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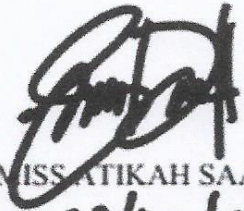
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I hereby acknowledge that this project paper has been accepted as part of fulfilment for the degree of Bachelor of Technology Management (Supply Chain Management and Logistics)

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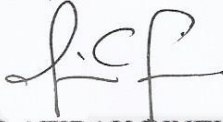NAME OF SUPERVISOR   : MISS ATIKAH SAADAH BINTI SELAMAT
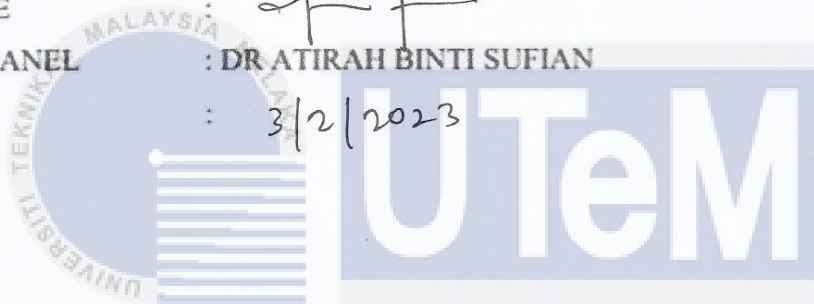
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART LOGISTIC ADOPTION TOWARDS LOGISTIC PERFORMANCE IN DHL
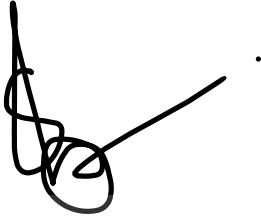MALAYSIA (SOUTHERN AREA).

WONG SOAN HANK

This thesis is submitted in partial fulfilment of the requirements for the award of Bachelor of
Technology Management (Supply Chain Management and Logistic) with Honours

Faculty of Technology Management and Technopreneurship

Universiti Teknikal Malaysia Melaka

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

30/01/2023

DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled "SMART LOGISTIC ADOPTION TOWARDS LOGISTIC PERFORMANCE IN DHL MALAYSIA (SOUTHERN AREA)." 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   : WONG SOAN HANK

DATE   : 20/06/2022

DEDICATION

I would like to thank the dedication of my sincerely family members who teaches me and encourage me to study until this education level. Besides that, I also express a deep sense of gratitude to my lecturer whom also my supervisor for my final year project, Miss Atikah Saadah Binti Selamat and my fellow friends. They gave me different kind of support and advice throughout this research. Without their support and motivation, this research is hard to complete within a short period of time.

ACKNOWLEDGEMENT

ABSTRACT

In this research, there are three aspect of smart logistic adoption that influence logistic performance in DHL Malaysia (Southern Area). The aspects are accessibility, reliability, and interoperability of smart logistic system. Technology Acceptance Model (TAM) was used as a framework to assist researcher in explain and forecasts the Technology users' behavior. A questionnaire survey was conducted to 111 respondents who works in DHL Malaysia (Southern area). The result of survey was recorded through Google form and the research sampling design was convenience sampling due to employee such as delivery men are not fixed to work at one location. After that, data analysis was conducted to ensure the data are reliable by using pilot test. The data was interpreted in descriptive analysis to visualize the information. Methods such as descriptive analysis, Cronbach's Alpha reliability analysis, Pearson Correlation analysis, multiple regression analysis are used to analyse data in this research. In the end of research, researcher obtain the result of relationship between aspect of smart logistic adoption and logistic performance. Researcher also provide research implication to help other in future study which related to this research.

