THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

ABDUL QADIR JAILANI BIN MAHADZIR

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

I hereby acknowledge that this project paper has been accepted as part of fulfilment for the degree of Bachelor Technology Management of Supply Chain and Logistic with Honours.

SIGNATURE   :

NAME OF SUPERVISOR   : DATIN DR. SURAYA BINTI AHMAD

DATE   : 20 JANUARY 2023

SIGNATURE   :

NAME OF PANEL   : DR. NURHAYATI BINTI KAMARUDIN

DATE   : 20 JANUARY 2023

THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

ABDUL QADIR JAILANI BIN MAHADZIR

This thesis is submitted in partial fulfilment of the requirements for the award of

Bachelor of Technology Management (Supply Chain and Logistic) with Honors

Faculty of Technology Management and Technopreneurship

Universiti Teknikal Malaysia Melaka

20/01/2023

DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled "**The barriers to digitalization in transportation industry**" is original done by myself and no portion of the work encompassed in this research project proposal has been submitted in support of any application for any other degree or qualification of this or any other institute or university of learning.

SIGNATURE   :

NAME   : ABDUL QADIR JAILANI BIN MAHADZIR

DATE   : 20/01/2023

DEDICATION

I would like to appreciate the dedication of my beloved family for give me some motivation to finish my final year project and motivate me to learn until degree level. And also, I express a deep sense of gratitude to my lecturer whom also my supervisor for my final year project, Datin Dr. Suraya Binti Ahmad and my fellow friends. They have provided me fully support and advice throughout this research. Without their blessing and encouragement, this research is impossible to complete within short period of time.

ACKNOWLEDGEMENT

ABSTRACT

Digital transformation is when digital technology is used in every part of a business. It's also a change in culture that requires organizations to always question the status quo, try new things, and get used to failing. Digital transformation is a must for all businesses, no matter how big or small they are. In this research, there are two research objectives to be figured out which to identify the technical barriers of digitalization in the transportation industry and to understand the organizational barriers of digitalization in the transportation industry. Using a quantitative approach, the researcher examines the relationship between variables. This method measures and analyses the independent variable which is technical barrier (limited ICT infrastructure, lack of internet speed, lack of digital competencies) and organizational barriers (lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing) and dependent variables (barrier of digitalization) using a variety of Statistical Packages for Social Sciences (SPSS) and graphical tools. A five-point Likert scale questionnaire will use in acquiring the respondent's information. Several analyses had been used in this research which are Cronbach's Alpha analysis, descriptive analysis Pearson's Correlation analysis and Multiple Regression analysis. The correlation value for the lack of digital competencies is the highest correlation in this research. There was a very strong relationship between lack of digital competencies and barrier of digitalization. Lastly, the researcher can conclude that the lack of digital competencies in technical barrier is an important component in barrier of digitalization in transportation industry.

Keywords: Technical Barriers (limited ICT infrastructure, lack of internet speed, lack of digital competencies), Organizational Barriers (lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing)

ABSTRAK

Transformasi digital ialah apabila teknologi digital digunakan dalam setiap bahagian perniagaan. Ia juga merupakan perubahan dalam budaya yang memerlukan organisasi sentiasa mempersoalkan status quo, mencuba perkara baharu dan membiasakan diri dengan kegagalan. Transformasi digital adalah satu kemestian untuk semua perniagaan, tidak kira besar atau kecil mereka. Dalam penyelidikan ini, terdapat dua objektif kajian yang perlu diambil kira iaitu mengenal pasti halangan teknikal pendigitalan dalam industri pengangkutan dan memahami halangan organisasi pendigitalan dalam industri pengangkutan. Dengan menggunakan pendekatan kuantitatif, pengkaji meneliti hubungan antara pembolehubah. Kaedah ini mengukur dan menganalisis pembolehubah bebas iaitu halangan teknikal (infrastruktur ICT terhad, kekurangan kelajuan internet, kekurangan kecekapan digital) dan halangan organisasi (kekurangan strategi yang berkesan, kekurangan ketangkasan organisasi dan tidak mempunyai budaya kerjasama dan perkongsian) dan pembolehubah bersandar (halangan pendigitalan) menggunakan pelbagai Pakej Statistik untuk Sains Sosial (SPSS) dan alatan grafik. Soal selidik skala Likert lima mata akan digunakan dalam memperoleh maklumat responden. Beberapa analisis telah digunakan dalam penyelidikan ini iaitu analisis Alpha Cronbach, analisis deskriptif analisis Korelasi Pearson dan analisis Regresi Berganda. Nilai korelasi bagi kekurangan kompetensi digital adalah korelasi tertinggi dalam penyelidikan ini. Terdapat hubungan yang sangat kuat antara kekurangan kecekapan digital dan halangan pendigitalan. Akhir sekali, pengkaji boleh membuat kesimpulan bahawa kekurangan kecekapan digital dalam halangan teknikal adalah komponen penting dalam halangan pendigitalan dalam industri pengangkutan.

Kata kunci: Halangan Teknikal (infrastruktur ICT terhad, kekurangan kelajuan internet, kekurangan kecekapan digital), Halangan Organisasi (kekurangan strategi yang berkesan, kekurangan ketangkasan organisasi dan kurang budaya kerjasama dan perkongsian)

TABLE OF CONTENT

CHAPTER 5 DISCUSSION, RECOMMENDATION AND CONCLUSION

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
AI	Artificial intelligence
IT	Information Technology
IOT	Internet of Things
GPS	Global positioning system
eCMR	Convention relative contract transport international Merchandises par Route
ROI	Return on investment
SPSS	Statistical Package for Social Science
LI	Limited IT infrastructure
LIS	Lack of internet speed
LDC	Lack of digital competencies
LES	Lack of an effective strategy
LOA	Lack of organizational agility
LCS	Lack a culture of collaboration and sharing
BOD	Barrier of digitalization

LIST OF APPENDICES

CHAPTER 1

RESEARCH BACKGROUND

1.1 Background of Study

Digital transformation is when digital technology is used in every part of a business (Jason sparapani, 2020). This changes how the business works and what it can offer customers. It's also a change in culture that requires organizations to always question the status quo, try new things, and get used to failing. Digital transformation is a must for all businesses, no matter how big or small they are (Deloitte). This message is clear in almost every keynote speech, panel discussion, article, or study about how businesses can stay competitive and relevant as the world becomes more digital. But in general, digital transformation is the use of digital technology in all parts of a business. This changes how businesses work and how they provide value to customers in fundamental ways. Beyond that, it's a change in culture that requires organizations to always question the status quo, try new things, and get used to failing. This sometimes means giving up long-standing business practices that the company was built on in favour of newer ones that are still being figured out.

A problem statement, a clear opportunity, or an aspirational aim should be the starting point for digital transformation (Jay Ferro). Digital transformation may be motivated by a desire to enhance the customer experience, lower costs, boost output, or boost profits. Many elements of our life have been impacted by digital technology, including healthcare and education. As more people got access to computers in their daily lives, transportation and logistics also saw a shift from digitalization. Technology has provided customers and businesses better options and chances than ever before, whether it's through online grocery stores, local delivery applications, or even on-demand airport shuttle services. It's not just traditional business advantages that may be gained by implementing digital solutions, transportation and logistics have also benefited greatly from this technology. Because of the lack of transparency in the transportation industry due to the employment of non-digital ways of operation, digitalization has played a significant role.

Several new trends are being applied in the transportation industry to speed up the digital transformation process. Artificial intelligence (AI), big data analytics, cognitive computing, robotic process automation, and the internet of things all play a role in these types of moves (Nekrasov, Sinitsyna, 2019). Digital transformation can also be enabled by other platforms, such as the cloud, which capture, store, and process information (Hartley, Sawaya, 2019). Digital transformation in transportation is plagued by difficulties such as a scarcity of qualified and devoted IT staff, the impact

of global warming on transportation costs and timeliness of implementations, and changing client demands. For the transportation industry to be successful in its digital transformation, it should utilize the existing technology to develop appropriate strategies for transformation (Campos Diez Canseco, 2018). It's also imperative that businesses adapt their operations to enable digital transformation. In order to make the transition as quick as possible, the sector should also take advantage of new technologies.

Another problem is asset underutilization and supply chain efficiency, which is exacerbated by the lack of connectivity and visibility across devices and systems. Providing assistance in slowing down digital transformation is essential. Digital transformation is largely fuelled by technological advancements, which have positive effects on productivity, market expansion, and operational effectiveness. (Jayakrishnan, Mohamad, Abdullah, 2018). Lacking in house digital transformation expertise, the transportation industry must rely on third-party resources to ensure efficiency and speed. The digital transition has many advantages for the transportation business. Machine learning algorithms and artificial intelligence have the potential to improve a wide range of machinery and equipment, including timing, speed, and efficiency. The transportation business must undergo a digital transformation to compete in today's marketplace. Because of this, various industries that deal with the transportation industry have undergone digital change. Logistics play a critical part in the supply chain, which can have a significant impact on the company model.

1.2 Problem Statement

Linchpin (2022) defines digital transformation as a reworking of corporate strategies and models to remain fully competitive in the digital era of information. Businesses of all sizes can be categorized in this way. However, a failure to adapt the transportation processes to the digital revolution could result in a decrease in revenue and profitability due to a lack of business opportunities. In addition to enacting new policies, the digital revolution also necessitates a shift in thinking. When it comes to digital transformation, it's more than just adding Internet of Things (IoT) applications and GPS tracking systems to your assets. Expansion of how information can disrupt your business is simply one part of the problem.

In general, Yatckevich (2019) proof of delivery will be realized within the eCMR going forward. The United Nations Convention for the Carriage of Products, known as the eCMR, governs the international transport of goods. The documents were previously sent to the freight forwarder by the

road hauler and then delivered to the transport customer by mail. This results in extra shipping expenses and additional labour for transportation providers. Furthermore, the payment procedure is slowed as a result. Once the transportation customer has proof of delivery, payment is made. Because of this a freight forwarder may have to wait up to three months for payment following a successful delivery. When evidence of delivery is submitted digitally, the payment process will also speed up. There is more financial flexibility for the corporation because of this. The eCMR will capture transaction data, allowing delivery routes to be more carefully monitored and data to be provided to the delivery location in real time. However, according to Yatckevich (2019), this raises more questions digitalization of the POD will on the one hand which expedite payment for shipping providers. Because shipping companies will have to pay their invoices early, this could influence the planning of freight forwarders.

According to Ranosys (2019), a lack of information and too much data is a problem. There's a lot of data and information being generated and maintained by the sector, especially with current trade expansion in the picture. However, obtaining this information is difficult especially when it is split and housed in several locations. Because of this, as well as human data entry and management, it's difficult to achieve the goal of improving client experiences. Logistics digital solutions not only track and manage this data, but also connect all the diverse sources on a single integrated digital logistics system. Supply chain and logistics digitalization also aids business leaders in adhering to new data management standards and meeting customer expectations.

Like many other industries, transportation and logistics have been adversely affected by the recent economic crisis. (Pournader, M., Shi, Y., Seuring, S., & Koh, S. L. ,2020). Suddenly, the sector found itself confronted with a new set of circumstances which a slowed product cycle, a reduced volume of bills, and an increased demand for services delivered through the internet. Most of these problems were caused by the lack of a modern and reliable digital logistics platform. This made it hard for leaders to make their operations as time- and cost-efficient as possible. There are many obstacles including siloed and unintegrated transportation and logistics operations, a lack of resiliency and process automation, an overreliance on old technology and a lack of a mobility management plan.

1.3 Research Questions

The researcher determined two research questions in this study:

    i.   What are the technical barriers of digitalization in the transportation industry?

   ii.   What are the organizational barriers of digitalization in the transportation industry?

1.4 Research Objectives

In this research, there are two research objectives to be figured out:

    i.   To identify the technical barriers of digitalization in the transportation industry

   ii.   To understand the organizational barriers of digitalization in the transportation industry

1.5 Scope and Limitation of the Study

This research paper is focusing on the impacts of the barriers of digitalization transformation in transportation industry in Cheng, Melaka. This study will be conducted among managers, executive, supervisor and general worker in company in Cheng, Melaka, Malaysia. The selected respondents will be chosen randomly. The researcher will be carried out by distributing questionnaires to the respondents.

The limitation of the study is the inaccurate data from respondents due to them was chosen randomly by the researcher. The researcher may not focus on every single state of Malaysia. Besides, the researcher experienced the time limitation in conducting the study. The research faced time constraints since the study needed to be completed in a long period of time.

1.6 Significant of Study

The findings of the study benefited for company on the barrier's digitalization transformation in transportation. They will understand the impacts of challenges on digital transformation in logistic and transportation. Besides, advertisers can understand more about digital transformation in logistic through this research. In addition, the study provides empirical literature sources to future researchers which carry out a similar topic by adding an existing body of knowledge on the impact of digital transformation on consumer behaviour.

