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FUTURE COMPETENCES FOR LOGISTICIANS IN FINLAND

Degree Programme in International Business and Marketing

Logistics

2020

SUOMEN LOGISTIIKAN TULEVAISUUDEN KOMPETENSSIT

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Kansainvälisen kaupan, Markkinoinnin ja logistiikan koulutusohjelma
Helmikuu 2020
Sivumäärä:
Liitteitä:

Asiasanat: logistiikka, trendit, kehittäminen, toimitusketju, kysely

Tämän opinnäytetyön tarkoituksena oli löytää ja tutkia Suomen logistiikan nykytrendejä ja sulauttaa nämä tiedot EFLE (European Forum of Logistics Education) yhdistyksen valmistelemaan tekeillä olevaan, uuteen logistiikan koulutusohjelmaan. Uusi koulutusohjelma on tarkoitettu EFLE:n jäsenorganisaatioon kuuluville toimijoille ja ammattikorkeakouluille toteutettavaksi instituutioiden opintosuunnitelmassa.

Tutkimus toteutettiin käyttäen pääosin kvantitatiivista tutkimusmetodia, tässä tapauksessa 32-kohdan kyselyä, jonka oli laatinut hollantilainen ammattikorkeakouluopiskelija Yigi Wang opinnäytetyönään syksyllä 2019. Tätä opinnäytetyötä varten kysely toteutettiin yhdessä logistiikkayrityksessä pilottikyselynä, jolla haluttiin testata ja saada tietoa kyselyn sisällön toimivuudesta ja ajankohtaisuudesta ja niiden käytöstä uuden opintosuunnitelman sisällön luomiseen. Toisena tutkimusmetodina käytettiin kvalitatiivista menetelmää, sillä opinnäytetyön teoriaosuus kerättiin pyrkimyksenä saada syvempää tuntemusta ja tietoa Suomen logistiikkaympäristöön tällä hetkellä vaikuttavista tapahtumista ja trendeistä. Yksinkertaisuudessaan, opinnäytetyön kahtena päätarkoituksena oli ensinnäkin tehdä pilottikysely yritykseen ja toiseksi, selvittää Suomen logistiikkaympäristön tämänhetkinen tilanne ja tulevaisuudennäkömät.

Opinnäytetyön teoriaosuudessa kävi ilmi, että Suomen logistiikkamarkkinoiden tämänhetkinen tilanne vaikuttaa melko vaihtelevalta, sillä meneillään on monia maailmanlaajuisia tapahtumia ja uusia teknologisia trendejä, jotka vaikuttavat globaaliin logistiikan ympäristöön eri tavoin. Meneillään oleva USA:n ja Kiinan välinen kauppasota vaikuttaa maailmanlaajuisesti talouden kasvuun negatiivisesti. Brexitin vaikutukset Suomessa tulevat olemaan haastavia, jollei uutta kauppasopimusta synny Britannian ja EU:n välille. Ilmastonmuutos ja sitä vastaan taistelu on aloitettu Euroopassa ja Suomi yrittää seurata muiden maiden jalanjäljissä auttaakseen ilmastonmuutoksen pienentämistä. Teknologisten trendien vaikutuksia Suomen logistiikkaympäristöön on vaikeampi arvioida, mutta verrattuna Wangin kyselyn aiheisiin ja niissä käsiteltävien trendeihin, kyselyn ja tämän opinnäytetyön kirjoittajat vaikuttivat olevan samaa mieltä joidenkin trendien näkyvyydestä ja tärkeydestä logistiikka-alalla. Molemmat kirjoittajat valitsivat töissään tärkeimmiksi ja tulevaisuudessa merkityksellisimmiksi trendeiksi muun muassa automaation, Asioiden Internetin, Lohkoketjut, Tekoälyn ja itseohjautuvat ajoneuvot.

Kyselyn vastauksien analysointi oli asteittain haastavaa, sillä kyselyyn osallistui vain yksi yritys. Vastauksia ei pystytty kovinkaan hyvin tai luotettavasti vertailemaan tämän opinnäytetyön sisältöön muuten kuin edellisessä kappaleessa keskusteltujen yhteensopivien trendien osalta.

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Degree Programme in International Business and Marketing Logistics

February 2020

Number of pages:

Appendices:

Keywords: logistics, trends, development, supply chain, questionnaire

The purpose of this thesis was to find and examine current trends in the global and Finnish logistic sector in respect of a new Logistic curriculum designed for EFLE (European Forum of Logistics Education) member institution's use. The research was conducted using quantitative method, a questionnaire which was created by a Dutch student, Yigi Wang in 2019. The questionnaire in this thesis was conducted as a pilot questionnaire to receive valuable information about the questionnaire's structuring and content's relevancy keeping in mind the future use of the results for creating the new Logistic curriculum. As the questionnaire was only a pilot in this thesis, the actual survey based on the questionnaire will be done later during 2020 by another student and with a bigger sampling. Another research method used in this thesis was the qualitative method. In the theoretical part of the thesis, the author researched on the current events and trends which are affecting the global and thus the Finnish logistic environment. Simplified, the two objectives of this thesis were to conduct the pilot questionnaire and to do a research on the state of the Finnish logistic markets.

In the theoretical research, the author found out that the state of the Finnish logistic markets are quite variant and under the change at the moment. There are several events and new technological trends which need attention and have an impact on the Finnish logistic infrastructure.

It was found out that the ongoing trade war between the US and China has a negative impact on the growth of the Finnish economy, as well as to many other countries. The effects of Brexit in Finland will be challenging unless a new trade agreement is reached between the UK and the EU. Climate change and the fight against it have begun in Europe, and Finland is trying to follow in the footsteps of other countries to mitigate climate change and the labor shortages issue might not be as black and white as it sounds like, but it is more due of the lack of skilled and committed workers. The impact of new technological trends on the Finnish logistics environment is more difficult to assess, but compared to the themes and trends in the Wang's questionnaire, the authors of the questionnaire and this thesis seemed to agree on the visibility and significance of some trends in the logistics sector. Both authors and the respondent of the questionnaire chose Automation, Internet of Things, Blockchain, Artificial intelligence and self-driving vehicles as the most important and significant trends in their work.

Analyzing the questionnaire responses was gradually challenging as only one company participated in the survey. The answers could not be compared very well or reliably with the content of the thesis, except for the compatible trends discussed in the previous paragraph.

CONTENTS

1	INTRODUCTION	6
2	PURPOSE OF THE STUDY	6
2.1	Background and purpose of the EFLE project.....	6
2.1.1	Introduction of EFLE	7
2.2	Objectives of the current EFLE project	7
2.3	Conceptual framework.....	8
2.4	Limitations of the research.....	9
3	THEORETICAL BACKGROUND	10
3.1	Definitions of concepts	10
3.1.1	Competence	10
3.1.2	Survey	10
3.1.3	Logistics	11
3.1.4	The logistic players and the supply chain.....	12
4	FUTURE PROSPECTS FOR LOGISTICS IN FINLAND	13
4.1	State of the global logistic markets	13
4.1.1	Donald Trump’s trade policy & US-China negotiations.....	14
4.1.2	The United Kingdom Brexit vote	15
4.1.3	Climate Change	17
4.1.4	Labor shortages in the logistic sector	18
4.1.5	E-commerce	19
4.2	The global logistic trends.....	20
4.2.1	Automation and IoT	22
4.2.2	Blockchain	23
4.2.3	AI, Machine learning and Autonomous vehicles	24
4.3	State of the logistic markets in Finland.....	26
4.3.1	Donald Trump’s trade policy & US-China negotiations’ impact in Finland	27
4.3.2	The UK’s Brexit vote’s impact in Finland	27
4.3.3	Climate Change in Finland	28
4.3.4	Labor shortages’ effects in Finland	29
4.3.5	E-commerce in Finland	31
4.4	Logistic industry trends in Finland	32
4.4.1	Automation and IoT	33
4.4.2	Blockchain	33
4.4.3	AI, Machine learning and Autonomous vehicles	34
5	METHODOLOGY	35

5.1	Research method.....	35
5.2	Data collection method	36
5.3	Preparation and conducting of the survey.....	36
5.4	Data collection and analysis.....	37
5.5	Validity and reliability	38
	5.5.1 Validity	38
	5.5.2 Reliability	39
6	QUESTIONNAIRE FINDINGS	39
6.1	Section 1: General questions.....	40
6.2	Section 2: Trends	41
6.3	Section 3: Competency	46
6.4	Section 4: Other comments.....	50
7	SUMMARY AND CONCLUSION	51
	REFERENCES.....	54
	APPENDICES	

1 INTRODUCTION

This thesis is a part of developing a new logistics curriculum which is being created as a project for EFLE (European Forum of Logistics Education) members. The project includes several member organizations and students. The students who are involved are carrying out their bachelor's degree theses in respect of the project.

This thesis concentrates on doing a pilot survey and gathering information of the current state of the global and Finnish logistic environments. The pilot survey is being made in a form of a questionnaire which will be sent out to a one logistic company. The state of the logistics markets is being investigated and mirrored through some of the most current global events and trends which the author found as the most important during her research.

The logistic infrastructure is changing as digitalization takes over the majority of industries and operations one by one. The industry must adapt to the changes and meet the challenges this new way of the world is setting. There are some significant global events and trends which are impacting and shaping the current logistic environment. Those events and trends are further discussed in the later chapters.

2 PURPOSE OF THE STUDY

2.1 Background and purpose of the EFLE project

This thesis is the second part of a project which will be conducted during 2018-2020 by students from Finland, Netherlands and Belgium. The purpose of the project is to create an updated Logistics curriculum for EFLE (European Forum of Logistics Education) universities. The mission of the EFLE community is "To contribute to the internationalization of our education, by sharing information regarding study programmes in Logistics, by visiting each other's institutions, etc.. To keep in line the latest trends and technologies in the logistics sector. To share knowledge and

experiences in educational and didactical approaches.” (Website of European Forum of Logistics Education 2019)

The purpose of this thesis is to acquire new information for the EFLE project by finding the current needs and trends from the perspective of the Finnish logistic environment. The goal and desired outcome of the current EFLE project is to create a new logistic curriculum by finding new trends and new logistic operation modes that can be taught to future logistic students and thus enhance today’s logistics operations to work more sustainably, faster and cost efficiently through the whole supply chain.

2.1.1 Introduction of EFLE

The EFLE consists of 31 institutions from 14 different countries. This current project involves Dutch, Belgian and Finnish Universities of Applied Sciences. From each university there are a number of students who all write their own bachelor’s degree thesis in respect to creating the new curriculum for EFLE member universities. (Website of European Forum of Logistics Education 2019)

The EFLE was founded in 1993 by Roland Brenin, a director of a French university Ecole Europeené Transport. Brenin held a logistic conference where he invited several logistic educators from different countries. Since then, logistic conferences with changing topics have been held in different locations among the EFLE member countries and institutions. The most recent was held in 2018 in the Rotterdam Mainport University of applied Sciences in Rotterdam, The Netherlands where the topic was “Innovations in ports”. (Website of European Forum of Logistics Education 2019)

2.2 Objectives of the current EFLE project

The objective of this thesis is to recognise today’s challenges and needs in logistics in Finland, and to merge the outcomes and the newly found information into the present curriculum that is used amongst the EFLE members. Also, the aim is to reveal the needs and direction that today’s logistics is going towards also from the global perspective. The objective will be met by doing a pilot questionnaire which is created by

Yigi Wang from HAN University of Applied Sciences in the Netherlands. The pilot questionnaire is conducted to see if the content of the survey is suitable, current and functional to be able to find out and identify today's logistics companies' needs and trends that are affecting the logistic environment. Another tool to meet the objectives is the theoretical background research which concentrates on the global and Finnish events and trends.