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Keyword: *Smart logistic, Logistic Performance, Accessibility, Reliability, Interoperability*

ABSTRAK

Dalam penyelidikan ini, terdapat tiga aspek penggunaan logistik pintar yang mempengaruhi prestasi logistik di DHL Malaysia (Kawasan Selatan). Aspek tersebut ialah kebolehcapaian, kebolehpercayaan, dan kebolehoperasian sistem logistik pintar. Model Penerimaan Teknologi (TAM) digunakan sebagai rangka kerja untuk membantu penyelidik menerangkan dan meramalkan tingkah laku pengguna Teknologi. Tinjauan soal selidik telah dijalankan kepada 111 responden yang bekerja di DHL Malaysia (kawasan Selatan). Hasil tinjauan telah direkodkan melalui borang Google dan reka bentuk persampelan kajian adalah persampelan mudah kerana pekerja seperti orang penghantar tidak tetap bekerja di satu lokasi. Selepas itu, analisis data dijalankan untuk memastikan data boleh dipercayai dengan menggunakan ujian rintis. Data telah ditafsirkan dalam analisis deskriptif untuk menggambarkan maklumat. Kaedah seperti analisis deskriptif, analisis kebolehpercayaan Alpha Cronbach, analisis Korelasi Pearson, analisis regresi berganda digunakan untuk menganalisis data dalam penyelidikan ini. Di akhir kajian, pengkaji memperoleh hasil hubungan antara aspek penerimaan logistik pintar dan prestasi logistik. Penyelidik juga memberikan implikasi kajian untuk membantu pihak lain dalam kajian masa depan yang berkaitan dengan penyelidikan ini.

Kata kunci: logistik pintar, prestasi logistic, kebolehcapaian, kebolehpercayaan, kebolehoperasian

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter, it will discuss about our research topic "Aspect of smart logistics adoption for DHL company in Southern Area of Malaysia". It includes the background of study, problem statement, research question, research objectives, scope and limitation of study, significant of study, and summary of this chapter.

1.2 Background of Study

According to JWD (2021), logistic management firstly began from British Army, they use it to transport and keep their military needs such as troops and weapons during first world war. In 1964, U.S. public starts to implement logistic management in their business and practice it until now.

Evolution of logistic is continuously grows as the demand towards logistic is increase. Previously, most of our shipment can only deliver local and inefficiency. Logistic service providers and customers also difficult to track their shipments. For example, customer want to cancel or modify order but company difficult to track and contact with the transporters. This causes waste of time and money due to miscommunication and poor technology in logistic. According to Flock Freight (2022), a survey found that industry's traditional shipping methods such as partial truck load (PTL), truck load (TL), and less-than-truckload (LTL) cause shipping fee increases and delay of shipment.

In 2020, the demand towards logistic service increase gradually and it had stimulated the evolution of logistic. According to Kaur G. (2021), Tasco Berhad, a logistic solution company reported their annual profit in year 2021 had hit all new time which is RM41.27mil during pandemic of COVID-19. This is because efficient logistic service to fulfil order become one of the competitive advantages in e-commerce activity during COVID-19 outbreak as people forced to stay home. Due to increase of consumer demand, the importance of information flows in supply chain become significant. However, every country had forced to lockdown during

COVID-19 outbreak peak period to prevent the infection of the virus so this action had brings huge impact to logistic industry. The number of shipments to a certain country had limited and many restrictions are set by inbound and outbound country government. The activities of logistic become less and its significant affect the production of manufacturing industry. For example, the production of semi-conductor shortage due to lack of material as they cannot reach the manufacturing factory on time. The interconnecting of logistic system had proven its significant as customers or any parties within the supply chain can check the availability of goods or service through a tracking system.

Today, logistic plays a significant role in most of the industry. It is significant to a business or manufacturer as it can optimize the production and profitability. According to ExpressIt Delivery (2021), better logistic performance can also offer lower costs, higher customer satisfaction, better supplier relationship, and greater industry reputation. Hence, "Smart logistic" become a solution for most of the logistic service provides such as DHL. The concept of smart logistic is combining the Internet of Things (IoT) and other technology with logistic service to optimize the logistic operation and visualize the information from the supply chain. For example, customer of food delivery company can put their orders in apps and immediately merchant and rider receive the order details. According to Bo F. & Qiwen Y. (2021), smart logistic is a suitable alternative to handle high complexity and volume of logistic operations.