1.7 Summary

In summary, the focus of this chapter has been on providing an overview of the research. Moreover, researcher discussed the history of the study, the problem statement, the research questions, the research objectives, the scope and limitations of the study, as well as the significance of the study. The researcher is going to conduct the study's literature review in the following chapter. The information will be more comprehensive as well as easier to understand.
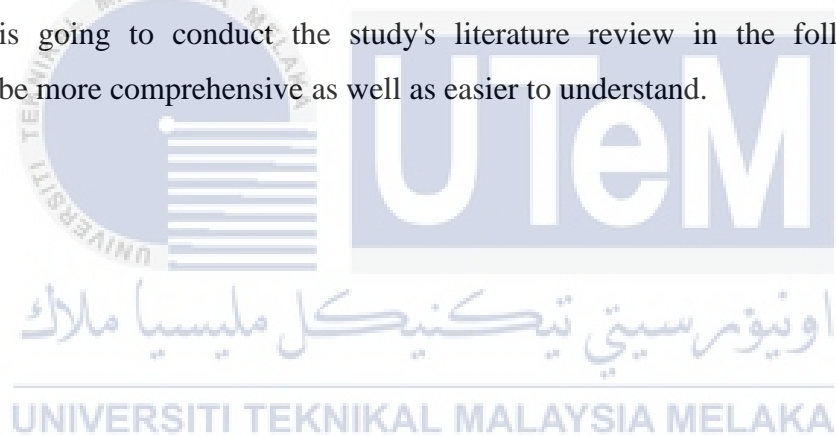
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section provides a review of recent research on the effects that digitalization will have on freight transportation as well as previous work on scenario planning to deal with the inherent uncertainties in this industry. In the literature review, as well as throughout the rest of the work it considers digitalization in a broad sense. For instance, it includes the application of digitized data as well as connected automobiles and automated driving.

2.2 Digital Transformation in Transportation and Logistic

It is essential in today's growing real-time market to move quickly and on schedule (i-SCOOP, 2022). The implications for supply chains, logistics, and the transportation industry are enormous, even if they seem obvious. When it comes to logistics and transportation, speed and efficiency are essential. Even more so now, in a rapidly evolving and increasingly digital world where digital transformations and the rise of the Internet of Things (IoT) are driving the next revolution in industry dubbed as Industry 4.0. Speed can be a competitive advantage if it is properly utilised. In short, it's known as the "spill over effect." An end customer, user, logistics partner, or any other stakeholder sits at the end of each supply chain, just like at the end of each process. The customer-obsessed operating paradigm, as coined by Forrester, is pervasive in today's business world. There is an inherent acceleration and quickness to hyper-connectivity. How procedures and people are linked together and used.

Speed and timeliness are driving various major developments in transportation and logistics, with speed being a competitive advantage. As a result, customer expectations and competitive distinctiveness necessitate them. Here are a few more examples of how they have the potential to alter the course of business.

- To increase conversions and activities, data-driven marketing tries to engage individuals when and where it makes the most sense.
- Information management is about making sure have the right information at the right time for the right process, people, situation, goals.

6

- Service to customers there has been an increase in the demand for fast replies, which is a combination of information and communication as well as rising customer expectations in a mobile world.
- The implementation of new business models or technology installations, making decisions, and launching new products or services

2.3 The Future of Transportation is Digital

Mobile phones, data processors, distributed computing, storage, and digital cellular networks all advanced significantly during the turn of the millennium (Heavin & Power, 2018). They are more advanced than digitization and fall into the category of digitalization in terms of their level of advancement.

Digitalization has made it easier to bring together all the many players in the transportation industry to work together (Vinod Shah, 2019). It has also improved productivity and reduced costs, while maintaining high levels of customer satisfaction. But even though digitalization has had many benefits, some areas still require digital transformation in order to achieve greater results.

i. Sustainable Mobility

Digital transformation has also played an essential role in the rise of electric vehicles since more and more people are making the move (Xianbo Zhao, 2020). Sustainability in transportation will be aided by digitization in the future. Businesses may make decisions based on real-time facts which have been impossible to measure using traditional methods, notably logistics with data at their fingertips. Smart linked vehicles, location services, cloud-based systems and blockchain in logistics are just a few of the latest digital trends in transportation and distribution.

ii. Al in Transportation and Logistics

In the late 1990s, the transportation and logistics business began to be transformed by digitalization. Small enterprises flourished, leading to improvements in both the quality of customer service and the timeliness of delivery (Manuel Woshank, 2020). Despite this, digitization has been ongoing and has seen numerous technological advancements that have contributed to its current broader definition. Business procedures have changed dramatically since the introduction of AI which

can analyse data more accurately than humans can. Fraud detection is critical in secure transactions such as banking where machine learning and deep learning are essential.

iii. loT in Transportation and Logistics

The transportation and logistics business are also heavily reliant on the Internet of Things. Real-time data can be used to enhance processes, cut costs, boost productivity, and deliver better services. Managing networks with a large number of connected devices can be made easier with the help of the Internet of Things (loT). These companies are constantly seeking for innovative ways to use the Internet of Things to its fullest potential.

iv. Autonomous Vehicles

A self-driving vehicle revolution is long overdue in the transportation industry. Many firms around the world are working hard to improve this technology so that it can handle even the most difficult traffic circumstances. Autonomous vehicles run on AI, which is a clever, reliable, and environmentally beneficial alternative to traditional combustion engines because it uses electric energy rather than gasoline. Buses and train stations have already begun using driverless vehicles which can perform better than human drivers in certain situations. Some of the world's top organizations are also investigating the use of autonomous vehicles in logistics as a way to decrease costs and improve efficiency.

Figure2.3: Vehicles run on AI

(Source: Volvo group, 2018)

v. Smart Connected Vehicles

Future operations will be more efficient because to the widespread adoption of connected vehicles (Mahdi Dibaei, 2019). In addition, the data acquired from various connected devices can be accessed through virtual mobility services and used by businesses to adjust their business strategies based on market demand, fuel prices, or even incidents along the route. Because they can exchange data with other autonomous vehicles, trucks, or even drones, connected vehicles are also useful in logistics.

vi. Location-based Services

Businesses increasingly rely on geolocation since it allows them to better serve their customers and boost productivity by leveraging collected data (Haosheng Huang, 2018). Even though companies have been collecting location data for years, it has not been widely used due to a lack of tools for collecting, sharing and analysing the data in question. When it comes to things like marketing campaigns or financial transactions, location-based analysis will become a standard practise in the future. With the help of consumer locations on a map, companies will be able to better understand how and when to deliver their goods.

vii. Cloud-Based Systems

The integration of better technology into corporate operations has already had an impact on the transportation industry due to the rise of cloud computing (Chanapha Butpheng, 2020). With cloud-based solutions, firms have more options for storing sensitive information while maintaining full access to it from any location. In most situations, transportation businesses are implementing cloud-based solutions because it allows them to focus on their main business functions such as the delivery of services. In addition, an IT staff handles all the company's hardware, software, and security issues. Using APIs, transportation companies can share data with other organisations via cloud-based systems, resulting in improved efficiency. Many companies in the transportation and logistics industry have lowered costs, boosted efficiency, and provided better services to their consumers with the use of loT and cloud-based technology.

ix. Blockchain in Logistics

Different industries throughout the world are making use of blockchain technology (Edvard Tijan, 2019). Due to its decentralised design and high level of security, it has already made a name for itself as a payment mechanism. However, some businesses have already put blockchain to the test, while others are already implementing it where it makes sense for their business model. Due to blockchain's ability to transform the logistics business, this will happen. Supply chain management, shipping, tracking of goods, and even air freight cargo can all benefit from blockchain technology. There is a lot of information that can be gleaned from this data that may be utilised in logistics research to predict market trends and other factors that influence demand by location. When a company needs to employ this feature in its operations, they should investigate the possibility of implementing secure voting systems via blockchain.

2.4 The benefit of digitalization in transportation industry

Everywhere in the world, there are winds of change that have a profound effect on daily life and the types of jobs people do. This shift is taking place at an incredible rate. Humanity can benefit from the digital economy's new possibilities. The digital economy is a by-product of the new possibilities offered by digital technology. In the 21st century, the most successful companies will be those that are able to take advantage of rapidly evolving technology in order to improve their logistical services (Bardakçi H, 2020). In order to have a fast and stable technological infrastructure, companies should be formed on the internet and intranet-based technology. To provide logistics services that are both convenient and efficient in the twenty-first century, digital technologies are required. Entrepreneurship in logistics relies heavily on innovation to develop fundamental skills. In order to remain viable and grow, a logistics company must first compete on the market and then enhance its core competencies.

Transportation is distinct from other sectors of the economy in that robotization has its own features (Sokolov, 2018). Accordingly, the term robotization refers to the creation and use of physical devices that are capable of follow the human actions. However, autonomous systems can operate in a far broader spectrum of environments. Self-controlling adaptive intelligent systems that can accomplish their production duties regardless of the level of human assistance should be referred to as robots. Automated vehicles and the use of technology that does not require human interaction are two examples of robotization in the transportation industry.

2.5 Barriers of digitalization

There are still many obstacles to digital transformation for most firms today, even though most are digitizing and incorporating new technologies. However, a Gartner report shows that more than half of CEOs involved in digital transformation initiatives say that the modifications brought have enhanced their benefits.

Surprisingly, the biggest problems with digital transformation are not caused by technology but by people. Leaders need to think about the human factor in addition to having a clear plan and putting the right technology in place (George Westerman, 2020). Along with the digital transformation program, there needs to be a good plan for dealing with the human barriers. In fact, this change may be harder to make in traditional organizations that have been successful in the past and have low employee turnover. This is because of things like silos, inherited technology, a lack of digital skills and a resistance to change.

2.5.1 Technical barriers

Firstly, the point is limited ICT infrastructure. There are also technical obstacles to overcome. Systems interoperability, ICT integration, standardisation, security, and data protection all fall under this category. There are obstacles relating to technological constraints that make it difficult for operators to fully leverage ICT solutions. Pokharel (2017) investigated the use of technology in the transportation and logistics industry. To do this, he polled 600 businesses from which 84 responded with 45 of those being considered legitimate. The replies were analysed to draw conclusions about the technical factors such as how industry managers are financially motivated, the quality of the underlying infrastructure and the availability of technology that fulfils the needs of the sector. In the event that there is a promising opportunity to raise earnings. Costs, lack of management support and the rapid pace at which technology is outdated are also cited as issues. Stakeholders anticipate an imminent upgrade to ICT solutions due to the rapid pace at which technology is progressing and the prevalence of custom-tailored software in businesses today. Helo and Szekely (2017) analysed the available software, weighed its advantages and stressed the need for standardised approaches and cross-platform compatibility. Other academics have also noted the lack of integration between the various ICT solutions.

Furthermore, lack of internet speed. Internet connectivity is vulnerable to computer health (Charlotte king, 2015). It's true that malware and viruses can slow down Internet connection, but there are other factors at play such as the size of hard drive, the condition of computers components, and the applications running. Internet slowness can also be caused by computer viruses. A computer virus infects a host computer and then attempts to spread itself using malicious code. It's not uncommon for viruses to generate hundreds of new infected emails every minute, thereby hogging all available processing power and network bandwidth. Viruses rarely display any outward signs of activity, so it's important to keep antivirus software active at all times. The browser has similar system resource needs to other computer programmes including processor speed, memory, and storage space. Browser automatically saves temporary copies of every page we visit both in memory and on hard drive. If browser is running slowly, find that closing other programmes that are using a lot of resources is helpful. We could try closing them. The computer's memory should also be expanded. Having insufficient free space on disc can also negatively impact performance. When we get rid of temporary files, we can free up more space on the hard drive. Some things that slow down internet connection cannot be helped, like a traffic jam on popular websites or a virus on device. Connection speeds aren't the only thing that can be affected by these kinds of problems on the internet. When many people try to access the Internet at once during peak hours, the speed can be impacted by local Internet congestion.

In addition, the literature confirms that a lack of digital competencies is among the most essential difficulties in logistics organisations (Veltkamp & Schulte, 2020; Rohleder & Schulte, 2020; Barthel, 2020). Another set of critical factors that can be mitigated by encouragement and training is employees' willingness and lack of qualifications. Vouchers for digitization from the state can help overcome technical constraints like data protection and security and investment expenditures. It was also mentioned that government funding is crucial for the success of handmade businesses. As a result, artisan businesses can continue with their regular operations while also focusing on the digital transformation. Interesting findings also indicate that many companies still lack a digital mentality and must work to cultivate one. Determining the extent to which employees and managers already have a digital mindset is a necessary first step in defining the steps needed to successfully implement the digital mindset. Many studies (Okechukwu, 2016; Töytari, 2017; Ivanov, 2018; Gimpel, 2018) demonstrate that a lack of a digital mentality is one of the biggest obstacles in the logistics industry.

2.5.2 Organizational barriers

Firstly, lack of an effective strategy. Companies need a clear plan to ensure a seamless transition from the traditional to the digital workplace (Fred Wilson, 2022). An effective transition is guaranteed once the strategy is put into action. On the other side, things might go horribly wrong when there is no strategy in place. Individuals taking the plunge into digital transformation are breaking with established standards. There may be repercussions for both the company and its employees as a result of the abrupt transition. Because of this, taking things at a calm and steady pace is essential. It's important to get everyone who has a stake in the outcome involved, to make sure everyone knows what's at stake, and to ensure that everyone has a firm grasp on the process's finer points. It will be much easier to implement the change without impacting anyone once they are aware of the specifics of the procedure and how it will occur.

