Zakarea Kassem

The effect of Information and Communication Technology on trade and Supply chain management in Finland and the United Arab Emirates.

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Abstract

ICT has had a significant impact on supply chain management in Finland and UAE, but there remain several challenges, including implementation costs, technical literacy and skill deficiencies, security concerns, and the changing role of employees when it comes to supply chain management using ICT. According to the study's findings, ICT has improved supply chain management in many ways, including increased transparency, and an efficient supply chain involves reducing costs, keeping track of products, communicating, and coordinating with internal and external stakeholders. The primary analysis shows several advantages to using ICT to track logistics, coordinate supply chains, plan, and conduct commerce. In this study, we investigated the impact of ICT on trade and Supply Chain Management. Finland and UAE were chosen for several reasons. One of the reasons is that both countries are willing to create the most advanced technology. In other words, this will create a high quality of life in their countries by managing our social lives, communicating with each other, and finding information. The UAE is Finland's second-largest export and import partner in the Gulf area, and the UAE and Finland have excellent diplomatic and commercial relations.

Keywords: ICT, SCM, IoT, Artificial Intelligence (AI), digitalization.

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Glossary

ERP: Enterprise resource planning is data that aims to organize all of the resources, information, and activities required to fulfill business operations such as accounting and resource management.

ICT: The component that allows contemporary computing is ICT, or information and communications technology (or technologies).

SCM: Management of a product's movement from materials to manufacturing to distribution is referred to as supply chain management.

VoIP: Connecting voice conversations across the Internet or any network that uses the Internet Protocol.

1   Introduction

ICT has become an essential part of organizational functions since the beginning of computerization. The primary focus of ICT research in the 1980's was to achieve strategic goals (Gratzer and Winiwarter, 2003). ICT has given rise to many new industries, such as online auctions and digital marketplaces. However, the greatest impact has enabled the transformation of existing industries that were previously constrained by the high cost of communicating, obtaining information, or conducting transactions. (Malhotra, 2000; Porter, 2001). Using information and communication technologies (ICT) has benefits for companies that implement them, particularly in terms of procurement, since it improves collaboration between suppliers and buyers. ICT in SCM activities in Finland and UAE are supported by enterprise resource planning systems, specialised logistics software, automation solutions, geographic information, and identification techniques. The data collected in the databases can be used to analyse operations, which aids in decision-making (Shqipe, Hyrije, and Zamir 2013)

We can see during our thesis the ICT advances in both countries. The data and Correspondence Innovation field have likewise added to the internationalization of creation and dispersion networks in different modern units. Global supply networks and relative market seriousness are fostered by ICT tools (Kble 2014), In 2022, business investment IT and ICT (excluding devices) is expected to grow by 9% to USD 709 million. During the period 2021-2025, the investment will grow at an average annual rate of 12.5%. By 2025, infrastructure as a service (IaaS) will represent 41% of hardware investment and have a compound annual growth rate of 45%.

In Finland, ICT is developing quickly to further Finland is one of the world's leading countries in information and communications technology (ICT). The country is home to world-leading companies in a lot of ICT and digitalization sub-sectors, some of ICT in SCM in Finland and UAE are upheld by big business asset arranging frameworks, specific operations programming, computerisation arrangements, geographic data, and ID methods (Finland ICT, 2022). The information gathered in the data sets can be

utilized to analyse tasks. The value of imports and exports between Finland and the UAE exceeded $500 million in 2020, underscoring the need for closer ties. In terms of total trade, the UAE is the largest commercial partner of the Nordic countries in the Gulf region. ties between Finland and the larger Gulf area, including the UAE.

Despite its geographical distance, the UAE is Finland's second-largest export and import partner in the Gulf area, with more than 70 Finnish companies operating there. With more than 120 Finnish companies, this marks the biggest convergence of business from Finland on the Arabian Peninsula. The UAE and Saudi Arabia are Finland's top two partners. Finnish exports to the UAE total $327 million, while exports to Saudi Arabia total $387.52 million. As part of our strategy, the UAE wants to co-create and design agile, sustainable, and smart solutions that will aid future commercial prospects and social development (Arab News, 2022).

The UAE and Finland have excellent diplomatic and commercial relations. However, improvement is still needed. Finland seems to have been considered a potential investment location and an important commercial partner by the (UAE Finland and the UAE,2022).

1.1   Research Purpose and Goals

The research aims to examine how ICT is used and has affected both country's production and trade in general. To achieve the review's goal, the researcher for this research will concentrate on the accompanying objectives:

- ❖ Explaining the ICT in the UAE and Finland on trade, supply chain management, and information technology.

- ❖ Assess the importance of ICT devices in the exchange and the future of ICT in the two countries.

- ❖ To study the role and Advantages & Disadvantages of ICT for companies.

- ❖ ICT commitments to further develop the production network in Finland and the UAE.

- ❖ Studying the impact of information communication technology in Finland and UAE trade.

1.2 Research questions

- ✓ What is the role of information and communication technology in supply chain management and trade?

- ✓ What is the influence of information communication technologies on communication collaboration among employees in companies?

- ✓ How can information communication technology improve supply chain operations and trade?

1.3 Study Structure

This thesis contains 6 primary parts. The first section is the topic introduction, which addresses the initial part of the review and gives general data about the trade impact in both countries and why we choose the UAE.

The next section would be a review of the literature. This section presents potential claims and discoveries relevant to the exploration topic region and linked prospects. Optional information sources include books, diaries, articles, and websites.

The third part is research methodology. This part of the thesis provides and describes the reasoning, approach, instruments, and procedures used to collect, gather, and investigate the exploration information to meet the review's goals. The part will likewise determine the exploration limits and moral contemplations for the thesis.

The fourth section will be about the Differences and Similarities in ICT between both countries; in this area, we will use both primary and secondary sources to assess the problems faced by Finland and the UAE in implementing ICT. Furthermore, complete data on the findings, for example, ICT to SCM and its impact on company performance.

Results and analysis is the fifth part and it will be to go through an analysis of the ICT and digitalization industry in Finland and discussion the questionnaire and the answers that we got to our questions and the discoveries from the writing survey and the use of ICT in the different companies.

The final part is the discussion, Conclusion, and Recommendations section summarizes the main topics of the general investigation and compiles data that address the exploration points and goals. Based on the findings of this investigation, the researcher will also make recommendations for innovative ways to further improve organizations. in Finland and the Emirates, as well as ideas from analysts

2   Literature Review

2.1   Supply chain management and information technology

Due to the increased complexity of data, uncertainty risk in the supply chain is growing {Christopher and peak, 2007} which leads to an increase in the vulnerability of electronic risk. IT helps the SCM to have a good flow of information and money without any interference within the network that contributes to firm profits by reducing coordination costs and transaction risks {stroeken 2000; marbert,2001}.

ICT also plays an important role in integrating supply, to satisfy the quality and quantity of the product this is done by less time-consuming in the manufacture of the product while there is less prone to error {tummala and Schoenherr, 2008} as we had seen earlier ICT in SCM has been outlining as collaboration and coordination and decision supply {Auramo 2005}. Therefore, ICT has been seen as or considered a critical prerequisite for managing the supply chain (Davenport and brooks 2004) curbing the e-risk is also among the functions of ICT in SCM.

2.2   Information and communication technologies (ICT)

Globally there is a need of providing an extension in the framework of ICT this is due to the global opening of the data to social life like agriculture and health centers. Gradually if we could look at the deeper part of ICT in the fields like agriculture, we could see that there is e-agriculture that will help to sustain the market ground and increase

productivity in the farm due to farmers using ICT in weather focusing and understanding soil texture without involving a lot of costs.

ICT has brought a great impact on both worlds both third-world and first-world classes. The evidence of this is that in school we can see the system shifting from manual teaching to an e-learning system. Students can access the materials online in any way this is due to the implementation of ICT.