DHL company is global logistic service provider company. In March 2022, it has almost 512,536 employees working in DHL company around the world. There are 5 main entities in DHL to provide logistic solution for their customers. They are DHL Express, DHL Global Forwarding, DHL Freight, DHL Supply Chain, and DHL eCommerce Solutions. Each entity has different responsibilities towards logistic solution, but they still need to work together and ensure the effectiveness and efficiency of supply chain. Hence, smart logistic in DHL company such as adoption of Internet of Things (IoT) in their logistic system can link every entity together. The information flows in their logistic system become visible and tracking information is approximate to real time.

1.3 Problem Statement

The problem to be addressed by this study is the adoption of smart logistic and the corresponding logistics performance among DHL company in Melaka, Malaysia. Nowadays, logistics service is overwhelming around the world as the rapid growth of e-commerce. Customers desire to have a lower cost, shorter delivery time, and safety logistics service. The adoption of technology in logistics such as smart logistics may help to improve their performance and increase competitive advantage in the market. In 2018, logistic performance index (LPI) of Malaysia is 3.22/5.0 which placed 41 in LPI global ranking. Hence, smart logistics is expected to improve logistics performance among Malaysia LSP company.

Logistic company without the assist of technology may suffer in low productivity and low efficiency operations. For example, DHL has met some challenges from the customers in their logistic services. From DHL Summary of "Customer Challenges", they stated that they need to find their logistic solutions for quality of resource and service management, cost reduction, local logistic operations and distribution network design, and supply chain resilience and flexibility. They required a good system or a modal such as smart logistic to assist them for finding their solutions.

According to Shapiro (2021, December 9), improved technology can benefits logistics industry with trucking transportation, international transportation, supply chain management, and shipment tracking. These advantages allow LSP to improve their logistics performance and increase customers satisfaction level. Joydeep Misra from Bridgera (2020, November 17) stated that smart logistics powered by Internet of Things (IoT) provide Amazon a solution for customers to receive their shipment in same day. This service also known as same-day shipping.

Referring to Suaz Canal blockage issues happened in 2021, Ever Green, a vessel which has a gross tonnage of 220,940 blocked the waterway at Suaz Canal. Suaz Canal is located at Egypt where offers the shortest path for vessel to travel between Asia and Europe. The blockage issues cause a heavy maritime traffic and affects all the transit time of vessel that planned to pass through Suaz Canal. The issue not only affecting the transit time of vessel, yet it also affects the operation of manufactory industry as the parts or materials needed were stuck on vessel at the Suaz Canal. Organizations that suffer in this tragedy struggled to respond as they cannot make decision with uncertainties. The uncertainties were come from the lack of real time visibility which required digitalization and assist of Iot.

Maritime logistic service provider companies always need to offer short lead time service due to consumer demand so they are forced to respond immediately for unexpected event happens. Hence, LSP companies require to improve their capabilities to capture approximate real time data that helps them to reduce damage from unexpected disruption and its consequence such as shipment delay.

Besides that, the outbreak of pandemic COVID-19 also causes a supply disruption which brings a big negative impact for poor logistic management. In conventional logistic management, the lack of technology causes higher risk to meet an inventory shortage problem. The quantity and supply of inventory is not enough to capture the consumer demand and causes the shortage happens. This is because the data of inventory has low visibility and poor real time tracking system. An example of toilet roll shortage in 2020, it happens when the COVID-19 starts to outbreak, consumer has high demand to keep large quantities of toilet roll as their daily necessities. However, the supply is unable to catch up the demand as manufacturing industry do not has enough material to produce. Hence, the importance of smart logistics adoption to visualize the information along supply chain had been shown in these previous issues. Smart logistic is expected not only to increase logistic performance, yet it also expected to enhance customer satisfaction and loyalty.

In other hand, emerging technology such as smart logistic may also not applicable for everyone since both DHL employees and customers have different background and education level. Low accessibility technology may not bring positive effect to the performance, yet it may bring negative user experiences. The application of technology is aimed to be user-friendly and optimize its function. For example, update and check of goods availability information can only worked by using computer. This is not user-friendly as deliveryman is impossible to always bring a computer along its travel and update the information of goods. Hence, accessibility of smart logistic adoption can be significantly affecting the logistic performance as low accessibility need longer time to use it and lead time will increase.

