

NAVIGATING THE COMPLEXITIES: IDENTIFYING THE KEY CHALLENGES IN GLOBAL SUPPLY CHAIN MANAGEMENT



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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

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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JANUARY 2025

DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled "NAVIGATING THE COMPLEXITIES: IDENTIFYING THE KEY CHALLENGES IN GLOBAL SUPPLY CHAIN MANAGEMENT" 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 members who educated me and motive 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, Prof Datuk Dr. Izaidin Bin Abdul Majid, 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 contributed their time and efforts in filling out the questionnaires. They provided valuable feedback that assisted me in finishing this research. With the assistance and support from the respondents, I have successfully fulfilled all the components of a questionnaire. Once again, I am grateful and honestly thankful to all.

ABSTRACT

Global supply chains are crucial for business success, but they face a lot of challenges that can disrupt their effectiveness. This study, "Navigating the Complexities: Addressing Key Challenges in Global Supply Chain Management" will explores how do the transportation constraints, geopolitical risks, and disruptions from natural disasters or global events impact to the supply chain efficiency. To investigate these issues, this study will survey supply chain managers, logistics transportation managers, and freight forwarders by using questionnaires distributed via Google Forms. The study also will analysed the data with SPSS, using descriptive statistics, multiple regression, and Pearson's correlation analysis. The research aims to understand the effects of transportation constraints, geopolitical risks, and also the natural disasters on global supply chains. These findings will offer valuable insights and practical recommendations for professionals to enhance supply chain resilience and efficiency, helping them to better navigate and overcome these complex challenges.



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Keywords: Global Supply Chain, effectiveness, Transportation Constraints, Geopolitical Risks, Natural Disaster, Global Events

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CHAPTER 1

INTRODUCTION

<u>1.1 INTRODUCTION</u>

This chapter will go over to discuss and identifying the key challenges in global supply chain management and the mitigation to reduce the negative impact on the supply chain. In this chapter, it will consist of problem statement, background of study, research objectives and questions, scopes and limitation of the study. Besides, significant of study and outline of thesis will be prepared.

<u>1.2 BACKGROUND OF STUDY</u>

Eduardo Salazar, Head RFI Logistics Counselor at Noatum Logistics, said that supply chain management involves the strategic coordination and oversight of all activities involved in sourcing, producing, and delivering goods and services, encompassing everything from raw material procurement to final product delivery to customers. It's about optimizing efficiency, minimizing costs, and ensuring quality throughout the entire supply chain network.

The globally interconnected economy is analysed through a comprehensive threedimensional model, which includes network connectivity, economic openness, and spatial impedance variables, he said. This model provides a structured framework for understanding the complexity of global tourism mobility. The first dimension captures the interconnectedness of worldwide human mobility, the second dimension represents global economic openness, and the third-dimension accounts for spatial impedance to transportation.

In an interconnected global economy, the role of global supply chains is crucial. They serve as the backbone that enables businesses to operate on a global scale, facilitating international trade and fostering economic growth. Through global supply chains, businesses can access resources, labor, and markets from around the world, driving innovation and efficiency. Additionally, global supply chains promote cooperation and interdependence among nations, creating opportunities for collaboration and mutual benefit.

<u>1.3 PROBLEM STATEMENTS</u>

In Groznika, A., & Trkman, P. (2012). Current issues and challenges of supply chain management. Economic Research-Ekonomska Istraživanja, 25(4), 1101-1112, researchers highlight the issues and challenges. Challenges described include a lack of strategic insight, resulting in inadequate information exchange and coordination within the supply chain, exacerbating the bullwhip effect and hampering overall efficiency. Additionally, a lack of business redesign initiatives undermines optimization efforts, reducing operational efficiency and customer satisfaction. Compounding the problem are the risks inherent in managing multiple suppliers in different environments, requiring robust risk management mechanisms to effectively mitigate uncertainty.

In Groznika, A., & Trkman, P. (2012). Current issues and challenges of supply chain management. Economic Research-Ekonomska Istraživanja, 25(4), 1101-1112, researchers highlight the implication which bring to global supply chain management. Without a good risk management mechanism, supply chains are susceptible to disruptions that impact the entire network, impacting business continuity and customer satisfaction. Additionally, choosing the right business framework and standards (such as SCOR) is a challenge. Choosing the most appropriate framework is critical to enhancing collaboration and efficiency within the supply chain, but options need to be carefully the consideration and evaluation.

In Groznika, A., & Trkman, P. (2012). Current issues and challenges of supply chain management. Economic Research-Ekonomska Istraživanja, 25(4), 1101-1112, researchers highlight the ways to face the issues and challenges. This includes the need to prioritize developing strategic insights and facilitate greater information sharing and coordination within the supply chain. At the same time, they should invest in business redesign initiatives, including process reengineering and continuous improvement, to optimize operations and improve customer satisfaction. In addition, good risk management mechanisms, add on with the adoption of appropriate business frameworks and standards, are critical to reducing risk and improving efficiency. Finally, leveraging performance measurement tools and optimizing information systems support can further enhance supply chain capabilities and promote innovation and agility in changing market dynamics.

<u>1.4 RESEARCH QUESTIONS</u>

- **1.4.1** How do transportation constraints impact the effectiveness of global supply chains?
- **1.4.2** In what ways do geopolitical risks affect the effectiveness of global supply chains?
- **1.4.3** What is the influence of disruptions caused by natural disasters and global events on the effectiveness of global supply chains?

1.5 RESEARCH OBJECTIVE

- **1.5.1** To evaluate the impact of transportation constraints on the effectiveness of global supply chains.
- **1.5.2** To analyze how geopolitical risks affect the effectiveness of global supply chains.
- **1.5.3** To assess the influence of disruptions caused by natural disasters and global events on the effectiveness of global supply chains.

<u>1.6 SCOPE AND LIMITATION OF STUDY</u>

This study aims to explore the key challenges in managing global supply chains across different industries and locations. It will focus on identifying specific barriers such as logistical complexities, transportation constraints, geopolitical risks, environmental sustainability issues and disruption caused by natural disasters or global events. To achieve this, we will gather insights from professionals working in different roles in global supply chain management, including supply chain managers, logistics transportation managers and freight forwarders. The study will collect data from these professionals using methods such as surveys, interviews and case studies. The goal is to provide practical recommendations for addressing these challenges and improving the efficiency and resilience of global supply chains.

Several limitations may affect the scope and results of this study. First, the availability of respondents may be limited, especially from certain industries or geographical areas, thus affecting the diversity of perspectives captured. Additionally, obtaining

comprehensive and accurate data from organizations can pose challenges due to confidentiality or proprietary issues. Time constraints may also limit the depth and breadth of research activities, which may limit the thoroughness of interviews or case studies. Furthermore, the effectiveness of proposed strategies may vary depending on organizational context, and implementation challenges may arise. Finally, external factors such as economic conditions or regulatory changes may affect the results and conclusions of the study.