2.3 Conceptual framework

The conceptual framework in Figure 1. pictures the relationships and nature of the project's most important topics which will be discussed more in detail later in the thesis. The main purpose of the EFLE project is to create a new logistics curriculum for the EFLE member universities. To achieve this outcome, the project aims in recognizing and developing the logistic competencies through all the different theses created in the EFLE universities for the project.

The main objective of the theoretical background study of this thesis is to recognize the current state of logistic environment globally and in Finland. The author of this thesis deals with current events and emerging trends which are affecting the logistics environment currently. The research method for the thesis is a questionnaire which is counted as a quantitative research method. The questionnaire conducted during this thesis will be a pilot questionnaire in the hope of receiving valuable information of the content and organization of the questionnaire. The ultimate purpose of the questionnaire is to find and recognize possible new ideas, current trends and issues in the logistic sector from a logistic company point of view, thus the questionnaire is conducted to a real logistic company to get valid real-life data. The final survey will be conducted during the making of another thesis by another student later in 2020.

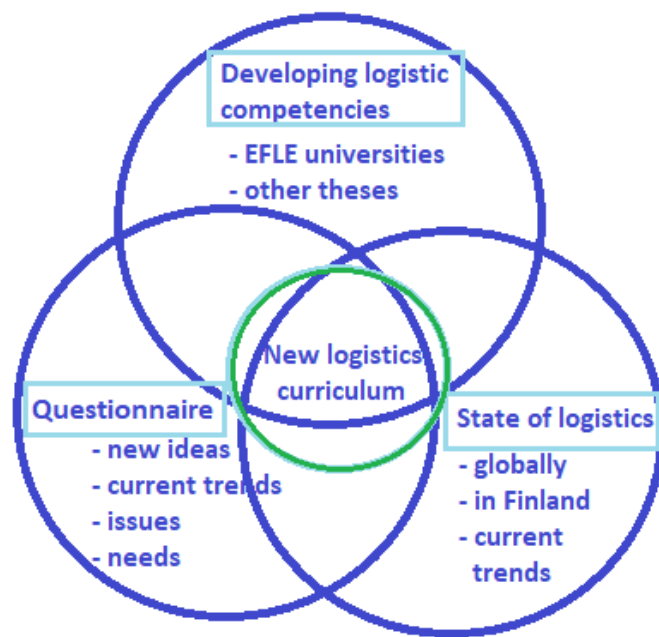


Figure 1: Conceptual framework of the thesis

2.4 Limitations of the research

This thesis will not recap the definitions of previously researched concepts regarding logistic competences: Skills, Attitudes and Knowledge, which Ha Nguyen from Satakunta University of Applied Sciences has already researched and clarified in the previous thesis conducted to the EFLE project earlier in 2019. Also, the final survey will not be conducted during this thesis project and only one company will be performing the pilot questionnaire. Only topics that were current during the pre-planning phase (September 2019-December 2019) are discussed in this thesis, (such as US-China negotiations and Brexit) and such events as US-Iran situation or the Chinese Coronavirus epidemic (2020) and other topics or events risen in the last quarter of making of the thesis will not be discussed.

3 THEORETICAL BACKGROUND

3.1 Definitions of concepts

In this part of the thesis, some of the main concepts will be defined more in detail to give the reader an insight and deeper understanding of the topics and terms that are the most important and will help to understand the whole picture of the thesis.

3.1.1 Competence

Know-how is the resource of individuals, teams, groups and organizations. Usually the synonym for know-how is competence. Competency means one's ability to accomplish their tasks, to improve and develop their work and ability to solve problems. Competency is derived from the application of knowledge, skills, experiences, networks, attitudes and personal qualities. When data and information obtained from these sources is applied to acting or operation, it generates competence. Some of the competence acquired through experience can be called "the silent knowledge" – knowledge that only the person knows, and which is strictly bind to certain actions and situations and it is difficult to pass on. (Ojala 2008, 47-52)

Managing human capital can be a distinguishing factor for a company. Companies that have the human and know-how capacity and who know how to use them most efficiently will have a great competitive advantage. Managing competences requires managing several different tasks at the same time and the human capital is constantly changing through the operating environment and company conditions and strategy. (Ojala 2008, 330-332)

3.1.2 Survey

A survey is a way to collect and examine knowledge of different societal phenomena's, people's actions, opinions, attitudes and values. A survey is created to find answers and to analyze them to get the results which the survey is pursuing for. Usually a survey

is described as quantitative research, as in most cases the used methods are statistical methods. (Vehkalahti 2014, 11-13)

A questionnaire is a measuring tool for the survey where questions are asked through written forms and the application ranges from social and behavioral research to opinion and feasibility studies and feedback measuring methods (Vehkalahti 2014, 11).

3.1.3 Logistics

Originally, the word “logistics” has a military based meaning, as it was invented to illustrate the movements inside the military bases when moving supplies or bases from one place to another. In the modern world, the word, ”logistics” was taken into use during World War II, when after the war, a closer examination of the function started, and the word became a popular concept amongst economic scientists and engineers examining transportation and production. The Korean War in the 1950’s brought a huge advancement for the use of the word as the war was battled on the other side of the world between the United States and Korea which was a huge logistic challenge for the countries. (Hokkanen & Karhunen 2014, 11; Website of Logistiikan Maailma 2019)

Today’s “logistics” was built in the 1980’s as the world trade and globalization started blooming and communication and transportation between countries became easier. In brief, the word “logistics” means moving and stocking goods. (Website of Logistiikan Maailma 2019). When examining more closely, the word means a lot more than just those two. “Logistics” as a wider term means the transporting of goods from one place to another, using different means of warehousing, keeping an inventory, packaging the goods and managing the overall administrative activities included in the process such as material-, information- and capital flow. (Website of ePerusteet. 2019)

An article in the website of Logistiikan Maailma states, that the newest insights into today’s logistics say that logistics is not only warehousing and transportation, but also technical and economic management, i.e. operations management. The article further states, that according to Karjalainen (2008) logistics is about managing an entity which

consists of material and information flows, production and distribution, procurement, overhaul- and transportation services, service operations and customer relations. (Website of Logistiikan Maailma 2019)

The logistic field is evolving as the digitalization has taken over the basic operations, companies are forced to come up with new innovative ideas which means the term “logistics” is growing fast and the meaning of the term is, and will be transforming constantly. The term is no longer easily defined, and as the Finland State of Logistic 2018 also notes, the definition and measurement methods vary from country to country and no common standard is used, which makes it hard to draw a line for a precise definition today. (Solakivi, et al. ... 2018, 53)

3.1.4 The logistic players and the supply chain

The supply chain is a network that consists of numerous different parties and operators of which all have their own function and mission to ensure a smoothly operating network of material, cash and information flows between the seller and the customer (B2C and B2B). Simplified, we could say that the general logistic operations and concepts are procurement, transportation and transportation modes, forwarding, terms of delivery, warehousing and terminal operations, material handling, production modes and packing (Hokkanen & Karhunen 2014, 4; Website of Logistiikan Maailma 2019).

In 2016, the most common transportation mode was road transport, which accounted for about 78% of all transports. Sea freight was 8,4%, railways accounted for 6,3%, pipe transports 4,3% inland waterway transport was 2,8% and the air freight held the smallest portion, only 0,05%. (Solakivi, et al. ... 2018, 57)

Today, due to digitalization, the logistic parties and network can also be defined in more detail such as 3PL and 4PL (third-party and fourth-party logistics), LSP (Logistic Service Provider), distributors, suppliers, retailers, wholesalers, manufacturers, transportation companies, administrative companies, warehousing operators, distribution centers, producers, manufacturing plants etc. All these functions have vital roles in the

supply chain management, and they are essential in ensuring a smooth operational material, cash and information flow for all the parties involved.

4 FUTURE PROSPECTS FOR LOGISTICS IN FINLAND

4.1 State of the global logistic markets

As addressed previously in chapter 3, the general logistic players are more than just procurement, transportation and warehousing (Hokkanen & Karhunen 2014, 4). Today's logistic field is strongly evolving and growing continuously through new innovations and thus the markets are changing and demanding new ideas and implementation modes for more efficient logistic environment.

In 2017, 7% of Europe's GDP (Gross Domestic Product) came from the logistic sector. The most common transportation mode was road transport with a portion of 78% of all transportations. Others were sea freight 8,4%, railroad transports 6,3%, pipe transport 4,3%, inland waterway transports 2,8% and air freight was only 0,05%. The current trends in the European logistic sector, such as Automation, Internet of Things (IoT) and Artificial Intelligence (AI) are following the global pattern and have substantial impact on the Europe's and the whole world's logistic infrastructure. (Solakivi et al. 2018, 56-57)

In 2016, the size of the logistic markets in Europe was estimated to be around EUR 1050 billion. Logistic companies accounted for EUR 525 billion of the total and the rest was divided evenly between industry and retail (Figure 2). (Solakivi et al. 2018, 55)

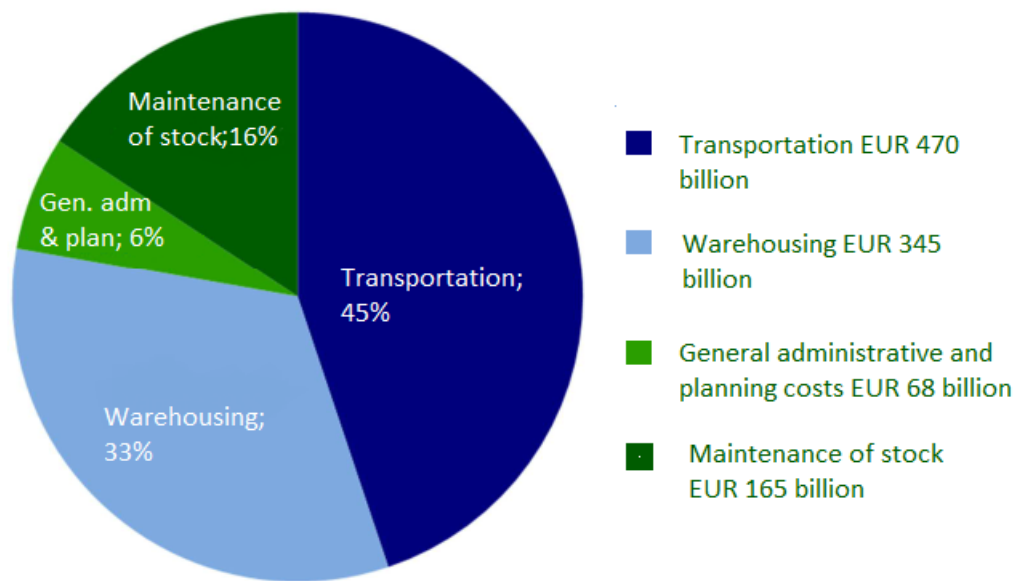


Figure 2. Estimated size of the EU28 countries' (including Norway and Switzerland) logistic markets in 2016. (Solakivi et al. 2018, 55-56)

In addition to the trends mentioned before, there are also other factors affecting the logistic environment/infrastructure change, such as the state of the global trade conditions, political influences, labor shortages and changes in consumer behavior and needs. Some of the events and trends are due to the digitalization and innovations in technological development.

