THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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THE BARRIERS TO DIGITALIZATION IN TRANSPORTATION INDUSTRY

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

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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.

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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.

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Last but not least, I would like to express my appreciation to all respondents who had contributed their time and efforts in filling the questionnaires. They had provided valuable feedbacks that assist me in finishing this research. With the assistance and supports from the respondents, I have successfully fulfilled all the components of a questionnaire. Once again, I am grateful and honestly thankful to all.

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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.

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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.

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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)

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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

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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.

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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.

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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.

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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.

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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.

- 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