Hence, lack of organizational agility. Transformative change is hampered by barriers, which are synonymous with difficulties, obstructions, and opposition. Organizations need to be more open and proactive to change in order to adapt to the evolving environment and maintain competitive advantage. Therefore, any of the 16 attempts to introduce change will pose significant difficulties for the organization's leaders at all levels (McConnell, 2018). People typically react negatively to change because it requires them to venture into the unknown. When it comes to the Digital Transformation problem, successfully managing organisational resistance and by addressing the human capital perspective to change is arguably more important than managing other components of the difficulty. When leading a large business through a period of change, it is essential for management to strike a balance between the new technology and the company's existing organisational and human resources. In-depth research on the organisational barriers to Digital Transformation is highly relevant because they are among the most significant obstacles faced by large companies on their transformation path. An investigation of this nature would provide useful examples of events that prompt corporations to overcome internal impediments to action, streamline their structures and operations in order to reduce complexity and speed up their transformation and expansion.

In addition, lack a culture of collaboration and sharing. Realizing that digitization is fundamentally about people rather than just data, technologies, and systems is of critical importance. The primary reason is that everyone's participation is important to the achievement of the digital revolution. The company leadership can't force workers to make the switch to digital operations. Prior to choosing on the digital tools to employ and how to utilise them, leaders must focus on altering the mindset of everyone in the business, as well as the organisational culture and practises. This is the only way to inspire a company-wide shift in culture and, ultimately, in the way it serves its consumers. What people have done and what they require can be gleaned from data, but it cannot be used to generate original goods and services. Unfortunately, digital technology is still incapable of seeing trends or guiding corporate decisions regarding how to adapt to changing markets. Culture the set of shared values and beliefs that makes employees excited to come to work every day, can't be driven by it (Peter-Anthony Glick, 2021)

2.6 Proposed Research Framework

In this research, technical barriers and organizational as the independent variables while barriers of digitalization as the dependent variable.
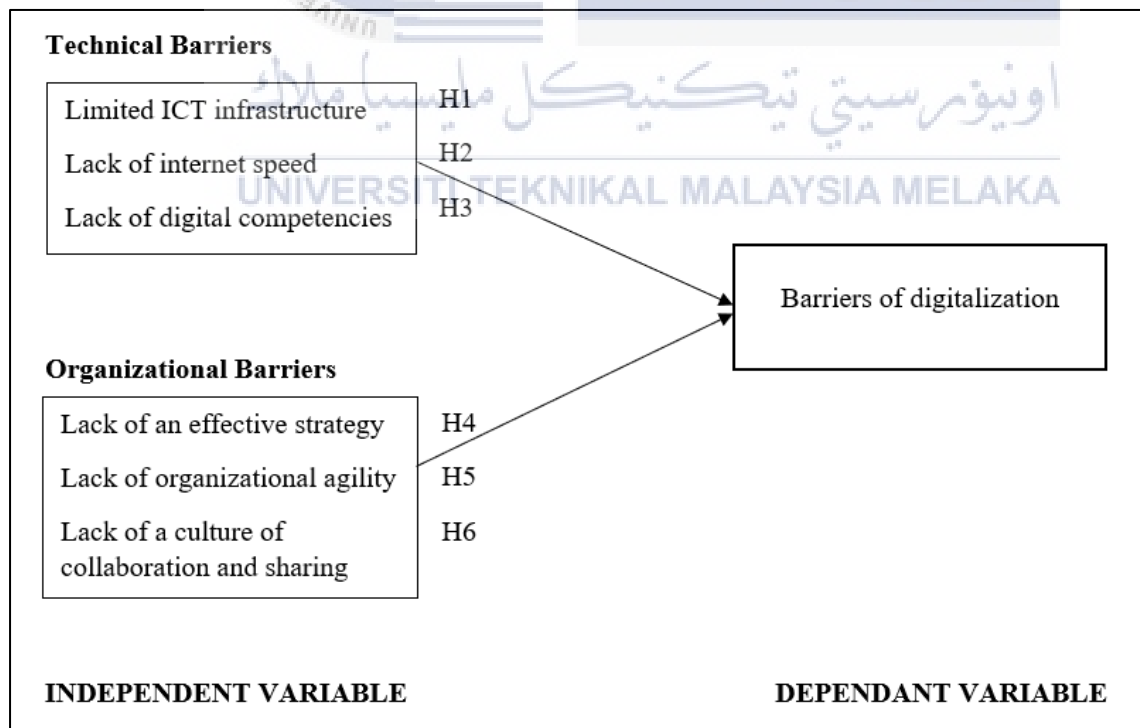
Figures 2.6: Research framework

2.7 Hypotheses

i: Limited ICT infrastructure

(H0): There is no significant relationship between limited ICT infrastructure to barriers of digitalization

(H1): There is a significant relationship between limited ICT infrastructure to barriers of digitalization

ii. Lack of internet speed

(H0): There is no significant relationship between lack of internet speed to barriers of digitalization

(H2): There is a significant relationship between lack of internet speed to barriers of digitalization

iii. Lack of digital competencies

(H0): There is no significant relationship between lack of digital competencies to barriers of digitalization

(H3): There is a significant relationship between lack of digital competencies to barriers of digitalization

iv. Lack of an effective strategy

(H0): There is no significant relationship between lack of an effective strategy to barriers of digitalization

(H4): There is a significant relationship between lack of an effective strategy to barriers of digitalization

v. Lack of organizational agility

(H0): There is no significant relationship between lack of organizational agility to barriers of digitalization

(H5): There is a significant relationship between lack of organizational agility to barriers of digitalization

vi. Lack of a culture of collaboration and sharing

(H0): There is no significant relationship between lack of a culture of collaboration and sharing to barriers of digitalization

(H6): There is a significant relationship between lack of a culture of collaboration and sharing to barriers of digitalization

2.8 Summary

In this chapter, the researcher has discussed on the barriers to digitalization in transportation industry. The proposed research framework consists of dependent and independent variables. The dependent variables such as customer satisfaction in retail stores. The inventory, lead time, transportation, and logistics management is the most important things in independent variable. Last but not least, the following chapter will be discussed about the research methodology.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher will cover the approaches that were utilized in the process of collecting the data and information for this research. The explanatory research design is constructed initially to explain the link that exists between the variables. The quantitative approach has been decided upon as the best option for the methodological choice. Primary and secondary sources provided the information for this study. The next topics that are going to be covered are going to be the study site, research strategy, time horizon, dependability and validity, and the method for data analysis. By following the steps outlined here for research methodology, one will be able to analyse and comprehend the findings of this study more accurately.

3.2 Research Design

A Research Design is just a plan for how a researcher will use different methods and techniques for their research. The research design helps a researcher unknown journey, but they can do it in a systematic way. In the same way that an engineer or architect decides for a building, a researcher chooses a plan from different ways to figure out what kind of research needs to be done. There are two different ways to look at research design which is quantitative research and qualitative research. Also, the design of a research study has four main features: reliability, neutrality, validity, and generalization. A researcher should also have a clear idea of how their project can fit into the research design.

The researcher chose the explanatory study because it is appropriate to the nature of this research. As the researcher mentioned before, an explanatory study emphasizes the relationships between variables. In this research, it contained two independent variables and one dependent variable. The researcher was going to determine the relationship between technical barriers and organizational barriers on barriers digitalization.

3.3 RESEARCH METHODOLOGY

3.3.1 Quantitative Data

Methodological options for research design include quantitative and qualitative. It is common to utilize questionnaires for data collection and graphs or statistics for data analysis in the quantitative method. In contrast, quantitative data gathering and analysis methods generate or use numerical data, whereas qualitative data collection and analysis procedures generate or use other types of data besides numbers.

Using a quantitative approach, the researcher examines the relationship between variables. This method measures and analyses the independent and dependent variables using a variety of statistical and graphical tools. In general, quantitative research relates to a deductive approach that emphasizes the use of data to test theoretical hypotheses. Using a collection of observable data, this method hypothesizes theories that are well-formed and grounded in general concepts and definitions. The researcher intends to verify whether the radical relationship exists as the relationship has previously been established.

3.3.2 Time Frame of Study

There are two main types of time horizons which is longitudinal and cross-sectional research. Data is collected over an extended period of time in longitudinal investigations. Even while cross-sectional studies only collect data once, it could take a few days, weeks, or even months for the results to become available. Cross-sectional studies were used by the researchers because of time restrictions. Researchers must complete Chapters 1 to 5 in 10 months. Data collection and analysis must be completed by the end of the month.

3.4 RESEARCH METHOD

To better understand how to collect survey data, researchers look at methods like questionnaire design and response rate optimization to learn more about sampling from a population and the techniques that go along with it. Survey methodology is concerned with instruments or procedures that ask a single question, which may or may not yield an accurate answer. Quantitative methods were utilized by the researcher in this study to determine how the various factors interacted. In addition to being widely applicable, the analytical technique provides a significant amount of quantitative information even with a low resolving power. (Ghauri et al., 2020)

3.4.1 Research instrument

This research method is popular because it lets researchers collect data by sending questionnaires to a sample. The data gathered in this way can be used to explain why certain variables are linked and to make models for these connections. A survey design is also recommended because it makes it possible to get a lot of information quickly, accurately, and effectively. Observation, experimentation, surveys, telephone, self-administered, and in-person interviews are some of the most common ways to do quantitative research.

3.4.2 Questionnaires.

A questionnaire is a structured written series of questions to which respondents record their responses, generally within a narrow range of options. The questionnaire will be employed since the variables under research, such as the respondents' views, opinions, perceptions, and feelings, cannot be observed. The questionnaire will also be employed since information must be gathered from a big sample in a short amount of time when the respondents are able to read and write. The questionnaire will be used to collect data from respondents (SCH Logistics Sdn Bhd employees). The surveys will include both open and closed ended questions and will be distributed to respondents from the SCH Logistics Sdn Bhd employees located in Cheng, Melaka.

3.4.3 Observation

Researchers want to observe is that the drivers who running the transportation has improve before the digitalization and want to see the improvement of transformation. The method of observation will disclose whether the respondents employ manage the transportation performed, suggesting that they have a record driving system.

3.5 Pilot study

Pilot study is a practice test for research study that allows to evaluate the research approach with a small group of test subjects before conducting your major study (Matt & Nick, 2022). In the course of scientific investigation, it is necessary to conduct pilot experiments. Before doing the main research, they may help uncover design issues and evaluate the feasibility and practicability of a project. It involves selecting a small group of individuals and performing research on them. Finding flaws in a researcher's workflow may save time and money. The results of a pilot study may help the researcher detect any errors or misunderstandings in the information given to participants, as well as any challenges with the task created. As result, the survey will be conducted up to 15 respondents to be appraised. Their feedbacks and comments will be considered in the final survey questionnaire in this research.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

FIGURE 3.5 LIKERT SCALE

Source: Mark (2019)

3.5.1 Sampling Design

This study uses a random sample method called probability sampling. Survey and experiment research methods are frequently related with it. According to Sekaran and Roger, probability sampling can be either unrestricted simple random sampling or confined complicated probability sampling (2016). The study subjects were selected at random to guarantee that all respondents of the population had an equal chance of being included. The best time to employ simple random sampling is when the researcher has a well-defined and easily accessible sample frame from the target population ideally in electronic form (Saunders et al., 2016). Director of SCH Logistics Steven Tan predicts that by 2022, the workforce would have grown to 150 individuals. Researcher calculated a sample size of 108 out of a possible 150 people based on the table of Krejcie and Morgan (1970). More than 108 employees like managers, executives, and others involved in logistical production were selected as respondents in this research.

Table 3.1: Determining sample size of a known population
Source: Krejcie and Morgan (1970)

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size. S is sample size.

3.5.2 Primary and Secondary Data Source

Primary data refers to information that has never been published before and was gathered for the first time. The drawbacks of secondary data sources, such as being out-of-date and lacking in coverage, necessitate the use of primary sources for the initial data. The project team will use a self-administered questionnaire to cover a large population quickly and economically.

Secondary data, according to Roston (2001), is data that is already accessible and has been recorded by other academics. Secondary material contains policy documents and abstracts from diverse researchers on the issue under debate. Secondary data for this project will come from libraries, records employee in SCH Logistics, records from other transportation logistics company, online material, textbooks, newspapers, and unpublished project reports. This is because it will be easily accessible and understandable as it is made up of widely projected work.

3.6 Questionnaire development

This study used a quantitative approach by surveying participants to collect data. The questionnaire is an efficient data gathering technique to test the researched constructs. According to Sekaran and Bougie (2010), questionnaires can be administered directly sent to respondents or electronically distributed. There are advantages and disadvantages to utilising questionnaires as survey devices. Among the positives include greater assurance of anonymity, no interview bias and the possibility to cover a larger range of places as it is cost-effective as the responses are collected at the convenience of the respondents. However, questionnaires have drawbacks as survey instruments such as low response rate, questions that go unanswered, and no control over the date of response (Sekaran and Bougie, 2010).

In order to get precise information on LI, LIS, LDC, LES, LOA, LCS, and BOD, the questionnaire items were rated on a five-point Likert scale. There were five possible responses on the Likert scale with one representing a "strongly disagree" rating and five representing a "strongly agree" rating. See Table 3.1 for an explanation of the three distinct parts of the questionnaire. Section A was comprised of demographic questions designed to learn more about the respondents. However, Section B was made up of questions about spotting factors while Section C inquired as to the goals of the potential investor.