A few of the most current factors affecting the global trade and the logistic infrastructure changes are issues such as US President Donald Trump's trade policy, US-China negotiations, The United Kingdom's Brexit vote (British Exit), the Climate Change, shortage of manpower in logistics and the outbreak of e-commerce.

4.1.1 Donald Trump's trade policy & US-China negotiations

Both the US and China have imposed new import tariffs side by side to products with an import value of hundreds of billions of dollars since 2018. The "trade war" as they call it, has become the single biggest factor of uncertainty affecting the global economy at the moment. (Kangasniemi 2019)

US President Donald Trump's new trade policy wipes out all the work the US has previously made when trying to open the trade barriers to enable cross-border commerce between US and the rest of the world. Trump's trade policy has imposed tariffs on Chinese products mainly in the hope of increasing sales of the US products, and in the hope of luring foreign and domestic companies to stay in the US for trade which would boost the US economic growth. According to The New York Times's Ana Swanson, Trump's standpoint of national welfare will not have very far-reaching effects: "Yet many economists and trade experts fear the approach could backfire on the United States, by degrading the international trading system and raising the cost of manufacturing, resulting in lower productivity and economic growth." (Swanson 2019)

The effects of the US-China trade war can already be seen in the material flow indexes. The US export has decreased from 64 billion to 52 billion dollars, and import has decreased from 250 billion to 219 billion dollars. (Kangasniemi 2019). According to Yle reporter Inka Haukka, the OECD has projected that the US economic growth will decline to 2%, China to decline to 5.5% and Japan and the Euro area are projected to grow between 0.7% and 1.2% in 2021. Overall, the world economy will grow 3.0%. (Haukka 2019).

The US and China will sign a new trade deal in January 2020 where some of the newly imposed tariffs are expected to be gradually removed by both parties. China vows to increase import from the US in respect of energy, pharmaceutical products and agricultural products. According to Trump, the US will rescind some of its tariff imposes and some of them will still stay in effect. (Burtsov 2019)

4.1.2 The United Kingdom Brexit vote

The British government held a referendum in June 2016 if the United Kingdom (UK) should leave the European Union (EU). The voting rate was very high, 72% of the Brits voted in the referendum. The nation voted 52% Leave and 48% Remain. This started a move called Brexit (British exit). (Website of Eurooppatiedotus (Ulkoasiainministeriö) 2020; Brexit: All you need to know... 2019)

In 2017, the former British Prime Minister Theresa May released Article 50, which was the formal process to leave the EU, and originally Brexit was supposed to happen already in March 2019. Due to the British Members of Parliament rejection of May's proposal of the Brexit deal three times, she resigned, and Boris Johnson stepped up and replaced her as the Prime Minister in 2019. (Brexit: All you need to know... 2019)

Now the Brexit deal has been accepted by the British Members of Parliament and Brexit will happen and the UK will leave the EU on 31.1.2020. After this, an official transition period will start during which time the UK agrees to follow the EU regulations and trade agreement while they are negotiating a new trade deal. After the transition period ends on 31.12.2020 (extension can be granted until 31.12.2022), if the trade deal has not been made, the UK will leave the EU without a trade agreement (no-deal Brexit) and will become a third country (a country outside the EU). (Brexit: All you need to know... 2019; Website of Valtioneuvoston Kanslia 2020)

The no-deal Brexit can have a serious impact on the EU and its member countries. A writer of an article on the website of the Swiss air & cargo thinks that product prices will increase as additional duties are imposed on products and the new customs clearance procedures will reduce the effectiveness of transport operations and increase costs on the transport sector. (Website of Swiss Air & Road Cargo 2020)

There are countless amounts of companies trading in the UK, but they might not have an EORI number (Economic Operators' Registration and Identification number) yet which companies need to be able to trade with the third countries. Some companies say that they are preparing for losses and declining turnover due to the possible new tariffs and increase in custom clearance operations and new VAT's added to products. Import and export duties will take place and companies might have to apply for permits, licenses and certifications separately for the EU and the UK products. Import of certain goods will be restricted or even prohibited from the third countries. The Finnish customs have estimated that if the no-deal Brexit happens, goods subject to customs clearance increase by 25%. The Finnish Chamber of Commerce is worried that goods imported outside the EU will need a certificate of authenticity which will possibly

leave goods stuck in customs as well. (Näin Brexit voi... 2019; Website of Valtioneuvoston Kanslia 2020; Website of DHL International GmbH 2020)

4.1.3 Climate Change

The European Parliament declared the start of a climate emergency in November 2019 and demanded all European Union (EU) legal and budgetary proposals to be in line with the Paris Agreement. The Paris Agreement aims to stop the climate change to 1,5 degrees by 2050. (Ilveskero 2019)

Road transport causes the most emissions of all transportation modes, air freight comes as the second, maritime freight is the third and rail transport is the least emitting transportation mode (Website of Open Access News 2019).

The CO₂ emissions contributes to global warming which is associated to the climate change and thus is to be reduced to prevent the global warming effect. Transport sector-based CO₂ emissions cover around 30% in the developed countries and 23% in total worldwide. The United Nations Economic Commission for Europe (UNECE) suggests, that “innovative vehicle technologies” and advanced systems whereas an improved transport infrastructure and Intelligent Transport Systems (ITS) are the way to go. They also state that educating and encouraging people to take actions in lowering their carbon footprint by using electric cars and public and modal transports as well as using sustainable biofuels of different generations (first, second and third generation fuels) are important to help fight the climate change. (Website of UNECE 2020)

The most common transportation mode in Europe in 2016 was road transportation which accounted around 78% of all transports (Solakivi, et al... 2018, 57). Road transport is also the biggest transportation mode to create emissions, with around 70% of all transportation modes (Website of the European Union 2020).

Maritime freight is accounted for 80% of world trade transportation. Maritime emissions are around 13% of all transport modes and fuel costs are accounted for 50-65%

of all transportation mode's fuel costs. The European Commission proposes that maritime fuel savings could be achieved with "slow steaming, weather routing, contra-rotating propellers and propulsion efficiency devices" which would lead to a major emission decline. (Solakivi, et al.... 2019, 57, 46; Website of United Nations Conference on Trade and Development 2020; Website of the European Union 2020)

According to the European Union, the solution to lowering emissions is to move to low emission traveling and moving modes. "The Strategy" as they call it, includes increasing the efficiency of the transport system by joining digitalization into the system and thus decreasing unnecessary actions and movements, encouraging the start of using low-emission energy modes and push zero-emission vehicles into use. Air freight emissions could be constrained by reducing fuel consumption by reducing weight on board, by modernizing the planes in general and by using biofuels. (Website of IATA 2020; Website of the European Union 2020)

4.1.4 Labor shortages in the logistic sector

Arguably all the industrial sectors are suffering of labor shortages currently. Structural and economic turmoil, demographic change, rapid globalization and digitalization have created a high uncertainty in the labor markets. Probably the main reasons for the lack of current labor shortage in the logistic industry are the baby boom generation's (individuals born between 1946 and 1964) retirement boom and increasing e-commerce leading to higher demand on quicker and more efficient transportation. (Stegall 2019; Website of Manpower Group 2019)

Many sources say that companies face shortage in their supply-demand balance for acquiring logistic talents. This simply means that companies are lacking talented individuals running for the positions they offer, and, in some studies, it's even estimated that for one qualified logistics manager there is six jobs available. (McCrea 2019; Website of DHL International GmbH 2020). According to Ilmakunnas, Kanninen and Husa (2013, 7), the appearance or recruitment difficulties relates to the lack of the supply and demand balance as the unemployed and open vacancies are either regionally or professionally inadequate.

The logistic industry needs to create more attractive public perception of the industry as today it is much more than just driving and warehousing operations – it's managing the whole supply-chain, says Logistics Management Review's Editor Bridget McCrea (2019). It's suggested that companies would take engagement programs into account which would commit and train the current employees as the need and availability of skilled workers do not meet currently at the industry sector (Hipari 2019). In the warehousing sector, warehouses are taking automated systems into use in trying to reduce the impact of labor shortages, however, automation is not the final solution for the warehouse labor shortages but it's only a helping factor in the time of the lack of manpower (Banker 2019).

4.1.5 E-commerce

It's estimated that the Europeans spent EUR 198 billion online in 2018 which is 17 billion more than the year before. Over the past couple of years, the number of consumers using e-commerce has increased briskly. Furthermore, using mobile devices for e-commerce is also increasing rapidly. Six out of ten consumers had made purchases through a mobile device within a year during 2018-2019. (Website of PostNord 2020)

In Europe, the share of e-commerce was around 8% of all sales and according to some reports, 25% of sales would be operated through e-commerce in the near future. According to Solakivi et al.'s yearly report "Finland state of Logistic 2018", after e-commerce passes 10% rise of sales, the rate will start increasing significantly. The rate difference between US and Europe is small, but the US still wins for now with approx. 10% share. (Solakivi et al. 2018, 57)

According to United Nations conference on Trade and Development's recent findings, global e-commerce sales grew 13% in 2017. The number one in the comparison, United States' online sales were three times higher than number two Japan's sales and almost four times higher than China's sales in 2017. In the Table 1. is shown the top ten countries by e-commerce sales in 2017.

Rank	Economy	Total (\$ billion)	As a share (%) of GDP
1	United States	8,883	46
2	Japan	2,975	61
3	China	1,931	16
4	Germany	1,503	41
5	Korea (Rep.)	1,29	84
6	United Kingdom	755	29
7	France	734	28
8	Canada	512	31
9	India	400	15
10	Italy	333	17

Table 1. Top ten countries by E-commerce sales, 2017. (Website of United Nations Conference on Trade and Development 2020)

E-commerce is flourishing and is soon becoming the most popular sales channel in the world. Traditional stores and markets are slowly falling out of the market as consumer demands evolve and the fast-paced society must adapt to it. According to Forbes' Contributor Michelle Grant, e-commerce will account for 14% of world's total retail sales in year 2021 (Grant 2018).

4.2 The global logistic trends

In addition to previously discussed (chapter 5.1. State of the global logistic markets) factors affecting to the logistic environment's current change - the global trade conditions, political situations, labor shortages, changes in consumer behavior, automation and digitalization - there are numerous new innovations and trends that are shaping the logistic infrastructure towards a more sophisticated and digitalized environment and what a few years back could have been called as a futuristic environment. These new trends include such as Internet of Things, that is the new way of tracking goods on the move, the Blockchain, which is allegedly the new internet, and AI, which aids companies to process and analyze an incredible amount of data to use it to facilitate their operations.