Last but no least, reliability of a technology may also affects the performance of an operation. The consistency occurs of error in the system may increase the cost of operation and low productivity. For example, the errors in recording the inventory quantity may cause wrong ordering of low turnover rate goods and surplus occurs. Company may face high inventory cost and other negative consequences from the mistake. The consistent occurs of errors may also increase the lead time as amends are needed to cover the errors.

1.4 **Research Question**

There are three research questions to be determined in this study:

    i.   What are the aspects of smart logistic that affect logistic performance?

    ii.   Which is the most significant aspect between smart logistic and logistic performance?

1.5 Research Objective

In this study, the researcher had identified three research objectives:

    i.   To determine the relationship between aspect of smart logistic and logistic performance.

    ii.   To determine the most significant aspect between smart logistic and logistic performance.

1.6 Scope and Limitation of the Study

       The scope of this research paper is to focus on aspect of smart logistic adoption towards logistic performance in DHL company. The respondent of this research will be conducted from employee in DHL company Malaysia (Southern area). It will be picked randomly among employee in DHL company Malaysia (Southern area). The research result will be obtained from questionnaire which given to the selected respondents.

       The limitation of this research is huge population of target company, DHL. DHL company is known as one of the most employee company in the world so it is difficult to reach that much of people for a satisfy research outcome. Besides that, due to high population of target company, it also requires to consume more time to collect the research questionnaire. However, the time given to complete this study is short so it is a challenge to collect enough data in this short period of time.

1.7 Significant of Study

The outcome of this study is to benefit logistic solution companies. They will understand the important aspects of smart logistic adoption for their company development. They also can understand the aspects of smart logistic adoption which can affect the most in level of logistic performance. Besides that, the research outcomes also can provide a reference for comparison between the three aspects of research used. This research might further study to investigate with other aspects in smart logistic adoption.

1.8 Summary

As a conclusion, the overview of this study is comprised in this chapter. The chapter is starts with discussing the background of study and coming up with problem statement of this study. After that, the researcher had dedicated three research question and research objective for this study. The researcher also highlighted the scope and limitation in this study. Finally, the significant to conduct this study also be discussed in this chapter. In the next chapter, the study will continue with literature review of this research.
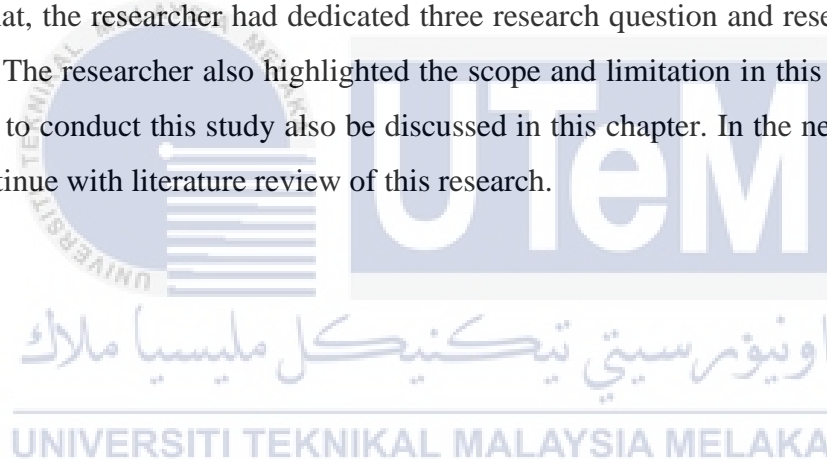
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The definitions of smart logistic and logistic performance will be discussed in this chapter. The factors of smart logistic adoption which are the independent variable such as accessibility, reliability, and interoperability of smart logistic, will also be discussed in this chapter.

2.2 Smart Logistic

According to I. Dembińska (2018), the direct meaning of word "smart" is wise or clever. However, it is not suitable to use it with logistic as the meaning is more to express people. The word also has another definition which is "intelligent" and it is more suitable to describe a high technology product or service.