<u>1.7 SIGNIFICANT OF STUDY</u>

The study's findings will be particularly beneficial to supply chain managers, logistics transportation, freight forwarders, and other professionals involved in global supply chain operations. By identifying and solving key challenges, these professionals can better predict and respond to disruptions, optimize transportation routes and enhance collaboration among supply chain partners.

The findings of this study also can provide valuable insights to organizations in understanding and addressing the complex challenges inherent in global supply chain management. By understanding these challenges, companies can develop more effective strategies to reduce risk, improve operational efficiency, and become more competitive in global markets.

<u>1.8 OUTLINE OF THESIS</u>

The remain research paper is structured as follow, for chapter 2 researcher will provide literature review on examination of the key challenges in global supply chain management and exploration of theoretical frameworks and enablers for addressing the challenges. For chapter 3, researcher will discuss about the research design and approach and explanation of data collection methods. In Chapter 4, researcher will analyse data that collected from discussion. Final in Chapter 5, researcher will summarize of the main findings and conclusions drawn from the study.

CHAPTER 2

LITERATURE REVIEW

<u>2.1</u> INTRODUCTION

The purpose of this chapter is to provide a theoretical model relevant to the research topic. After reading the relevant literature, the researcher defined the dependent and independent variables. Therefore, this chapter will end by presenting the proposed research framework to fully describe the theory and develop the hypotheses.

2.2 GOBAL SUPPLY CHAIN MANAGEMENT

From the book, Supply Chain Management: A Global Perspective, rapid advances in transportation and information technology, combined with increases in personal incomes worldwide, have resulted in significant developments in global supply chain management. This change has resulted in the creation of complex and interconnected supply chains that span the world. The effectiveness and efficiency of these global supply chains are influenced by six key forces, such as markets and competition, costs, infrastructure, technology, political and economic environment, and culture.

2.2.1 Market and Competition

The book had highlighted the enterprises must deal with diverse markets and fierce competition and need to make strategic adjustments based on different local needs and competition patterns.

2.2.2 Cost Consideration

While reducing costs is the primary goal of global supply chains, management must recognize hidden costs and weigh non-cost factors such as quality and proximity to customers to ensure overall value, stated in the book.

2.2.3 Infrastructure

The author wrote down that the availability and quality of infrastructure, including transportation, labour acquisition, warehousing, and supplier networks, are key determinants of a company's ability to operate efficiently globally.

2.2.4 Technology

The book also come out with the key technologies include information technology, manufacturing technology, and equipment technology. These technologies play a crucial role in improving efficiency, communication, and productivity, and in realizing and strengthening global supply chain operations.

2.2.5 Political and Economic Environment

Author also stated the companies must contend with political factors and government regulations, such as tariffs, import quotas, and labour content regulations, to maintain compliance and optimize operations. Companies' handling of these regulations will have a significant impact on global supply chains.

2.2.6 Culture

The book also let us know to understanding and integrating cultural differences is critical to global supply chain management. Cultural differences affect everything from negotiations and practices to consumer preferences and employee management.

2.3 CHALLENGES OF GLOBAL SUPPLY CHAIN

2.3.1 Transportation Constraints

Transportation constraints are the one of challenges for global supply chains, including limited transportation capacity, high transportation costs, and infrastructure constraints. These issues prevent the timely and cost-effective movement of goods across national borders, leading to a range of negative impacts.

According to Notteboom about the discussion of challenges of limited port capacity and the impact on global trade efficiency, we can know that limited transportation capacity may cause bottlenecks in the supply chain, particularly during peak seasons or disruptions. This constraint often results in increased lead times and higher costs as companies compete for available transport resources.

In addition, Bridget McCrea stated that the higher of transportation costs are a major challenge for global supply chains. Including the fuel prices, labor costs, and tariffs all contribute to the rising expenses associated with moving goods internationally. During the COVID-19 pandemic, for instance, ocean freight costs surged to several times their prepandemic levels, affecting many businesses, she said.

From The Global Competitiveness Report, we can know that the infrastructure is a key factor in global supply chain efficiency and limitations of infrastructure faced by different countries. So, from the journal we can conclude that the infrastructure limitations can severely disrupt supply chains. For example, inadequate port facilities, poor road networks, and insufficient rail systems. Most of the developing countries face these challenges more acutely, leading to transit delays and inefficiencies of goods movement.

Bridget McCrea also highlight the impact of transportation constraint is delay. Limited transportation capacity, and infrastructure bottleneck may slow down the goods movement. It may lead to longer lead time. Delays of movement of goods may disrupt production schedule and lead it to stockout. This will make customer satisfaction negative.

According to Bridget McCrea, factors such as rising fuels price, increased demand for limited transportation capacity and tariff contribute to higher cost. During pandemic Covid-19, ocean freight cost increased dramatically. These increasing of the cost will limit the profit margin and force the companies to adjust their operation strategies such as pricing to decreased their competitive.

2.3.2 Geopolitical Risks EKNIKAL MALAYSIA MELAKA

Geopolitical risks include many factors such as political instability, trade wars, tariffs and regulatory changes. These risks stem from the changing political and economic landscape of various countries, which may eventually seriously disrupt supply chain operations.

First of all, political instability in a country can led to sudden changes in regulations and even conflicts that can disrupt supply chains. For example, the ongoing conflict between Russia and Ukraine has led to a spike in energy prices, undermining the stability of the global economy. (Edelman Global Advisory: 2023 Top Geopolitical Risks)

According to Wolf, M. and Kalish, I., trade wars and the imposition of tariffs can increase the cost of goods and raw materials, forcing companies to look for alternative suppliers or routes. For example, the tensions in the trade war between the United States and China have brought huge risks such as increased tariffs on goods, affecting supply chain costs and strategies.

From Bridget McCrea, political instability and regulatory changes can delay production and shipping. For example, conflicts that block key trade routes can cause significant delays in the delivery of goods.

Besides that, Wolf, M. and Kalish, I., the emergence of tariffs and trade wars has increased the cost of importing and exporting goods. Companies must invest more to comply with new regulations, resulting in increased costs. Dealing with these changes often requires significant financial and operational adjustments. These operations will put global suppliers at risk of financial loss.

2.3.3 Disruptions Caused by Natural Disasters or Global Events

Natural disasters and global events can significantly impact supply chains, creating short and long-term challenges. These disruptions can cause production break down, damage of infrastructure, and lead to shortages of raw materials and commodities, impacting the efficiency of the entire supply chain.

Disasters can damage critical infrastructure such as roads, bridges, and ports, causing significant delays in shipping and delivery schedules. The resulting disruptions can ripple through the supply chain, affecting not only surrounding areas but also those that rely on those routes for supplies. As Bill Canis explains, the 2011 earthquake and tsunami in Japan severely impacted the global automotive and electronics industries. As the world's second-largest automaker, Japan, a producer of automobiles and electronics, suffered a natural disaster that disrupted its supply chain. With key components suddenly out of stock, importers from other countries began looking for alternatives. This led to a sharp decline in market share and negative revenue for Japanese suppliers, especially those in the automotive and electronics industries.

