertwined. In the long term, political opportunities are opportunities in the economic field as well, but as a significant short-term risk and threat, Mr. Y sees the rise of nationalism and protectionism in Western countries. As an example, Mr. Y mentions Trump's United States, British Brexit, and Italy. These three are having a severe impact on the overall negative cyclical economy as reflected in this year's German economy, which turned negative.

In addition, Mr. Y mentions various barriers to trade that significantly reduce the need for international transportation from a Finnish perspective. These are important things for Finland because we are such an export-oriented country.

Socio-cultural field:

Mr. Y sees logistics as influencing world trade and integrating countries more closely, although on the other hand, Western countries are witnessing the rise of protectionism. Factors affecting the development of the sociological community, the flows of logistics and the flows of world trade, directly and in the background, are more of a threat than an opportunity.

As a global phenomenon, Mr. Y highlights the circular economy. This happens on a small scale within individual cities, regions, and municipalities. This is not a phenomenon that would affect even entire countries. The phenomenon is strongly linked to logistics and certainly a growing industry in many ways. As environmental problems increase and environmental awareness increases, especially in the West, but also in China, the pressure on the circular economy is also increasing. In logistics, the circular economy means, for

example, transporting recycled materials, which Mr. Y believes will grow. On the other hand, from a logistical point of view, the sharing economy between individual households is negligible. Mr. Y does not see the circular economy as a substitute for traditional material flows, such as iron ore mining for steel production, but believes in significant future growth in the reuse of used iron ore. A similar opportunity exists in the forest industry. Trends such as the circular economy are emerging for sociological and environmental reasons related to people's growing environmental awareness and thus affecting global trends in material flows. Mr. Y sees a trend like the circular economy as positive or negative, and transport flows benefit or suffer, purely depending on what is being transported.

Technological & Environmental field:

Mr. Y sees technology and the environment intertwined, at the level of logistical threats. The main threat is fossil fuels, which currently dominate all types of logistics. Kerosene is used in aviation logistics, heavy fuel oil is used in shipping cargo and road logistics is largely diesel-based. Tesla has announced the first electric truck and so they are coming. Other alternative fuel solutions include bio-diesel, natural gas, LNG, but all have higher unit costs than conventional ones. Customers in the logistics industry, on paper, are willing to pay more for carbon neutral transport, but not in reality. However, Mr. Y is convinced that the current debate in the West is bringing about a change in a more positive direction.

Carbon neutrality is easier to implement in vans and delivery trucks. A major problem with battery-powered cars is the availability of earth metals and the environmental friendliness of their entire life cycle. It is difficult to judge the environmental friendliness of earth mining, but in spite of this, battery-powered trucks are just the solution for the light truck traffic that Tesla has now introduced. The total weight class is in the tens of tons. In Finland, the top mass without a special permit is 76 tonnes - a combination vehicle. At present, no alternative has been invented to make it work, other than diesel, whereby bio-diesel or the like can be the solution here. However, this does not solve the problem of large giant container ships or air cargo. The bigger the vehicle, the longer the road is away from fossil fuels, although the trend is moving away from fossil fuels.

Technology offers many significant opportunities to transport goods smarter, faster and more efficiently. Technology brings threats to the sociological side because logistics employs a lot of people and autonomous vehicles, artificial intelligence, and others affect employment. There are many things in logistics that can be automated. The good thing is that creating an automation chain is a long process. Autonomous vehicles have long been talked about and are still a long way off. In logistics, just vehicle autonomy does not solve the problem if people are needed at the starting point and at the end. Without a driver, loading and unloading can be a problem. Many things have to be resolved before full autonomy can be achieved, especially when it comes to air freight. Technology and ethical issues with autonomous trucks, container ships and airplanes slow down the process.

Platform solutions for the logistics marketplace have also been the subject of discussion for a long time, but have not become very common. The trend is to sell storage space online, for example, for 10 pallets. Digital logistics platforms will enhance demand and supply management, which will certainly become more common at some point. This affects the forwarding business, which purchases and sells transportation. As a result of technological progress, this type of activity in sea, road and air freight is likely to cease in its present form. An actor who consults a great deal and who has a kind of digitally efficient ecosystem with few people in between can thrive.

Logistics always involves a lot of design work that can be automated with digitalization, artificial intelligence and advanced design solutions. At the moment, much of the work is based on people, but technology can make logistics solutions faster, smarter and more efficient. On a large scale, this will change at some point.

Legal field:

Mr. Y sees sanctions and customs issues related to international trade and trade policy as more of a risk. In the past, this has been an opportunity as a result of European integration. Protectionism and integration go back and forth and its direction is certainly not known in advance. It is influenced by the general direction of society and sociological factors. The legal side influences environmental issues, environmental regulation and technology adoption, for example in the testing of autonomous vehicles. Testing regulations vary

from country to country, but in Finland the situation is quite good. Legislation must be able to allow the technological development of various transport technologies.

Similarly, from an environmental point of view, the point is that it is difficult to leave fossil fuels because there is no solution. Consumer pressure, social debate, and legislation are the things that can make a difference in a rapid turnaround. Even if the law is changed, the world cannot be changed in an instant because logistics volumes are so massive. For example, EU legislation on sulfur dioxide, in particular, will bring about a change in shipping costs, but it will take time.

4.3.3 A Finnish Industrial company (Mr. Z)

Political field:

Mr. Z sees CO₂ emission limits as a significant consideration when it comes to future logistics planning. The risk is that decisions are made poorly at the political level. Poor political decisions require companies to procure too quickly, which would particularly threaten companies in markets that are economically disadvantaged.

Economical field:

Mr. Z believes global internet commerce will significantly increase global logistics planning. New logistics platform solutions like Booking, Airbnb, Uber will come true. The new solutions will make competition between traditional companies tougher and fiercer.

Socio-cultural field:

Mr. Z believes that someday in the future anyone can be a logistics service provider and make money if a functional platform solution is created for it.