DHL has defined and segmented some of the current and hottest trends into three groups in their regularly published Logistics Trend Radar: technological trends, business trends and social trends. The technological trends include inter alia digitalized trucking, autonomous vehicles, AI and Big Data, and electric driving technologies. The business trends consist of for instance the rise of e-commerce and digital freight platforms that connects carriers and shippers digitally. The social trends according to DHL are urbanization and sustainable logistics (among other things such as omni-channel logistics and batch size one etc.). (Website of DHL International GmbH 2020). In addition to DHL’s infographic, as contemplated earlier in chapter 5.1.4 (“Labor shortages in the logistic sector”), the retirement of the baby boomers could also be added to the list of social trends as the impact is already seen as the shortage of talented manpower in logistics. Figure 3. shows the DHL’s Logistics Trend radar with the topic’s relevancy and impacts on the different divisions DHL has defined. (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 15).

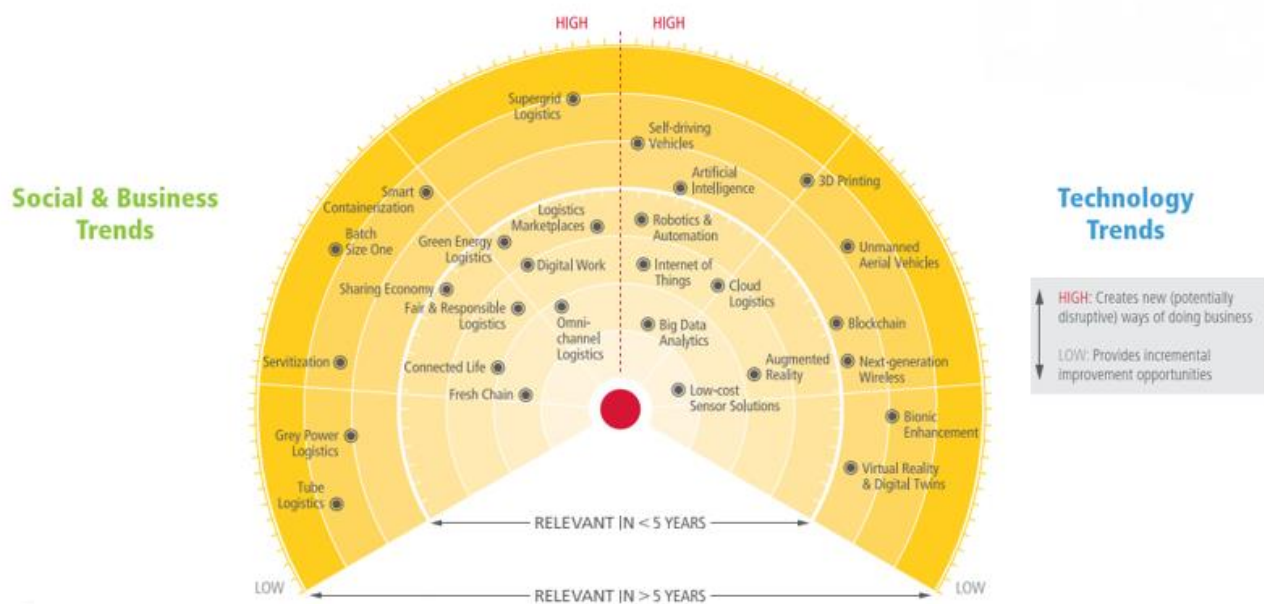


Figure 3. The Logistics Trend Radar. (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 15).

4.2.1 Automation and IoT

Automation and IoT (Internet of Things) in many cases go hand in hand when talked about either. Today it's starting to become more common to acquire new automated technologies into industrial sector such as in warehouses and factories. These automated operations can be described as such technologies that eases and automates handling and controlling of different processes and machines. The Internet of Things is "a network of physical objects and devices around the world that are connected to the internet and specifically meant to collect and share data" says Jeffrey Heimgartner in an article on Engineering.com. Moreover, the previously mentioned processes and machines are those devices that the IoT's are connected to. (Heimgartner 2019)

As discussed in chapter 5.1.4. ("Labor shortages in logistic sector"), automation is becoming a huge leverage and aid in overcoming the labor shortages. In addition to that, automation will be a solution to meet the evolving customer demands – higher level of products and services with lower prices. The increasing use of e-commerce has placed a demand on quicker and more efficient deliveries such as last-mile deliveries which require automated warehouse operations and more sophisticated warehouse control systems to be able to meet the needs of the customers of tomorrow. Chung, Gesing, Chaturvedi & Bodenbenner found in their research of Logistic trend radar 2018-2019 (2019), that the automated processes and robotics are the key opportunities in increasing asset utilization and overall productivity in that matter. (Vernon 2017; Banker 2019 & Chung, Gesing, Chaturvedi & Bodenbenner 2019, 46)

With the IoT being involved almost in all steps of the supply-chain, companies and consumers can track and follow their goods from everywhere as IoT is connected to the internet as the application areas are wide. In the transport sector the use of IoT can be seen mostly in control and observation equipment used in traffic control. It is extremely useful when using as a positioning system and providing arrival forecasts for transports and when being used for the cool supply temperature monitoring. (Abbatte 2019; Website of Logistiikan Maailma 2020)

Warehouse automation will not be completely replacing human labor, but it will contribute as bringing the technology and people using it together. Using of new

technologies will be significantly utilized in the future to improve the efficiency of personal work. (Puro 2018)

According to DHL, automation could be efficiently used also at the transport sector by creating automated loading and unloading systems which would save time and the space at the loading docks could be used more efficiently. The operations could even take place outside the working hours, so that the drivers could have their regular day breaks and the loadings could proceed even without any human operators. However, an investment like this would take some notable amount of financial capital to implement and would require a lot of modifications and changes to the existing equipment. (Website of DHL International GmbH 2020)

4.2.2 Blockchain

Blockchain has often been described as a phenomenon such as the internet and it has also been alleged to be the new internet. As a phenomenon it can be described but as the new internet, not. Rather, the blockchain is a add on to the internet which brings different improvements and new functionalities in the same way as iOS update brings new features, applications and accessibilities to an iPhone. (Johansson, Eerola, Innanen & Viitala 2019, 40)

Today's Blockchain was invented back in 2008, when an individual or a group of people named Satoshi Nakamoto published a concept of a payment system without intermediaries, Bitcoin cryptocurrency. The rise of Bitcoin was significant, as with the help of the blockchain it became the first virtual currency which did not need a reliable administrator (i.e. bank) to confirm the transactions. One of the blockchains initial purposes was indeed to remove middlemen and third-party actions between such human interactions. (Hallamaa 2018; Johansson, Eerola, Innanen & Viitala 2019, 34-35)

Blockchain is not an easy concept to define. Blockchain as a word, has been described such as transactions between banks, electrical registers or supply chain management system. Basically, the blockchain can be defined as a new technology. As a term, "blockchain" is a little misleading, as the blockchain does not entirely work as a chain

of blocks as you would think from the name. There are many blockchains which have no blocks involved, and in its simplest, it can be defined as a reliable digital account book that contains different transactions in a timely manner. The transactions are such that cannot be deleted or changed after once saved, and there can only be new information and transactions added after. (Johansson, Eerola, Innanen & Viitala 2019, 26-28)

Due to the saving of information chronologically and to the fact that the transactions and movements leave permanent markings and trails, and that they can be traced back to their origin, the blockchain enables reliable flow of information that could be used for example in creating a totally visible supply chains which is a perfect meet for today's most critical customers' demand of clear and visible transactions in their value chain. In a single supply chain, there can be dozens of operators involved from transportation companies to forwarding companies, and from port operators to customs authorities, and the information is all siloed between themselves. With blockchain, the data can be shared in real time between the operators and all the information is available for everyone at the same time. (Johansson, Eerola, Innanen & Viitala 2019, 163). According to DHL's latest trend research Logistics Trend Radar, blockchain will be implemented in majority of global trade related operations in 5-years' time and it could increase global GDP by nearly 5% and global trade by 15% by introducing new solutions that reduce supply chain trade barriers (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 41).

4.2.3 AI, Machine learning and Autonomous vehicles

AI (Artificial Intelligence) is a part of data processing which concentrates on automating intelligent operations. AI's objective is to program the computer so that it can handle issues independently as if a human would. The world's leading AI-countries are the US and China. Corporations such as Google, used billions of euros on developing AI already in 2016. In logistics, artificial intelligence will be used in electronization of traffic, developing transport services, and managing transport and it is essential in automating traffic. AI enables personalizing services and facilitating the ordering of services. (Lukkari 2017; Fauland 2018)

Computer applying machine learning is based on adaptive algorithms which can learn from data and are not dependent on rule-based programming, i.e. it can be described as pattern recognition. Some of the data can be fed from the IoT technologies as an example. Simply put, an email's spam detection ability is a result of data input to the machine learning algorithm (the algorithm has been fed with data – emails classified either “spam” or “non-spam” from which the machine can learn how to separate spam from non-spam messages). (Fauland 2018; Website of European Logistic Portal 2019; Chung, Gesing, Chaturvedi & Bodenbenner 2019, 41)

Another, logistic related example of AI could be that in the airfreight industry, algorithms are created which can learn and optimize the stacking of freight pallets, says an article found in the website of European logistic portal (2019). Machine learning can be applied in various logistic technologies such as in warehouse management systems, robotic vision systems, making transport planning faster and more efficient and making the supply chain more visible. (Banker 2019; Website of European Logistic Portal 2019). Also, autonomous vehicles are already being introduced in the warehouse environment and yards, and the next phase could be seeing them conquering the streets and transportation markets as self-driving vehicles and trucks. Both, DHL and FedEx have stated, that soon, there could be self-driving trucks delivering parcels from door to door, drones and “sidewalk delivery robots”. (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 19; Website of FedEx 2020).

According to SSI Schaefer's Whitepaper “Artificial intelligence in Logistics” (2018) writer Jacqueline Fauland, even though AI systems can handle significantly more amount of data and information than humans, the disadvantage is that AI can only choose from previously known options (Fauland 2018). It could also have a huge socioeconomical impact if autonomous vehicles and robots are replacing truck drivers and delivery employees (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 19).

4.3 State of the logistic markets in Finland

As the whole Europe is, so are the Finnish logistic markets following and responding to the current global trends, such as AI and IoT and Blockchain. The contributing factors presented in chapter 5.1. “State of the global logistic markets” affecting the global trade and the logistic infrastructure changes are issues which also strongly affect the Finnish nation and economy.

As the e-commerce is thriving and supply chains grow longer and more complex, customers demand a wider variety of delivery terms and as the last-mile deliveries become standard, the logistic infrastructure and especially transportation plays a bigger role in everyday life trying to meet these new changing and growing demands. According to Finland state of Logistics 2018 (2019) the transportation sector accounted for 10% of Finland’s political economy in 2016 and in 2017 transportation sectors services’ import accounted for 19% and export for 14% of total trade (Solakivi, et al. ... 2018, 57 & 59-61).