3.6.1 Section A: Background of the respondents

Table 3.2: Demographic construct

Construct	Measuring items	Number of items
Demographic	Age, gender, educational level, race, current position, work experience	6

3.6.2 Section B: technical barriers and organizational barriers

Table 3.3: limited IT infrastructure

No	Items	Source
	Limited ICT infrastructure	
1	Integrate different software applications is important	(Helo and Szekely, 2017)
2	ICT technology is changing so quickly	

Table 3.4: lack of internet speed

No	Items	Source
	Lack of internet speed	
1	Internet slowness can also be caused by computer viruses	(Charlotte king, 2015)
2	Internet speed can be impacted by local Internet congestion	

Table 3.5: lack of digital competencies

No	Items	Source
	Lack of digital competencies	
1	Lack of training and qualification employee	(Okechukwu, 2016; Töytari, 2017; Ivanov, 2018; Gimpel, 2018)
2	Lack of a digital mentality is one of the biggest obstacles in the logistics industry	

Table 3.6: lack of an effective strategy

No	Items	Source
Lack of an effective strategy		
1	Companies need a clear plan	(Fred Wilson, 2022)
2	It's important to get everyone involved	

Table 3.7: lack of organizational agility

No	Items	Source
Lack of organizational agility		
1	Organizations need to be more open and proactive	
2	Management need balance between the new technology and the existing organisational	(McConnell, 2018)

Table 3.8: lack a culture of collaboration and sharing

No	Items	Source
Lack a culture of collaboration and sharing		
1	Everyone participation is important to the success of the digital revolution	(Peter-Anthony Glick, 2021)
2	Set of shared values makes employees excited to come to work every day	

3.6.3 Section C: barriers of digitalization

Table 3.9: barriers to digitalization

No	Items	Source
Barriers of digitalization		
1	The biggest problems with digital transformation are not caused by technology but by people	(George Westerman, 2020)
2	Digital transformation program there needs to be a good plan for dealing with the human barriers	
3	Leaders need to think about the human factor in addition to having a clear plan	
4	Putting the right technology in right place	

3.7 Reliability and validity

In order to ensure the authenticity of the ideas used in this thesis paper, researchers used citations from cited publications and books. Data collection starts with acquiring all the data and then checking it with the hotel administration to see if there is any disagreement or disputed data. Researchers followed up mutual verification by creating an agreed-upon checklist, which they then reviewed with the original responders in a subsequent interview. All empirical data was obtained and evaluated by the authors and the management, resulting in an elevated level of reliability in the collection of data.

Second, because the investigated organization is an excellent company with a small workforce, it is simple to locate the most suited responders to answer the questions. The researcher questioned five people at the company, which is the owner, general manager, the driver, the management system, and the logistics management. They are well-versed in the company's business operations and everyday operations. The researcher gathered actual data from them, ensuring the data's credibility.

Table 3.10: Cronbach's Alpha Coefficient Range and Strength of Association
Sources: Saunders et al., (2016)

Cronbach's Alpha Coefficient Range	Strength of Association
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

3.8 Data analysis

Data analysis tools for Quantitative Data must be used to show raw information in a digestible way. It is necessary to examine quantitative data to find evidence that will be helpful in the research process. The data obtained from the respondent will be analyzed by the researcher using the Statistical Package for Social Science (SPSS). SPSS is used by market researchers, health researchers, survey businesses, government agencies, education researchers, marketing organizations, data miners, and many others to process and analyses survey data obtained using an online survey platform like Google form. The data will collect on the end of this month.

3.8.1 Descriptive Analysis

Descriptive analysis uses numerical description and comparison of variables to focus on the central tendency and dispersion. Means, medians, modes, and standard deviation are the most common ways to calculate descriptive statistics, although there are other methods as well. The gender, age, occupation, and educational level of the respondents are analyzed using descriptive analysis in this study. The raw data is transformed into an easier-to-understand form that better reflects the demographics of the respondents.

3.8.2 Pearson's Correlation Analysis

This study will employ Pearson's Correlation analysis to measure the strength of linear relationships between the dependent variable and the independent variables. When using Pearson's correlation coefficient, values from -1 to +1 indicate perfectly negative and positive correlations, respectively. The value 0 indicates that there is no link or association (Saunders et al., 2016).

Correlation Coefficient Value (r)	Direction and Strength of Correlation
-1	Perfectly negative
-0.8	Strongly negative
-0.5	Moderately negative
-0.2	Weakly negative
0	No association
0.2	Weakly positive
0.5	Moderately positive
0.8	Strongly positive
1	Perfectly positive

Figure 3.8.2: Value of the correlation coefficient

Sources: Saunders et al. (2016)

3.8.3 Multiple Regression Analysis

Six independent variables and one dependent variable can be analysed using the statistical method known as multiple regression analysis (Saunders et al., 2016). Understanding how the independent factors (technical barriers and organizational barriers) interact with the dependent variable (barriers digitalization) is critical to this study's outcome. Multiple regression analysis aids the researcher in identifying the independent factors that have the greatest impact on the dependent variable. Multivariate regression analysis uses the following equation to calculate the results:

$$\text{Equation of MRA: } Y = a + bX1 + cX2 + dX3 + eX4 + fX5 + gX6$$

Where:

Y = Dependent Variable (Barrier of digitalization)

a = Constant value or Intercept

b = Influence of X1 (limited ICT infrastructure)

c = Influence of X2 (lack of internet speed)

d = Influence of X3 (lack of digital competencies)

e = Influence of X4 (lack of an effective strategy)

f = Influence of X5 (lack of organizational agility)

g = Influence of X6 (lack a culture of collaboration and sharing)

X1, X2, X3, X4, X5, X6 = Independent variable

3.9 Summary

To sum up, this kind of research is required to give respondents a survey questionnaire. Through Google form, 150 people from SCH logistics need to fill out the questionnaire. This study used cross-sectional studies, in which the data were only collected once. Before the questionnaire is sent out to the respondents, a pilot test will be done. The researcher also looks at online journals, articles, reports, and books as secondary sources. The reliability of the variables is measured by Cronbach's Alpha. The researcher had to use descriptive analysis, Pearson's correlation analysis, and multiple regression analysis to figure out what the data meant. In Chapter 4, we will talk about the next analysis and discussion of the data and more specific data that received from respondent.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

In Chapter 4, the researcher will discuss and present the result of data analysis collected from the respondent. IBM Statistical Package for the Social Sciences (SPSS) version 20.0 is used to analyse the data collected. This chapter is using descriptive analysis to determine the relationship between dependent variable and independent variable. The questionnaire is assigned to 108 respondents through an online survey which is Google Form. There are three parts in the questionnaire which Part A is the demographic information of respondent, Part B is influences independent variable barrier of digitalization, and Part C is factors that affect barrier of digitalization.

4.2 Pilot Test

A pilot test is conducted before the data collection process to reach target respondents. The pilot test is a small-scale trial to make the researcher prevent the problems which conducting to data recording issue (Saunders et al., 2016). Around 15 respondents are chosen to conduct the pilot test. The researcher is taking one week to complete the pilot test. The objective of the pilot test is to test the reability of the data and validity of the questionnaire (Barlett, 2013).

4.2.1 Reliability Test

Cronbach's Alpha is used during the reliability test to measure the consistency. It is measuring internal consistency between the items on a scale. It is used to confirm not to mix positively and negatively worded question. From Table 3.3 in Chapter 3 has been mentioned that Cronbach's Alpha value is between 0.7 to 0.8. For the features, it is considered as good strength as the Cronbach's Alpha value is between 0.8 to 0.9.

Table 4.1: Cronbach's Alpha for Pilot Test

(Sources: SPSS Output)

Reliability Statistics			
	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Limited ICT infrastructure	.747	.764	2
Lack of internet speed	.874	.874	2
Lack of digital competencies	.799	.817	2
Lack of an effective strategy	.863	.863	2
Lack of organizational agility	.898	.934	2
Lack a culture of collaboration and sharing	.745	.753	2

4.2.2 Validity Test

Validity test has been conducted in this research. There are 22 items are included in the questionnaire. Hence, the internal validity can be observed in this pilot test which determines the relationship between the dependent variable and independent variables.

4.3 Descriptive Statistics on Demographic Background

A descriptive analysis is used to analyze the demographic background of respondents which includes gender, age, races, education level, current position in company and how long working experience in company.

4.3.1 Gender
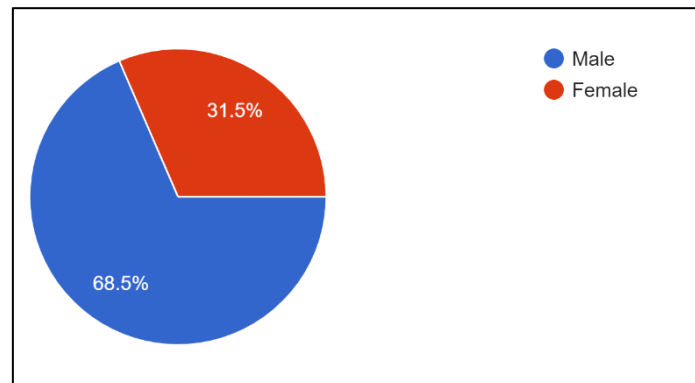
Figure 4.1

Table 4.2: Gender

(Sources: SPSS Output)

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	74	68.5	68.5	68.5
	Female	34	31.5	31.5	100.0
	Total	108	100.0	100.0	

Table 4.2 shows the gender of 108 respondent involved in this research. There are 74 male respondent which is 68.5% and 34 female respondent which are 31.5%. the majority of respondent male.

4.3.2 Age
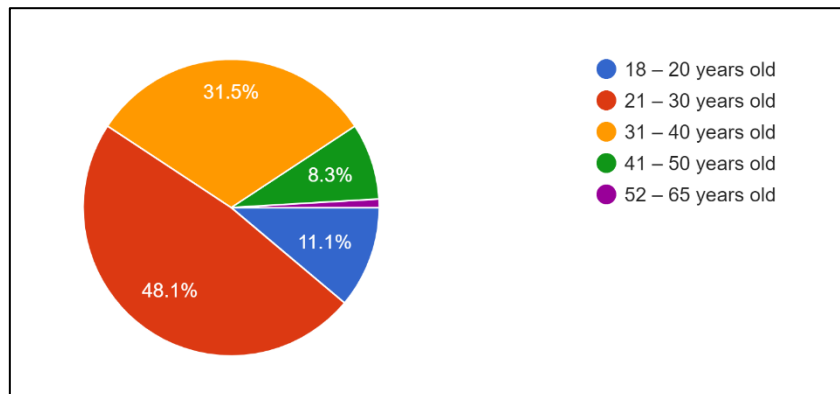
Figure 4.2

Table 4.3: Age

(Sources: SPSS Output)

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 – 20 years old	12	11.1	11.1	11.1
	21 – 30 years old	52	48.1	48.1	59.3
	31 – 40 years old	34	31.5	31.5	90.7
	41 – 50 years old	9	8.3	8.3	99.1
	51 – 65 years old	1	.9	.9	100.0
	Total	108	100.0	100.0	

Table 4.3 shows the age range of respondent are 18 years old to 65 years old above. It is apparent that majority of respondents were 21 to 30 years old which around 52 respondents (48.1%). The next followed by 31 to 40 years old which around 34 respondents (31.5%), 12 respondents of 18 to 20 years old (11.1%), 9 respondents of 41 to 50 years old (8.3%), and only 1 respondent were aged 51 to 65 years old which is 9%.

4.3.3 Races
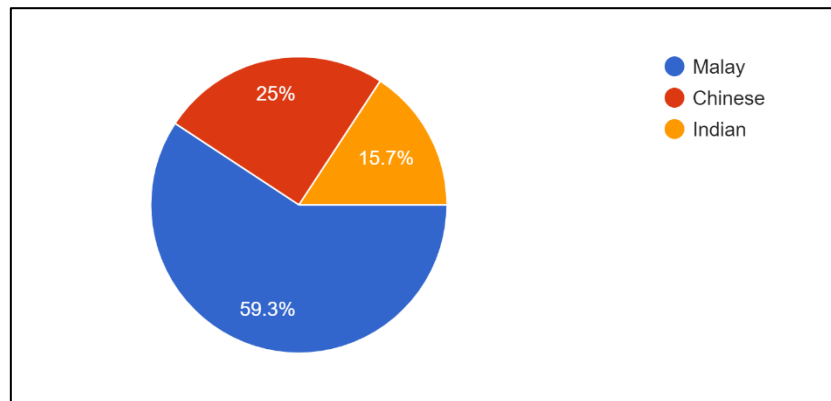
Figure 4.3

Table 4.4: Races

(Sources: SPSS Output)

Races

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	64	59.3	59.3	59.3
	Chinese	27	25.0	25.0	84.3
	Indian	17	15.7	15.7	100.0
	Total	108	100.0	100.0	

Table 4.4 shows the races of 108 respondent. The majority races are 64 respondents from Malay which is 59.3%. Next, 27 respondents from Chinese which is 25% and 17 respondents from Indian which is 15.7%.