Technological field:

According to Mr. Z, eco-friendly technology and easy-to-use mobile apps are the way forward logistics is heading.

Environmental field:

Mr. Z sees carbon-neutral logistics methods as challenging. Part of the reason for this is that not only logistics providers but also customers need to think about the carbon footprint as a whole. As an example, Mr. Z mentions an internet order from China. Customers need to start wondering how big a carbon footprint such an order really has.

Legal field:

Mr. Z hopes that future logistics, both locally and regionally, will increase in popularity. Of course, one major issue is all logistics costs, including separate or taxed environmental charges. These costs should be based on the distance of the goods transported and it is these decisions that are made at the legal level.

4.3.4 A Transportation company X (Mr. X)**Political field:**

Mr. X believes Brexit will have a significant impact on future logistics, but its effect, positively or negatively, is not yet known at this stage. Strikes in Finland and internationally, whether legally or illegally, affect the future of logistics. Its impact on the future is manifold. Fuel prices, emissions costs, diesel tax are all things that will have an impact on the future of logistics. The rise of regional trade blocs, protectionism and state capitalism is also causing instability and uncertainty about the future. In addition, Mr. X sees relations between the EU and Russia as particularly problematic. On the other hand, the growing importance of China and India increases the opportunities for future logistics.

Economical field:

Mr. X sees as an important consideration the continued development of democratic and rule-based political and economic integration between the EU and other countries. In addition, Mr. X mentions the importance of the fiscal sustainability gap as it describes the public debt as the population ages. Especially in Finland we have this problem. This can either be a risk or an opportunity. On the other hand, it has an impact on competition for talent and on the growth of foreign labor. Globalization and the renewal of business models contribute to the opportunities and threats to the future of logistics.

Socio-cultural field:

Mr. X believes that urbanization will continue to grow. This is evident in the fact that consumers and end-user customers are clearly concentrating on cities. This has a direct impact on the concentration of the distribution network and thus also on logistics costs. The increase in e-commerce has contributed to the decline in traditional retail and whole-sale. Mr. X also highlights the fact that transport workers are retiring, which causes a capacity shortage. Due to low birth rates, the population is aging rapidly.

Technological field:

Mr. X sees technological advances as strong. This will enable economic development in Finland. The future of logistics is clearly driven by environmental and bio-based technologies. Mr. X mentions the digitalization of information and the growth of the Internet of Things (IoT) as an important consideration when looking at the future of logistics from a technology perspective.

Environmental field:

Mr. X sees Finland's strong commitment to environmental management, but it also raises concerns about whether it will have an impact on competitiveness. The challenge is that when we look at EU environmental legislation versus global environmental legislation, we find that the effort to combat climate change is very local. Public debate, customers and legislation put pressure on organic production and consumption. The scarcity of raw materials and energy and their sharp rise in prices also contribute to the pressure.

Legal field:

According to Mr. X, Russian sanctions create uncertainty at the legal level. Local bargaining and labor law are important issues that affect the competitiveness of businesses. The role of monetary policy, particularly with regard to interest rates and investment, will have a major impact on the future of logistics. Financial risk management is also an issue that contributes to influencing future logistics threats and opportunities.

4.3.5 Air Transportation company (Mr. W)

Political field:

At the political level, Mr. W sees the EU-Japan relationship as an opportunity for the future of logistics. The agreements between the EU and Latin America are also an important logistics opportunity.

As a particular threat to future logistics, Mr. W mentions the US-China trade war. In addition, the situation between the United States and the EU appears to be threatening for the future of logistics. Brexit and the surrounding uncertainty, the situation in Turkey, Iran and other conflicts in the Middle East and Africa create a great deal of uncertainty and many threats to logistics.

Economical field:

At the economic level, Mr. W sees the US and Chinese economy. The economies of both major powers remain strong on a global scale. The Indian economy may also rise from the present, which is also an excellent opportunity.

The slowdown in the global economy is a clear threat to the future of logistics, Mr. W said. At least Italy, Germany and the EU as a whole are experiencing a clear economic slowdown.

Socio-cultural field:

Mr. W sees Africa's growing middle class growth and the consequent increase in middle-class purchasing power as a special opportunity. Similarly, China and its middle class represent a significant opportunity at global level.

Mr. W does not raise any particular risks related to the future of logistics at the socio-cultural level.

Technological field:

Mr. W believes that digitalization is a clear opportunity that makes economic transactions faster and more numerous, for example. Digitalization will also increase e-commerce.

However, digitalization and technology in general, according to Mr. W, carry the risk that systems are not able or simply do not want to be able to communicate with each other. At the same time, authorities such as Customs expect and even demand more data. However, information sharing is not facilitated, for example, by providing Customs in all countries with a supranational or global format. Instead, Customs in each country has its own formats.

Environmental field:

According to Mr. W, a clear possibility, from an environmental point of view, is clear CO₂-based compensation that has a direct impact on the development of new aircraft and thus a direct contribution to reducing emissions.

From a global perspective, Mr. W sees a threat to one sided sanctions based on CO₂ emissions that apply only within the EU, but not, for example, in MEA or Asia.

Legal field:

From a legal point of view, Mr. W sees the FTA as an opportunity for future logistics.

On the other hand, Mr. W believes that potential new trade blockades and new customs formalities will pose a serious threat to future logistics. There is a risk that they will result in less products being transported, which will be subject to heavy trade embargoes and cumbersome customs clearance processes.

4.3.6 Tulli (*customs* in English) Jarkko Fagerström

Political field:

Mr. Fagerström sees the global political environment as rather unstable and states that there are, at present, more threats than opportunities. Of the possibilities, he mentions that the more stability there is, the better the logistical chain will be able to handle the transportation needs and the less formalities required.

On the other hand, unstable situations, especially in Eastern Europe and between the world's major powers, pose challenges to logistics. This can also contribute significantly to the free movement of goods and increase the collection rate of goods and thus slow down the logistics chain.