Let's now review employment, many companies are doing their services online hence ICT knowledge is playing a key role in this field. Implementation of online jobs like writers and many more are brought to life by the same ICT, so we can conclude and say that ICT has not only brought life to many opportunities but also the world into one global network.

Supply chain management in Finland and UAE has been crucial in increasing organizational efficiency at all levels. As well as supply chain management research (SCM). All physical supply networks have been disrupted in the Covid-19 pandemic period, while soft supply chains (such as data, software, and financial supply chains) have taken center stage in UAE. This demonstrates the significance of ICT. Connecting and exchanging real-time data between supply chains and their respective participants is critical, but difficult. The significance of information and communications technology (ICT) in integrating and simplifying supply networks and supply chain management is significant.

2.3   Information and Communication Technologies and E-Business Models

Organizational factors have a joint impact on corporate resources for implementing ICT innovations. Market factors provide an important impetus for the introduction of ICT, with issues relating to the market climate and the company's position in the market having a direct influence on the introduction of technologies. The increasing use of ICT in a company directly affects its functionality and increases productivity and

profitability (Ferreira, n.d.). These factors involve the management aspects of a company and significantly influence any decision to improve performance. The level of ICT adoption by companies must be considered an evolutionary process. As described in contemporary literature.

2.4   Future of ITC in both countries in trade

The future of ICT in supply chain operations management that it will help the reorganization of supply chain operations between Finland and the UAE supply chain solutions in order to increase supply chain performance and efficiency. On the other hand, the future scope of ICT will aid in the establishment of a sustainable supply chain. Furthermore, the future scope of ICT in the supply chain will help to a more sufficient integration of logistical functions through knowledge production and real-time information exchange for better decision making." The answer goes on to say that ICT will play a larger role in enhancing logistics performance in the supply chain, notably in avoiding delays, better-integrating supply processes, on-time delivery to consumers, and shorter lead times (Georgiadou, 2017). It is possible to conclude that the future scope of ICT with both countries in managing supply chain operations appears promising.

The UAE logistics operation, on the other hand, considered that greater focus should be placed on the right allocation of resources and funding to incorporate ICT solutions into supply chain tasks. On the other hand, Increasing awareness of ICT in supply chain management and improving the technical capabilities of employees may be an important strategy. In Finland, ICT may be examined in such a way that the development of employee skills is highlighted, as it will help prepare employees to deal with new and developing ICT technologies, as well as facilitate the transition from old to new technology. It may be construed that ICT usage in corporate supply chain management can be expanded by focusing on strengthening technical skills, collaboration with other technology enterprises, and adequate budget and resource planning for ICT deployment in the supply chain. (Sardar, 2019).

ICT is one of the pillars of economic development to gain a national competitive advantage. It can improve people's quality of life because it can be used as a learning

and educational medium, provide easy connection between processes in different parties within enterprises and improve the quality of information exchanged in SCM. And the mass communication media in promoting and campaigning for practical and important issues, such as the health and social sectors.

In the coming time, the world will depend more on technology than on the personal skills of employees. Therefore, ICT tools for learning are of great benefit as they provide more detailed and accurate information that people can research on a computer. However, these ICT tools can disrupt a child's mind if used incorrectly. The future of ITC is big and wide. It works with big companies like branding e.g., Nokia, Tata tea, Noon, And other packaging companies.

2.5   Challenges in integrating ICT

Companies faced several challenges when it came to integrating ICT into their company and implementing ICT in SCM. ERP, an information technology tool, was also difficult. The common problem was "different geographical locations and lack of workers knowledge" based in IBM in UAE. On the other side, among the hurdles in the usage of ICT are the high cost of internet services, the expense of maintenance and security, and security concerns. Similarly, a significant amount of effort and training is necessary for the adoption and usage of new ICT technologies that offer obstacles for businesses in the use of ICT. Thus, limited knowledge/awareness, shifting responsibilities, security concerns, and cost constraints are difficulties that sectors confront while implementing ICT in supply chain management (Tuominen, 2010).

In Finland, supply chains are becoming more complicated than ever as customer demands for extra features and product needs continue to climb. Companies must now use unorthodox and new approaches to attain competitiveness and efficiency in the day-to-day operations of supply chains, which may be accomplished through appropriate

supply chain management (D. Elmuti, 2008). Efficient and effective supply chain management guarantees that the correct data is accessible for the right forecast, the right resources, and the right goods, in the right amount, condition, location, time, and cost. These are known as the nine rights in supply chain management (9Rs) (Jagdeep Singh, 2019).

2.6   Historical trade in UAE & Finland

A diplomatic relationship between Finland and the United Arab Emirates was established in 1975 as a result of Finland's recognition of the United Arab Emirates in 1972. In that year, Carolus Lassila was appointed Finland's first ambassador. Two years later, Kai Helenius succeeded him. Jeddah, Saudi Arabia, was the port of entry for both Ambassadors.

The United Arab Emirates is Finland's second-biggest export partner and the Gulf region's largest import partner (UAE). The trade balance of Finland is obviously in surplus. In the UAE, over 70 Finnish enterprises are active. Aside from the domestic market, several Finnish firms with a presence in the nation operate their regional activities from an office in the UAE. Several Finnish firms have offices in the nation. Finnish firms are increasingly interested in expanding into the UAE market. Finland and the UAE have bilateral relations (Bilateral relations,2022).

In 2020, the entire value of commerce between the two nations was 482 million euros, comprising imports and exports. In 2020, Finland's overall exports to the UAE were 283 million euros (up from 312 million euros in 2019), while UAE imports to Finland were 199 million euros (up from 227 million euros in 2019). After Saudi Arabia, the UAE was the second-largest export partner for Finnish goods in the Gulf (€188 million), and the third-largest import partner (€17 million). Merchandise made up 66 percent of total exports. Pulp, paper, paperboard, paperboard goods, iron and steel machinery and equipment, and paper and cardboard products were Finland's primary exports to the UAE. Approximately 34% of Finland's exports were in the service sector. Finland's second-biggest export partner in the Gulf region was the UAE (95 million euros) and its

largest import partner (184 million euros) in terms of trade in services (Bilateral relations,2022).

2.7 Finland-UAE Trade

The UAE offers significant business opportunities for Finnish companies. Potential areas of cooperation and the focus of Finnish activities are health and wellness services, education, clean technology solutions, economy, ICT, food, and tourism. The country's economic environment is favorable, the country's long-term growth expectations are good, and the related development plans are extensive (Arab News, 2022). In addition to major infrastructure projects, the country is looking for cutting-edge technology and know-how to diversify the structure of its economy, which is still largely based on the oil and gas industry. Competition is fierce, however, and success requires tenacious commitment, local presence, and good partnerships on the part of both companies and government agencies. Finland's reputation in the region is positive, although not very strong. Finland is best known for its high-quality education, technological know-how, innovations, and start-ups, and as a reliable partner (Raevuori, 2022).

3 Research methodology

The purpose of this chapter is to explain the parameters of research necessary for understanding and justifying appropriate research methods and instruments for sourcing, collecting, analyzing, and interpreting research data. Therefore, this chapter assisted the researcher in understanding and defining different research methods and tools so they could select the ones most appropriate for their objective and aim. It also discusses philosophy, approach, design, techniques, methodology, methods for collecting, analyzing, and sampling data, limitations, and ethics that the researcher considers.

3.1 Research Philosophy

According to this philosophy, researchers use these assumptions to collect, evaluate, and synthesize data, as well as to form systematic conclusions based on the data analysis. To understand the nature of a research problem, the research philosophy develops contextual information. Realism, pragmatism, interpretivism, and positivism are the four main philosophical perspectives in research. To understand the nature of an investigation, these philosophies help researchers structure their premises and identify key ideas. In selecting appropriate research methods, instruments, and strategies, the researcher must adhere to certain theoretical principles (Cres, 2013). In this study, the researcher valued interpretivism research philosophy over other approaches.