4.3.4 Educational Level
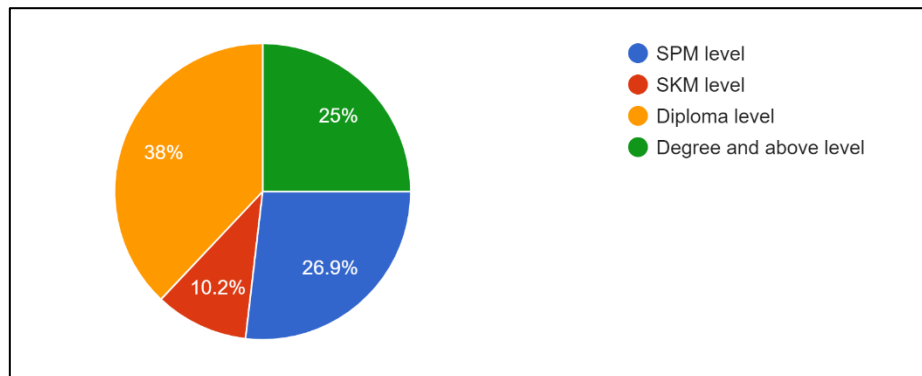
Figure 4.4

Table 4.5: Education level

(Sources: SPSS Output)

Educational level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Spm level	29	26.9	26.9	26.9
	Skm level	11	10.2	10.2	37.0
	Diploma level	41	38.0	38.0	75.0
	Degree and above level	27	25.0	25.0	100.0
	Total	108	100.0	100.0	

Table 4.5 shows the educational level of 108 respondents. The educational level starts from SPM level to Bachelor Degree and above. The majority of respondents have Diploma level which is 41 respondents (38.0%). The next followed by SPM level which is 29 respondents (26.9%), 27 respondents from Degree and above level (25%), and only 11 respondents are SKM level (10.2%).

4.3.5 Current position
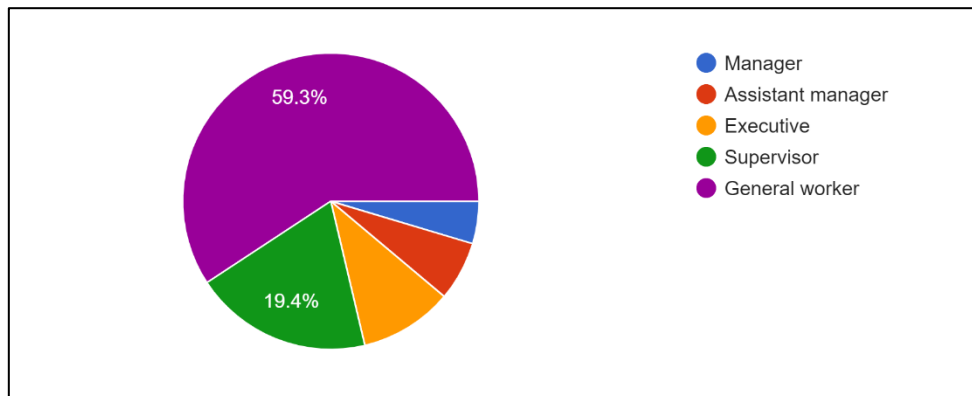
Figure 4.5

Table 4.6: Current Position

(Sources: SPSS Output)

Current position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	5	4.6	4.6	4.6
	Assistant Manager	7	6.5	6.5	11.1
	Executive	11	10.2	10.2	21.3
	Supervisor	21	19.4	19.4	40.7
	General worker	64	59.3	59.3	100.0
	Total	108	100.0	100.0	

Table 4.6 show the current position of 108 respondents. The most position is general worker which is 64 respondents (59.3%). The next followed is supervisor which is 21 respondents (19.4%), Executive which is 11 respondents (10.2%), Assistant Manager which is 7 respondents (6.5%), and for Manager is only 5 respondents (4.6%).

4.3.6 Working Experience
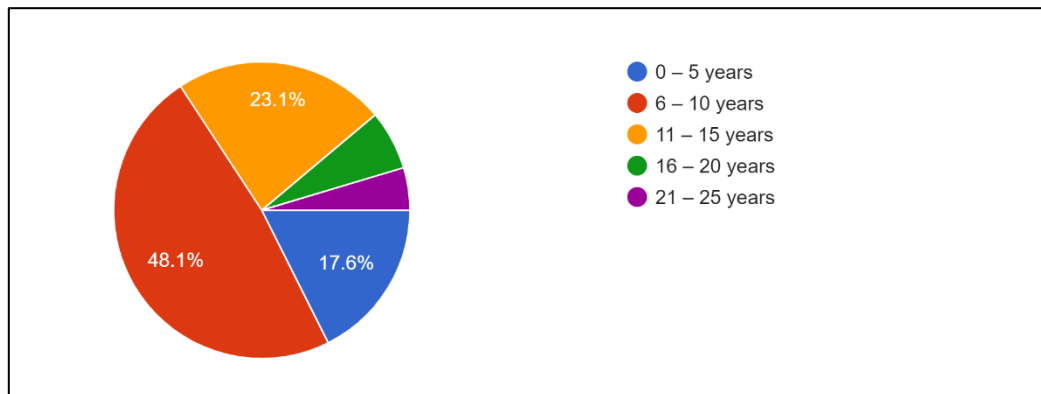
Figure 4.6

Table 4.7: Working experience

(Sources: SPSS Output)

Long work in company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 – 5 years	19	17.6	17.6	17.6
	6 – 10 years	52	48.1	48.1	65.7
	11 – 15 years	25	23.1	23.1	88.9
	16 – 20 years	7	6.5	6.5	95.4
	21 – 25 years	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

Table 4.7 shows the working experience for 108 respondents. The working duration is 1 year to 25 years. The majority of respondent for working duration in that company is from 6 to 10 years which is 52 respondents (48.1%). The next followed by 11 to 15 years which is 25 respondents (23.1%), 19 respondents which is 0 to 5 years (17.6%), 7 respondents which is 16 to 20 years (6.5%), and only 5 respondents which is 21 to 25 years (4.6%).

4.4 Descriptive Statistic on Independent Variable

The descriptive analysis is used to analyse the independent variables which were limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing in this research. The central tendency measurement was conducted. The mean, medium, and mode of variables is identified by descriptive analysis.

4.4.1 Independent Variable: limited ICT infrastructure

Table 4.8: Limited ICT infrastructure

(Sources: SPSS Output)

Statistics		Integrate different software applications is important	ICT technology is changing so quickly
N	Valid	108	108
	Missing	0	0
Mean		3.94	3.84
Median		4.00	4.00
Mode		5	4
Std. Deviation		1.049	.997

From Table 4.8 shows the descriptive statistic for limited ICT infrastructure. The mean value for the items in LI ranges from 3.84 to 3.94, which shows that respondents mostly agree with the statements in the items of LI.

4.4.2 Independent Variable: Lack of internet speed

Table 4.9: Lack of internet speed

(Sources: SPSS Output)

Statistics

		Internet slowness can also be caused by computer viruses	Internet speed can be impacted by local Internet congestion
N	Valid	108	108
	Missing	0	0
Mean		3.75	3.74
Median		4.00	4.00
Mode		5	4
Std. Deviation		1.216	1.062

As displayed in Table 4.9, it shows the result from the descriptive analysis for lack of internet speed, and the mean for all items ranging from 3.74 to 3.75. from the mean values, it can be concluded that most of the respondents somewhat agree with the items in the LIS.

4.4.3 Independent Variable: Lack of digital competencies

Table 4.10: Lack of digital competencies

(Sources: SPSS Output)

Statistics

		Lack of training and qualification employee	Lack of a digital mentality is one of the biggest obstacles in the logistics industry
N	Valid	108	108
	Missing	0	0
Mean		3.86	3.82
Median		4.00	4.00
Mode		5	4
Std. Deviation		1.080	1.084

Next, Table 4.10 displays the result of the descriptive analysis for lack of digital competencies. The result of the mean values of the variable range between 3.82 to 3.86. This could mean that the respondents somewhat agree to the items.

4.4.4 Independent Variable: Lack of an effective strategy

Table 4.11: Lack of an effective strategy

(Sources: SPSS Output)

Statistics

		Companies need a clear plan	It's important to get everyone involved
N	Valid	108	108
	Missing	0	0
Mean		3.89	3.95
Median		4.00	4.00
Mode		5	5
Std. Deviation		1.113	1.054

As for the lack of an effective strategy, the descriptive analysis is displayed in Table 4.11. Here, the result of the mean value show that it ranges from 3.89 to 3.95. The value of means could be interpreted that most of the respondents agreed with the statements in the items.

4.4.5 Independent Variable: Lack of organizational agility

Table 4.12: Lack of organizational agility

(Sources: SPSS Output)

Statistics

		Organizations need to be more open and proactive	Management need balance between the new technology and the existing organisational
N	Valid	108	108
	Missing	0	0
Mean		3.90	3.84
Median		4.00	4.00
Mode		4	5
Std. Deviation		.966	1.069

From Table 4.12 shows the descriptive statistic for lack of organizational agility. The mean value for the items in LOA ranges from 3.84 to 3.90, which shows that respondents mostly agree with the statements in the items of LOA.

4.4.6 Independent Variable: Lack a culture of collaboration and sharing

Table 4.13: Lack a culture of collaboration and sharing

(Sources: SPSS Output)

Statistics

		Everyone participation is important to the success of the digital revolution	Set of shared values makes employees excited to come to work every day
N	Valid	108	108
	Missing	0	0
Mean		3.92	4.06
Median		4.00	4.00
Mode		4	5
Std. Deviation		.939	1.003

As displayed in Table 4.13, it shows the result from the descriptive analysis for lack a culture of collaboration and sharing, and the mean for all items ranging from 3.92 to 4.06. from the mean values, it can be concluded that most of the respondents somewhat agree with the items in the LCS.

4.5 Pearson's Correlation Coefficients Analysis

Pearson's Correlation was mentioned as a tool for analyzing data in Chapter 3 of the study. The strength of a linear relationship between an independent variable and a dependent variable can be measured by Pearson's Correlation Coefficient (r). It's a way to analyze the stability of the strength relationship between the data points (Saunders et al., 2016). Table 4.14 showed the guidelines of Pearson's Correlation Coefficients.

Table 4.14: Pearson's Correlation Coefficients
(Sources: Saunders, Lewis and Thornhill, 2016)

Pearson's Correlation Coefficient (R-values)	Interpretation
±0.70 to ±1.0	Very strong relationship
±0.40 to ±0.69	Strong relationship
±0.30 to ±0.39	Moderate relationship
±0.20 to ±0.29	Weak relationship
±0.01 to ±0.19	No relationship

Table 4.15: Correlation Analysis for all variables

(Sources: SPSS Output)

Correlations		Limited ICT	Internet speed	Digital competencies	Effective strategy	Organizational agility	Collaboration and sharing	Barriers of digitalization
limited ICT	Pearson Correlation	1	.756**	.888**	.837**	.774**	.806**	.753**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	108	108	108	108	108	108	108
Internet speed	Pearson Correlation	.756**	1	.734**	.827**	.728**	.762**	.657**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	108	108	108	108	108	108	108
Digital competencies	Pearson Correlation	.888**	.734**	1	.787**	.797**	.783**	.772**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	108	108	108	108	108	108	108
Effective strategy	Pearson Correlation	.837**	.827**	.787**	1	.756**	.768**	.706**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	108	108	108	108	108	108	108
Organizational agility	Pearson Correlation	.774**	.728**	.797**	.756**	1	.752**	.740**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	108	108	108	108	108	108	108
Collaboration and sharing	Pearson Correlation	.806**	.762**	.783**	.768**	.752**	1	.750**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	108	108	108	108	108	108	108
Barriers of digitalization	Pearson Correlation	.753**	.657**	.772**	.706**	.740**	.750**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	108	108	108	108	108	108	108
**. Correlation is significant at the 0.01 level (2-tailed).								

From table 4.15, the independent variables in this research are limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing while the dependent variable is barrier of digitalization. The correlation value for limited ICT infrastructure was 0.753 with a significant level 0.000 (p<0.01). This showed that there was a very strong relationship between limited ICT infrastructure and barrier of digitalization. Next, the correlation value for the lack of internet speed was 0.657 with significant level 0.000 (p<0.01). It was also a strong relationship between lack of internet speed and barrier of digitalization. Third, the correlation value for the lack of digital competencies was 0.772 with significant level 0.000 (p<0.01). This is the higher correlation in this research. There was a very strong relationship between lack of digital competencies and barrier of digitalization. Furthermore, the correlation value for the lack of an effective strategy was 0.706 with significant level 0.000 (p<0.01). There was a very strong relationship between lack of an effective strategy and barrier of digitalization. Moreover, the correlation value for lack of organizational agility was 0.740 with significant level 0.000 (p<0.01). There was a very strong relationship between lack of organizational agility and barrier of digitalization. Lastly, lack a culture of collaboration and sharing was 0.750 with significant level 0.000 (p<0.01). There was a very strong relationship between lack a culture of collaboration and sharing and barrier of digitalization.