Economical field:

According to Mr. Fagerström, economic inequality creates an unequal situation within the EU from a logistical point of view. This is a clear threat, since poorer countries, struggling with economic difficulties, are unable to develop their logistical environment on an equal footing.

As a global opportunity, Mr. Fagerström mentions advanced marine equipment and technology that facilitates the transport of goods.

Socio-cultural field:

Mr. Fagerström sees the flow of human flows from one area to another on Earth as a result of many different reasons. Migration flows from Africa to Europe cause numerous problems, including socio-cultural ones. In addition to legal migratory flows, there is also a large amount of illegal organized human smuggling. Much of this illegal smuggling takes place under the guise of a legitimate logistics chain.

The logistics chain is, at least for the moment, a highly labor-intensive sector. For this reason, Mr. Fagerström believes that well-managed immigration can provide labor for logistics.

On the other hand, according to Mr. Fagerström, there is a risk of wider and more precise controls in the logistics chain, which causes delays in the flow of goods and thus increases logistics costs.

Technological field:

According to Mr. Fagerström, technology has developed tremendously in recent decades. In the future, perhaps in the next few years, robotic vessels and freight vehicles will be in use.

From a logistical point of view, technological development is quite an opportunity, since it is possible for goods to move virtually without labor, regardless of the time of day.

On the other hand, Mr. Fagerström mentions that he does not see our infrastructure ready for the development of this type of technology for a long time. In addition, robot shipments are vulnerable to criminal activity, as the unlawful seizure of cargo and means of transport in such situations would be extremely difficult to prevent.

Environmental field:

Mr. Fagerström believes that climate change and talking about it have already reached global limits. The logistics chain is one of the industries affecting the climate. Like it or not, the use of fossil fuels will forcibly decrease in the future.

Mr. Fagerström sees the development of new forms of energy for logistics as an opportunity. Transport vehicles using renewable and fossil fuels are taking over the market and developing them will create many jobs. In addition, it brings economic benefits to the logistics chain.

However, there is a risk that regulations will change too quickly, so that vehicles that leave too quickly will not be replaced at the same rate, and thus sufficient equipment will not be available. This causes a rapid rise in logistics costs.

Legal field:

Mr. Fagerström sees two important things from a regulatory point of view that affect logistics.

1. National legislation
2. Global regulations

Each country seeks to safeguard its own culture, security and economy through national legislation. Global regulations, in turn, tend to influence broader entities. At the same time, the emphasis is simply on economic considerations.

A safe environment for logistics is an opportunity. This is accomplished through the cooperation of rationally drafted laws and regulations that guarantee all actors a fair and secure access to their roles in the logistics chain.

The challenge for logistics in terms of legislation is therefore to harmonize regulations. The danger is that if national laws differ from larger entities, the logistic chains will be placed in an unequal position.

5 DISCUSSION AND CONCLUSIONS

The chapter covers discussion and conclusions as the author interprets the results of empirical research in relation to theory and literature. The chapter critically examines the results and compares them with the views expressed in the theoretical and literature part of the thesis. The chapter presents the research questions and whether the research answered the questions asked or not. The chapter mentions any shortcomings in the study, and highlights possible unanswered questions that would be interesting to investigate further. The chapter aims to help other researchers who want to explore the same area as the author, but from an alternative perspective.

The aim of the study was to examine what the future of logistics looks like from a political, economic, socio-cultural, technological, environmental and legal perspective. In addition, the aim was to investigate whether future opportunities and threats appear to be different in different areas of logistics.

The research questions were as follows:

1. How does future of logistics look like?
2. Opportunities and threats and their implications in future logistics from political, economic, socio-cultural, technological, environmental, and legal point of view

3. Do the different public and private sectors, that use multiple logistics services at home and abroad, see the future threats and opportunities for logistics in the same way?

The cross-section on the future opportunities presented in the interviews and, on the other hand, the future threats presented only a few surprises. For the most part, the interviewees brought up the same or similar opportunities, and the same phenomenon was visible when looking at future threats.

It is good to mention that the author feels that doing the research would have been much easier if it had been started from the interviews. When it comes to studying the future, which is practically impossible, it is also a good question to ask whether it is possible to use theory when studying the future? The author does not have an answer to this question, but believes that instead of theory, it might be more realistic to present the current state of logistics when starting to explore the future rather than present theories. The author acknowledges that the material presents the current state of logistics as it gives the reader a better idea of the starting point for exploring the future of logistics. Because the future is uncertain, the author feels that the theory section has by some means missed its target, and therefore not all of the theory is linked, at least not directly, to the results presented in the empirical section.

5.1 View to future of logistics

Interviews with different operators in the logistics industry show that the future of logistics presents many opportunities, but also many uncertainties and threats. The technology side in particular has a lot of potential for future logistics. The problem is that the technology itself is either not yet complete or there is not enough ready infrastructure.

Choudary confirms, what Mr. Y mentioned during interview, that the direction is right, but we are still a long way from a workable solution. Trends are now heavily in alternative fuels and energy sources, automation and artificial intelligence. Especially solar power, electric cars and electricity power storages. At some level, trend-oriented goals can be

achieved, as Tesla's cybertruck demonstrates. On the other hand, without taking a stand on truck traffic in Europe or the whole world, where tonnage amounts and amounts of trucks on the roads are much higher than here in Finland. In Finland alone we are seeing a strong shift towards larger lorries for which there is not even an electric solution yet visible. Shift is seen in the charts presented in the theory section of this thesis. As Mr. Y points out, Cybertruck may only be a solution for the city deliveries or perhaps something little more than that but it will not be sufficient for hull trucks. The reasons for the increase in truck size are likely savings and environmental reasons.