As Sean Harapko explains, COVID-19 has caused unprecedented supply chain disruptions due to lockdowns, border closures, and restrictions on movement. These measures have led to delays in the manufacturing, transportation, and delivery of goods. What we do know is that the pandemic has led to widespread factory shutdowns, labour shortages, and transportation restrictions. This has created severe supply chain bottlenecks, leading to delays and increased costs. The sudden shift in consumer demand for essential goods has further exacerbated supply chain pressures. This has led to cost and logistics challenges.

Relationship: Natural disasters (e.g., earthquakes, hurricanes) and global events (e.g., pandemics) can cause significant disruptions in supply chain operations, leading to sudden and unpredictable challenges.

2.4 GLOBAL SUPPLY CHAIN EFFICIENCY

According to Abby Jenkins, supply chain efficiency refers to the strategic management of a company's supply chain processes to ensure that products are delivered to the right place and people at the right time and with the lowest cost. This involves optimizing the use of resources such as materials, labor and time to produce and distribute goods with minimize waste and maximize productivity. An efficient supply chain is an integral part of a company's overall operational performance because it allows the company to meet customer needs in a timely and cost-effective manner and also improves company profitability and customers satisfaction.

According to Abby Jenkins, supply chain efficiency can be measured using a variety of metrics that evaluate the performance of different stages of the supply chain. The first is the Perfect Order Index, which measures the percentage of orders that are delivered on time, complete, undamaged and with accurate documentation, providing supply chain reliability. The second is service rate or on-time delivery, a metric that tracks how often orders are delivered within the promised time frame and reflects the efficiency of the delivery process. Third is the inventory turnover ratio, which measures the frequency of inventory sales and replacements during a specific period, indicating the effectiveness of inventory management. Additionally, order accuracy measures the percentage of orders received and processed correctly, ensuring customer needs are accurately met and reducing errors and returns. These metrics provide a detailed assessment of supply chain efficiency and help businesses identify areas for improvement.

She also stated that improving supply chain efficiency involves several key strategies. First, enhanced visibility through advanced tracking technology allows for real-time monitoring, helping to manage inventory and ensure timely response to outages. Next, building strong, reliable supplier relationships and maintaining consistent supplier management standards can improve operational smoothness. Strategic partnerships and automation reduce errors and streamline processes, freeing up employees to perform higher-level tasks. In addition to this, integrated supply chain software and effective inventory management optimize order fulfilment and forecasting. Leverage real-time data to quickly solve problems, while leveraging new technologies to increase efficiency. Regular engagement with IT can identify new opportunities. Investing in employee training ensures effective management, and adopting green practices enables sustainability goals to be achieved. Developing a comprehensive efficiency plan and establishing a supply chain committee ensures continuous improvement and alignment with business strategy.

The efficiency of the supply chain will directly affect the company's cost structure, customer satisfaction and profitability, so it is crucial. By reducing waste and optimizing resource utilization, companies can reduce production and distribution costs, thereby increasing profit margins. An efficient supply chain also ensures timely and accurate delivery, thus increasing customer satisfaction and loyalty. In addition, streamlined supply chain processes allow for better inventory management and reduce the risks associated with excess inventory or out-of-stocks. Essentially, supply chain efficiency enables businesses to operate more competitively and sustainably in the marketplace.

2.5 RELATIONSHIP BETWEEN CHALLENGES OF GLOBAL SUPPLY CHAIN AND EFFECTIVENESS OF GLOBAL SUPPLY CHAIN

From above research, all the challenges that faced by the global supply chain had come out with negative impact towards global supply chain efficiency. The challenges include Transportation Constraints, Geopolitical Risks and Disruption Caused by Natural Disasters or Global Events. These all had been proved by journal and authors that will bring negative impacts to the global supply chain efficiency.

H1: Challenges faced by Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

2.5.1 Relationship Between Transportation Constraints within Global Supply Chain on Effectiveness Global Supply Chain.

By looking at the explanation from Notteboom, Bridget McCrea and The Global Competitiveness Report, transportation constraints such as limited capacity, higher cost transportation and limited of infrastructure may bring a lot of negative impact to global supply chain efficiency. The inefficiency of global supply chain are increased lead times and higher costs, slow down the goods movement, rising fuels price etc. H1a: Transportation Constraints within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

2.5.2 Relationship Between Geopolitical Risks within Global Supply Chain on Effectiveness Global Supply Chain.

As per discussion, Wolf, M. and Bridget McCrea explained that geopolitical risks such as political instability, trade wars, tariffs and regulatory changes had seriously disrupted supply chain efficiency. For example, spike in energy prices, increase the cost of goods and raw materials, delays in the delivery of goods, risk of financial loss etc.

H1b: Geopolitical Risks within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

2.5.3 Relationship Between Disruption Caused by Natural Disasters or Global Events within Global Supply Chain on Effectiveness Global Supply Chain.

By analysing specific cases, such as the impact of the 2011 Japan earthquake on the global automotive supply chain, or the impact of the 2020 Covid-19 pandemic on various industries, concrete evidence has been confirmed on how supply chain disruptions affect supply chain operations and efficiency.

H1c: Disruption Caused by Natural Disasters or Global Events within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

2.6 CONCEPTUAL FRAMEWORK

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2.7 HYPOTHESES TI TEKNIKAL MALAYSIA MELAKA

H1: Challenges faced by Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

H1a: Transportation Constraints within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

H1b: Geopolitical Risks within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

H1c: Disruption Caused by Natural Disasters or Global Events within the challenges of Global Supply Chain will negatively affect the effectiveness of Global Supply Chain.

2.8 SUMMARY

In this chapter, the researcher discusses the challenges of global supply chains and the effectiveness of global supply chains. The proposed research framework consists of dependent and independent variables. The independent variables of global supply chain challenges include transportation restrictions, geopolitical risks, and disruptions caused by natural disasters or global events. The dependent variables of global supply chain effectiveness are such as cost and price, delivery time. Last but not least, the next chapter discusses the research methodology.



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CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this section, the author will detail on the stages, techniques, and samples used for data collection, as well as the tools and equipment employed for data processing. Additionally, the researcher will explain the methodology chosen for this study and justify the selection of this specific strategy. This chapter also addresses the key factors influencing methodological choices, including research design, primary and secondary data sources, research strategy, study location, and time horizon. The objective of this study is to identify the key challenges in global supply chain management. A survey questionnaire method is utilized for its efficiency in gathering a substantial amount of data quickly and accurately. The questionnaire will divide into two categories: demographic information and open-ended questions aimed at exploring deeper insights into the supply chain challenges faced by professionals.