Using this philosophy, the researcher collected and analyzed data in order to gain a thorough understanding of the study topic. To examine the influence of information and communication technology on supply chain management, philosophy was used to mold assumptions and design a research framework, the research focused on a specific trade and SCM in Finland and the United Arab Emirates.

3.2 Research Purpose

By understanding the nature of the investigation, the researcher was able to define the research aim. Study goals can include exploration, explanation, or description. Based on the researcher's description, the current study aims to provide an overview. Since the

descriptive research aim provides the researcher with a better understanding of the study's purpose, it was taken into consideration in this study. It is for the purpose of acquiring a more comprehensive explanation of the study topic that the descriptive purpose is to answer the effect of Information and Communication Technology (ICT) on trade and SCM in Finland and the United Arab Emirates. Information and communication technology, as well as its applications, will be examined in this study. In what ways can it help a company's supply chain?

3.3   Data collection method

The use of primary or secondary procedures can be influenced by cost and time constraints (Bell, 2014). As part of my investigation into the ICT case, the plan is to gather both primary and secondary data, both of which will be qualitative research data as well as the current state of knowledge from secondary sources. Using primary data collected by ICT specialists, secondary data were analyzed through reviews of books, journals, and articles published in market research and other forms of publishing.

As a next step, I created a questionnaire with open-ended questions to elicit a detailed response. This research examines how ICT is used in supply chain management, the factors that affect ICT in this industry, its role and advantages, the challenges of using ICT, strategies to overcome those challenges, how ICT can be enhanced in supply chain management in the future, and how it can be improved. Data analysis from diverse ICT sources is an additional strategy to consider. Other sources include academic articles, books, and case studies.

3.4   Why ICT

While IT Information Technology is similar, ICT information communication technology focuses on communication. This includes the internet, wireless networks, cell phones, and other communication channels. Around the world, communication technologies have risen in popularity. International communication is now possible through instant messaging, voice-over IP (VoIP), and video conferencing. Social networking sites also make it easier to communicate across borders. Every day, people all over the world rely on communication technology and computers to do their tasks. Because information technology may be used to reach not just the world wide web, but the entire planet. ICT, or information and communication technology, has become an essential component of nearly every aspect of life. It is essential for governments, educational institutions, corporations, and private residences. The human species has always had a great desire to interact with one another more quickly. And information and communication technology have transformed the way we live (Why ICT,2022)

Modern data that we can process is enabled using information and communications technology (ICT). ICT includes all the applications, data, and services we use to communicate, create, disseminate, store, and manage information. The use of ICT can increase a country's competitiveness and promote economic growth. This technology may enhance people's quality of life because it can be used to learn and teach, make processes in various enterprises more efficient, and raise the standard of information communicated in SCM. Using mass media to advocate for and run campaigns for important and practical issues, such as social and health issues. In the coming time, the world will depend more on technology than on the personal skills of employees. Therefore, ICT tools for learning are of great benefit as they provide more detailed and accurate information that people can research on a computer. However, these ICT tools can disrupt a child's mind if used incorrectly. The future of ITC is big and wide. It works with big companies like branding e.g., Nokia, Tata tea, Noon, And other packaging companies.

4 Advantages & Disadvantages in ICT for companies

4.1 Information-sharing

For data interchange, document circulation, record repositioning, archive management, indexing, discovery, and retrieval, SCM technologies in the UAE must use ICT-based networks (Techopedia,2022).

"Consequently, decision support systems (DSS), a form of advanced information and communication technology (ICT), significantly assist farmers in learning pest management skills and acquiring knowledge. Computer programs that assist in decision-making are called decision support systems (DSS). They gather, compile, integrate, and evaluate every sort of information needed for decision-making before using the analysis to suggest the best course of action. Many public and commercial entities in the nation have created DSSs for the field of plant protection, which has been detailed in this analysis" based on IBM company in UAE. This is how ICT helps in sharing information.

Based on my interview and the questionaire that I completed with several companies, we can understand that information communication technology is used in multiple ways whether it is to "communicate with our clients/ teammates or to inform about newsletters via electronic emails, keep track of the development, etc. Apart from that, to work on the applications we have developed using different computer languages we do use ICT on daily basis" beads in Tata Consultancy Services LTD.

4.2 Advantages of ICT in companies

The existence and influence of knowledge and technology (ICT) are no longer foreign, but rather universal in our society today. ICT ability is required in everyday life interactions and skilled growth fields, like info security, intelligent machines, environmental technology, devices, and services. ICT is thus the foremost necessary growth-promoting technological ability in nearly every field. In Finland, finding out ICT with data and skills in technological fields together with physical science,

embedded systems, programming, telecommunications, and knowledge networks (Edunation2022).

Here are some of the companies' advantages in using ICT.

- Increases Communication: It is considerably faster to send/share information, which saves time and money.

- Cost effectiveness: There are several offers from telecommunication providers and smartphones, making them significantly less expensive than in the past. ICT saves a significant amount of money on business flights and lodging.

- Increased accessibility: Websites are available for communication at all times of the year. This implies that a business may be open at any time and from any location, allowing customers to make purchases from various locations and nations.

On the other hand, ICT is the first of its kind in the Middle East, intending to spur the development of a significant ICT industry in the UAE. The ICT Fund's activities are aimed at assisting the UAE's ICT sector in growing into a nationally significant industry with a global leadership position. The three core areas of the ICT Fund that stimulate growth are education, research, and development. Similarly, the ICT is interested in public activities that aim to create a more extensive stable climate for the ICT sector. The ICT Fund promotes education through three main programs: ensuring educational opportunities through grant funding; strengthening the academic framework for ICT within colleges and reinforcing ICT education in schools.

Based on the company's answers, we can see other advantages like ICT can be used in any country as long as there is no language barrier in its feature. If that gap is filled by the ICT development company and the same tool is available in more than one language, then the rest is just the basic training. Following that, it will make people learn new skills to achieve new goals and business.

4.3   Disadvantages of ICT in companies

Disadvantages of the use of ICT in Tata company: The different geographical locations as these tools should be in their native languages for normal people to understand and work on them. In addition, with this rapidly transforming world, companies need to keep updated about new tools and also to provide knowledge about new tools to each employee, it takes a specific amount of bandwidth every time there is some new tool. ICT disadvantages listed below:

ICT and the use of the internet have become a source of pornographic videos which if watched by underage influence/corrupt their minds.

In the universities, it has increased the level of plagiarism hence universities release unqualified students in society

Data and personal information-related privacy issues. all this and still more disadvantages that we can find for the use of information communication technology also in comparing it for the advantages we can find that the ICT is more beneficial for the companies and the trade in supply chain management but as always, there are still some disadvantages.

4.4   How ICT improved performance in both countries.

Using ICT tools to improve organizational (or personal) efficiency and effectiveness is important for UAE and Finnish logistics activities (Cohen et al, 2002). ICT tools facilitate the execution of activities faster, support autonomous decision-making processes, and enable logistical operations to be more efficient and effective. Furthermore, ICT tools can lead to the adoption of better business practices to ensure customer service levels (Bharadwaj 2000) because they make processes more transparent for stakeholders.

From the interviews and questionnaires, we got that always businesses trying to reduce costs and bring in high profits, companies desire ICT tools that support production, marketing, supply chain integration, and customer feedback. The supply chain is composed of all activities that are involved in the flow and transformation of products from the extraction of raw materials (extraction) to the consumption of those products (Effy and Jones 2008).