Mr Y also pointed out that, the environmental aspect is closely linked to technology, as new technology makes it possible to bring environmentally friendly products to the consumer market. Through the political and legal sphere, it is possible to create pressure for change and more environmentally friendly technology. The new younger generation is gaining more and more place in decision-making bodies, leading to political and social debate. The old aging generation has once made choices and decisions based on the knowledge and skills available at the time. It is now easy for the modern generation to criticize these choices and the consequences they entail. However, the know-how that we have now was not available at the time. Mr. Q pointed out that, large and incumbents have a great deal of say and change does not necessarily take place without coercion. On the one hand, new players like Tesla with their electric car and solar technology, Uber with its platform and logistics solution, and Amazon's drone and automation technology show how old and well-established players need to be vigilant if they want to stay in the game.

5.2 Opportunities and threats of future logistics

Political

In the future of logistics, the focus of the political field is clearly on the global market. Fagerström specifically mentions political stability as an opportunity and that is a clear thing. Most of the interviewees emphasized global commerce, but it must be remembered that even if it is a Finnish company whose main market is in Finland, political instability abroad will certainly give rise to instability also at home and thus affect the performance

of the Finnish company. Russia's long-standing instability, for example, is a good example of this. Similarly, the UK has been rowing and felting for years in connection with the EU exit. In this context, it is worth mentioning Italy, the US-China trade war and strikes. Political decisions at municipal, national, EU, and global levels are important and can contribute to the direction future logistics will take. Decoupling or eco-economic decoupling may not have been prominently featured in the media or social media, but its effects are clearly visible otherwise. The idea that it would be possible to increase state economic output (BKT) indefinitely without increasing environmental pressures in the process seems absurd and illogical. Apparently, talk of road tolls, electric vehicles, alternative fuels, alternative power sources, the various tax increases on motoring, in addition to already high vehicle costs in Finland, compared to the EU level, are very much related to the government's attempts to effectively use decoupling or eco-economic decoupling without causing too much panic in transport and logistics.

Economic

On the economic side, the focus remains very much in line with the political perspective. Global markets, the internet and other emerging technologies. Opportunities remain somewhat unchanged, but in the face of threats there are inequalities and competition in addition to the already mentioned British EU exit, Trump, Italy, strikes, Russia, the US-China customs war and general global instability. The poor economic situation in Italy has long been the subject of debate, and there is no doubt that the direction is poor. As Mr. Q pointed out, economic problems affect the ability of companies to compete on an equal footing with other players in the same industry. In particular, countries and companies having trade relations with countries or firms struggling with economic problems, countries or firms operating under economic sanctions, or countries or firms in fragile or uncertain situations are unlikely to be able to compete on equal terms with other firms in the same sector. The situation changes dramatically, especially when the benchmark is a company or country whose client base is from stable countries.

Socio-cultural

Socio-cultural opportunities include social media, the circular economy, the logistics carrier concept, internet commerce, the middle class of Africa and China, and legal migra-

tion. On the other hand, the workforce, the global rise in protectionism, the logistics carrier concept, the aging population, and the negative effects of migration are seen as threats.

Fagerström points out that, global instability causes migration, which has both positive effects, but like any major global movement of human masses, there is also room for negative effects. Mr. Y points out that, global instability and the rise of protectionism in Europe and beyond are certainly interlinked. According to Mr. Q, given the low birth rates and the problems that this creates, especially in Europe and Finland, large migration can at best be the answer to these countries' problems. Unfortunately, as Fagerström points out, there is also scope for illegal activities and trafficking, which creates a kind of pressure and a threat to equal and legal competition.

The aging population is linked to the logistics carrier concept, although the carrier concept is an opportunity and a threat in itself. New systems may not be best suited for older workers who are used to doing things in a certain way for decades. On the other hand, trends and the accompanying platform solutions and technology will most likely change the entire logistics carrier concept, regardless of the age of the employees. Mr. Q points out that, it will be more about who dares to take the challenge and rise to the trend at the right moment.

Mr. W mentions, internet commerce and areas that may not have been previously considered major markets, such as Africa and China, have become major targets as a result of their prosperous middle class due to economic growth. Africa and China may not directly hit significant profits for Finnish companies, whose main market area is the Finnish market and mainly import products from these countries. These areas are more of an opportunity for major international logistics agents in air, sea or road freight, perhaps also in rail freight, for which the Finnish market is only one market among many others.

Mr. Q mentions social media (SOME) as an opportunity. The influence of SOME on the socio-cultural level is diverse and its importance is difficult to measure accurately. Roughly speaking, it has a huge impact, especially on the younger generation, but also on the rest of the population. People are constantly on their phones. Given the impact of

social media, especially on young adults and teens, its long-term potential is impossible to assess, but when used effectively, the potential is likely to be virtually limitless in collaboration with other emerging technologies. Social media is also linked to the opportunities mentioned here, such as internet commerce, circular economy, logistics carrier concept, middle-class Africa and China, immigration. On the other hand, social media is equally linked to the negative side and threats of socio-culture; protectionism, the negative side of the logistics carrier concept, the aging population and the threats of immigration, which are all mentioned in the interviews. In the case of social media, the question is probably more about how it is to be used and for what purposes. Social media is already heavily used, for example, on the recruitment side, which is significantly related to the aging of the population, but social media is also heavily used for publishing fake news and other protectionist activities.

Technological

On the technology side, the future looks exciting, but on the other hand, many major innovations seem to be far from ready, as Mr. Y pointed out. Opportunities focus on new platforms, autonomy, artificial intelligence, digitalization, eco-technology, mobile applications, technology research and development, bio-technology, and internet commerce. Some of these have been in the air for a long time, but the real breakthrough is still ahead. On the threats side, monitoring, platforms, fossil fuels, labor, the Internet of Things (IoT), systems compatibility, and infrastructure were mentioned.