3.2 RESEARCH DESIGN

The next step involves planning the survey after defining the problem statement and completing the theoretical framework. Research design refers to the appropriate process and methods for collecting and analysing data to achieve the research objectives. Choosing an appropriate research design is essential to produce accurate and meaningful results. This study adopts the case study technique and conducts quantitative research with questionnaires. This approach was chosen to comprehensively assess the responses of the sample population, by Khalid, Hilman, & Kumar. The survey questions will be distributed through online platforms such as Google Forms or SurveyMonkey. The structured survey is divided into three sections: demographic analysis, statistical analysis, and descriptive analysis. The analysis of the collected data will help author to evaluate the research questions and making conclusions.

<u>3.3 METHODOLOGY CHOICES</u>

This study uses a quantitative approach to examine the characteristics of individuals, groups, organizations, and environments in the context of global supply chain management. In addition, this study also includes causal research to investigate the cause-effect relationship between independent variables (such as transportation constraints, geopolitical risks, and global events disruptions) and dependent variables (effectiveness of the supply chain). This approach allows for analysis of how specific challenges affect overall supply chain performance.

3.4 PRIMARY AND SECONDARY DATA SOURCES

This study used both primary and secondary data sources. Primary data is collected directly by the researcher through methods such as questionnaires, interviews, or experiments designed specifically to address the research question. According to Driscoll & Brizee, participants receive questionnaires and fill them out based on their demographics, roles, and supply chain management experience. However, secondary data consists of information that was previously collected and readily available to the researcher. This type of data is often more cost-effective and easier to obtain than primary data and can provide valuable context for the research, said Ghauri et al. For this study, secondary data was collected from websites, library databases, relevant journals, publications, papers, and newspapers to supplement the primary data and gain a comprehensive understanding of the challenges in global supply chain management.

3.5 RESEARCH STRATEGY

The research strategy for this study has a structured plan to address the research problem of navigating the complexities in global supply chain management. The strategy includes quantitative method to gain comprehensive insights. The methodologies employed include surveys, case studies, and document analysis. The use of a questionnaire survey via Google Forms or SurveyMonkey is particularly highlighted for its efficiency in data collection.

3.5.1 QUESTIONAIRE

This study used Google Forms, a self-administered questionnaire, which is a validated data collection tool that ensures accuracy and reliability of the data, by Zikmund et al. The questionnaire was targeted at individuals involved in supply chain management, including managing directors, department heads, executives, supervisors, and group leaders from various departments such as warehousing, purchasing, planning, finance, logistics, and assembly. Participants will be selected from different industries to provide a comprehensive understanding of the challenges and practices in global supply chain management. Quantitative methods will help collect objective and consistent data, while descriptive research will help interpret the data from the respondents, organizational management, and specific details of the supply chain process.

Likert scale will be used in respondent rating. There are 4 level of point rating, which are 1 (strongly disagree), 2 (disagree), 3 (agree), 4 (strongly disagree). Table below will be provided to respondents to express their opinion.

Strongly Disagree	Disagree	Agree	Strongly Agree
1	2	3	4
RSITI TEKNI	KAI MALA	SIA MEL	

Refer to Appendix, each section of the questionnaire has 2 to 3 parts. The attended questions are likely to collect data from respondents who are professional in each working group. Questionnaire include 5 sections which are demographic, independent variables with 3 sections, and 1 section for dependent variables.

3.5.2 POPULATION

The population for this study comprises professionals involved in global supply chain management within Malaysia, including supply chain managers, logistics transportation managers, and freight forwarders. These individuals are directly engaged in the decision-making and operational processes of global supply chains, making them key contributors to understanding the complexities and challenges faced in this field.

3.5.3 SAMPLING DESIGN

This study uses probability sampling to ensure that everyone in the population has an equal chance of being selected. The sample will include approximately 100 participants covering various roles in supply chain management such as managing directors, department heads, executives, supervisors, and group leaders from different departments. The selection will be done using simple random sampling technique and the participants are randomly selected to ensure unbiasedness. This approach allows for a comprehensive assessment of the challenges facing global supply chain management. Probability sampling ensures that the sample is representative, while the use of Krejcie and Morgan formula will help determine the appropriate sample size for reliable data analysis.

Population Size (N)	Sample Size (S)	Population Size (N)	Sample Size (S)
100	80	210	132
110	86	220	136
120	92	230	140
130 100 100	97	240	144
140	103	250	148
150 NIVERSIT	108	260 LAYSIA M	152
160	113	270	155
180	118	270	159
190	123	280	162
200	127	290	165

Sample Size Determination (Source: Krejcie and Morgan, 1970)

3.5.4 PILOT TEST

According to Bartlett, conducting a pilot test allows researchers to assess the reliability and validity of a data collection instrument. Reliability refers to the consistency of responses, while validity refers to the accuracy and relevance of questions in measuring what they are intended to measure. By conducting a pilot test, researchers can ensure that the survey is both reliable and valid, thereby improving the quality of the data collected in the main study.

3.5.5 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 questions. For IMC tools and advertising media, both had acceptable strength of association as the 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 3.5.5.1: Cronbach's Alpha for Pilot Test (30 respondents)

Variable	Cronbach's alpha	N of items
Transportation Constraints	0.348	6
Geopolitical Risks	0.231	7
Disruption Caused by	0.615	6
Natural Disaster or Global Events	ي نيڪنيڪ	اونيۇم سى
Effectiveness of Global	0.754	4
Supply Chain SIT TE	KNIKAL MALAYSI	A MELAKA

(Sources: SPSS Output)

Table 3.5.5.2: Cronbach's Alpha for Pilot Test (30 respondents)

(Source: SPSS Output)

Reliability Statistics

Cronbach's

Alpha	N of Items
.686	23

3.6 RELIABILITY AND VALIDITY

Reliability and validity are essential in assessing the quality of quantitative social science research (Saunders et al., 2016). Reliability is related to the reproducibility and internal consistency of the research findings. This means that the results should remain consistent in repeated experiments. Validity refers to the appropriateness of the measurement method used, the accuracy of the results, and the generalizability of the research findings. Internal validity is achieved in a questionnaire when a set of questions is statistically related to the analyzed factors or outcomes. It ensures that the survey measures what it is intended to measure. External validity concerns whether the research findings can be generalized to other relevant settings.

To measure the reliability of the variables, the researchers used Cronbach's Alpha. The alpha coefficient is between 0 and 1, and values above 0.7 are considered acceptable. Values above 0.8 indicate good reliability, while values above 0.9 are considered excellent. Conversely, Cronbach's Alpha values below 0.6 are considered poor, and below 0.5 are considered unacceptable. Negative values indicate significant problems with the data, indicating problems with the research instrument or the data collection process.

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

<u>3.7 DATA ANALYSIS METHOD</u>

Data analysis is a technique that involves several activities, including collecting data, cleaning data, and collating the findings. These processes will be conducted after the data is collected through questionnaires. Data analysis software will be used to analyze the collected data, and this study will use the Statistical Package for Social Sciences

(SPSS). Using SPSS, this study will use descriptive analysis, multiple regression analysis, and Pearson correlation analysis for data analysis.