4.5.1 Limited ICT infrastructure

Table 4.16: Correlation between Limited ICT infrastructure and Barrier of digitalization

(Sources: SPSS Output)

		Limited ICT infrastructure	Barrier of digitalization.
Limited ICT infrastructure	Pearson Correlation Sig. (2-tailed) N	1 108	.753** .000 108
Barrier of digitalization.	Pearson Correlation Sig. (2-tailed) N	.753** .000 108	1 108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.16 showed the correlation between limited ICT infrastructure and barrier of digitalization. The Pearson Correlation value is 0.753 which is a very strong relationship between limited ICT infrastructure and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of p<0.001. Hence, limited ICT infrastructure will have impact barrier of digitalization.

4.5.2 Lack of internet speed

Table 4.17: Correlation between Lack of internet speed and Barrier of digitalization (Sources: SPSS Output)

		Lack of internet speed	Barrier of digitalization.
Lack of internet speed	Pearson Correlation	1	.657**
	Sig. (2-tailed)		.000
	N	108	108
Barrier of digitalization.	Pearson Correlation	.657**	1
	Sig. (2-tailed)	.000	
	N	108	108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.17 showed the correlation between lack of internet speed and barrier of digitalization. The Pearson Correlation value is 0.657 which is a strong relationship between lack of internet speed and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of p<0.001. Hence, lack of internet speed will have impact barrier of digitalization.

4.5.3 Lack of digital competencies

Table 4.18: Correlation between Lack of digital competencies and Barrier of digitalization

(Sources: SPSS Output)

		Lack of digital competencies	Barrier of digitalization.
Lack of digital competencies	Pearson Correlation Sig. (2-tailed) N	1 108	.772** .000 108
Barrier of digitalization.	Pearson Correlation Sig. (2-tailed) N	.772** .000 108	1 108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.18 showed the correlation between lack of digital competencies and barrier of digitalization. The Pearson Correlation value is 0.772 which is a very strong relationship between lack of digital competencies and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of p<0.001. Hence, lack of digital competencies will have impact barrier of digitalization.

4.5.4 Lack of an effective strategy

Table 4.19: Correlation between Lack of an effective strategy and Barrier of digitalization

(Sources: SPSS Output)

		Lack of an effective strategy	Barrier of digitalization.
Lack of an effective strategy	Pearson Correlation	1	.706**
	Sig. (2-tailed)		.000
	N	108	108
Barrier of digitalization.	Pearson Correlation	.706**	1
	Sig. (2-tailed)	.000	
	N	108	108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.19 showed the correlation between lack of an effective strategy and barrier of digitalization. The Pearson Correlation value is 0.706 which is a very strong relationship between lack of an effective strategy and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of p<0.001. Hence, lack of an effective strategy will have impact barrier of digitalization.

4.5.5 Lack of organizational agility

Table 4.20: Correlation between Lack of organizational agility and Barrier of digitalization

(Sources: SPSS Output)

		Lack of organizational agility	Barrier of digitalization.
Lack of organizational agility	Pearson Correlation Sig. (2-tailed) N	1 108	.740** .000 108
Barrier of digitalization.	Pearson Correlation Sig. (2-tailed) N	.740** .000 108	1 108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.20 showed the correlation between lack of organizational agility and barrier of digitalization. The Pearson Correlation value is 0.740 which is a very strong relationship between lack of organizational agility and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of $p<0.001$. Hence, lack of organizational agility will have impact barrier of digitalization.

4.5.6 Lack a culture of collaboration and sharing

Table 4.21: Correlation between Lack a culture of collaboration and sharing and Barrier of digitalization

(Sources: SPSS Output)

		Lack a culture of collaboration and sharing	Barrier of digitalization.
Lack a culture of collaboration and sharing	Pearson Correlation Sig. (2-tailed)	1	.750** .000
	N	108	108
Barrier of digitalization.	Pearson Correlation Sig. (2-tailed)	.750** .000	1
	N	108	108
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4.21 showed the correlation between lack a culture of collaboration and sharing and barrier of digitalization. The Pearson Correlation value is 0.750 which is a very strong relationship between lack a culture of collaboration and sharing and barrier of digitalization. The correlation is significant at the 0.01 level (2-tailed) which proved that the two perceptions have efficiency of p<0.001. Hence, lack a culture of collaboration and sharing will have impact barrier of digitalization.

4.6 Multiple Regression Analysis

Multiple regression analysis is used to measure the significant relationship between independent variables (Limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing) and dependent variable (barrier of digitalization). It is statistical tool to measure the relationship of strength of a cause and effect between independent variable and dependent variable.

Table 4.22: Model Summary of Multiple Regression Analysis

(Sources: SPSS Output)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.820ª	.672	.653	.45816
a. Predictors: (Constant), LCS, LOA, LIS, LDC, LES, LI				
b. Dependent Variable: BOD				

Table 4.22 showed the model summary that illustrates the relationship between the independent variables and dependent variable. The correlation coefficient value (R) is 0.820. This showed that there was a strong correlation between the variables. Next, the coefficient of determinant, R square showed value 0.672 which means that the barrier of digitalization was affected by independent variables with 67.8%. The other 32.2% was other factors which are not involved in this research. The adjusted R square showed 65.3%.

Table 4.23: ANOVA analysis

(Sources: SPSS Output)

<table>
<tr><td colspan="7" align="center">ANOVAª</td></tr>
<tr><td colspan="2">Model</td><td>Sum of Squares</td><td>df</td><td>Mean Square</td><td>F</td><td>Sig.</td></tr>
<tr><td rowspan="3">1</td><td>Regression</td><td>43.481</td><td>6</td><td>7.247</td><td>34.524</td><td>.000ᵇ</td></tr>
<tr><td>Residual</td><td>21.201</td><td>101</td><td>.210</td><td></td><td></td></tr>
<tr><td>Total</td><td>64.682</td><td>107</td><td></td><td></td><td></td></tr>
<tr><td colspan="7">a. Dependent Variable: BOD</td></tr>
<tr><td colspan="7">b. Predictors: (Constant), LCS, LOA, LIS, LDC, LES, LI</td></tr>
</table>

Table 4.23 showed the F-test value was 34.524 with a significant level 0.000. The significant level was lower than 0.05 thus the researcher can conclude that there is a significant relationship between independent variables (limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing) and dependent variable (barrier of digitalization). The null hypothesis would be rejected as the significant level of regression model is more than 0.05.

Table 4.24: Coefficient of Multiple Regression Analysis

(Sources: SPSS Output)

Coefficientsª						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig
1	(Constant)	1.138	.219		5.210	.000
	LI	.066	.123	.078	.537	.592
	LIS	-.028	.081	-.038	-.349	.728
	LDC	.277	.108	.285	2.110	.037
	LES	.055	.098	.071	.564	.574
	LOA	.190	.089	.222	2.123	.036
	LCS	.245	.098	.272	2.502	.014
a. Dependent Variable: Barrier of Digitalization						

Table 4.24 showed the beta value of independent variables which limited ICT infrastructure (LI) was 0.066, lack of internet speed (LIS) was -0.028, lack of digital competencies (LDC) was 0.277, lack of an effective strategy (LES) was 0.055, lack of organizational agility (LOA) was 0.190 and lack a culture of collaboration and sharing (LCS) was 0.245. Based on ascending order, the least significant of beta value was lack of internet speed, next lack of an effective strategy, then limited ICT infrastructure, thus lack of organizational agility, then lack a culture of collaboration and sharing and lack of digital competencies have the most significant beta value. The linear equation of Multiple Regression Analysis (MRA) was Y=a+bX1+cX2, thus Barrier of Digitalization = 1.138 + 0.066 LI - 0.028 LIS + 0.277 LDC + 0.055 LES + 0.190 LOA + 0.245 LCS

4.7 Hypothesis Testing

i: Limited ICT infrastructure

(H0): There is no significant relationship between limited ICT infrastructure to barriers of digitalization

(H1): There is a significant relationship between limited ICT infrastructure to barriers of digitalization

Accept H0

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of limited ICT infrastructure toward barriers of digitalization is 0.592. Therefore, there is no significant relationship between limited ICT infrastructure to barriers of digitalization as the significant value is more than 0.05. The null hypothesis (H0) is accepted and alternative hypothesis (H1) is rejected.

ii. Lack of internet speed

(H0): There is no significant relationship between lack of internet speed to barriers of digitalization

(H2): There is a significant relationship between lack of internet speed to barriers of digitalization

Accept H0

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of lack of internet speed toward barriers of digitalization is 0.728. Therefore, there is no significant relationship between lack of internet speed to barriers of digitalization as the significant value is more than 0.05. The null hypothesis (H0) is accepted and alternative hypothesis (H2) is rejected.

iii. Lack of digital competencies

(H0): There is no significant relationship between lack of digital competencies to barriers of digitalization

(H3): There is a significant relationship between lack of digital competencies to barriers of digitalization

Accept H3

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of lack of digital competencies toward barriers of digitalization is 0.037. Therefore, it proves that there is a significant relationship between lack of digital competencies to barriers of digitalization as the significant value is less than 0.05. The alternative hypothesis (H3) is accepted and null hypothesis (H0) is rejected.

iv. Lack of an effective strategy

(H0): There is no significant relationship between lack of an effective strategy to barriers of digitalization

(H4): There is a significant relationship between lack of an effective strategy to barriers of digitalization

Accept H0

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of lack of an effective strategy toward barriers of digitalization is 0.574. Therefore, there is no significant relationship between lack of an effective strategy to barriers of digitalization as the significant value is more than 0.05. The null hypothesis (H0) is accepted and alternative hypothesis (H4) is rejected.

v. Lack of organizational agility

(H0): There is no significant relationship between lack of organizational agility to barriers of digitalization

(H5): There is a significant relationship between lack of organizational agility to barriers of digitalization

Accept H5

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of lack of digital skill toward barriers of digitalization is 0.036. Therefore, it proves that there is a significant relationship between lack of digital skill to barriers of digitalization as the significant value is less than 0.05. The alternative hypothesis (H5) is accepted and null hypothesis (H0) is rejected.

vi. Lack of a culture of collaboration and sharing

(H0): There is no significant relationship between lack of a culture of collaboration and sharing to barriers of digitalization

(H6): There is a significant relationship between lack of a culture of collaboration and sharing to barriers of digitalization

Accept H6

Table 4.24 showed the result of coefficient of multiple regression analysis. The significant value of lack of a culture of collaboration and sharing toward barriers of digitalization is 0.014. Therefore, it proves that there is a significant relationship between lack of a culture of collaboration and sharing to barriers of digitalization as the significant value is less than 0.05. The alternative hypothesis (H6) is accepted and null hypothesis (H0) is rejected.

4.8 Discussion on Result and Findings

The data analysis results showed there is no positively impact between limited ICT infrastructure, lack of internet speed and lack of an effective strategy with barriers of digitalization. However, there is positively impact between lack of digital competencies, lack of digital skill and lack of a culture of collaboration and sharing.

4.8.1 The relationship limited ICT infrastructure of barriers digitalization in transportation industry

Pokharel (2017) looked at how transport and logistics companies were using ICT. From a technical point of view, ICT adoption could be made easier by a good infrastructure, the availability of technology that meets the needs of the industry, and how industry managers are financially motivated. The researcher also refers to (Helo and Szekely, 2017) analysed the available software, weighed its advantages and stressed the need for standardised approaches and cross-platform compatibility. It proved that the mode showed in Table 4.8 that the respondent strongly agrees with integrate different software applications is

important. However, the SPSS output showed there is no significant relationship between limited ICT infrastructure to barriers of digitalization because of the agree response from ICT technology is changing so quickly. Thus, the hypothesis testing is rejected. The researcher is suggested to place this part on demographic background to have clearly sight on what limited ICT infrastructure that most of the respondent deal with. Based on the demographic background of the respondents, most of the respondents are between 21 to 30 years old, and most of them are general worker. It means that they as employee who work every day are more involve to the ICT infrastructure who is changing so quickly.

4.8.2 The relationship between lack of internet speed of barriers digitalization in transportation industry

Malware and viruses can slow down Internet connection, but there are other factors at play such as the size of hard drive, the condition of computers components, and the applications running. Internet connectivity is vulnerable to computer health (Charlotte king, 2015). From Table 4.9, the mode showed that the respondents strongly agree with internet slowness can also be caused by computer viruses. In chapter 2, the researcher had mentioned the browser has similar system resource needs to other computer programmes including processor speed, memory, and storage space. However, the SPSS output showed there is no significant relationship between lack of internet of barrier digitalization because of the agree response from internet speed can be impacted by local Internet congestion. Thus, the hypothesis testing is rejected. The researcher is suggested to place this part on demographic background to have a clearly sight on internet slowness can also be caused by computer viruses that most of the respondent deal with. The researcher conclude that the computer virus is cause to internet slowness. Based on the demographic background of the respondents, most of the respondents are between 21 to 30 years old, and most of them are general worker. It means they are more approach to internet and it's important to keep antivirus software active at all times.