Surprisingly, drones, for example, are not mentioned in interviews. Drones may face challenges related to the Civil Aviation Act, extremely limited transport capacity, and ethical issues such as Privacy Protection, Security, and possible criminal activity. However, with regard to air freight, automation and unmanned airplanes were mentioned in interviews by Mr. Y. Both are known to be in use on the military side, but their arrival in the civilian side is at least not yet in sight. Here too, ethical issues and security are quickly becoming a problem. It is likely that the journey will be long before the population is convinced of the ability of artificial intelligence and automation to safely transport people and goods by air on full-size aircraft. The announcement by a major international player such as Amazon that it is developing drone technology as part of its "last mile" principle raises the hope that the arrival of the technology on the transportation side, such as small parcel

courier deliveries in city centers, may not be as far as we think. The way in which its potential launch will eventually change the competition settings will be interesting to see.

Platforms, autonomy, artificial intelligence, digitalization, mobile applications, research and development are all largely interconnected. As Mr. Y pointed out, autonomous cars and artificial intelligence have already been the subject of American news. Given that the news has sometimes been positive and sometimes negative, it will be a long time before fully autonomous truck columns are allowed onto the highway. After that, development is likely to go even further before autonomous trucks are allowed into a city with traffic lights and varying traffic patterns and where pedestrians, cyclists and others will be in danger.

Both Mr. Q and Mr. Y mentioned that, eco-technology and bio-technology are already used, for example, on the fuel side as bio-diesel and renewable diesel, as well as electric cars, solar panel technology, and solar power storage technology.

The direction of the trend will influence what will, in the long run, be the choice of a global consumer base. Nowadays electric cars and related technology seem to be going strong. However, it has to be taken into account that bio-based and renewable diesel and both existing gas solutions (CNG and LNG) are based on long-established fossil fuel technologies in industry, transport and logistics but are (at least to some extent) cleaner. The electric car trend has clearly captured many who believe that battery production is environmentally friendly and that there is enough raw material for battery production to replace all petrol, gas and diesel engines in the world. However, the trend can change very soon as people wake up to the reality that the electric car is just a treat for a small elite, because it will be too expensive to build the infrastructure it needs globally. In addition, at least in Finland, the price of a full electric car is currently ridiculously expensive compared to alternatives. The second awakening may well be related to the problem of electric motors moving large vessels such as container ships and cargo planes. Mr. Y sees size as a problem. If it is technically feasible at some point, how long will it take and how expensive it will be.

On the platform side, the situation looks good as big operators like Maersk, IBM, UPS, Alibaba, etc. have started to develop blockchain-based and other new platform solutions. It is also positive that solutions take into account the connectivity of third-party applications. This allows the system to be expanded globally as more stations, ports, customs, etc. become involved. In the interviews, platforms were mentioned in passing, but at least the author did not get the impression that the interviewees were particularly excited about the issue or that it was particularly revolutionary. At least in the past, many times, communication between platforms has been the weakest link in the system. This is probably a challenge this time too, and well explains the caution shown in the interviews towards new systems. As Mr. Q pointed out, it is not enough that significant operators, even market leaders, choose new systems and develop their products, but that the company is forced to choose the right one at the right time. At worst, wrong choice can even bring the market leader to its knees and bankruptcy.

Environmental

Today, the environment seems to be everywhere, on everyone's lips, and everything seems to be related to the environment in one way or another. Some have even heard of the environment so much that they are tired of hearing it and call it "environmental fuss" (Fuss, *vouhotus* in Finnish is *a display of unnecessary or excessive excitement, activity, or interest*).

Opportunities on the environmental side included energy efficiency, electricity, LNG, bio-diesel, CO₂ compensation, new technology, non-fossil fuels, and alternative energy. Similarly, infrastructure, fossil fuels, scarce and expensive raw materials, carbon footprint, CO₂, EU sanctions on CO₂ emissions, costs, and regulations emerged as threats.

The environment seems to be a unifying factor in one way or another, and this is not surprising, of course, because logistics and industry put a lot of pressure on the environment. Infrastructure, CO₂, non-fossil fuels, raw materials all contribute to the environment. Either by exporting something from the environment to industry or by adding something unhealthy, toxic and destructive to the environment. From this perspective, as Mr. Y points out, it is easy to see why reducing CO₂ emissions, for example through com-

penetration or sanctions or restrictions that limit the use of high-emission and old technologies, and the development of new, greener technologies are so important and why they should receive political support.

The problem, on the other hand, is the lack of infrastructure, as Fagerström points out, either fully or partially, to enable new technology or the scarcity and high cost of raw materials. This, in turn, poses a problem as to whom the scarce raw materials are being supplied and afforded. This situation further distorts competition to the benefit of those who have it versus those who do not. With the further thrust of sanctions and restrictions that prevent the use of old, polluting technology, when the new one is either unaffordable or unavailable due to a shortage of raw materials, some operators will have to stay out. Fagerström points out, that the threat and concern is that while operators see new technology and alternative energy and CO₂ emission reductions as a positive thing, the underlying pressure for rapid change creates a lot of gray clouds around it. In one hand, the problem is the large fleet of large incumbent operators, which is extremely expensive to replace. If the timetable is too short, it may even be impossible to renew the fleet. As a result of which the operator will have to pay a fine and lose a competitive advantage over other operators. On the other hand, the expense side of the problem also consists of the high cost of infrastructure, and the construction time to build it. The interviews also revealed uncertainty about who pays for the infrastructure. The alternatives presented were that the payer is the operator, or the operator pays together with the government, or the payer is the government alone. In the latter option, the operator would only have to bear the cost of modifications to its own fleet and premises.

Legal

On the legal side, authorities, CO₂ legislation, EU integration, local and regional logistics, labor legislation, free trade legislation, and a safe operating environment emerged as opportunities. Similarly, arbitrariness, the EU, trade agreements, protectionism, environmental taxes or charges, Russia sanctions, trade embargoes, and global versus local inequalities were seen as threats.