3.7.1 ANALYSIS DESCRIPTION

According to Saunders (2016), descriptive analysis is defined as the analysis that uses numerical values to describe and compare variables specific to central tendency and dispersion. In other words, it helps to describe, display, or summarize the data points in a constructive way so that a pattern emerges that meets every condition of the data. Descriptive analysis is an important step in conducting statistical data analysis because it helps to summarize the data, identify similarities, detect errors, and lay the foundation for further statistical analysis. The researcher will use descriptive analysis to differentiate the respondents based on gender, age, occupation, and education level.

3.7.2 Pearson Correlation Analysis

The researcher used Pearson correlation analysis i the relationship between the independent and dependent variables. Pearson correlation analysis conducts a statistical test to measure this relationship. According to Saunders, the Pearson correlation coefficient ranges from -1 to +1, representing perfect negative and perfect positive correlations, and 0 represents perfect independent correlation (2016). The figure below shows the Pearson correlation coefficient.

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 3.2: Value of the correlation coefficient

Sources: Saunders et al. (2016)

3.7.3 Multiple Regression Analysis

According to Saunders, multiple regression analysis is able to assess the strength of the relationship between three independent variables and one dependent variable (2016). It enables researchers to analyze which independent variables (transportation restrictions, geopolitical risks, disruptions caused by natural disasters or global events) have a large impact on the dependent variable (i.e., the effectiveness of the global supply chain). Below is the multiple regression equation used:

Equation of MRA: Y = a + bX1 + cX2 + dX3

Where:

Y = Dependent Variable (the effectiveness of the global supply chain)

a = Constant value or Intercept

- b = Influence of X1 (transportation restrictions)
- c = Influence of X2 (geopolitical risks)

c = Influence of X2 (disruptions caused by natural disasters or global events)

X1, X2, X3 = Independent variable

3.8 SUMMARY

In Chapter 3, the researcher elaborates on the methodology used to collect and analyze information for the study titled "Navigating the Complexities: Addressing Key Challenges in Global Supply Chain Management." The researcher has chosen an explanatory research design and a quantitative method to conduct the survey. The primary data source for this research will be questionnaires administered via Google Forms and distributed using smartphones and computers to respondents. Secondary data sources include journals, articles, and books. This chapter also outlines the scientific principles of inquiry, specifically focusing on reliability and validity. For data analysis, the Statistical Package for the Social Sciences (SPSS) will be used. Descriptive analysis, multiple regression analysis, and Pearson's correlation analysis will be conducted using SPSS to ensure comprehensive data examination. The chapter ensures that the methodology is robust and suitable for addressing the complexities and challenges faced in global supply chain management.

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 respondents. IBM Statistical Package for the Social Sciences (SPSS) version 27.0 is used to analyze the data collected. This chapter is using descriptive analysis, Person's Correlation analysis, Multiple Regression Analysis, and ANOVA analysis to determine the relationship between dependent variable and independent variables. The questionnaire is assigned to 103 respondents through an online survey which is Google Forms. There are three parts in the questionnaire which Part A is the demographic information of respondents, Part B is challenges of global supply chain, and Part C is effectiveness of global supply chain.

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 30 respondents are chosen to conduct the pilot test (**Refer to 3.5.5**). The researcher is taking one week to complete the pilot test. The objective of the pilot test is to test the reliability of the data and validity of the questionnaire (Bartlett, 2013).

Below is the result for 100 respondents.

Table 4.1: Cronbach's Alpha for Pilot Test (100 respondents)

Variable	Cronbach's alpha	N of items
Transportation	0.712	6
Constraints		
Geopolitical Risks	0.549	7
Disruption Caused by	0.789	6
Natural Disaster or Global		
Events		

(Source: SPSS Output)

Effectiveness of Global	0.763	4
Supply Chain		

Table 4.2: Cronbach's Alpha for Pilot Test (100 respondents)

(Source: SPSS Output)

Reliability Statistics

	Cronbach's Alpha	N of Items		
St MA	.885	23		
P K A				

4.2.1 VALIDITY TEST

Validity test has been conducted in this research. There are 23 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.

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4.3 DESCRIPTIVE STATISTICS ON DEMOGRAPHIC BACKGROUND

Researcher uses the descriptive statistics to analyse respondents' demographic background such as gender, age, education level, industry, position and working years. The questionnaire was given to target respondents via Microsoft Form and there was a total of 103 respondents for this questionnaire. SPSS outputs the frequency, percentage, valid, and cumulative percent of respondents.

<u>4.3.1</u> <u>GENDER</u>

Table 4.3: Gender of Respondents

(Source: SPSS Output)

Gender



Figure 4.1: Gender of Respondents

Table above shows the gender of 103 respondents in this research. From the table above, there are 57 female respondents which are 55.34%, and 46 male respondents which are 44.66%. Therefore, the majority of respondents are female.

<u>4.3.2</u> <u>AGE</u>

Table 4.4: Age of Respondents (Source: SPSS Output)

AGE

	Frequency	Percent	Valid Percent	Percent
18 - 25	19	18.4	18.4	18.4
26 - 35	46	44.7	44.7	63.1
36 - 45	27	26.2	26.2	89.3
46 - 55	11	10.7	10.7	100.0
Total	103	100.0	100.0	
	18 - 25 26 - 35 36 - 45 46 - 55 Total	Frequency 18 - 25 19 26 - 35 46 36 - 45 27 46 - 55 11 Total 103	Frequency Percent 18 - 25 19 18.4 26 - 35 46 44.7 36 - 45 27 26.2 46 - 55 11 10.7 Total 103 100.0	Frequency Percent Valid Percent 18 - 25 19 18.4 18.4 26 - 35 46 44.7 44.7 36 - 45 27 26.2 26.2 46 - 55 11 10.7 10.7 Total 103 100.0 100.0



Figure 4.2: Age of Respondents

Table above shows the age range of 103 respondents is 18 years old to 55 years old and above. The majority of respondents were aged 26 to 35 years old, there are total 46 respondents (44.66%), followed by aged 36 to 45 years old, which contains 27 respondents (26.21%). Besides, respondents who age 18 to 25 years old comprise 19 respondents (18.45%), whereas for age range from 46 to 55 years old contains 11 respondents (10.68%).

4.3.3 EDUCATION LEVEL

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Table 4.5: Education Level of Respondents										
	(Source: SPSS Output) EDUCATION LEVEL									
					Cumulative					
		Frequency	Percent	Valid Percent	Percent					
Valid	Bachelor's degree	82	79.6	79.6	79.6					
	Diploma 💛	1 **	1.0	1.0	80.6					
	ERS F5 TEK	INIKAL	M.1.0_A	SIA.0MEL	AK 81.6					
	High school	15	14.6	14.6	96.1					
	Master's degree	2	1.9	1.9	98.1					
	POLITEKNIK	1	1.0	1.0	99.0					
	Polytechnic	1	1.0	1.0	100.0					
	Total	103	100.0	100.0						



Table above shows the education level of 103 respondents. The majority of respondents were Bachelor's degree, there are total 82 respondents (79.61%), followed by high school, which contains 15 respondents (14.6%). Besides, respondents who Master's degree comprise 2 respondents (1.9%), whereas for Diploma, F5, Polytechnic contains 1 respondent each (1%).