"As also ICT helps and improves everything, as the world is basically moving on to all the digital platforms. We need to use ICT tools to get our things done & these tools help us schedule, manage & finish our tasks. In supply chain management, ICT tools have improved in maintaining the unique IDs for the product and developed during the supply chain process so that it is easy to keep track of the whole development cycle for that specific product, that's what I understand based on my interview with Tata company and analyzing IBM respond.

UAE has, been politically, economically, and socially developed by the use of ICT in UAE has helped in a range of field, just highlighting a few documents circulation, retrieval of data, indexing, and telecommunication has been done better with the aid of ICT Socially and economic network in UAE due to the drastic increase of tin population there was a need to implicate social networks to serve the citizens efficiently and provide adequate literacy, jobs opportunity, health care, and many more, due to this UAE has pioneered an exceptional quality of life hood and unmatched business environment, (Inkinen, 2015).

On the interview we have also analyzed and seen that the impact of ICT is consentient in both fields, ICT has changed the whole network flow not only of information but also how the chain of that information is done. Unlike the previous days, the texture and taste of the Finland community to ICT have a good reputation. Finland has both grown economically, technologically, and socially improved. Focusing on our previous review of Finland in both related fields ICT has shown good importance.

4.5 Finnish companies in another field

UAE selects Finnish companies that provide cutting-edge technology and knowledge in the healthcare sector as one of the world's three strongest economies for healthcare technology and a global leader in effective healthcare systems. The healthcare industry in Finland is a global leader due to its expertise in genetics, diagnostics, chronic illness management, remote care technologies, imaging, patient monitoring, wearables, healthcare, senior care, and ICT in hospitals (Arabian Business, 2022).

Finnish health care. The population in Finland has shown a drastic increase hence the government needs to cope with the changes to provide equity in the population. ICT has improved the provision of health services by doing online booking of doctors and buying medicinal drugs online, (Jalava, 2007)

Finland has the second most advanced digital economy in the EU, which includes healthcare as well. In the medical industry, Finland is a leader in digitization. The national health register has been housed in databases since the 1960s. In today's healthcare system, both public and private sectors are covered by the national digital patient data repository. Finns are able to access their medical histories and e-prescription histories online, contributing to the richness and breadth of Finnish health data. Medical systems have collected blood and tissue samples over a long period and stored them in biobanks. According to studies, Finland's biobank rules are among the most advanced in the world, and they are constantly being updated and enhanced to facilitate research (export.gov, 2022).

Finnish medical technology is recognized worldwide. Finland is one of only seven countries in the world that exports more medical technology than it imports. In 2018, Finland's health technology exports reached $2.6 billion, an increase of 3.4 percent from 2017. Imports of medical technology items increased by 6% to $1.4 billion. Approximately 90% of the net surplus was attributed to the historically robust Finnish medical equipment market in 2017 (Ministry, 2022).

4.6　ICT growth between the two countries

The UAE intends to increase its economic growth and competitiveness by transforming into a digital economy and promoting investments in critical industries such as ICT, renewable energy, health and pharmaceuticals, circular economy, agricultural technology, and education (Valtioneuvosto,2022).

As the United Arab Emirates strives to diversify its economy, lessen its reliance on oil, and become more competitive, Finnish businesses can greatly contribute to the region's growth and development. Expertise in the energy industry is in demand as the country seeks to increase the proportion of renewable and clean energy in its energy consumption.

In Europe, Finland is a leader in digitalization. Access to and utilization of ICTs is now a key contributor to competitiveness, economic expansion, and social advancement. ICTs, particularly mobile phones, have created new avenues for the free exchange of ideas and opinions over the past ten years, advancing democracy and human rights. Finns commonly associate the country with excellent education systems, a high level of technological proficiency, and a unique landscape. Furthermore, Finland and the UAE share similarities: both are tiny, prosperous countries with harsh climates (Current affairs, 2022).

4.7　How authorities work in ICT development

Both sides lauded the current convergence in bilateral relations, which has helped promote economic and commercial cooperation as well as investment. A significant level of cooperation exists between the two nations in technology related to advanced industries, such as renewable energy, as the State is eager to attract the latest equipment and technology in a variety of fields, including renewable energy (Khaleej Times. 2022).

A close relationship between the EU and Middle Eastern countries has long been a priority for Finland. In the first eight months of 2017, Finland's overall trade with the UAE reached Dh804.43 million. High-quality mobile phones, telecommunications and cable, and industrial items from Finland are particularly attractive to the Emirates (Khaleej Times. 2022).

Additionally, two local public schools signed a contract with the Abu Dhabi Education Council (ADEC) to apply the Finnish education system model. Among these sectors, we can take our collaborations to the next level, and with approximately 45 Finnish firms in the UAE, we see considerable growth in a variety of industries (zawya.com. 2022).

4.8   Information communication technology in AI & Smart cities

Artificial Intelligence (AI) is important in the UAE. As a feature of the public authority's UAE Centennial plans, the UAE AI Strategy 2031 was sent off to further develop effectiveness in cars, well-being, space, environmentally friendly power, water, innovation, schooling, climate, and traffic areas. The UAE has effectively started incorporating AI with ventures like schooling, medical services, space, transportation, and avionics. Man-made intelligence is a critical piece of the aggressive plans of the UAE government to broaden its economy and become an information economy, (Concepcion, 2019). In similarity, Finland has greatly adopted the art of AI to an extent of setting up a university that focuses on AI, the AI University of Helsinki.

Both countries will enjoy AI, ICT-related benefits such as Artificial Intelligence (AI) being ready to essentially move the Information and Communications Technology (ICT) industry as innovations like Machine Learning, Natural Language Processing, Deep Learning, and others significantly upgrade the presentation of interchanges, applications, content, and advanced business. Simulated intelligence will likewise drive new plans of action and set out altogether new business open doors as points of interaction and efficiencies working with a commitment that has been up until now endless.

Smart cities, The impact of smart cities on ICT cannot be ignored as basically setting up a smart city is the application of ICT in its full stretch. the applicability of ICT enhances interactivity and performance in urban cities, resources allocation and consumption, improvement of contact between city stakeholders and citizens, reduction of cost in city services delivery, and greatly enhanced quality. Both countries are prone to this advancement of ICT due to the implementation of smart cities.

4.9   ICT internet in both countries

In Finland, the most common use of ICT in SCM is to reduce friction in supply chain transactions through cost-effective information flow (e.g., Cross 2000). (Auramo, 2005). ICT, on the other hand, is regarded as critical in facilitating supply chain collaboration and coordination through the exchange of 5G data.

The UAE was the principal country in the Arab locale and the fourth north around the world to send off its 5G organization. Before the finish of 2023, it is assessed that 16 million 5G cell phones will be functional in the area, (Zeadally, 2020). In June 2021, Etisalat uncovered a 6G venture that is assessed to associate with multiple times quicker than 5G. They have put resources into 6G acknowledgment by leading exploration and creating global guidelines that are the fundamental structure blocks for the 6G biological system.

The same applied in Finland as it's among the European countries that complied with the 5G network despite the risk of being prone to the negativity of cyber security, (Kwilinski, 2020). As per national statistics, it is estimated that a 5G network has been activated in 139 locations in Finland which is equal to over 3.5 million Finns who can access 5G internet or 64 percent of the Finland population have a 5G network as per Telenor's Finland operator. In both countries, the 5G network has increased business efficiency by introducing greater speeds and minimizing latency across networks. 5G will also impact ICT by increasing capacity, network slicing, minimizing latency, greater liability, and increased speed.

5   Results and analysis

The highest surpluses in potentially ICT-enabled services were in Europe and Asia & the Pacific in 2014 (see Figure 1). In addition to Latin America and the rest of the Western Hemisphere, Canada, the Middle East, and Africa, the US had surpluses on possibly ICT-enabled services. The five countries with the highest trade surpluses in potentially ICT-enabled imports were Ireland, Canada, the United Kingdom, Korea, and China U.S. in 2014 (Department of Commerce,2022).