Authorities, local and regional logistics, and a secure operating environment are interrelated issues that are in turn linked to domestic and external laws and treaties. Fagerström

points out that, without common laws and agreements that apply to all operators, domestic and foreign, competition cannot be fair. Integration creates opportunities where they never existed and opens doors as protectionism seeks to close opportunities and people in or out. Trade embargoes, sanctions and protectionism are the spirit of our time, and they all seek to restrict free trade, integration and the (safe) operating environment. Interestingly, while EU integration is seen as an opportunity, the EU itself is also seen as a threat. This may well be related to the global rise in protectionism, which has been kept under control so far, as certain major powers in the world have done well economically. However, recent economic changes have turned the balance, which in turn has led to an increase in global protectionism. This, in turn, is linked to global versus local inequality, which explains the use of protectionism. Global treaties and laws steer operations in one direction, but if they are ignored or omitted altogether for local reasons, then the direction is very different. The end result is a reduction in integration, a potentially unsafe operating environment, sanctions and embargoes aimed at seeking out their own interests, violating fair trade and international treaties, or seeking to renegotiate the treaties to their own advantage.

5.3 Differences between logistics sectors

Taken as a whole, there were very few differences between the answers and, in practice, the same things are repeated in many different areas. On the other hand, it is good to mention that although the interviewees mentioned the same things, some of the interviewees saw certain things as positive and some as negative. Of course, it may be that the interviewees did not always explicitly state that there were two sides to these issues, but only mentioned the one that they thought was more significant.

When viewed from one area to another, differences may become more evident. This may be due to the fact that more parts are more or less interconnected. As a result, one interviewee may have mentioned the same threat at the political level, while another interviewee may have mentioned it at the legal level. However, the political and legal levels are clearly linked. Similarly, one interviewee may have mentioned something at a technological level, while another interviewee may have mentioned it on the environmental

side. Here, too, the explanation may well be that the interviewee has seen the technological and environmental levels so closely linked that he or she treats them as one entity rather than as two separate levels. For this reason, the writer does not see that the reader should look too slavishly at the single level only, but rather at the levels as a whole, if possible. Nonetheless, if we look at the levels separately, the author will notice more differences between the answers when looking at a particular level.

At the political level, there are very few differences between the sectors. The situation is the same whether the opportunities or threats at the political level are considered.

At the economic level, the differences between the sectors continue along the same lines without major differences. On the threat side, the differences are a bit more than the possibilities.

At the socio-cultural level, the situation becomes interesting, as in both opportunities and threats, virtually every sector responded differently.

At the technological level, the differences are narrowing again and clearly the same answers can be seen, but only on the possibilities. In the threat side, the answers are still surprisingly different.

At the environmental level, the responses between sectors are very much the same in terms of opportunities and threats. There is, however, somewhat more difference between the threats.

At the legal level, cross-sectoral responses are again slightly dispersed, both in terms of opportunities and threats.

5.4 Conclusion

The purpose of this thesis was to study the direction in which logistics is going in the future and what opportunities and threats are seen in different fields. It is of course impossible to see the future, but looking at the current situation from a political, economic, socio-cultural, technological, environmental and legal point of view, we may be able to get an idea of where we are going in the future.

For the most part, the interviewees mentioned things that have been in the public for a long time. In that sense, there were hardly any surprises. Perhaps the most surprising thing was the air cargo side, unmanned airplanes and drones. The author would have expected drones to receive a bit more attention, but it clearly has its own challenges, which is why, at least for the time being, logistics does not see it as the spearhead of future logistics.

5.4.1 Future research

The thesis provides a good opportunity for further research due to its scale. One interesting topic for further research is the impact of logistics on the environment and how new technology could reduce the burden on the environment.

REFERENCES

- AIMS Education - UK, 2016. What is Logistics Management? Definition & Importance in Supply Chain | AIMS Lecture.
- Battisti, G., Giulietti, M., 2015. Tesla Is Betting on Solar, Not Just Batteries. *Harv. Bus. Rev.*
- Bryman, A., 2012. *Social Research Methods, 4th Edition, 4th edition.* ed. Oxford University Press, Oxford ; New York.
- Business Jargons, 2017. Cost Reduction [WWW Document]. *Bus. Jarg.* URL <https://businessjargons.com/cost-reduction.html> (accessed 1.10.20).
- Cardwell, D., 2015. Tesla Ventures Into Solar Power Storage for Home and Business. *N. Y. Times.*
- Chen, J., 2019. Inflation Definition [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/i/inflation.asp> (accessed 5.8.19).
- Choudary, S.P., Alstyne, M.W.V., Parker, G.G., 2019. Platforms and Blockchain Will Transform Logistics. *Harv. Bus. Rev.*
- Christopher, M., 2011. *Logistics & supply chain management, 4. ed.* ed. Financial Times Prentice Hall, Harlow.
- Fallon, N., 2018. SWOT Analysis: Definition and Examples [WWW Document]. URL <https://www.businessnewsdaily.com/4245-swot-analysis.html> (accessed 5.10.19).
- Farahani, R., Rezapour, S., Kardar, L., 2011. *Logistics Operations and Management: Concepts and Models.* Elsevier.
- Finavia, 2019. Lentoliikenteen tilastot | Finavia [WWW Document]. URL <https://www.finavia.fi/fi/tietoa-finaviasta/tietoa-lentoliikenteesta/liikennetilastot/liikennetilastot-vuosittain> (accessed 5.21.19).
- Fuhrmann, R., 2019. How to Calculate the Inventory Turnover Ratio [WWW Document]. Investopedia. URL <https://www.investopedia.com/ask/answers/070914/how-do-i-calculate-inventory-turnover-ratio.asp> (accessed 1.12.20).
- Furgison, L., 2015. SWOT Analysis Challenge Day 4: How to Identify Threats [WWW Document]. Bplans Blog. URL <https://articles.bplans.com/swot-analysis-challenge-day-4-identify-threats/> (accessed 5.10.19).
- Grant, M., 2019. How SWOT (Strength, Weakness, Opportunity, and Threat) Analysis Works [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/s/swot.asp> (accessed 5.10.19).
- Hall, M., 2019. Porter's 5 Forces vs. PESTLE Analysis: What's the Difference? [WWW Document]. Investopedia. URL <https://www.investopedia.com/ask/answers/041015/whats-difference-between-porters-5-forces-and-pestle-analysis.asp> (accessed 5.8.19).
- Hargrave, M., 2019. How to Use the DuPont Analysis to Assess a Company's ROE [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/d/dupontanalysis.asp> (accessed 1.1.20).
- Iveco, n.d. Stralis LNG Natural Power [WWW Document]. URL <https://www.iveco.com/en-us/press-room/kit/Pages/3-RAISTRALISLNG.aspx> (accessed 1.19.20).