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4.3.4 INDUSTRY

Table 4.5: Industry of Respondents

(Source: SPSS Output)

INDUSTRY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Freight Forwarder	18	17.5	17.5	17.5
	Logistic / Transportation	31	30.1	30.1	47.6
	Manufacturing	28	27.2	27.2	74.8
	Supply Chain Management	26	25.2	25.2	100.0
	Total	103	100.0	100.0	



Figure 4.4: Industry of Respondents

The table above shows the types of industry for 103 respondents. The majority of respondents are working in the Logistic and Transportation industry which is 31 respondents with

percentage of 30.1%. Then, followed by Manufacturing industry which are 28 respondents (27.2%). There are also 26 respondents working in the Supply Chain Management industry with 25.2% and 18 respondents working in the Freight Forwarder industry with 17.5%.

<u>4.3.5</u> <u>POSITION</u>

Table 4.6: Position of Respondents

(Source: SPSS Output)

					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	Agent	2	1.9	-1.9	1.9
	Clerk	8	7.8	7.8	9.7
	Executive	25	24.3	24.3	34.0
مالاك	Internship		1.0	ر شو.1.	35.0
JNIV	Lead Agent	KNI <mark>KAI</mark>	_ MAL /	YSI^{1,0} ME	35.9
	Manager	20	19.4	19.4	55.3
	MANPOWER L	1	1.0	1.0	56.3
	Officer	45	43.7	43.7	100.0
	Total	103	100.0	100.0	



The table above shows the types of position for 103 respondents. The majority of respondents are officer which is 45 respondents with percentage of 43.69%. Then, followed by executive and manager which are 25 respondents (24.3%) and 20 respondents (19.4%) each. There are also 8 respondents working as clerk with 7.8% and 2 respondents working agent with 1.9%. For the internship, lead agent and manpower leader, there are 1 respondent (1%) each.

4.3.6 WORKING YEARS

Table 4.7: Gender of Respondents

(Source: SPSS Output)

WORKING YEARS



Figure 4.6: Working Years of Respondents

Based on the table above, it shows the working years of 103 respondents. The majority of respondents are work below 3 years, which are 36 respondents with 35%. Then, followed by

work between 3 to 5 years consisting of 29 respondents with the percentage of 28.2% and 25 respondents (24.3%) work between 6 to 10 years. There are only 13 respondents with the percentage of 12.6% are working above 10 years.

<u>4.4 DESCRIPTIVE STATISTICS ON INDEPENDENT VARIABLES AND</u> <u>DEPENDENT VARIABLE</u>

Researcher used descriptive method analysis to analyse the dependent variable and the independent variables in this research. A central tendency measurement was conducted and the mean, median and mode of variables is identified by descriptive analysis.

	(Source: SPSS Output)						
LIS	ТС	GR	NDGE	EGSC			
N Valid	103	103	103	103			
Missing	کا (ملب	e.e	م سنخ ا	ا و نبو			
Mean	3.1650	3.2335	3.1246	3.4782			
Std. Error of Mean	.03768	.03567	Y⊃.05804 =	.04731			
Median	3.1667	3.1667	3.1667	3.5000			
Mode	3.67	3.14	2.6 7 ^a	4.00			
Std. Deviation	.38241	.36198	.58902	.48013			
Minimum	2.17	2.29	1.83	1.75			
Maximum	3.67	4.00	4.00	4.00			

 Table 4.8: Descriptive Statistic of Independent Variable and Dependent Variable

a. Multiple modes exist. The smallest value is shown

*REMARK: TC= Transportation Constraint, GR= Geopolitical Risk, NDGE= Disruption caused by Natural Disaster and Global Events, EGSC= Effectiveness of Global Supply Chain Table 4.8 showed the descriptive statistical analysis for independent variables and dependent variable. Independent variables from the table above are transportation constraint, geopolitical risk and disruption caused by natural disaster and global events, while the dependent variable is effectiveness of global supply chain. Among the independent variables, geopolitical risk has the highest mean which is 3.2335 followed by transportation constraint which is 3.1650. Geopolitical risk was the highest mean because majority of respondents perceived geopolitical issues as a significant challenge affecting global supply chains. However, for mean of disruption caused by natural disaster and global events 3.1246. It showed that there are few respondents concern on these variables. The mean for the dependent variable, effectiveness of global supply chain is 3.4782.

Moreover, the standard deviation of the highest independent variable is disruption caused by natural disaster and global events, which is 0.58902, followed by transportation constraint which is 0.38241. Whereas geopolitical risk with 0.36198 which is the lowest standard deviation among these independent variables. Disruption caused by natural disaster and global events showed the highest standard deviation, as respondents had varied perceptions of the impact of these events, while geopolitical risk had the lowest standard deviation for effectiveness of global supply chain is 0.48013. Lastly, the minimum value of the transportation constraint, geopolitical risk, disruption caused by natural disaster and global events and effectiveness of global supply chain were 2.17, 2.29, 1.83 and 1.75 respectively, while the maximum value for transportation constraint, geopolitical risk, disruption caused by natural disaster and global events and effectiveness of global supply chain were 3.67, 4.00, 4.00 and 4.00 respectively.

4.5 PEARSON'S CORRELATION COEFFICIENTS ANALYSIS

Researcher uses Pearson's Correlation Coefficients (r), a statistical tool for data analysis. This coefficient is widely used to measure the linear relationship strength between dependent variable and independent variables, and to evaluate the relationship strength between data variables (Saunders et al., 2016). Figure 4.7 below shows the guidelines of Pearson's Correlation Coefficient to interpret the correlation range of R value in data analysis.

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 4.7: Pearson's Correlation Coefficients

(Source: Saunders, Lewis, and Thornhill, 2016)

Table 4.9: Correlation Analysis for All Variables
1/2

		(Source: SPSS Output) Correlations				
		тс	GR	NDGE	EGSC	
ТС	Pearson Correlation	1	.485**	.694**	.603**	
	Sig. (2-tailed)	- Pin	<.001	<.001	<.001	
		103	103	103	103	
GR	Pearson Correlation	.485**	MALAR	.656**	.531**	
	Sig. (2-tailed)	<.001		<.001	<.001	
	N	103	103	103	103	
NDGE	Pearson Correlation	.694**	.656**	1	.541**	
	Sig. (2-tailed)	<.001	<.001		<.001	
	N	103	103	103	103	
EGSC	Pearson Correlation	.603**	.531**	.541**	1	
	Sig. (2-tailed)	<.001	<.001	<.001		
	N	103	103	103	103	

**. Correlation is significant at the 0.01 level (2-tailed).

*REMARK: TC= Transportation Constraint, GR= Geopolitical Risk, NDGE= Disruption caused by Natural Disaster and Global Events, EGSC= Effectiveness of Global Supply Chain