There was 52% of EU service exports were ICT-enabled services, which accounted for $1.2 trillion in exports. (See Figure 3). The EU exports of ICT-enabled services increased by 36% every year between 2010 and 2014, the first year with comparable statistics. Over 49% of total EU service imports were ICT-enabled services, worth $935.1 billion.

Figure 1: ICT largest surpluses

Chart 13. Potentially ICT-Enabled Services Imports by Major Area, 2014

Europe 106.9
Asia and Pacific 57.7
Latin America and Other Western Hemisphere 46.6
Canada 15.0
Middle East (D)
Africa (D)

Billions of dollars

(D) Suppressed to avoid the disclosure of data of individual companies.
U.S. Bureau of Economic Analysis

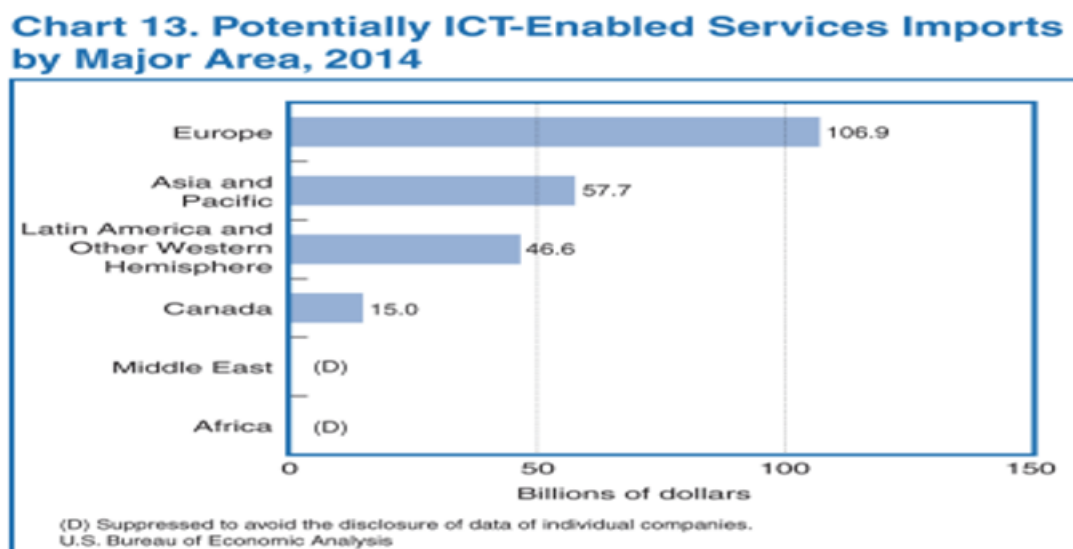**Figure 2: Export and import**

Chart 10. Trade in Potentially ICT-Enabled Services by Major Area, 2006–2014

Note. Gaps in the series indicate that data for these years are supressed to avoid the disclosure of the data of individual companies.

U.S. Bureau of Economic Analysis

Figure 3: Trade in the European Union

Figure B1. European Union's International Trade in ICT-Enabled Services in 2014 (billions USD)
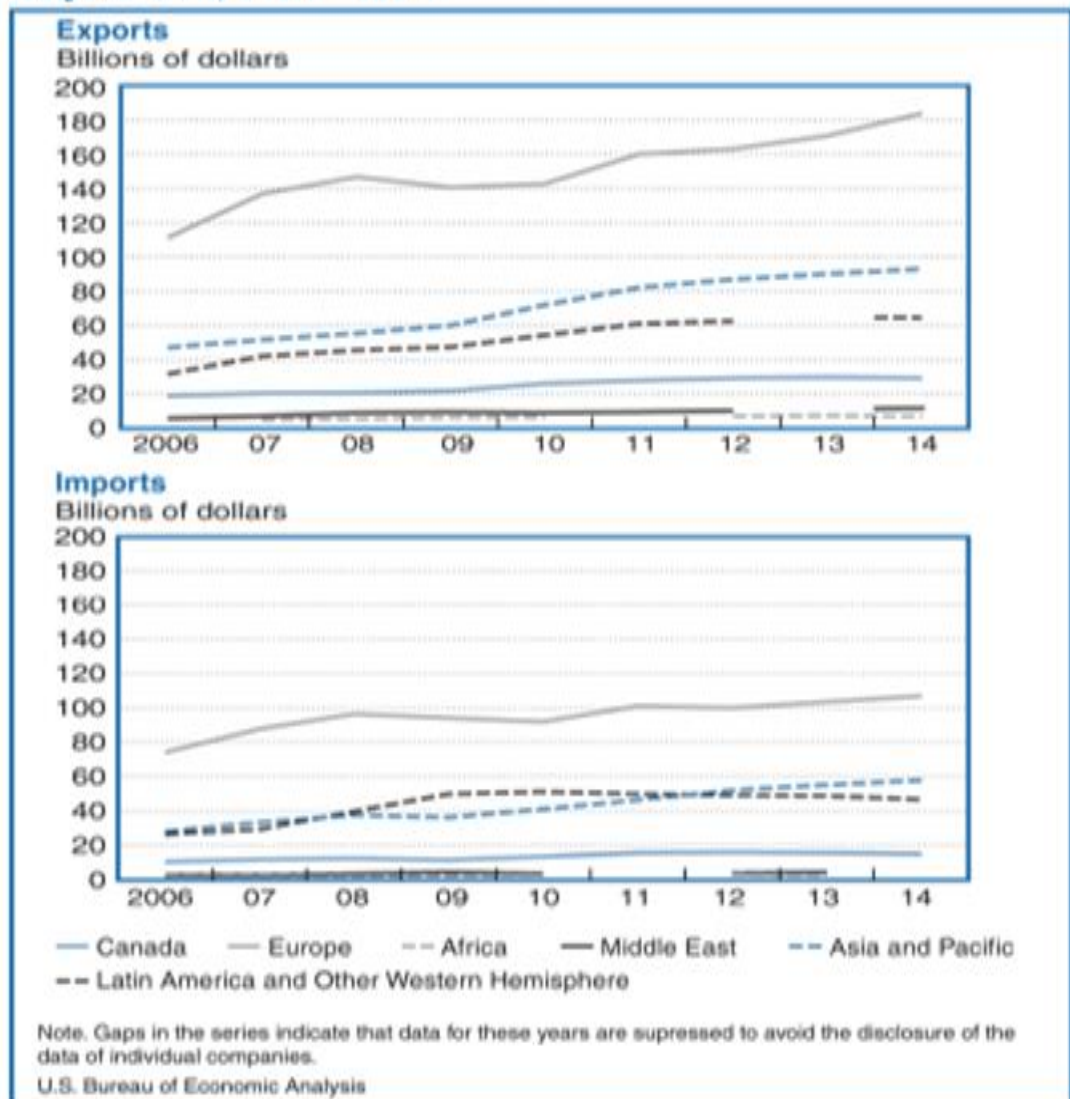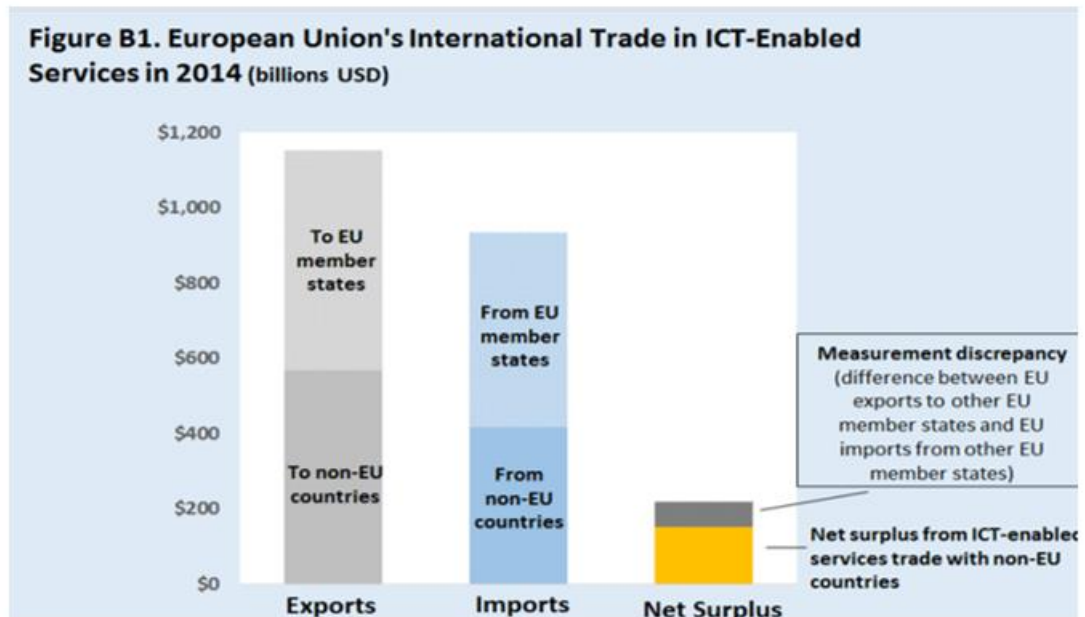
5.1 Role of information and communication technology in supply chain management and trade