- Iveco Publication, 2017. new_stralisNP.pdf [WWW Document]. URL https://www.iveco.com/Common/Documents/Brochures/new_stralisNP.pdf (accessed 1.19.20).
- Kacmary, P., Fedorko, G., 2014. Logistics Development. Trans Tech Publications, Limited, Durnten, SWITZERLAND.
- Kaufman, J., 2012. The Personal MBA: Master the Art of Business, Reprint edition. ed. Portfolio, New York, N.Y.
- Kenton, W., 2019. How Logistics Work [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/l/logistics.asp> (accessed 5.5.19).
- Leighton, R.M., 1999. Logistics | military [WWW Document]. Encycl. Br. URL <https://www.britannica.com/topic/logistics-military> (accessed 5.4.19).
- Lewis, M.R., 2019. How to Calculate Accounts Receivable Collection Period [WWW Document]. wikiHow. URL <https://www.wikihow.com/Calculate-Accounts-Receivable-Collection-Period> (accessed 1.12.20).
- Liikenne- ja viestintäministeriö, Liikenne- ja viestintävirasto, Väylävirasto, Ilmatieteen laitos, 2019. Kotimaan liikenne ja talouskehitys | Liikennejärjestelmä.fi [WWW Document]. URL <http://liikennejarjestelma.fi/toimintaymparisto/liikenteen-ky-synta/kotimaan-liikenteen-kehitys/> (accessed 5.16.19).
- Liikennevirasto, 2018. rautatietilasto_2017.pdf [WWW Document]. URL https://www.traficom.fi/sites/default/files/media/file/rautatietilasto_2017.pdf (accessed 5.17.19).
- Logistiikan Maailma, 2019. . 2PL 3PL Ja 4PL Logistiikkapalvelut – Huolintayhtiön Tarjoamat Palv. Logistiikkatoimintojen Eri Ulkoistamisvaihtoehdossa. URL <http://www.logistiikanmaailma.fi/huolinta-terminaalit/huolinta/huolintay-ritysten-tarjoamat-palvelut/> (accessed 11.13.19).
- Markwell, S., Leigh-Hunt, N., 2010. The impact of political, economic, socio-cultural, environmental and other external influences [WWW Document]. Health Knowl. URL <https://www.healthknowledge.org.uk/public-health-textbook/organisation-management/5b-understanding-ofs/assessing-impact-external-influences> (accessed 4.30.19).
- Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D., Zacharia, Z.G., 2001. DEFINING SUPPLY CHAIN MANAGEMENT. J. Bus. Logist. 25.
- Michalowicz, M., 2017. The 7 Business Weaknesses That May Be Your Biggest Advantages [WWW Document]. Bus. Trends Insights. URL <https://www.american-express.com/en-us/business/trends-and-insights/articles/the-7-business-weaknesses-that-may-be-your-biggest-advantages/> (accessed 5.10.19).
- Morana, J., 2013. Sustainable Supply Chain Management, 1st ed. John Wiley & Sons, Incorporated, UK.
- NESTE, 2014. How is renewable diesel different from biodiesel? [WWW Document]. Neste Worldw. URL <https://www.neste.com/renewable-solutions/how-renewable-diesel-different-biodiesel> (accessed 1.20.20).
- PEST analysis [WWW Document], 2019. . Wikipedia. URL https://en.wikipedia.org/w/index.php?title=PEST_analysis&oldid=895798331 (accessed 5.8.19).
- Peterson, S.D., Jaret, P.E., Findlay Schenck, B., 2013. How to Identify Opportunities and Threats in Business Planning. dummies. URL <https://www.dummies.com/business/start-a-business/business-plans/how-to-identify-opportunities-and-threats-in-business-planning/> (accessed 5.10.19).