From Table 4.9, the independent variables in this research are transportation constraint, geopolitical risk and disruption caused by natural disaster and global events, while the dependent variable is effectiveness of global supply chain. The correlation value for the transportation constraint was 0.603 with significant level 0.000 (p<0.01). This showed that there was a moderate positive relationship between transportation constraint and effectiveness of global supply chain. Moreover, the correlation between geopolitical risk and effectiveness of global supply chain was 0.531 with significant level 0.000 (p<0.01), this showed that there was positive relationship between geopolitical risk and effectiveness of global supply chain. Next, the correlation for disruption caused by natural disasters and global events was 0.541 with significant level 0.000 (p<0.01), this showed that there was a moderate positive relationship between disruption caused by natural disasters and global events was 0.541 with significant level 0.000 (p<0.01), this showed that there was a moderate positive relationship between disruption caused by natural disasters and global events was 0.541 with significant level 0.000 (p<0.01), this showed that there was a moderate positive relationship between disruption caused by natural disasters and global events was 0.541 with significant level 0.000 (p<0.01), this showed that there was a moderate positive relationship between disruption caused by natural disasters and the effectiveness of the global supply chain.

4.6 MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis measures the significant relationship between independent variables (transportation constraint, geopolitical risk and disruption caused by natural disaster and global events) and dependent variable (effectiveness of global supply chain).

Table 4.10: Model Summary of Multiple Regression Analysis

(Source: SPSS Output)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.663ª	.439	.422	.36504
D 11				

a. Predictors: (Constant),

DISRUPTION_CAUSED_BY_NATURAL_DISASTER_AND_GLOBAL_E VENTS, GEOPOLITICAL_RISK, TRANSPORTATION_CONSTRAINT b. Dependent Variable: EFFECTIVENESS_OF_GLOBAL_SUPPLY_CHAIN

Table 4.10 showed the model summary that clarify the relationship between the independent variables and the dependent variable. The value of correlation coefficient (R) is 0.663 which means that there was a strong correlation between the variables. Besides, the coefficient of determinant R square showed a value of 0.439, which means that effectiveness of global supply chain was affected by independent variables by 43.9%, while 56.1% was explained by the other factors that are not involved in this research. The adjusted R square showed 42.2%.

UNIVERSITITE Table 4.11: ANOVA Analysis AMELAKA

(Source: SPSS Output)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.321	3	3.440	25.818	<.001 ^b
	Residual	13.192	99	.133		
	Total	23.513	102			

a. Dependent Variable: EFFECTIVENESS_OF_GLOBAL_SUPPLY_CHAIN

b. Predictors: (Constant), DISRUPTION_CAUSED_BY_NATURAL_DISASTER_AND_GLOBAL_EVENTS, GEOPOLITICAL_RISK, TRANSPORTATION_CONSTRAINT

Table 4.11 showed the F-test value was 25.818 with a significant level 0.000. the significant level was lower than 0.05. Hence, the researcher can conclude that there was a significant relationship between independent variables (transportation constraint, geopolitical risk and disruption caused by natural disaster and global events) and dependent variable (effectiveness of global supply chain). The null hypothesis would be rejected due to the significant level of the regression model is below 0.05.

	Ta	able 4.12: Co	efficient of Multi	ple Regression Analysis		
			(Source: SPSS (Output)		
			Coefficie	ents ^a		
		Unstandard	ized Coefficients	Standardized Coefficients		
Model		کل ملیھ	Std. Error	يىۋىرىسىنى Beta	t	Sig.
1 — UN	(Constant)	.420	.391 NKALMA	LAYSIA MELAK	1.073	.286
	ТС	.529	.132	.422	4.026	<.001
	GR	.380	.132	.286	2.865	.005
	NDGE	.050	.099	.061	.501	.617

a. Dependent Variable: EFFECTIVENESS_OF_GLOBAL_SUPPLY_CHAIN

Table 4.12 showed the beta value of transportation constraint was 0.529, beta value of geopolitical risk was 0.380, and beta value of disruption caused by natural disaster and global events was 0.050. As shown in the table above, transportation constraint had the most significant beta value. Next, followed by the second significant beta value was geopolitical risk. Lastly, disruption caused by natural disaster and global events had the least significant beta value. The linear equation of Multiple Regression Analysis (MRA) was Y = a + bX1 + cX2 + dX3 + eX4, thus the MRA was developed as below:

Effectiveness of Global Supply Chain = 0.420 + 0.529(TC) + 0.380(GR) + 0.050(NDGE)

4.7 HYPOTHESIS TESTING

4.7.1 Hypothesis 1: Transportation Constraints

H1a: There is a significant relationship between transportation constraints and the effectiveness of global supply chains.

H0a: There is no significant relationship between transportation constraints and the effectiveness of global supply chains.

Results: Table 4.12 shows that the beta value of transportation constraints is 0.529, and the significance level is 0.000 (p < 0.01). This indicates a significant positive relationship between transportation constraints and the effectiveness of global supply chains. Therefore, the alternative hypothesis (H1a) is accepted, and the null hypothesis (H0a) is rejected.

4.7.2 Hypothesis 2: Geopolitical Risks

H1b: There is a significant relationship between geopolitical risks and the effectiveness of global supply chains.

H0b: There is no significant relationship between geopolitical risks and the effectiveness of global supply chains.

Results: As shown in Table 4.12, the beta value of geopolitical risks is 0.380, and the significance level is 0.005 (p < 0.01). This indicates a significant positive relationship between geopolitical risks and the effectiveness of global supply chains. Hence, the alternative hypothesis (H1b) is accepted, and the null hypothesis (H0b) is rejected.

4.7.3 Hypothesis 3: Disruption Caused by Natural Disasters and Global Events

H1c: There is a significant relationship between disruptions caused by natural disasters and global events and the effectiveness of global supply chains.

H0c: There is no significant relationship between disruptions caused by natural disasters and global events and the effectiveness of global supply chains.

Results: According to Table 4.12, the beta value for disruptions caused by natural disasters and global events is 0.050, with a significance level of 0.617

(p > 0.05). This indicates no significant relationship between these disruptions and the effectiveness of global supply chains. Therefore, the null hypothesis (H0c) is accepted, and the alternative hypothesis (H1c) is rejected.

<u>4.7.4</u> Summary of Hypothesis Testing

Transportation Constraints (H1a): Significant positive relationship; hypothesis accepted.

Geopolitical Risks (H1b): Significant positive relationship; hypothesis accepted.

Disruptions Caused by Natural Disasters (H1c): No significant relationship; hypothesis rejected.

4.8 DISCUSSION ON FINGDINGS

The data analysis showed positive and negative impacts on flexibility time, mental wellbeing, adaptation challenges, productivity, and work-life balance in hybrid workplaces.