4.8.3 The relationship between lack of digital competencies of barriers digitalization in transportation industry

Lack of digital competencies is among the most essential difficulties in logistics organisations (Veltkamp & Schulte, 2020; Rohleder & Schulte, 2020; Barthel, 2020). Determining the extent to which employees and managers already have a digital mindset is a necessary first step in defining the steps needed to successfully implement the digital mindset (Okechukwu, 2016; Töytari, 2017; Ivanov, 2018; Gimpel, 2018). Furthermore, there is a significant relationship between lack of digital competencies to barriers of digitalization. Thus, the hypothesis testing is accepted. Therefore, the researcher found that respondents was strongly agree with lack of training and qualification employee and lack of a digital mentality is one of the biggest obstacles in the logistics industry cause the lack of digital competencies. The researcher can summarize that the content inside the lack of digital competencies is good indicator because refers to Chapter 2, vouchers for digitization from the state can help overcome technical constraints like data protection and security and investment expenditures. It also effects their regular operations while also focusing on the digital transformation.

4.8.4 The relationship between lack of an effective strategy of barriers digitalization in transportation industry

An effective transition is guaranteed once the strategy is put into action. Companies need a clear plan to ensure a seamless transition from the traditional to the digital workplace (Fred Wilson, 2022). From Table 4.11, the mode showed that the respondents strongly agree with companies need a clear plan and it's important to get everyone involved. However, the SPSS output showed there is no significant relationship between lack of an effective strategy to barriers of digitalization. Thus, the hypothesis testing is rejected. The researcher is suggested to place this part in demographic background to have a clearly sight on what barrier digitalization that most of the respondents deal with. Based on the demographic background of the respondents, most of the respondents are between 21 to 30 years old, and most of them are general worker. It means that things might go horribly wrong when there is no strategy in place. It's important to get everyone who has a stake in the outcome involved, to make sure everyone knows what's at stake, and to ensure that everyone has a firm grasp on the process's finer points. The researcher refers to Chapter 2, (Fred Wilson, 2022) things might go horribly wrong when there is no strategy in place. Hence, individuals taking the

plunge into digital transformation are breaking with established standards. There may be repercussions for both the company and its employees as a result of the abrupt transition.

4.8.5 The relationship between lack of organizational agility of barriers digitalization in transport industry

People typically react negatively to change because it requires them to venture into the unknown. Therefore, any of the 16 attempts to introduce change will pose significant difficulties for the organization's leaders at all levels (McConnell, 2018). In-depth research on the organisational barriers to Digital Transformation is highly relevant because they are among the most significant obstacles faced by large companies on their transformation path. Furthermore, there is a significant relationship between lack of organizational agility to barriers of digitalization. Thus, the hypothesis testing is accepted. Therefore, the researcher found that respondents was strongly agree with management need balance between the new technology and the existing organisational and agree with organizations need to be more open and proactive is one of the biggest obstacles in the logistics industry cause the lack of organizational agility. The researcher can summarize that the content inside the lack of organizational agility is good indicator because successfully managing organisational resistance and by addressing the human capital perspective to change is arguably more important than managing other components of the difficulty based on Chapter 2. Hence, it is essential for management to strike a balance between the new technology and the company's existing organisational and human resources.

4.8.6 The relationship between lack of a culture of collaboration and sharing of barriers digitalization in transportation industry

Realizing that digitization is fundamentally about people rather than just data, technologies, and systems is of critical importance. Culture the set of shared values and beliefs that makes employees excited to come to work every day, can't be driven by it (Peter-Anthony Glick, 2021). Furthermore, there is a significant relationship between lack of collaboration and sharing to barriers of digitalization. Thus, the hypothesis testing is accepted. Therefore, the researcher found that respondents was strongly agree with set of shared values makes employees excited to come to work every day and agree with Everyone

participation is important to the success of the digital revolution is one of the biggest obstacles in the logistics industry cause the lack of collaboration and sharing. The researcher can summarize that the content inside the lack of collaboration and sharing is good indicator because the company's leadership can't force workers to make the switch to digital operations but leaders must focus on altering the mindset of everyone in the business, as well as the organisational culture and practises. In the Chapter 2, researcher can conclude this is the only way to inspire a company-wide shift in culture and, ultimately, in the way it serves its consumers.

4.9 Summary

In chapter 4, the researcher has analysed the data collected from the respondent. All of the data was analysed by SPSS software version 20.0. The researcher imported the data into SPSS and used reliability analysis for pilot test, descriptive analysis, Pearson's Correlation Coefficient analysis and ANOVA analysis. The data outputs showed that the relationship between independent variable and dependent variable. The result showed that the limited ICT infrastructure, lack of internet speed and lack of an effective strategy have no significant relationship with barriers of digitalization while the lack of digital competencies, lack of organizational agility and lack of a culture of collaboration and sharing have a significant relationship with barriers of digitalization. In next chapter, the researcher will discuss about the result outcome, limitation and recommendation of the overall research.

CHAPTER 5

DISCUSSION, RECOMMENDATION AND CONCLUSION

5.1 Introduction

In this chapter, the researcher discussed about the conclusion of the overall result. The summary of the findings will be explained. The summary of the findings is elaborated in the first section of this chapter while the justification of the research objective is explained in the second section. The third section is discussed about the limitation of the study. Lastly, the fourth section is described about the recommendations for the future study.

5.2 Fulfilment of Research Objectives

The result of the research will be result of the study in seeking the barriers to digitalization in transportation industry at SCH logistic company. This research will provide result that have important research objectives related to the factors of limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing. All the research objectives will be discussed below.

5.2.1 To identify the technical barriers limited ICT infrastructure of barriers digitalization in transportation industry

The research has successfully found out the technical barriers limited ICT infrastructure of barriers digitalization in transportation industry. The first question is limited ICT infrastructure. In conducting digitalization in transportation industry, employee need to have knowledge in different software and ICT technology. As a result of limited ICT infrastructure as the basis for make a good company. It is found that factor of limited ICT infrastructure is need to be improved in SCH logistic company. Hence, limited ICT infrastructure is important to company that make their employee can proficient in different software and ICT technology to avoid the barriers. Finding the technical barrier contributes to digitalization is a must. The researcher can conclude company need to make their employee use ICT infrastructure usually.

5.2.2 To identify the technical barriers lack of internet speed of barriers digitalization in transportation industry

The research has successfully found out technical barriers lack of internet speed of barriers digitalization in transportation industry. The second question is lack internet speed. In conducting digitalization in transportation industry, employee need to have a knowledge in internet speed like it caused by computer virus and local internet congestion. As a result, lack of internet speed can make the company make the delivery process using transportation will have negative impacted. It is found that factor of lack of internet speed is need to be improved in SCH logistic company. Hence, lack of internet speed is important to company that make their employee aware of computer virus and need to manage their time when using internet to avoid local internet congestion. When the company can solve this problem, they can avoid the barrier to digitalization. Finding the technical barrier contributes to digitalization is a must. The researcher can conclude company need to make their employee manage the internet speed wisely.

5.2.3 To identify the technical barriers lack of digital competencies of barriers digitalization in transportation industry

The third question is lack of digital competencies. The research has successfully found out technical barriers lack of digital competencies is very important to barriers digitalization in transportation industry. This is because lack of training and qualification employee and lack of a digital mentality is one of the biggest obstacles in the logistics industry cause the lack of digital competencies. The employee in SCH logistic company strongly agree with these digital competencies because the company have managed their company with good environment. Finding the technical barrier contributes to digitalization for this variable is outstanding. The researcher can conclude these digital competencies get approval and accepted for this company. The company can get a good profit and can survive in transportation industry. The researcher can conclude company need to make their employee use digital competencies infrastructure usually.

5.2.4 To understand organizational barriers lack of an effective strategy of barriers digitalization in transportation industry

The research has successfully found out organizational barriers lack of an effective strategy of barriers digitalization in transportation industry. The fourth question is lack of an effective strategy. In conducting digitalization in transportation industry, employee need to have a knowledge in effective strategy like a clear plan and get everyone involved in company. As a result, lack of an effective strategy can get the company more in trouble because not having a good plan. It is found the factor lack of an effective strategy is need to be improved by this company to makes sure they in a good way. Hence, when this company have a good plan and make everyone involved in meeting it can solve this lack of an effective strategy. When the company can solve this problem, they can avoid the barrier to digitalization. Finding the organizational barrier contributes to digitalization is a compulsory. The researcher can conclude when everyone involved in company strategy it can make a good result in transportation industry.

5.2.5 To understand organizational barriers lack of organizational agility of barriers digitalization in transport industry

The fifth question is lack of organizational agility. The research has successfully found out organizational barriers lack of organizational agility is essential of barriers digitalization in transport industry. This management need to more open proactive and need to balance between new and existing technology. The employee in SCH logistic company strongly agree with this organizational agility because when management can manage their company properly their employee will happy in working time. Finding the organizational barrier contributes to digitalization for this variable is successful. The researcher can conclude this organizational agility get approval and accepted for this company. When a management can control a lack of organizational agility it can benefited human resource and the transformation of organizational agility.

5.2.6 To understand organizational barriers lack of a culture of collaboration and sharing of barriers digitalization in transportation industry

The research has successfully found out organizational barriers lack of a culture of collaboration and sharing is fundamental of barriers digitalization in transportation industry. The sixth question is lack of a culture of collaboration and sharing. The everyone participation in digital revolution and set shared values to make employee happy environment is the most crucial things in culture of collaboration and sharing. The employee in SCH logistic company strongly agree with this culture of collaboration and sharing because when company give them a reward, they can hardworking and take the task with seriously. Finding the organizational barrier contributes to digitalization for this variable is great. The researcher can conclude this culture of collaboration and sharing get approval and accepted for this company. When the company management have a good relationship between employee, the employee will give the best service to the company.

5.3 Summary of the findings

The researcher finished the data analysis of the demographic variables. The total respondent was 108 and demographic background provided from them included gender, age, race, educational level, current position and working experience. From the data output, the majority respondents were male. The major age range of respondent was 21 to 30 years old. For the race majority is Malay. For the current position educational level, most of the respondent were general worker and have Diploma level. Last but not least, the most respondent answer is 6 to 10 years for working experience.

In the Pearson's Correlation Coefficients analysis, the correlation analysis and the relationship of six independent variables and one dependent variable had been tested. The independent variable was limited ICT infrastructure, lack of internet speed, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing and dependent variable was barrier of digitalization. There was only strong relationship for lack of internet speed with barrier of digitalization. There was a very strong relationship between limited ICT infrastructure, lack of digital competencies, lack of an effective strategy, lack of organizational agility and lack a culture of collaboration and sharing with barrier of digitalization.

In the Multiple Regression analysis, the relationship between independent variables and dependent variable had been determined. The correlation coefficient value (R) showed that there was a moderate correlation between the variables. Based on ANOVA analysis, the researcher can conclude that there is a significant relationship between independent variables as the significant level of regression model is below 0.05.

5.4 Limitation of the Study

The following limitations restrict the findings presented in this study. The first limitation is this study only focused on the SCH logistic company which is around 150 employees from the company. Therefore, this finding could not be generalized to cover all logistic company in Melaka. It is difficult to find more respondents to fill in the questionnaire and sometimes the questionnaire was ignored by the respondent after the researcher sent it through email. Unfortunately, there was 108 respondents involved in this research. The data result will become less accurate and consistent. The last limitation faced by researcher was the data accuracy. All of the question in the survey form were provided choice and selection. Thus, some of the respondents are just ticking the form without reading the question properly. It will decrease the accuracy of data analysis and impact the data result.

5.5 Recommendation for the Future Study

This research is about the barriers to digitalization in transportation industry. There are some suggestion and recommendations from the researcher to people who conduct a similar study. All of the suggestions are to make the future study more perfect.

A large sample size and population are required in this research. The employee in industry especially is exposed to barriers of digitalization. Therefore 150 respondents and above are required to make the future data results more accurate and perfect. Besides, the researcher in the future study should find the old generation as their respondents which the age range is between 31 to 40 years old because they are the people with experience in barriers of digitalization.

The researcher in the future study is suggested to divide the respondent into different categories such as the variety transportation in logistic. This is because the transportation has many categories such as lorry, ship, aeroplane and train. With this kind of transportation, they can have different response to the questionnaire. To produce an accurate data result, this step is required.

Next, the researcher in the future study can use the qualitative method to carry out the research. The qualitative methods include interviews or experiment. This way can make the researcher obtain specific information and direct response from the respondents. Sometimes the researcher can get feedback out of the questionnaire. This result in the researcher can have more explanation and discussion in the research.

Last but not least, the researcher is suggested to put the questionnaire regarding the internet and digital transformation in demographic background of the respondents, so that it can be clearly see that what internet and what digital transformation that they deal with.

5.6 Conclusion

In conclusion, the hypothesis testing show most of the respondents view the limited ICT infrastructure, lack of internet speed and lack of an effective strategy have no significant relationship with barriers of digitalization, thus null hypothesis (H0) are accepted. Besides, most of the respondent view the lack of digital competencies, lack of organizational agility and lack of a culture of collaboration and sharing have a significant relationship with barriers of digitalization, thus the alternative hypothesis (H3), (H5), (H6) are accepted. The findings of the study will benefit the digitalization in transportation as they can refer to this research to figure out the strategy to attract to attract the employee.

At the end of this chapter, the researcher explained the summary of the findings, limitations and recommendations of the study. In the summary of the findings, the researcher concludes the result based on data analysis and discussion in Chapter 4. For the limitation, the researcher listed out the problem facing in this research such as sample size and population, time limitation and accuracy of data collection. For the recommendation, the researcher was giving suggestion to make the future study more perfect. The recommendation included a large sample size, background of the respondents and using qualitative methods.