- Post, J., 2018. What is a PEST Analysis? [WWW Document]. URL <https://www.businessnewsdaily.com/5512-pest-analysis-definition-examples-templates.html> (accessed 3.5.19).
- Rushton, A., Oxley, J., Croucher, P., Transport, I. of L. and, 2000. The Handbook of Logistics and Distribution Management. Kogan Page Publishers.
- Scania, G., 2017. Long-awaited gas giant [WWW Document]. Scania Group. URL <https://www.scania.com/group/en/long-awaited-gas-giant/> (accessed 1.19.20).
- Singh, S., 2016. Future Of Logistics: Five Technologies That Will Self-Orchestrate The Supply Chain [WWW Document]. Forbes. URL <https://www.forbes.com/sites/sarwantsingh/2016/09/22/future-of-logistics-5-technologies-that-will-self-orchestrate-the-supply-chain/> (accessed 3.7.19).
- Solakivi, T., Ojala, L., Laari, S., Lorentz, H., Töyli, J., Malmsten, J., Lehtinen, N., Ojala, E., 2017. FSOL-Final.pdf [WWW Document]. URL <https://blogit.utu.fi/logistiikkaselvitys/wp-content/uploads/sites/92/2016/12/FSOL-Final.pdf> (accessed 5.15.19).
- Storhagen, N.G., 2018. Logistik : grunder och möjligheter, 5th ed. Liber, pp.46-47.
- Tesla, 2020. Cybertruck [WWW Document]. Tesla. URL <https://www.tesla.com/cybertruck> (accessed 11.23.19).
- Tilastokeskus, 2019. Suomen virallinen tilasto (SVT): Tieliikenteen tavarankuljetukset [verkkójulkaisu]. ISSN=1798-2995. 2018. Helsinki: Tilastokeskus [WWW Document]. URL http://www.stat.fi/til/kttav/2018/kttav_2018_2019-04-16_tie_001_fi.html (accessed 5.16.19).
- Traficom, 2019. Kotimaan Vesiliikenteen 2018_vuosijulkaisu_WEB.pdf [WWW Document]. URL https://www.traficom.fi/sites/default/files/media/file/Kotimaan_Vesiliikenteen_2018_vuosijulkaisu_WEB.pdf (accessed 5.16.19).
- Tulli, 2019. Tehtävät, strategia ja arvot [WWW Document]. Tulli. URL <https://tulli.fi/tietoa-tullista/tullin-toiminta/tehtavat-strategia-ja-arvot> (accessed 11.19.19).
- Tuovila, A., 2019. What Is Working Capital Management? [WWW Document]. Investopedia. URL <https://www.investopedia.com/terms/w/workingcapitalmanagement.asp> (accessed 1.10.20).
- Volvo Trucks, 2020. The new gas-powered Volvo FH LNG [WWW Document]. URL <https://www.volvotrucks.com/en-en/trucks/volvo-fh-series/volvo-fh-lng.html> (accessed 1.19.20).
- Wei, J., 2019. Advantages of Maintaining Low Working Capital [WWW Document]. Investopedia. URL <https://www.investopedia.com/articles/investing/103015/advantages-maintaining-low-working-capital.asp> (accessed 1.10.20).
- What is a PESTEL analysis?, 2016. . Oxf. Coll. Mark. Blog. URL <https://blog.oxfordcollegeofmarketing.com/2016/06/30/pestel-analysis/> (accessed 4.30.19).
- What is PESTLE Analysis? A Tool for Business Analysis [WWW Document], 2019. URL <https://pestleanalysis.com/what-is-pestle-analysis/> (accessed 5.8.19).
- Wikipedia, 2019. Logistics. Wikipedia.
- Witron Logistik, 2017. What is logistics? Warehouse systems from design to service.
- Wood, D.F., Barone, A., Murphy, P., 2002. International Logistics. AMACOM, Saranac Lake, UNITED STATES.

APPENDICES

Interview Email

Haastattelu oppinnäytetyötä varten

Hei

Olen Visa-Tarkko Leinonen ja opiskelen Arcadan ammattikorkeakoulussa kansainvälistä liiketaloutta pääaineenani logistiikka.

Sain valvojeni kautta sähköpostiosoitteenne ja olisin tiedustellut olisiko teitä mahdollista haastatella lopputyötäni varten syksyn aikana, mutta kuitenkin mahdollisimman pian? Haastattelun pituus olisi arviolta 30 minuuttia. Voitte halutessanne myös vastata esitettyihin kysymyksiin sähköpostitse, mikäli se on teille parempi vaihtoehto. Siinä tapauksessa varsinaista haastattelua ei tarvita.

Lopputyön aiheena on logistiikan tulevaisuus ja siihen liittyvät ulkoiset mahdollisuudet ja riskitekijät.

Kyseessä on puolistrukturoitu haastattelu, jossa kysyisin kuusi kysymystä liittyen logistiikan tulevaisuuden mahdollisuuksiin ja uhkakuviin poliittisesta, ekonomisesta, sosiaalisesta, teknologisesta, ilmastollisesta ja laillisesta näkökulmasta tarkasteltuna.

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?

Kirjoitan lopputyöni englanniksi, mutta haastattelu voitaisiin halutessanne suorittaa myös suomeksi. Haastattelu voidaan suorittaa anonymisti ja keräämäni datan lähde voidaan myös pitää salassa mikäli niin haluatte. Teidän on myös mahdollista olla vastaamatta joihinkin esitettyistä kysymyksistä halutessanne.

Tutkimustani varten ottaisinkin mielelläni äänitallenteen jaltai muistiinpanoja haastattelun aikana voidakseni palata haastattelun tietoihin uudelleen kirjoitusvaiheessa. Tämä ei kuitenkaan ole pakollista.

Kiitos ajastanne.

Ystävällisin terveisin | Best regards,
Visa-Tarkko Leinonen
International Business Student | ABS16-1



visa-tarkko.leinonen@arcada.fi

Figure 13 Attachment 1

Interview 1:

Name: Mr. Q

Company: A Finnish Trading company

Title: Director of Logistics and Development

Date and time: September 9, 2019 at 12:49-1:22 pm.

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?

Interview 2:

Name: Mr. Y

Company: A Finnish Transportation company

Title: Director of Logistics, Development and Technology

Date and time: September 5, 2019 at 3:06-3:34 pm

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?

6. What future opportunities and threats for logistics can you see in legal level?

Interview 3:

Name: Mr. Z

Company: A Finnish Industrial company

Title: Director of Logistics

Date and time: September 4, 2019 1:41 pm

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?

Interview 4:

Name: Mr. X

Company: A Transportation company X

Title: Director of Sales, Marketing and CEM

Date and time: September 6, 2019 at 8:10 am

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?

Interview 5:

Name: Mr. W

Company: Air Transportation company

Title: Director and Head of Sales and Handling – Finland and Baltics

Date and time: September 11, 2019 at 8:10 am

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?

4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?

Interview 6:

Name: Jarkko Fagerström

Company: Tulli (*Customs* in English)

Title: Tulliylitarkastaja (*Senior customs officer* in English)

Date and time: October 7, 2019 at 8:46 am

Questions:

1. What future opportunities and threats for logistics can you see in global political level?
2. What future opportunities and threats for logistics can you see in global economic level?
3. What future opportunities and threats for logistics can you see in global social level?
4. What future opportunities and threats for logistics can you see in technological level?
5. What future opportunities and threats for logistics can you see in global environmental level?
6. What future opportunities and threats for logistics can you see in legal level?