The use of information and communication technology (ICT) has a significant impact on how supply chains are integrated and managed. Supply chain management with ICT has an impact on the communication between stakeholders inside and outside organizations in terms of improving stakeholder relations. As well as helping to shorten cycle and process times, ICT fosters the development of cooperative networks for inclusive growth. Information and communication technology can be used to manage intricate supply chains more efficiently and effectively (Radjou,2003).

ICT helps reduce trade expenses. The role of a single ICT variable, namely the extent to which the business community uses the Internet in international commerce. With the proliferation of information and communication technology (ICT) services, businesses can leverage business innovations to increase exports and imports, in part by improving trade facilitation, service delivery, and information access, thereby improving the ease of doing business for both the general public and international traders. Using e-government has boosted the business climate by reducing the number of procedures needed to launch a company, and therefore the time, expenses, and Taxes (World Bank, 2019).

In order to achieve long-term benefits for all stakeholders along the supply chain, ICT has been integrated into supply chain management through collaboration and information sharing. Therefore, ICT has achieved success in supply chain management because of its reputation and necessity. By utilizing information and communication technology, supply chains become more agile and efficient, and products are delivered online as desired

Over the past few years, ICT has been used for a variety of applications, including reducing theft, identifying route tampering, tracking equipment, reducing production delays, and enhancing product security. As a result, supply chain agility is improved, cycle time is reduced, and goods are delivered to customers in a timely manner. (Nadim Ahmad, 2004). The main advantages of ICT are the accessibility of information to individuals and the reduction in production costs due to enhanced efficiency. Across boundaries, knowledge is generated, disseminated, and easily accessible, and anyone may contribute information, increasing openness and driving down costs. (D. Rooney).

5.2 influence of ICT on communication collaboration among employees in companies

The impact of ICT on employees' personal and professional lives Considering the impact of ICT on employees' personal lives, it is important to note that they have been able to save time by offering their services via ICT systems such as Skype and e-mail, as opposed to traveling to clients. Employees can use these tools across geographical borders, just as ICT enabled them to do so from their offices and homes.

workers without access to ICT couldn't serve in different countries. Additionally, ICT enabled employees to stay in touch with family members outside of the work context. Through ICT, they were able to communicate with each other easily, particularly between towns, allowing managers to stay in constant contact with employees and clients in all places. ICT allows them to communicate with family members overseas. They can still stay in touch and be part of each other's lives through services like Skype and WhatsApp. The use of ICT at work was ofttimes used as an excuse for avoiding difficult conversations. Sending a nasty or blaming e-mail is seen as much easier than talking to someone face-to-face or "eye-to-eye."

As we all agreed, most things have a negative side effect, so here highlight the negative side effect of ICT. Employees can become so dependent and addicted to their ICT that it can be almost problematic with negative consequences as a result of the use of ICT. As previously stated, ICT has increased the expectation that family, friends, and employers should we always be available for them. They expect to be more reachable and available to family, friends, and the workplace in all times. Expecting to be accessible for work over the weekend which caused sometimes for disagreement in workplaces, Data analysis showed an increase in using ICT with these positive and negative uses for ICT.

5.3   Improves of ICT supply chain operations and trade

Inventory management can be made easier with the help of ICT. Manufacturers and distributors can be made or destroyed by their inventory. Loss of consumer sales if manufacturing cannot keep up with demand. Spending too much leads to additional expenditures, so inventory is crucial. A company may lose orders due to capacity constraints if its working capital is overburdened witan inventory. Businesses can optimize inventories and manage cash flow by using ICT supply chain management.

The use of ICT can improve the efficiency of production. In today's hypercompetitive environment, having "most" of what is needed for output is not enough. In order to ensure that product managers have confidence that what they need will be available when they need it, supply chain management technology gives end-to-end visibility for supply chain activities.

Companies are increasing their use of ICT for order management as e-commerce accelerates. Customer expectations and order velocity are increasing, so supply chain planning must ensure that production is optimized according to those expectations. With the help of ICT, we can improve communication and collaboration. Due to supply chain technologies and automation, companies have increased visibility and can monitor operations better. In addition to improving communication and cooperation with major suppliers, this also reduces costs.

Imports and exports were less affected by the value chain's higher ICT levels. Over time, ICT levels have had a greater impact on trade in labour-intensive countries than in resource-dependent countries. Communication technologies also work to enhance trade gains for services in a similar way to lower transportation costs. Global commerce in products and services related to information and communications technology (ICT) is calculated using this statistic. This shows the significance of international trade in ICT.

5.4   ICT and digitalization industry in Finland

In Finland, there are world-leading companies in a variety of ICT and digitalization subsectors, some of which have the ability to address some of the world's most pressing challenges. Mobile games like Clash of Clans from Supercell, Angry Birds from Rovio and Fingersoft are paving the way with communication technology and adaptable mobile games. Smart jewellery, smart garments, and smart materials are all examples of Finnish wearable technology. Finland has been a pioneer of the Industrial Internet because of a world-class cluster of machinery businesses such as Kone, Metso, Valmet, and Wärtsilä, as well as a significant concentration of ICT specialists (Finnpartnership, 2022).

5.5   Global needs and digitalization solutions

To solve the world's challenges, digitalization and ICT are essential. Therefore, Finnish ICT and digitalization firms play an important role in collaborations aimed at attaining Sustainable Development Goals (SDGs). The SDGs are the plan for a brighter and more sustainable future for everybody (Finnpartnership, 2022).

Global issues like poverty, inequality, climate change, environmental degradation, prosperity, peace, and justice are addressed through these organizations. In delivering solutions in areas such as food and nutrition, health and well-being, education, equality, water and sanitation, energy, employment, industry and innovation and infrastructure, sustainable cities and communities, responsible consumption, and ozone depletion, commercially viable partnerships, often based on innovation impinging on ICT and digitalization, are seen as major actors. Business is completely acknowledged as a solution provider and a partner (Marketresearchuae.com. 2022).

5.6 ICT Growth in UAE

By providing logistical and technical assistance, aligning digital and sustainable development, and orchestrating inclusive economic growth, the UAE aims to strengthen the ICT industry. In the country, remote learning and working, e-commerce expansion, and e-government services are being implemented. A total of 36 strategic performance metrics are included in the country's ICT strategy, including quality, speed, costs, infrastructure, employment, education, and innovation.