Solakivi et al. also reports that 90% of Finland’s foreign trade export and 80% of import are operated by sea freight (Solakivi, et al. ... 2018, 62). According to Hokkanen and Karhunen (2014), the most important competitors of Finland are Sweden, Germany and the UK. The ports play a vital role in the Finnish logistic infrastructure, as Finland is counted as an island and the most important competitors are situated a voyage away. The introduction of new services and technologies will enable more efficient transport operations, which can improve Finland’s logistics position and competitiveness. (Hokkanen & Karhunen 2014, 22; Pöyskö, Hurskainen, Lapp & Vaarala 2016, 43).

There are several technological trends affecting the Finnish markets at the moment and in the future and responding to the trends is essential for Finland to keeping up and maintaining competitive position in the markets. Also, there are other factors affecting strongly to the Finnish logistic environment. Those factors are such as the state of the global trade conditions – US-China trade war, political matters such as the Brexit, the climate change, labor shortages and the rise of e-commerce.

4.3.1 Donald Trump's trade policy & US-China negotiations' impact in Finland

As discussed in the earlier chapters about United States' and Donald Trump's trade war with China, it is evident, that it also has an impact on the Finnish trade and logistic environment. The Finland Chamber of Commerce's director Timo Vuori thinks that the war can open new market opportunities for Finland, but probably the impact is still more likely to be negative than positive. As the US and China are the biggest trading partners for Finland, the war can have severe consequences to the Finnish exports and economic growth. According to the Finnish customs statistics, Finnish export to the US grew by 6% and to China it grew by 4% in 2018. (Website of Finland Chamber of Commerce 2019)

Timo Vuori from the Finland Chamber of Commerce and Ville Valkonen from Verkkouutiset both agree that the trade war disrupts the global production chain where Finland is considered to be an intermediate exporter and the effects will soon be seen indirectly through the slowing economic growth in other countries. (Valkonen 2019; Website of Finland Chamber of Commerce 2019)

In the transportation sector, the trade war is presumed to affect to all transportation modes. The biggest impact is seen in the air freights for perishable goods. According to a research studied by Heli Satuli from Suomen Osto- ja Logistiikkayhdistys LOGY ry, the growth and investments would diminish and as a result of a rise in consumer prices, also consumption growth would slow down. (Satuli 2018)

4.3.2 The UK's Brexit vote's impact in Finland

The Brexit deal is still ongoing and not quite ready, and the UK has not quite yet divorced from the EU so the details of the deal are still unknown, but what is certain, is that the impact will be seen in Finland as well. The biggest impact will be seen in the Finnish economy and companies operating abroad and with the UK. One evident consequence would be new customs duties imposed on Finnish exports, as many Finnish companies haven't got customs codes needed to operate with third countries (countries outside the EU). The Finnish customs have estimated that if the UK separates

themselves from the EU, the amount of goods subject to customs clearance would increase by 25% which would mean hiring more customs staff. As e-commerce continues to flourish, in addition to the companies, the increasing number of consumers purchasing goods online brings more work to the customs, as in the future goods purchased online from the UK (net worth more than EUR 22,00), must be declared and duties paid. (Harjumaa 2019)

Great Britain is the 7th biggest trade partner for Finland. However, the UK's share of Finland's export has been steadily declining in the past years. In 2019 the share declined to 4,1% from previous' years 4,4%. Also, the import has been declining – from 2,7% to 2,6% in 2018-2019. Figure 4. illustrates the downward trend in the UK imports and exports from 2009 onwards.

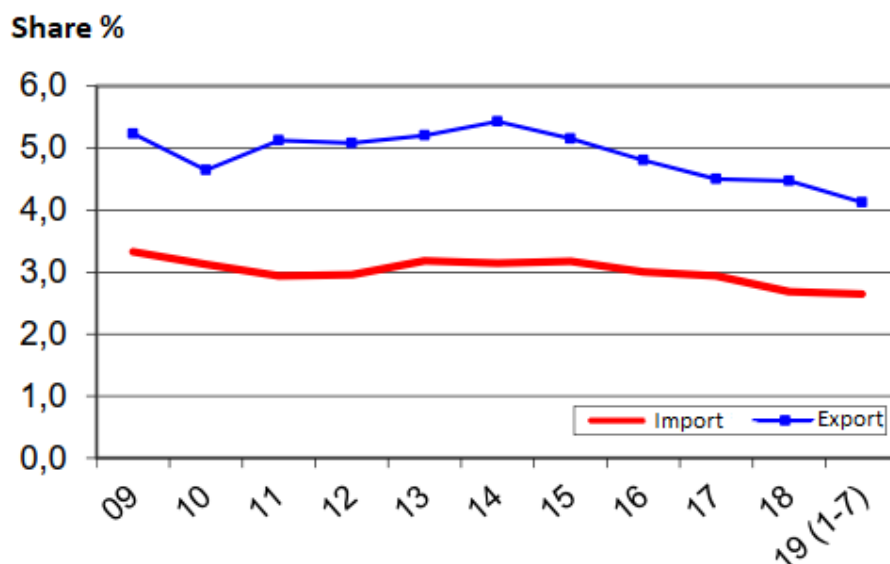


Figure 4. Great Britain's share in Finland's import and export in 2009-2019 (1-7). (Tulli: Suomen ja Ison-Britannian välinen kauppa 2019)

4.3.3 Climate Change in Finland

Sustainability has become one of the most important topics that companies fight for and thrive for today. Companies are looking for new ways to lower their carbon footprint by making processes more efficient and more environmentally friendly.

Logistics plays an important role in mitigating climate change. The new Paris Agreement between the EU countries is demanding all the countries to commit to the program so to stop the climate change by the year 2050. So far, Finland has committed to reducing transport emissions by 30% by 2030. The Finnish postal services Posti's aim is to reduce their carbon dioxide emissions by 30% by reducing emissions by efficient route planning, joint transports and by reducing emissions the same amount elsewhere in their other projects than what they produce from the daily transportation (within a yearly cycle). (Website of Posti 2017, Ilveskero 2019)

Mikaela Katro from Mediaplanet Group has found out that the railway transport's future prospects in Finland seems to be positive, as railway transports emissions a relatively small to the number of goods carried by them. In Finland, the share of railway transportations is 30% of total transports. The benefit of railway transports can be seen in shorter delivery times than in maritime shipping and they are also cheaper than air freight shipping. (Katro 2019)

According to Solakivi et al.'s Finland State of Logistics report (2018), the environmental factors influence companies' decision-making less than social factors and economic factors which are terminology from the "triple bottom line" driven by sustainable development. Also, regulatory actions made by government affects the companies' decision-making in environmental issues. The "Triple bottom line" coined by John Elkington in 1994, means considering the social, environmental and economic factors in the company's decision-making and operations. (Solakivi, et al. ... 2018, 31&121)

4.3.4 Labor shortages' effects in Finland

As the population is ageing, and consumers are getting more demanding on shorter delivery times and green logistics, more and more people are needed in the logistic sector to fill those positions that are left open by the baby boomers or positions created from the increasing demands of consumers resulting from the rise of e-commerce.

Heli Satuli states in her article that the logistic sector will need globally over a million new workers in the next few years according to some studies. According to her article,

DHL has estimated that only one in every six jobs finds a suitable candidate for the job. In Finland, every third transportation company has issues in filling in the positions they have in the offering. The most difficulties can be seen in tanker and dangerous materials transport companies and nearly half of them have difficulties of finding talented workers. The main issues among this problem is the lack of competence, skills, experience or commitment amongst the applicants. (Satuli 2018b).

According to Hipari (2019) in the Finnish logistic sector the number of job applicants has decreased a considerable amount of 18,5% and again the rate of open vacancies has increased by 90%. As discussed earlier in chapter 5.1.4. (Labor shortages in the logistic sector), to overcome the labor shortages impacts like creating more attractive perception of the industry, creating engagement and training programs inside companies to create commitment between the employee and the employer and bringing more workforce into the country from abroad could be driving factors to help fight the issue. (Hipari 2019)

As seen in Figure 5., the overall situation of the Finnish employment rate is improving. According to Statistics Finland, in 2019 there were 10 000 more employed persons than in 2018 and the unemployed were 8000 less than the year before. The employment rate in 2019 was 72,6% and unemployment rate 6,7%. Figure 5. shows Finland's employment rate and trend of employment rate between 2009 and 2019. (Official Statistics of Finland 2019)

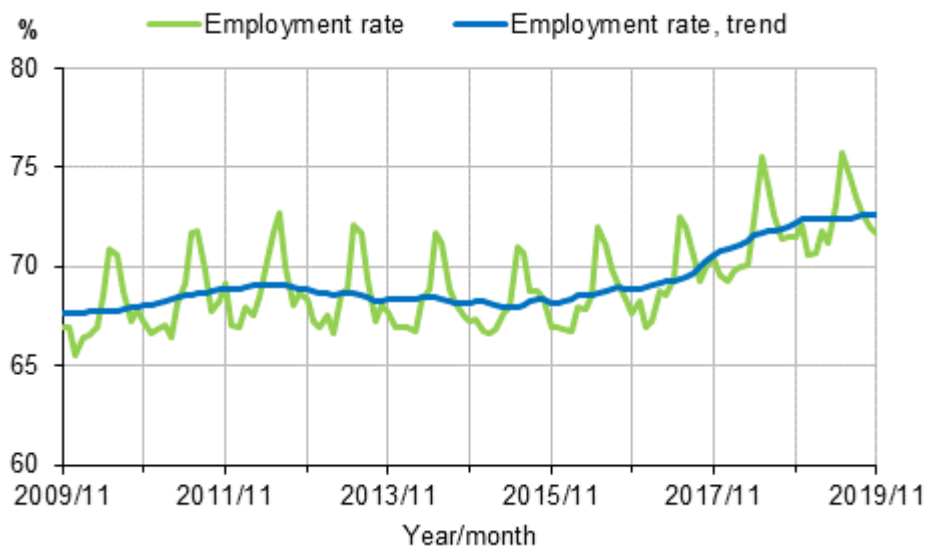


Figure 5. Employment rate and trend of employment rate 2009/11–2019/11, persons aged 15–64. (Official Statistics of Finland 2019)

Wrapping up, according to Satuli and Hipari, the state of the Finnish labor markets are somewhat alarming, as the industry is in need of more talented workers and the overall perception is not very steady and positive to be able to acquire these workers at the moment. Something needs to be done to attain more skilled employees and to retain those that are already in the industry. As the overall employment rate is improving, the effort to attract more people into the industry is essential.