According to W. Kenton (2022), the definition of "logistic" is the combination of process to acquire, stored, and moved the goods to their destination. According to H. Bhasin. (2021), the main activity of logistic includes order processing, materials handling, warehousing, inventory control, transportation, and packaging. According to W.P. Wong & C.F. Tang (2018), logistics is a way of transporting commodities from producers to consumers, it is the backbone of trade. Hence, logistic plays important role in every business.

According to Y. Song et.al (2021), the concept of smart logistic is based on the modern advanced information and communication technology (ICT). It can intelligently develop a contemporary integrated logistics system by processing and analysing information from all parts of logistics in real time. According to Y. Ding (2020), there are some types of smart logistic in recent such as autonomous logistic, smart freight, intelligent transportation system, and customer-oriented intelligent logistic.

2.2.1 Smart Logistic in DHL company

According to DHL (2020), we bring robotics and automation to our smart warehouse. Businesses are exploiting the potential of micro-fulfillment. It uses small warehouses in urban areas for immediate and short-term delivery to more people. The time and efficiency gains afforded by smart warehousing solutions make this model increasingly viable for enterprises. According to M. Kruysen (2020), automated processes are bringing greater resilience to logistics infrastructure as the pandemic has highlighted the importance of supply chain resilience.

According to DHL (2023), there are five ways to implement 5G in their logistic. First is digitalized logistic. It can offer faster speeds, lower latency, greater coverage, and relatively lower power consumption, smart devices can communicate with each other faster even closer to real-time speeds. This will catalyze the use of time-sensitive Internet of Things (IoT) device applications and open the door to new use cases in logistics and beyond. Second is reduce risk of supply chain to minimum. Portable Internet-connected tracking devices that track the location and status of goods in real time throughout the supply chain can eliminate information blind spot. Third is autonomous transport. With ultra-low latency, 5G is significant for self-driving trucks on public roads, where every millisecond counts. Indeed, 5G data can be transmitted with a latency of only 1 millisecond, 50 times faster than 4G so the self driving system can take less time to do a decision and offer safer and more reliable operation. Forth is higher efficiency operation at port. To build an intelligent traffic system, sensors, cameras, and devices are networked to form an integrated communication system. Intelligent autonomous transport load and unload, transmit cargo inventory information and provide access to controlled areas. Lastly is implementation of Augmented Reality (AR). Reduced lag time and instant updates to cargo movement improve the user experience of AR applications that can visually display the latest changes. This reduces the potential for error and increases the efficiency of staff managing warehouse operations.

2.3 Logistic performance

According to Brumbrach (1988), performance implies behaviour and results. The act comes from the performer and translates the performance from abstraction to action. According to UKEssay (2018), performance might be simply described as the achievement of quantifiable goals. However, it is not just about what individuals achieve, but also about how they do it.

The aspects used to measure logistic performance are shipping time, order accuracy, picking accuracy, delivery time, picking and packaging time, equipment utilization rate, transportation cost, warehousing costs, picking, and packaging costs, use of packaging material, number of shipments, inventory accuracy, inventory turnover, and inventory to sales ratio.

Besides that, Logistics Performance Index also normally in evaluate logistic performance. According to The World Bank (2018), it is an outstanding benchmarking tool designed to assist nations in identifying the difficulties and opportunities in their trade logistics performance, as well as what they can do to improve it.

According to G. Chow et.al (1994), logistic performance in meeting agreed delivery dates, fill rate on baseline/in-stock items, advance notice of shipping delays, manufacturer's accuracy in predicting and dedicating to predicted shipping dates on contract/project orders, manufacturer's compliance to special delivery instructions, accuracy in filling orders

2.3.1 Lead time

According to Brightpearl (2022), the definition of lead time is the time from start of a procedure until it is completely done. Lead time also can know as the combination of shipping time and delivery time which can use to evaluate the logistic performance. According to Mecalux (2019), it can be calculated by using formula below:

$$Lead\ time = Delivery\ date - Order\ date$$

According to W.S. Chang (2019), in the case of global outsourcing. companies face greater uncertainty in the shipping process because of longer delivery times. It demonstrates that growing supply chain complexity, whether through horizontal or vertical collaboration, may increase the chance of disruptions in lead time. The spread and multiplication of risks is a problem that requires prompt attention and resolution for lead time.