Over 45.000 new job opportunities were created as a result of improving the internet speed of safe servers by 20 times by the end of the year. In the Middle East, the UAE contributes 31% of all IT spending, providing a substantial customer base for ICT innovations. According to (Marketresearchuae.com, 2022), demand for ICT products and services has grown rapidly across Asia and Africa.

UAE e-commerce sales were expected to exceed USD 20 billion in the coming years, according to research. Approximately 64 percent of the UAE's population is under 31 years old and uses smartphones. Internet purchases per individual in the country average over $300 yearly (Marketresearchuae.com, 2022).

5.7 Data analysis process

Interview responses are analyzed and interpreted in order to identify information patterns that will assist in addressing study objectives. In relation to ICT use in a business, the information comes from interview questions about ICT trading and supply chain management.

There are four main target areas in the analytical method: ICT usage in the business, variables affecting ICT, ICT role and benefits, and strategies to increase ICT usage. To examine the impact of ICT on supply chain management in businesses, the analysis focuses on the responses of interview participants.

5.8   Interview Questions

The online survey consisted of eight questions. An open-ended question was asked during the interview in order to encourage a full response. The questions address the use of ICT in trade and supply chains, the factors influencing ICT usage in supply chains, Using ICT for supply chain management, ICT challenges and solutions, the future scope of ICT, and how to improve ICT contributions to trade supply networks are discussed

- ➢ In what ways does your company use ICT? (Strategy).

- ➢ In supply chain operations management and trade, what role do ICT tools play?

- ➢ What are the benefits of ICT solutions for your company?

- ➢ When implementing ICT for your business, what challenges did you face?

- ➢ How were challenges overcome?

- ➢ How can ICT help your business improve its trade operations?

- ➢ In the future, how do you think ICT can contribute to trade and supply chain management?

- ➢ How can ICT be used in your country to enhance supply chain management and trade?

5.9   Interviews and data analysis

The term ICT refers to all digital technology that helps individuals, companies, and organizations in their use of information, including all electrical items that are involved with digital data. In other words, information and communication technology (ICT) is concerned with the storage, retrieval, and transmission of digital data. Through ICT, IBM can serve its customers more efficiently, effectively, and responsively. Commercial operations are supported by ICT, such as design, manufacture, research, development, distribution, sales, and feedback. In the opinion of an IBM employee, "job search and recruiting via the Internet can lead to improved efficiency in the labor market and the economy by decreasing transaction costs as well as better matching employees with jobs by widely disseminating job information."

ICT focuses on technological issues, including financial, economic, and technological aspects, emphasizing the importance of ICT in enabling a wide range of services and transactions. As with many internet services and online banking, it goes through authentication mechanisms. As reported by MDS Finland, ICT improves access to a variety of financial services, boosts efficiency in institutions and businesses, reduces costs, and encourages and strengthens communication. Furthermore, it demonstrates the importance of ICT in delivering urban services by relating information and communication technology to urbanization.

 ICT can be used to promote and assure urbanization, which has become a requirement of modern life and is an obstacle to economic development and a higher quality of life. According to an employee at Tata, a number of study areas might be recommended to understand the role of information and communication technology in business. Software piracy, for instance, poses a significant challenge to software providers because it is a global, multidimensional phenomenon."

"Information communication and technology have significantly affected the way business is conducted." MDS Finland employee says.

Due to technological advancements, accounting systems have been vastly improved. Nowadays, most businesses operate with accounting information systems. By allowing the exchange of papers and the collection and analysis of data rapidly, computers and other digital technology have improved office productivity.

IBM experienced significant changes due to software development and computer usage. In order to assess the effects of technological innovation and information communication technology, further research is necessary for this area. As ICT progressed, vast amounts of information became available. This increased accessibility posed significant security threats to computer systems. In spite of significant advances in information security, Tata says "an exploratory study on informatics audit for security is required."

6   Discussion, Conclusion, and recommendations

6.1   Discussion

There can be an increase in costs in the supply chain. Consequently, supply chain managers have used wireless, mobile, and cloud computing technologies to enhance efficiency and performance. There are many challenges involved in implementing ICT, including the cost, IT knowledge, security concerns, skills, and the changing roles of workers.

Our explanation could include how ICT tools are crucial for trade between both nations, this requires a company to evaluate whether the costs of implementing and maintaining real-time information and supply chain efficiency are worth the benefits they provide. ICT plays a major role in supply chain operations ranging from planning to execution, according to the findings about its function and benefits. Due to the openness of each supply chain activity, waste has been reduced due to the identification of inefficient processes and delays, which are being regulated so that overall efficiency is enhanced.

In addition to data collection via ICT equipment, real-time information can be processed and exchanged for better supply chain decisions. Additionally, ICT advantage may have contributed to improving the company's communication with its suppliers and customers, based on its results. ICT tools such as mobile technology, social media, and other ICT tools have significantly simplified supply chain operations. based on (Lu and Swatman (2009) mobile technology can help keep information flowing within a company. Communication improves relationships with suppliers and consumers, which leads to a more productive supply chain. Supply chain management can be enhanced by considering the costs associated with acquiring and deploying ICT tools, in addition to increasing ICT skills and literacy.

While ICT may be considered a cost center, it is also a driver of corporate value and performance. The two countries are taking advantage of ICT through the use of low-cost technologies such as email, social media, online portals, etc. Hardware, including computers and IT software, requires adequate cash and resources for acquisition and maintenance. In order for ICT instruments to be more useful and effective, there should be training for ICT literacy and skills. Using ICT in supply chain operations, will improve flexibility to new systems and foster innovative practices. In summary, ICT usage in supply chain and commerce in the UAE and Finland affects supply chain operations in many ways.

6.2   Limitation

The interview approach and sample methodology were identified by the researcher as the study's limitations. During the interviews, the objective was to determine whether ICT was influencing supply chain management for a specific group and to compare the main findings from the literature review. This leads to the usual literature review question and goals. Additionally, only Finland and the UAE were examined in the study in terms of ICT's impact on supply chain commerce.

6.3 Conclusion

Since there was very little information available about the UAE market, I was pleased with my research findings. The distance between Finland and UAE, cultural and religious differences as well as the government's attitude towards nationalization makes it difficult to enter the UAE market or find information on the market. As a target market, I chose the UAE because there are no previous studies regarding it, and ascertaining them is extremely difficult. Additionally, I knew the data would be in both Arabic and English, which made choosing the area easier. There was no problem with the research procedures used. Internet sources provided most of the information on the country, which allowed the study to be conducted for free. In addition to the data already collected, a few email surveys were sent, and the information collected was used to supplement it.

As a result of the research findings, ICT has an increasing impact on supply chain operations in Finland and the UAE, in focusing on increasing supply chain capabilities Using ICT technologies may help supply operations become more efficient, which has several advantages. There are a number of factors that contribute to the effect of ICT on supply chain management, including better transparency and improved operational efficiency, which are compounded by lower supply chain costs and lead to cost savings. Real-time information access and sharing, improved communication, and the development of supplier and customer relationships are all apparent advantages.

Technological advances continue to change how we consume and produce services, making it necessary to improve the economic statistics used to measure international trade, particularly with respect to ICT-enabled services. It is currently more accurate to measure services that could be traded digitally rather than those that are actually delivered digitally. Government statistics agencies and other academics are working to expand the availability of data that can assist them in accurately measuring cross-border digital data flows and real ICT-enabled commerce at the Department of Commerce and across the globe.