4.3.5 E-commerce in Finland

E-commerce is blooming in Finland. The total growth rate is increasing, and the goods purchased online are not only material and services, but consumers also buy more and more groceries and daily consumer goods online. Online shopping is extremely flexible and time saving – 24% of Finnish consumers bought food and consumer goods online in 2019. (Paytrail 2019, 3)

PostNord has compiled a semiannual report on the Nordic e-commerce consumption behavior. The report states that one thing is in common between the Swedish, Danish, Finnish and Norwegian consumers – more and more people are paying more attention to responsibility when shopping online. Responsibility in the Nordic sense means being aware and making sustainable decisions to buy goods of which's environmental and climate impact are smaller. The consumers are also starting to demand more sustainable and smaller packaging. Finnish consumers are accepting longer delivery times than other Nordic consumers. (PostNord 2019, 2)

According to Hallavo, in Finland the share of e-commerce was EUR 4 billion (excluding tickets, services, electronic material, traveling and car trade) in 2013. The e-commerce is thriving, and its use is constantly increasing. Comparing Hallavo's previous estimation to Paytrail's yearly report "E-commerce in Finland 2019", where the share of e-commerce in the material trade sector was EUR 5,1 billion and the total value of e-commerce was EUR 13,8 billion, can the rise and trend of e-commerce be seen in

the increasing numbers of consumption through online shopping. (Hallavo 2013, 150; Paytrail 2019, 6)

The distribution of e-commerce in Finland in 2019 is shown in Figure 6. The largest sector is traveling, with 42% share (EUR 5,8 billion), the second largest is material goods with a share of 37% (EUR 5,1 billion) and the third largest is services which take up to 21% (EUR 2,9 billion) of the total turnover of e-commerce. Traveling sector has declined from the previous year by 5% which can be explained with the consumers being more aware of sustainability and trying to lower their carbon footprint. Both materials and services have increased. (Paytrail 2019, 6)

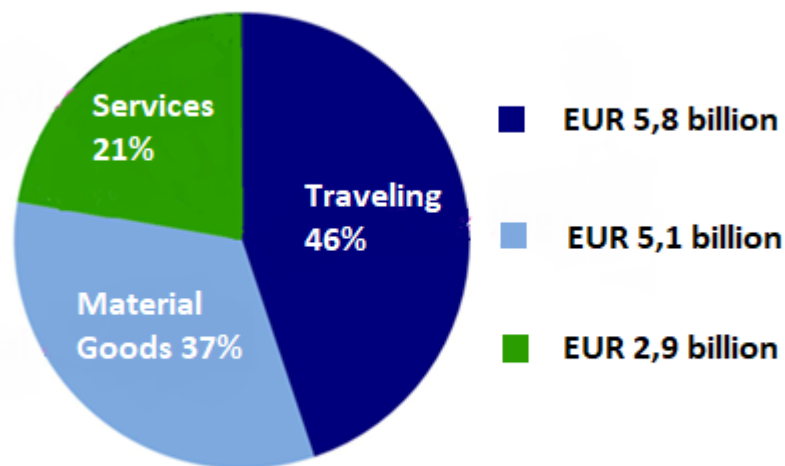


Figure 6. Distribution of e-commerce in Finland 2019. (Paytrail 2019, 6)

4.4 Logistic industry trends in Finland

The trends discussed earlier in chapter 5.2. “Global logistic trends” are affecting the Finnish logistic environment as they are affecting other countries. Some of their impact is smaller than others compared to global perspective. The rise of e-commerce is firing up bunch of new trends that can be seen in the rise of new innovative technologies such as automation, IoT, Blockchain, Artificial intelligence, Machine learning and autonomous vehicles. These trends have already been discussed through from the global

point of view in chapter 5.2., and they will be examined from the Finnish perspective in the following chapters.

4.4.1 Automation and IoT

In the long term, the Finnish logistics environment and companies could achieve significant economic benefits by acquiring digitization and automation into everyday operations. The costs of longer distance deliveries could be decreased with more efficient and less workforce-binding solutions when moving to automation and robotics. Pöyskö, Hurskainen, Lapp & Vaarala (2016, 44) think that Finland could act as a visionary in many fields regarding the commission of digitalization related development areas. (Pöyskö, Hurskainen, Lapp & Vaarala 2016, 44)

According to Pöyskö, Hurskainen, Lapp & Vaarala (2016, 44-45) Finland has a strong expertise and product development ability in several divisions such as transportation robotics, mobile applications, vehicle software's, hub automation and robotics and in the marine cluster including automation, engines and shipbuilding. (Pöyskö, Hurskainen, Lapp & Vaarala 2016, 44-45)

The Finnish Government has issued a resolution for the digitalization of transport data. The aim of the resolution is to foster the digitalization of the logistics environment and to create new business opportunities. The resolution also supports Finland's plans of reducing emissions in the transport sector. The act's main objectives are to improve the flow of information within the logistic chains, to increase the functionality of short-range logistics, to invest in the development of intelligent logistics automation and to accelerate the digitalization of ports. (Finnish Government 2018)

4.4.2 Blockchain

The basic principle of the blockchain can be explained as simply as a shared account book where all events are logged in in a chronological order and nothing can be deleted afterwards. The accuracy is measured through complex algorithms which is administered and authenticated by "miners" – ordinary people. There's no need for a third-

party operator such as banks, because the trust is created solely by individuals in the chain. (Hallamaa 2018; Johansson, Eerola, Innanen & Viitala 2019, 33-34)

According to PostNord's research, the Finnish and Swedish are the most interested in the supply chain transparency and to be able to follow up the whole chain from the origin to the end. 33% of Finnish consumers thinks it is somewhat important to be able to track the product from the point of origin to the end product and 15% thinks that this is extremely important. Three out of four of Nordic consumers think that these factors influence their decision-making. (PostNord 2019, 21)

Hallamaa states, that because the trust to third-party operators in Finland is basically high, the blockchain technology's un-intermediary operations do not create as much value to Finnish people than it creates in more corrupted and unstable countries. The Finnish trust could be utilized in developing and distributing the blockchain through authoritative operated blockchains which could be reliably presented to citizens. (Hallamaa 2018)

4.4.3 AI, Machine learning and Autonomous vehicles

Artificial intelligence means a machines' ability to copy human reasoning. AI is used for example to enhance performance through intelligent processes or to replace human work with full automation. According to CGI, in the future artificial intelligence is no longer a competitive advantage, but it will soon become "prerequisite for survival" for Finnish companies. (Website of CGI 2019)

With "deep neural networks" which are according to Mahmood et al. 2017, "machine learning algorithms implemented by stacking of neural networks", have been achieved very significant and impressing results in the areas of i.e. image recognition, speech recognition and translation, and the attention that AI receives in Finland, is based on these aforementioned machine learning performances. In the fields of data-analytics and machine learning, Finland is one of the leading countries in producing scientifically significant researches on the two topics. (Mahmood et al. ... 2017; Ailisto et al. ... 2019, 6 &17)

In recent years in transportation sector, the focus has been on automation and robotics development of vehicles which are rapidly developing to fully automated vehicles. In the Finnish marine sector, several companies have strongly invested in product development of unmanned vessels. Unmanned cargo ships and new ship concepts are being developed and the first unmanned vessels are expected to be in test use in the coming years. (Pöyskö, Hurskainen, Lapp & Vaarala 2016, 18 & 24)

In the logistics sector, moving to autonomous vehicles increases operational efficiency and safety. Fully automated vehicles can operate without a driver continuously for long distances and as a result transportation costs are reduced, and the flexibility of the system increases. Nowadays the vehicles still have drivers, but many of the systems have already been automated, such as automatic steering system that can adjust speed, safety distances and correct driving lanes. The driver's responsibility is to operate the greater control movements such as turning, joining lanes and exiting. (Ailisto et al. ...2019, 18)

5 METHODOLOGY

5.1 Research method

The research method used in this thesis is quantitative method. Quantitative method is pursuing for explaining the concepts more in general with uniform statistical options and replies while qualitative method deals with more detailed and explanatory approach to the topic by allowing freely written answers by individuals. During the making of this thesis, a survey questionnaire was conducted to a selected audience. A survey questionnaire is in most cases categorized as a quantitative study because measurements that are applied are usually statistical. (Vehkalahti 2014, 11-13)

Quantitative method was chosen as the main tool as the purpose of this thesis was to collect data and information based on the questionnaire. However, the background information and theoretical background gathered for this research was gathered using

qualitative secondary data research methods as the main objective of the theoretical background was to research the same topics that were found in the questionnaire but from the Finnish point of view. By applying the qualitative research method, a large count of valuable background data was studied on the related concepts and evaluated with the purpose of staying in line with the content of the questionnaire.

5.2 Data collection method

The data collection method of this thesis is a questionnaire which has been conducted to a single logistic company as a pilot survey to test the survey questionnaire content and its functionality before sending it out to a bigger audience. The finalized questionnaire will be conducted in the next phase of the EFLE project which is carried out by another student later during 2020.

Collection of data through a questionnaire is a popular method when sampling for a big audience. A questionnaire is also defined as a primary source of data. As Krishnaswami and Satyaprasad (2010, 86) explains, primary data is gathered from “original sources from which the researcher directly collects data that have not been previously collected” – meaning that primary data is acquired through questionnaires, interviews or personal communications. (Krishnaswami & Satyaprasad 2010, 86)

The theoretical background of this thesis has been collected through secondary data sources. Secondary sources are those that have already been collected to some other purpose than to this exact purpose: readily available sources and researches on various topics and statistics and reports. Also, books, articles and websites with data, financial journals and blogs can be considered as secondary data sources. (Krishnaswami & Satyaprasad 2010, 86)

5.3 Preparation and conducting of the survey

The survey questionnaire was designed and written by a Dutch student Yigi Wang during autumn 2019. The questionnaire includes 32 questions and they are all intended for companies operating in different logistic fields. The questionnaire handles different

themes from background information of the respondent's companies to their vision of today's logistic industry trends, attitudes, skills and knowledge through their company's values (Wang, Y 2019, 8).

For this thesis, only a pilot survey was conducted. The pilot survey was implemented to test the questionnaire and to get feedback on the content and functionality of the questionnaire from a real-life case company. SAMK Senior Lecturer Daniela Tanhua selected a company to the pilot survey and the survey questionnaire was sent out only to that company.

Preparation of the questionnaire included attaining suggestions for improvement from several EFLE members that were requested for them (gathered by Yigi Wang and Tytti Nieminen). Based on the received suggestions, Wang edited the questionnaire accordingly before Nieminen sent it out to the chosen company for the pilot survey purposes. Nieminen sent out the pilot survey questionnaire during week 4 in January 2020 and received it back in the end of week 5 in January 2020.

The challenges that the author of this thesis might face regarding to the questionnaire and its analysis, are that there were only one company attending to the pilot survey so the results might not give as deep insight into the topics as hoped or assumed in the beginning of the thesis. However, the analyzing and results of the survey will be presented later in chapter 7, "Research findings".

5.4 Data collection and analysis

The data analysis was made by going through the answers from the pilot questionnaire one by one. The questionnaire was made in a Word-file where Wang had divided the questions into four sections: General questions, Trends, Competency and Other comments. The answers were mainly requested to be given on a scale 1 to 5 or if the topic was highly popular/relevant in or to the company or not. The questionnaire included a few exceptions where the respondent was asked to give a longer opinion on the topic or question. The pilot survey respondent was also asked to give straight feedback of

the questionnaire to receive freely given suggestions based on the respondent's own individual opinions.

The challenges that the author of this thesis might face regarding to the questionnaire and its analysis, are that there were only one company attending to the pilot survey so the results might not give as deep insight into the topics as hoped or assumed in the beginning of the thesis. However, the analyzing and results of the survey will be presented later in chapter 7, "Research findings".

5.5 Validity and reliability

5.5.1 Validity

Simply put, validity shows if the method used to conduct the thesis is valid and if it measured what it was intended to. Measuring validity is the most important section of the process as it tells if the topic and the goal has been reached or if they haven't. If the validity has not been achieved, the reliability also loses its meaning. (Vehkalahti 2014, 41)

The literature review done for the thesis was well defined and clearly limited. The author found several other topics during her research that she could had used but she decided to limit the results to those topics that were earlier discussed in the thesis. The sources she used were mainly secondary data sources such as books, articles and blogs. They were all current and new and the author only chose resources which were found amongst reliable sources of information.