References

Aeologic. (2022, December 22). Digital Transformation of logistics and Transportation. Aeologic Blog. Retrieved January 11, 2023, from https://www.aeologic.com/blog/digital-transformation-of-transportation-and-logistics/

Bardakçi, H. (2020). Benefits of digitalization in international logistics sector. International Journal of Social Science and Economic Research, 5(06), 1476-1489.

Blogger, G. (2021, June 7). 5 trends of Digital Transformation in transportation and Logistics. 5 Trends of Digital Transformation in Transportation and Logistics. Retrieved May 22, 2022, from https://www.yoh.com/blog/5-trends-of-digital-transformation-in-transportation-and-logistics

Bogush, | P. (n.d.). 5 barriers to digital transformation you need to know and address. Businesstechweekly.com. Retrieved June 27, 2022, from https://www.businesstechweekly.com/operational-efficiency/digital transformation/barriers-to-digital-transformation/

Brennen, J. S., & Kreiss, D. (2016). Digitalization. The international encyclopedia of communication theory and philosophy, 1-11

Brink, H., Packmohr, S., & Paul, F. H. (2022, March). Extending a socio-technical model of the barriers to digital transformation through data triangulation. In 2022 8th International Conference on Information Management (ICIM) (pp. 68-74). IEEE.

Cichosz, M., Wallenburg, C. M., & Knemeyer, A. M. (2020). Digital transformation at logistics service providers: barriers, success factors and leading practices. The International Journal of Logistics Management, 31(2), 209-238.

Corlett. (2019, June 10). What is the difference between transportation and logistics? Utah Freight Delivery l Utah Trucking l Freight Shipping Utah l Corlett Express. Retrieved May 29, 2022, from https://corlettexpress.com/what-is-the-difference-between-transportation-and-logistics/

Cube Logistics. (2022, May 23). Know the difference between logistics and transport. Retrieved May 23, 2022, from https://www.20cube.com/blog/know-the-difference-between-logistics-and%20transport/#:~:text=Transportation%20focuses%20on%20the%20movement,packing%2C%20and%20transportation%20of%20goods.

Datapine. (2022, March 9). What is data analysis? methods, techniques, types & how-to. Retrieved June 19, 2022, from https://www.datapine.com/blog/data-analysis-methods-and-techniques/

Fastcoo. (2022, January 4). How does digitalization in Logistics Impact the industry? Retrieved January 11, 2023, from https://www.fastcoo.com/en/digitalization-in-logistics/

Gartner's. (2020, April 7). Gartner's 6 barriers for Digital Transformation. innovators. Retrieved July 17, 2022, from https://www.ideas4allinnovation.com/innovators/gartner-barriers-digital-transformation/

Glick, P.-A. (2021, March 10). How important is culture for a digital transformation? LinkedIn. Retrieved November 3, 2022, from https://www.linkedin.com/pulse/how-important-culture-digital-transformation-peter-anthony-glick

GmbH, T. I. M. O. C. O. M. (n.d.). Digitalisation challenges facing the transport industry. TIMOCOM. Retrieved June 11, 2022, from https://www.timocom.co.uk/company/newsroom/press-releases/biggest-digitalisation-challenges-facing-the-transport-industry

Gupta, S. (2018). Organizational barriers to digital transformation.

Iscoop. (2016, march 4). Digital Transformation in transportation and Logistics. i. (2022, May 1). Retrieved May 24, 2022, from https://www.i-scoop.eu/digital-transformation/transportation-logistics-supply-chain-management/

Jones, M. D., Hutcheson, S., & Camba, J. D. (2021). Past, present, and future barriers to digital transformation in manufacturing: A review. Journal of Manufacturing Systems, 60, 936-948.

King, C. (2018, August 3). 3 most common causes of slow internet connection. LinkedIn. Retrieved November 9, 2022, from https://www.linkedin.com/pulse/3-most-common-causes-slow-internet-connection-charlotte-king

Kocak, S., & Pawlowski, J. (2022). Digitalization Breakers: A Mixed Method For Finding The Concrete Barriers In The Craft Sector.

Lorena Benito, Gregorio Recio. (2016, July 10). Digitalization challenges in the logistics industry. Retrieved June 12, 2022, from https://nae.global/en/digitalization-challenges-in-the-logistics-industry/

Melendez, C. (2021, April 1). Council post: Five barriers to digital transformation and how to overcome them. Forbes. Retrieved July 27, 2022, from https://www.forbes.com/sites/forbestechcouncil/2021/04/01/five-barriers-to-digital-transformation-and-how-to-overcome-them/?sh=5785bd44b112

Monrat, A. A., Schelén, O., & Andersson, K. (2019). A survey of blockchain from the perspectives of applications, challenges, and opportunities. IEEE Access, 7, 117134-117151.

MoS Way. (2018, September 18). Volvo develops autonomous vehicle system for Logistics. Retrieved June 14, 2022, from https://www.onthemosway.eu/volvo-develops-autonomous-vehicle-system-for-logistics/

Nofer, M., Gomber, P., Hinz, O., & Schiereck, D. (2017). Blockchain. Business & Information Systems Engineering, 59(3), 183-187.

Packmohr, S., & Brink, H. (2021, September). Impact of the pandemic on the barriers to the digital transformation in higher education-comparing pre-and intra-covid-19 perceptions of management students. In International Conference on Business Informatics Research (pp. 3-18). Springer, Cham.

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. International journal of information systems and project management, 5(1), 63-77.

Retain. (2020, November 5). Main barriers to digital transformation. Retain Technologies. Retrieved June 18, 2022, from https://retaintechnologies.com/en/main-barriers-to-digital-transformation/

Rima Aditya, B., Ferdiana, R., & Suning Kusumawardani, S. (2021, May). Digital Transformation in Higher Education: A Barrier Framework. In 2021 3rd International Conference on Modern Educational Technology (pp. 100-106).

Rye, T., & Ison, S. (2016). The implementation and effectiveness of transport demand management measures: An international perspective. Routledge.

Saarikko, T., Westergren, U. H., & Blomquist, T. (2020). Digital transformation: Five recommendations for the digitally conscious firm. Business Horizons, 63(6), 825-839.

Services, D. R. S. I. (2022, July 8). Digital Transformation Trends in the Transportation & Logistics Sector. Document Management Blog. Retrieved June 11, 2022, from https://blog.drsimaging.com/digital-transformation-trends-in-the-transportation-logistics-sector

Sokolov, I.A. (2018). Robots, autonomous robotic systems, artificial intelligence, and the issues of transforming the market of transport and logistics services in the context of the digitalization of the economy. International Journal of Open Information Technologies, 5

Speranza, M. G. (2018). Trends in transportation and logistics. European Journal of Operational Research, 264(3), 830-836.

Ranosys. (2022, February 16). Transport and Logistics Digitization: Challenges and Opportunities. Retrieved June 11, 2022, from https://www.ranosys.com/blog/insights/transport-and-logistics-digitization-challenges-and-opportunities/

Venod Shah. (2021, October 19). Digital Transformation of Transportation and Logistics. Urban Transport News. (n.d.). Retrieved May 24, 2022, from https://www.urbantransportnews.com/news/digital-transformation-of-transportation-and-logistics

Vogelsang, K., Liere-Netheler, K., Packmohr, S., & Hoppe, U. (2019). Barriers to digital transformation in manufacturing: development of a research agenda.

Vogelsang, K., Liere-Netheler, K., Packmohr, S., & Hoppe, U. (2019). A taxonomy of barriers to digital transformation. In 14th International Conference on Wirtschaftsinformatik, Siegen, Germany (February 24-27, 2019) (pp. 736-750). Universität Siegen.

Whatfix. (2022, January 11). What is Digital Transformation? overview, why and how. Retrieved June 16, 2022, from https://whatfix.com/digital-transformation/

Yaga, D., Mell, P., Roby, N., & Scarfone, K. (2019). Blockchain technology overview. arXiv preprint arXiv:1906.11078.

Zhao, X., Grimes, K. L., Colosi, L. M., & Lung, W. S. (2019). Attenuation, transport, and management of estrogens: A review. Chemosphere, 230, 462-478.
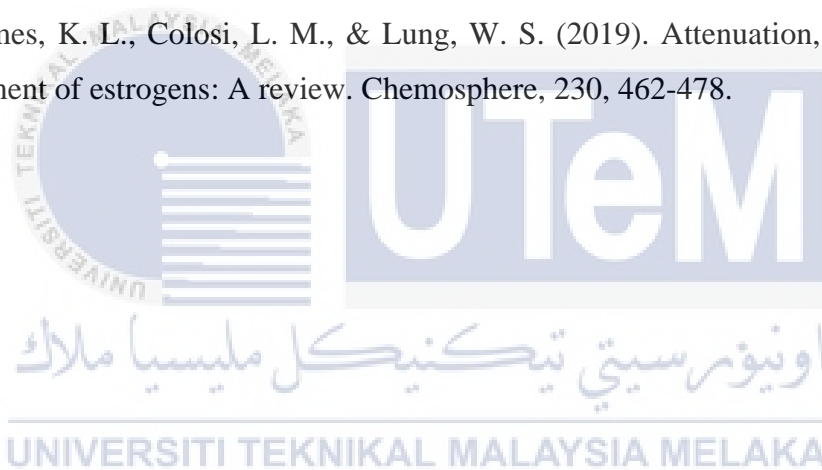
SECTION A: DEMOGRAPIC

Please answer the questions below by placing a check mark (/) in the appropriate boxes or applicable by writing your response in the space provided.

1. What is your gender?
   - o Male
   - o Female

2. What is your age?
   - o 18 – 20 years old
   - o 21 – 30 years old
   - o 31 – 40 years old
   - o 41 – 50 years old
   - o 52 – 65 years old

3. What is your race?
   - o Malay
   - o Chinese
   - o Indian

4. What is educational level?
   - o SPM level
   - o SKM level
   - o Diploma level
   - o Degree and above level

5. What is your current position in the company?
   - o Manager
   - o Assistant manager
   - o Executive
   - o Supervisor
   - o General worker

6. How long does you work in this company?

- o 0 – 5 years
- o 6 – 10 years
- o 11 – 15 years
- o 16 – 20 years
- o 21 – 25 years

SECTION B: THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

This section is to determine the barriers to digitalization in transportation industry in SCH logistic Melaka. Please rate and select the satisfying level (1-5) that best reflects your opinions towards the question.

Scale:

1 - Strongly Disagree

2 - Disagree

3 - Neutral

4 - Agree

5 - Strongly Agree

Part 1: Limited ICT infrastructure

Question	1	2	3	4	5
Integrate different software applications is important					
ICT technology is changing so quickly					

Part 2: Lack of internet speed

Question	1	2	3	4	5
Internet slowness can also be caused by computer viruses					
Internet speed can be impacted by local Internet congestion					

Part 3: Lack of digital competencies

Question	1	2	3	4	5
Lack of training and qualification employee					
Lack of a digital mentality is one of the biggest obstacles in the logistics industry					

Part 4: Lack of an effective strategy

Question	1	2	3	4	5
Companies need a clear plan					
It's important to get everyone involved					

Part 5: Lack of organizational agility

Question	1	2	3	4	5
Organizations need to be more open and proactive					
Management need balance between the new technology and the existing organisational					

Part 6: Lack a culture of collaboration and sharing

Question	1	2	3	4	5
Everyone participation is important to the success of the digital revolution					
Set of shared values makes employees excited to come to work every day					

SECTION C: THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

This section is to determine the barriers to digitalization in transportation industry in SCH logistic Melaka. Please rate and select the satisfying level (1-5) that best reflects your opinions towards the question.

Scale: 1 - Strongly Disagree

2 - Disagree

3 - Neutral

4 - Agree

5 - Strongly Agree

Part 1: Barriers of digitalization

Question	1	2	3	4	5
The biggest problems with digital transformation are not caused by technology but by people					
Digital transformation program there needs to be a good plan for dealing with the human barriers					
Leaders need to think about the human factor in addition to having a clear plan					
Putting the right technology in right place					

END OF QUESTION. THANK YOU FOR YOUR COOPERATION.

Gantt Chart of Final Year Project (FYP) 1

WEEK/ ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FYP talk	▓								M							
Search for FYP topic	▓	▓							I							
Meeting with supervisor		▓	▓						D							
Topic discussion			▓													
Title confirmation				▓					S							
RO & RQ Construction					▓				E							
Submission Chapter 1						▓	▓		M							
Submission Chapter 2								▓	E							
Submission Chapter 3									S			▓	▓			
First draft of FYP 1									T E R					▓		
Submission of FYP 1									B R						▓	
Presentation 1									E A							▓
Revised of FYP 1									K							▓

Gantt Chart of Final Year Project (FYP) 2

WEEK/ ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Create Questionnaire	▓	▓							M							
Distribute Questionnaire		▓	▓						I							
Collect Questionnaire				▓	▓				D							
Analysis Data						▓	▓		S							
Submission Chapter 4								▓	E							
Submission Chapter 5									M	▓						
Proposal Correction									E		▓	▓				
Slide Preparation									S				▓	▓		
Submission of FYP 2									T						▓	
Presentation 2									E							▓
									R							
									B							
									R							
									E							
									A							
									K							