ICT advantages and drawbacks in general, ICT roles in general, and ultimately ICT roles in supply chain management. By using ICT, businesses and organizations can integrate every conceivable function within and outside of their walls, which results in a greater exchange of information and/or supply chain-related data and activities. The transportation and logistics industries are linked by supply chains.

Based on companies' interviews, ICT adoption has improved customer connections, increased revenue, and reduced costs for most respondents. ICT adoption has improved customer connections, increased revenue, and reduced costs for most respondents.

Customer service, keeping ahead of the competition, and adhering to management directions were the primary motivations for ICT investment. Lack of internal expertise and high ICT costs were the main impediments to ICT adoption. ICT in the UAE and Finland is examined in this thesis in order to provide preliminary exploratory data. We hope that the findings of this study will serve as a basis for future research and will assist policymakers in understanding the current state of ICT usage and its impact on businesses in Finland and the UAE.

6.4   Recommendation

According to the findings, both countries' trade policies need to emphasize a better understanding of ICT tools and their benefits in managing supply chains. Additionally, collaborating with tech companies can help assess the costs, advantages, and educational requirements of new ICT technologies. The findings show that the workforce's lack of technical expertise and skills in using ICT tools has an impact on how ICT affects supply chain management. As a result, it is advised that employees in both countries update their skill sets in order to become accustomed to new technologies that will increase the use of ICT in supply chain operations.

To ensure the success of the company, top management should promote organizational learning related to new and emerging information and communication technologies. Also, it is recommended that the company budget for investments in ICT and infrastructure development. With smart resource allocation, organizations with limited budgets can simplify the adoption and maintenance of ICT systems. ICT investments must be carefully planned based on business requirements when implementing new ICT technologies for supply chain procedures to ensure business benefits exceed the costs of obtaining and implementing the technology *(MIT Sloan*, n.d.).

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8   Appendices

Concept map of information flow and the importance of use on ICT.

Material flow chart

Information flow chart
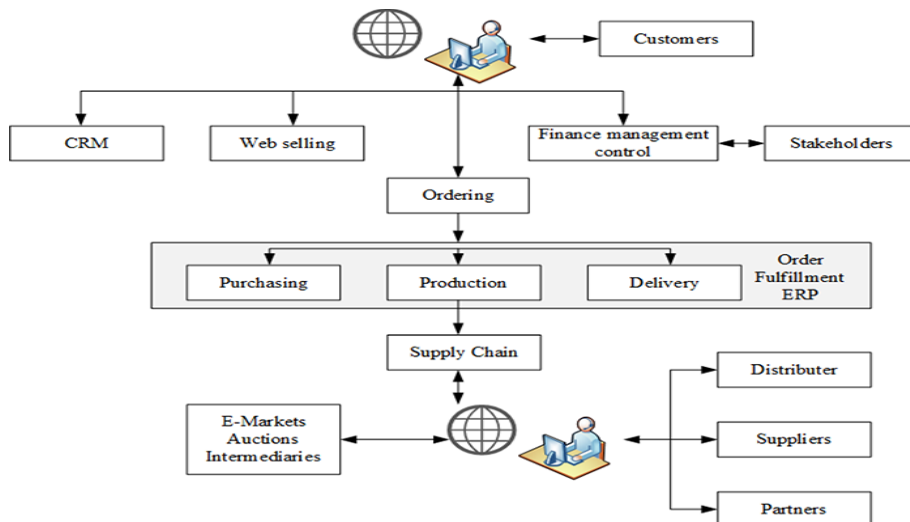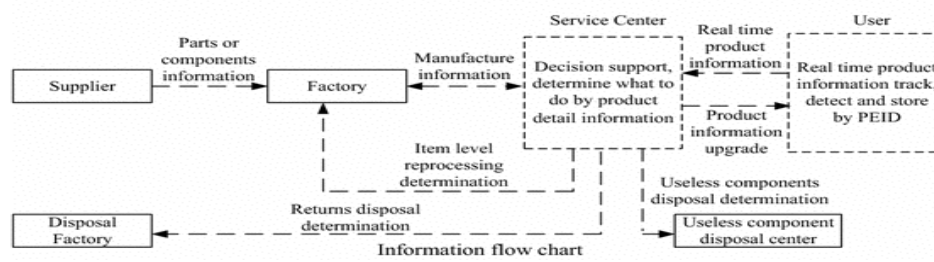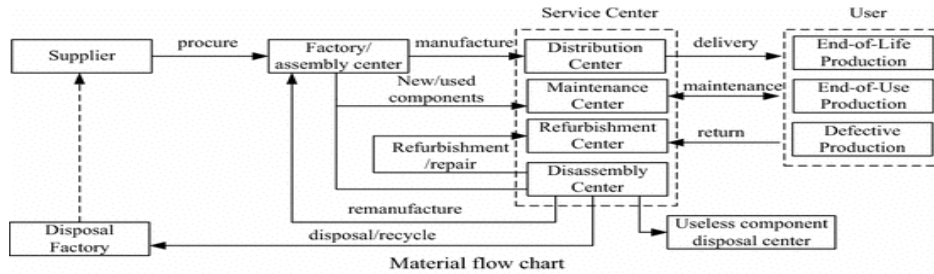
Here's my analysis and replies from the interview that I did with the three companies that I got the chance to interview their workers from different areas the first company was Tata Consultancy Services ltd, IBM from UAE, and MDS Finland.

Hello dear,

I'm Zakarea Kassem a 3rd-year student of international business and logistics and I'm doing my thesis; I hope that you can answer the following questions about the Information communication technology (ICT) topic with a good explanation.

I'm doing this questionary for my thesis analysis, and your answers will help me so much.

Thanks in advance.

➢ In what ways does your company use ICT? (Strategy).

➢ In supply chain operations management and trade, what role do ICT tools play?

➢ What are the benefits of ICT solutions for your company?

➢ When implementing ICT for your business, what challenges did you face?

➢ How were challenges overcome?

➢ How can ICT help your business improve its trade operations?

4th

Challenges can vary on the different geographical location as these tools should be in their own native languages for normal people to understand & work on them. Also, with this rapidly transforming world companies need to keep updated about new tools & also to provide knowledge about new tools to each employee it takes specific amount of bandwidth every time there is some new tool.

5th

Challenges were overcome by having prior information about what's trending on the market & having enough knowledge about different tools so that you can choose what's suitable for your work & even if there are newer versions of the same tool you still no need to spend much time learning it again as basic features are always the same.

6th

To grow among other business you have to be efficient enough in delivering the products & services to your customers with quality & in timely manner. So, to achieve that ICT tool like better software, better hardware, smart programs play very important role & with the combination of each the end results will be good & so will be the trading options.

7th

Supply chain consists of multiple stages from collecting raw materials to actually developing them into useful products like software or hardwires, & to keep the whole process on track whether it be development stage or logistics, ICT can help a lot with keeping things at a one single platform which can be tracked & organized by a group of people depending on of their roles.

1st

Companies use ICT in multiple ways whether it is to communicate with our clients/teammates or to inform about newsletters via electronic emails, keep track of development, etc. Apart from that, to work on the applications we have developed using different computer languages we do use ICT on daily basis.

- information on technology – this area relates to technology and technical mechanisms for processing, transforming, and managing information to suitable means to aid business processes. This also encompasses managing and administrating systems and IT equipment

- Telecommunications technology – this covers cabling, wireless, switching, transmission, radio frequency, and optical communications media and internet protocol networks. Electronic communications are a means for information to transcend network boundaries - go from point A to point B.

2nd

ICT tools in supply chain management assist in keeping track of the distinct ID for the products that are being developed within the supply chain process so that the whole development cycle for that particular product can be easily tracked.

8th

ICT can be used in any country as long as there is no language barrier in its feature. If that gap is filled by the ICT development company & same tool is available in more than one language, then rest is just the basic training. Following that it will make people learn new skills to achieve new goals & businesses