An issue that might impact to the validity of this thesis might be the questionnaire and its analysis, as there were only one company attending the pilot survey, the results might not reach the level that they were initially hoped to reach for.

5.5.2 Reliability

Analyzing a survey questionnaire is not as simple as it seems. The reliability and quality are often impacted by contextual, statistical, cultural, lingual and even technical issues which leads to a fact that usually analyzing the results require more than just one researcher's output. (Vehkalahti 2014, 40).

As there were numerous sources to choose from, the reliability could suffer from a fact that there could have been too many sources available and the author of this thesis might have chosen wrong or not current and valid sources to rely on.

Analyzing of the questionnaire and comparing the answers to this thesis's qualitative research was challenging as only one company participated in the pilot survey. The reliability suffers from the fact that only one set of responses were received and some of the questions were left unanswered. However, what was found out was that some of the questionnaire's content matched with the content of this thesis. The trends were mostly the same and the topics were somewhat comparable.

6 QUESTIONNAIRE FINDINGS

This chapter covers the empirical findings from the questionnaire of the results and answers received from the company that participated in the survey. The questionnaire has been created by a Dutch student, Yigi Wang as her bachelor's degree thesis subject, and this is the first time it is being tested for the functionality and content wise. The content of the questionnaire deals with some of the same topics and concepts that the author of the thesis has already covered in her theoretical research. In the questionnaire, the topics are divided into four different sections: General questions, Trends, Competency and Other comments. The author of the thesis will review and analyze the topics and questions of each section and question one by one in the following part of this thesis.

6.1 Section 1: General questions

The first section, General questions, including the first ten questions, are mainly concerning general topics and the questions' focus is on defining the company's background information, such as industry sector, employee ages, size of the company and other relevant background information.

1. *What is the industry sector of your company?*
2. *What is your company business type?*
3. *What size is your firm? (in terms of employees)*
4. *What size is your firm? (in terms of turnover)*
5. *In which function department are you in the company?*
6. *On which level is your position involved in the company?*
7. *In which region is your company conducting business activities?*
8. *What is your age?*
9. *How long have you been working?*
10. *What is the popularity of applying IT technologies in your firm currently?*

The first nine questions concerned solely on defining the industry sector, size, age distribution of the employees, region, level of their position and which department they belong to in the company and defining the basic business type. The tenth question however, concerned the levels of IT technologies the company is applying, which differed from the other questions as it is aimed at the respondent's technological features unlike the previous questions which were more personal.

The respondent's company operates in the Chemical industry sector and in B2B (business to business) environment. According to the questions number three and four, the company is accounted to be a "Small and medium sized company (1-249 employees)" in terms of employees, and in terms of turnover, they are regarded as "Large-sized company (more than 50 million euros)". In the next few questions, it was found out that the level of position of the respondent is in a strategic level in their company's logistics department. The respondent is between 35 and 50 of age and has been working in the company between 15 to 25 years. The company operates in several regions

in the world which indicates that the company is very well expanded in their business activities.

The last question in the first section of the questionnaire diverged from the earlier general questions as it concerned the popularity of applying IT technologies in the company. The response gave out that the company does not employ warehousing and inventory operations in their activities, nor they execute controlling and monitoring of information in their company. However, they used Communication in their supply chain network commonly.

As a conclusion for the first section, you could say that the respondent's company is a multinational large-sized company with turnover of over EUR 50 million. The company's industry sector is Chemicals, which is one of the biggest industry sectors in Finland. The chemical industry accounted for about one fifth of Finland's exports in 2018 and the value of the sector was EUR 12,8 billion. (Website of Kemianteollisuus 2020). The respondent their self, is a strategic higher-level employee with several years of experience in the company.

6.2 Section 2: Trends

Section two, Trends, handles some of the current trends in the global industries. The questions are requiring the respondent's own opinions and knowledge of the trends and their opinion of the possible future appearance of those trends in the logistic industry sector and in their company. The section includes the questions number 11 to 19. The questions are expected to be answered choosing the best suitable answer for the question from the following options: *“Very common – Rarely, Very popular – Not happening, Highly relevant – Hardly relevant, Very important – Very unimportant or from a scale 1 to 5”*.

11. Which engineering technology trends do you think will be popular in near future? Very common – Rarely

This question asks which of the following engineering technology trends the

respondent thinks will be popular in the near future: self-driving vehicles (excluding cars and trucks), unmanned aerial vehicles (excluding drones), robotics, Internet of Things (IoT), 3D printing, Low-cost sensors solutions and Artificial intelligence. The respondent thinks that self-driving vehicles are *Not* going to be *Common* in the future. However, according to the respondent, *Common* trends will be unmanned aerial vehicles, robotics, 3D printing and low-cost sensor solutions and out of all, IoT will become *Very common* amongst the trends. Artificial intelligence was left *Neutral*, which indicates that the respondent might not be very familiar with the topic itself.

12. Which information technology trend do you think will be popular in near future? Very popular – Not happening

The next question is striving to get the respondents opinion on to which information technology trend do they think will be popular in the near future. The trends which are included in this question are Blockchain, Big Data analytics, Cloud logistics and Augmented reality. The respondent thinks that Blockchain and Cloud logistics will become *Very popular* and Big Data analytics *Popular*. In this question, Augmented reality was left *Neutral*, which again indicates that the term could be unknown or insignificant to the respondent.

Apart from the Blockchain, the other trends given as answers in this question are not same which the author of this thesis has chosen as the most relevant trends of the time in their research. This might result from different time of execution of the questionnaire (midway through 2019) and this thesis (turn of the year 2020) or it might lead from cultural differences and distinctive personal opinions and priorities.

13. Which enginery trends do you think will be applied in your company in the future? Scale 1 to 5

Question 13 tries to solve which engineering trends the respondent thinks would be applied in their company in the future. When submitting back the questionnaire to the author of this thesis, the respondent asked for more details on the questions 13 and 14 as they were not sure what was requested in them and how to answer them. Even though the author of the thesis replied to the respondent on the same day, no answer

was given to questions 13 and 14 by the respondent.

14. Which information technology trends will be applied in your company in the future? Scale 1 to 5

No answer was given to question No. 14.

*15. Which customer-oriented trends do you think will be popular in the future?
Highly relevant – Hardly relevant*

In question 15., the questionnaire's creator wants to know which customer-oriented trends does the respondent think will be popular in the future. The creator of the questionnaire gives four customer-oriented options: Batch size one, Connected Life, Digital Work and Fresh chain. The creator also gives separate definitions of the terms for the respondent – indicating that the terms might not be familiar to the audience beforehand.

Based on that, the respondent has chosen Batch size one and Connected Life both to be *Highly relevant* in the future. However, this result is somewhat not surprising. Due to the rise of e-commerce and digitalization, consumers are demanding more customized and quicker deliveries and easier ways of controlling their own doings and as Batch size one promotes micro production and fast deliveries and Connected life provides customizable delivery services operable through smart devices, they are both following the current trend scheme from the customer-oriented point of view. Digital work (managing robotics or programming) will be a little less relevant than the two aforementioned – just *Relevant*, and the Fresh chain (cold-chain shipments) will *Not* be *Relevant* in the future according to the respondent.

*16. Which type of logistics trends do you think will be popular in the future?
Highly relevant – Hardly relevant*

The following question is pursuing to find out the respondent's opinion on to which type of logistics trends they think will be popular in the future. Again, the definitions have been given, which again tells that the creator of the questionnaire might have

thought that the concepts are not very familiar or easily understandable for the reader. The creator of the questionnaire has given the following concepts to be rated by their relevance: Fair and responsible logistics, Green energy logistics, Grey power logistics, Omni-Channel logistics, Tube logistics and Supergrid logistics.

Of these, the respondent thinks that in the future, Grey power- and Omni-channel logistics will be *Highly Relevant* for companies to acquire, and Fair and responsible-, Green energy- and Supergrid logistics would be *Relevant*. The respondent thinks that the lot spoken Tube logistics trend will *Not be Relevant* in the future. Perhaps Tube logistics would not be usable or suitable in the respondent's industry or to be used in Finland as Tube logistics is designed to be used to reduce transport congestion in megacities which does not apply to Finnish cities (population of Helsinki, the Finnish capital is under 700 000) (Pietiläinen 2019).

The respondent is on the right track by choosing Grey power- and Omni-channel logistics as the most relevant trends for this question, as both are very current topics at the moment. The author of this thesis does not recap on either of the topics in her thesis, but Grey logistics can be accounted as a part of the labor shortage issue which was earlier discussed in the thesis (chapters 4.1.4 and 4.3.4.) as a bigger entity - Grey power logistics is aiming to create simpler logistic services for ageing population. According to DHL's Logistics Trend radar (among others), Omni-channel logistics (all supply-chain operators working together to create a seamless network) is also a part of the Social & Business Trends discussed in chapter 4.2. and is very relevant and will also be happening in the near future (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 17).

17. Which smart business trends that you think will be popular in the future?

Very popular – Not happening

In question 17. of the Trends-section, the creator of the questionnaire wants to know which are some of the smart business trends that the respondent thinks will be popular in the future. Here the creator explains the concepts that she has chosen as the answers. In this question there are only three trend's that are being under investigation: Servitization, Sharing Economy and Smart containerization.

According to the respondent, Servitization is going to be *Very Popular*. Servitization aims to transform businesses from product-based to service-based operations, which is very much needed during the digitalization of businesses as consumers are getting more aware and more demanding. The respondent rated Sharing Economy as *Popular*, with given examples of Uber and AirBnB. The link between these examples and logistics might be a bit unclear to some readers but for the respondent it was clear enough to choose the popularity based on them.

Smart containerization did not raise any emotions for the respondent as they answered *Neutral* for this trend. Smart containerization refers to new technologies which can help to track and create data through IoT's and sensors in containers. Previously in question 11. the respondent opinion of IoT indicated that they would think that IoT would become *Very Common* in the future. However, even though the concepts were linked into the smart containerization in this matter, the respondent didn't seem to think that the smart containerization would be relevant. This indicates that it is possible that the respondent might not have understood the meaning of the term, or the linking to IoT's or they could have misunderstood the use of the IoT's, which is most commonly known as sensors and data gathering tools for any machines and shipping containers.

18. How important is sustainability as the development strategy in your company? Very important – Very unimportant

The respondent stated that sustainability is *Important* as the development strategy in their company. Sustainability nowadays is becoming something considered self-evident and is being expected from most companies. The respondent's answer tells that their company values sustainability and they are committed in lowering their climate change impact.

19. How important is 5G technology for logistics industry development? Very important – Very unimportant

Question 19. handled the importance of 5G technology for logistic industry development. The respondent does not regard 5G as an important technology, as they chose

Unimportant as their answer for the question. 5G technology is something the author of this thesis did not regard as an emerging trend quite yet. The author of this thesis thinks, that certainly 5G is an emerging trend which will have a huge impact on improving technology usability in the future, but for now, the 5G is still in its baby steps and cannot properly be utilized or capitalized as the majority of nations do not have access to it yet.

6.3 Section 3: Competency

The third section of the questionnaire includes questions regarding competencies such as knowledge, skills and attitude, which the creator of the questionnaire handled in their own thesis. The creator gives a little insight into the topics by opening up the concepts: knowledge is information or facts acquired through education, skills are abilities to perform certain tasks and attitude is feelings or behavior toward something. The section includes eight questions regarding these topics. All the questions can be answered by rating them between *Very Important*, *Important*, *Neutral*, *Unimportant* and *Very Unimportant*.

20. How important are the competencies in terms of professional attitude for the logistics professionals?

In question 20., the creator of the questionnaire has given three “Essential attitudes” which are to be rated by their importance as logistic professional’s traits. The attitudes are Collaboration in network, Positive and adaptive to troubles and Entrepreneurship to adapt to new trends. The respondent has rated Collaboration in network and Entrepreneurship to adapt to new trends as *Important* attitudes and Positive and adaptive to troubles-attitude as *Neutral*. From these answers, it could be inferred that the respondent appraises cooperation between the stakeholders and thinks that obtaining and adapting to new trends are essential for logistic professionals. However, the respondent rated Positive and adaptive to troubles as *Neutral*, which might indicate that this is not very important or doesn’t matter to the respondent’s own attitudes or match their company values.

21. How important are the competencies in terms of personal skills?

The next question is aiming to find out, which of the following personal skills are the most important: Communication, Decision-making, Time management, Leadership, Reliability, Languages (other than English), Presentation and Creativity. The respondent rated none of the skills *Very Important*, but they chose Communication, Decision-making, Reliability and Creativity as second highest - *Important* skills. Time management, Leadership and Presentation were left *Neutral* and Language was rated *Unimportant*. Understandable, the language was answered as Unimportant, as English is the world's leading business language in most of the internationally operating companies.

The author of this thesis finds it somewhat strange, that the respondent has left Time management in the Neutral compartment, as time management is one of the most important features in supply chain management and in logistics.

22. How important are the competencies in terms of business skills?

This question wants to know how important the following competencies are for the respondent in terms of business skills. The competencies are Data analysis skills, Task-prioritizing, Project management, Financial management, Team working and Problem-solving. These skills are basic skills that are somewhat expected from employees in many companies.

The respondent rated Team working and Problem-solving skills as the most important, *Very Important* skills. Nowadays teamwork is increasingly promoted and valued more and more in many companies and Problem-solving skills are essential for an individual to master their work. Task-prioritizing and Project management skills were rated as *Important*.

Out of these, Data analysis skills and Financial management skills were *Unimportant* for the respondent. The respondent works at the logistics department in their company, and this answer indicates that the respondent might not be in a leading position in the company if they do not have to manage data or finances.

23. *How important are the competencies in terms of IT skills?*

Question number 23. handles the importance of IT skills. The answers include System operation, Programming, Big Data, Data-visualization and Data analysis with software. Big Data is rated as *Important*, but others are *Neutral*, *Unimportant* or *Very unimportant*. The author of the thesis does not include Big Data amongst her theoretical research, but the concept, according to Chung, Gesing, Chaturvedi & Bodenbenner (2019) can be explained as: “unprecedented amounts of data can be captured from various sources along the supply chain. Capitalizing on the value of big data offers massive potential to optimize capacity utilization, improve customer experience, reduce risk, and create new business models in logistics.” (Chung, Gesing, Chaturvedi & Bodenbenner 2019, 18).

24. *How important are the competencies in terms of knowledge about shipper business? (please skip this question if you are not working at this type of company)*

The next question is aimed to those that work in shipping field in logistics. The respondent is working in their company's logistic department, from which it can be concluded that they also handle shipping and forwarding in their work. The answers the respondent gave, were that Route planning is *Very important*, Transportation Modes, Import & Export and Handling equipment relevant knowledge are all *Important* competencies for a person working in this field of business. These answers might indicate that the respondent is handling the regular shipping procedures in their job as all these are required competencies in mastering logistic operations management. Custom and Trade regulation were left *Neutral* which indicates that the respondent does not have to deal with those functions.

25. *How important are the competencies in terms of knowledge about carrier business? (please skip this question if you are not working at this type of company)*

In question 25. of the Competence section, the creator of the questionnaire wants to know how important the competencies are in terms of knowledge about carrier

business. The respondent thinks that knowing Transportation modes, Laws and regulation, Custom tariff, Warehousing, Inventory management and Capacity optimization are *Important* competencies to know in carrier business. These are all somewhat basic operations of logistics and supply-chain management. Consolidation/ bundling and Inbound& outbound logistics were answered *Neutral*.

26. How important are the competencies in terms of knowledge about forwarding business? (please skip this question if you are not working at this type of company)

No answer was given to question No. 26.

27. How important are the competencies in terms of knowledge about distribution business? (please skip this question if you are not working at this type of company)

This question asks the reader, how important are the competencies in terms of knowledge about distribution business? The question tries to find out the importance of basic operative functions such as Warehousing management, Distribution operation, Service design, Customer Service, Sustainability, Lean management and IT application in the respondent's company. The respondent rates Customer service as the most important; *Very Important*, and Warehousing management, Distribution operation and Sustainability as *Important* competencies for distribution businesses. Service design and Lean management were *Unimportant*, which indicates that these functions and systems are not used in their company.

28. How important are the competencies in terms of knowledge about integrated logistics?

In the last question of section 3., the creator of the questionnaire has given nine competencies to choose from to answer the question: How important are the competencies in terms of knowledge about integrated logistics? According to Bouchard (2014), Integrated logistics can be explained as a logistics provider, which provides a variety of logistics related services such as air, ocean, road and rail transport,

warehousing and other value-added services that make up a logistics service from end to end (Bouchard 2014).

The respondent thinks that Transport operations, Warehousing, Business and logistics regulations and Sustainability are *Important* in terms of knowledge about integrated logistics. The most important, *Very Important*, is again Customer service. The respondent has repeatedly chosen customer service as the most important answer of all questions it has been included. This indicates that customer service is the most important factor for the respondent and is also highly valued within the company. Another repeated answer is Sustainability, which is an important trend at the moment and seeing it being applied in this company is a great sign of commitment to the climate change prevention. In this question, Inventory management, Risk management and IT application were *Neutral* and again, Lean management was *Unimportant* (as previously).

6.4 Section 4: Other comments

Other comments section contains open questions, which are asked to be answered in the respondent's own words. The questions relate to previously discussed topics, logistic trends and competencies that were handled in the previous questions.

However, the respondent did not give straight answers to any of the below questions during the interaction with the author of this thesis. The respondent stated in an email discussion with the author, that they see networking to be the most critical and important so-called megatrend currently. This means that no company is able to handle all parts of the supply chain (especially the changes) and due to networks, it is easy to access the specific needs of different areas. (Salonen 2020)

29. What are the other future logistics trends from your point of view?

30. What are the other logistics competencies regarding skills from your point of view?

31. What are the other logistics competencies regarding knowledge from your point of view?

32. *What are the other logistics competencies regarding attitude from your point of view?*

7 SUMMARY AND CONCLUSION

There are several trends and events that are shaping the logistic environment and impacting its players at the moment. Some of the events are affecting the global trade conditions and thus impacting and complicating the logistic infrastructure. US-China trade war and the Brexit vote are some of the current political factors affecting to the global trade.

The United States and China both are one of Finland's and the whole Europe's biggest trading partners, and now they are combatting on who has the greater power. This could backfire on both countries' economy as it has been predicted that the economic growth of both countries is going to significantly decrease. Trump's trade policy is restricting the imports and exports of the US and its trade partners which has an impact on the global trade and thus impacts in Finland's ability to trade efficiently with other countries. Globally Finland is accounted to be a middleman trade partner in the supply chain for other countries, so the effect of the war will impact other countries more violently and, in that way, affects the Finnish economy as well. In the Finnish logistic sector, it is predicted that the trade war's impact would be that the Finnish economic growth will start slowing down and some even fear it will start to decline.

Finland's 7th biggest trade partner, the United Kingdom has left the EU on 31st January 2020. This means that if the UK and the EU won't come to a conclusion and agreement on new trade regulations within a year, the UK will become as any third country (outside the EU) and the trade conditions of third countries will apply. It's feared that the deal will not be made during 2020. If this happens, Finland among other EU countries will face new tariffs and trading restrictions and taxes which affect the trade and thus transportation of goods to and out of the UK. Many Finnish companies are only trading inside the EU, and if one of the biggest trading partners in Finland is no longer in the EU, this would mean great changes and difficulties to companies in Finland to

be able to trade with a country outside the EU. Only time will show how the situation with the UK will be solved.

The Climate change and sustainability have become one of the most important topics that companies thrive for today. Finland has committed to the EU's Paris agreement and to lower transport emissions by 30% by 2030. Some researchers say that Finland should opt in to using railway transportation more instead of sea freight shipping and air freight shipping to meet the agreement's terms. Posti has promised to lower their carbon footprint coming from transportations by reducing emissions the same amount elsewhere in their other projects than what they produce from the transportation.

The labor shortage issue in Finland seems to be improving. The Finnish employment rate has been increasing since 2015. However, the problem might not lay in the amount of job seekers anymore, but in the lack of competence and skills of the applicants. It was noticed in several sources that there's a shortage of talented and committed employees especially in the logistic sector. The image of the sector is not very persuasive, and the industry needs more marketing and paying attention to trying to assure people that logistics is more than just warehousing and driving trucks. More skilled workers are needed in the sector and due not being able to find them, companies have started acquiring automation and other such technological solutions instead.

The growth rate of e-commerce is rising in Finland as it is also rising globally. Consumers are starting to utilize e-commerce in purchasing daily consumer goods and groceries more and more and not just material and services. Due to the rise of e-commerce, new innovative ideas and trends need to be introduced into the industries to keep up with the new technological changes and demands.

Yigi Wang's questionnaire included similar topics which were included in the theoretical part of this thesis. Yigi Wang had chosen some of the current topics she thought were important and essential now and in the near future, and the author of this thesis chose such that she thought would be important and most relevant from her perspective, with the same reasoning. Wang's questionnaire handled themes from general logistic operations to current technological trends. Some of her questions and trends related to them were such that the author of this thesis had already included in the State

of the logistic markets-research as included in larger entities and topics such as climate change and events impacting the trade conditions. However, the actual technological trends were chosen one by one by both authors. The author of this thesis did not choose her trends based on the questionnaire but based on her preliminary study phase. This thesis handled trends Automation, IoT, Blockchain, Artificial Intelligence, Machine learning and Autonomous vehicles. Wang's questionnaire handled trends such as Robotics, which can be connected to automation, IoT, Artificial Intelligence, Blockchain and Self-driving vehicles among other trends, which were not discussed in this thesis other than in the questionnaire results. The questionnaire's respondent also stated in their responses that apart from the Artificial intelligence, they thought the beforementioned trends are common and hoped to be used in the future which also backs up the reasoning for these trends to be chosen as the most important ones. As both authors and the respondent have chosen these same trends as some of the most important trends of their researches, could be concluded that these trends are reliable and valid, and these trends were worth investigating.

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