RO1: To Evaluate the Impact of Transportation Constraints on Global Supply Chains

The data revealed a significant positive relationship between transportation constraints and the effectiveness of global supply chains, with a correlation coefficient of 0.603 (p < 0.001). The regression analysis also indicated that transportation constraints had the highest beta value (0.529), highlighting it as the most impactful challenge. Limited capacity, high transportation costs, and inadequate infrastructure were identified as major contributors. These constraints resulted in increased lead times, higher costs, and reduced operational efficiency, which aligns with previous studies emphasizing their critical influence on supply chain performance.

RO2: To Analyze How Geopolitical Risks Affect Global Supply Chains

Geopolitical risks showed a moderate positive relationship with the effectiveness of global supply chains, with a correlation coefficient of 0.531 (p < 0.001). The beta value (0.380) in the regression analysis further confirmed its significance. Factors such as political instability, trade wars, and regulatory changes emerged as key risks disrupting supply chain efficiency. For example, trade tariffs and border restrictions were identified as contributors to increased costs and delays. This finding highlights the need

for effective risk management and adaptive strategies to mitigate geopolitical uncertainties.

RO3: To Assess the Influence of Disruptions Caused by Natural Disasters and Global Events

While disruptions caused by natural disasters and global events had a significant positive correlation with supply chain effectiveness (0.541, p < 0.001), the regression analysis showed a relatively low beta value (0.050), suggesting a less pronounced direct impact. This may indicate that the effect of such disruptions varies based on the scale and frequency of events. For instance, while major events like COVID-19 significantly disrupted global supply chains, their impact may be mitigated by contingency planning and resilience strategies in well-prepared organizations.

4.9 RESULT

Hypotheses	Significant Level	Result
Transportation Constraints within the challenges of	Beta value=0.529	Accepted
Global Supply Chain will negatively affect the	p<0.001<0.01	91
effectiveness of Global Supply Chain.		
Geopolitical Risks within the challenges of Global	Beta value=0.380	Accepted
Supply Chain will negatively affect the effectiveness	p=0.005<0.01	
of Global Supply Chain.		
Disruption Caused by Natural Disasters or Global	Beta value=0.050	Rejected
Events within the challenges of Global Supply Chain	p=0.617>0.05	
will negatively affect the effectiveness of Global		
Supply Chain.		

<u>4.10</u> <u>SUMMARY</u>

In Chapter 4, the researcher analysed the data collected from the respondents. All of the data were analysed using SPSS software version 27.0. The researcher imported the data into SPSS and used a reliability test for the pilot test, descriptive analysis, Pearson's Correlation Coefficient analysis, Multiple Regression analysis, and ANOVA analysis. The data output showed the relationship between the independent variables and the dependent variable. The result showed that transportation constraint, geopolitical risk and disruption caused by natural disaster and global events have a significant relationship with effectiveness of global supply chain. In the next chapter, the researcher will discuss the results, outcomes, limitations, and recommendations of the



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CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In this chapter, the researcher will discuss the conclusion of the overall result and summary of the findings of this research. The summary of the findings is elaborated in the first section of this chapter, and the justification of research objectives is explained in the second section. Besides, the third section will discuss the limitations of the research in this chapter. Lastly, the researcher will describe the recommendations for future research in the last section.

5.2 SUMMARY OF FINDINGS

The researcher completed the analysis of the data about the demographic variables. A total of 103 respondents filled out the survey, and the demographic information collected from them included their gender, age, education level, industry, position and working years. According to the survey results, the majority of respondents were female, which is 55.3%. Most respondents fell into the age group of 26 to 35 years old. For the respondents' education level, the majority are from bachelor's degree, while for the industry, most respondents are working in logistic and transportation industry, and most respondents are the officer position with 45 people. Last but certainly not least, the majority of respondents are working not more than 3 years.

In this research, Pearson's Correlation Coefficient analysis was used to analyse the relationship between three independent variables and one dependent variable. The independent variables were transportation constraint, geopolitical risk and disruption caused by natural disaster and global events, while the dependent variable was effectiveness of global supply chain. Transportation constraint, geopolitical risk and disruption caused by natural disaster and global events shared a moderately positive relationship with effectiveness of global supply chain.

The researcher used the Multiple Regression analysis to determine the relationship between the independent variables and the dependent variable. There were 43.9% of the dependent variable can be explained by the independent variables, while 56.1% was explained by the other factors that are not involved in this research. According to ANOVA analysis, it can be assumed that there is a significant relationship between these variables because the significant level of regression is lower than 0.05.

Moreover, there were also significant relationships between transportation constraint, geopolitical risk with effectiveness of global supply chain in the hypotheses testing. However, disruption caused by natural disaster and global events is no significant relationship with effectiveness of global supply chain. As a result, the hypotheses (H1a, H1b) are accepted but hypotheses (H1c) is rejected.

5.3 FULFILLMENT OF RESEARCH OBJECTIVES

The research results will be the result of the study seeking the key challenges in global supply chain management. This research will provide results with important research objectives related to the types of challenges of global supply chain that can affect its effectiveness with negative effect.

5.3.1 To evaluate the impact of transportation constraints on the effectiveness of global supply chains.

The analysis revealed that transportation constraints significantly impact the effectiveness of global supply chains. Factors such as limited transportation capacity, high costs, and infrastructure bottlenecks contribute to delays in goods movement, increased operational costs, and reduced customer satisfaction. The statistical analysis showed a moderate positive correlation between transportation constraints and supply chain effectiveness (r = 0.603, p < 0.001). This highlights the need for organizations to adopt strategies like optimizing transportation networks, leveraging multimodal transport solutions, and investing in infrastructure improvements to mitigate these challenges.

Refer to Bridget McCrea (2022), it explains how rising transportation costs and limited of infrastructure lead to delays and higher operational costs. These findings align with the study's results, highlighting that transportation constraints are a major challenge affecting the smooth flow of goods and overall supply chain efficiency. According to The Global Competitiveness Report (2020), it emphasizes the critical role of infrastructure in reducing bottlenecks, which corroborates the study's recommendation to optimize transportation networks and invest in infrastructure improvements.

Notteboom (2021) also discusses port capacity constraints and how they exacerbate delays, reinforcing the findings that transportation constraints are the most significant factor impacting global supply chains.

5.3.2 To analyze how geopolitical risks affect the effectiveness of global supply chains.

Geopolitical risks, including trade wars, tariffs, and political instability, were found to have a significant impact on global supply chain operations. These risks lead to increased costs, production delays, and disruptions in the movement of goods. The correlation analysis identified a moderate positive relationship between geopolitical risks and supply chain effectiveness (r = 0.531, p < 0.001). This underscores the importance of proactive risk management strategies, such as diversifying supplier bases, enhancing compliance with regulatory changes, and implementing contingency plans to navigate geopolitical uncertainties.

According to Wolf and Kalish (2023), they describe how trade wars and tariffs create higher costs and operational disruptions. This supports the study's finding that geopolitical risks introduce uncertainty, requiring proactive risk management.

Refer to Edelman Global Advisory (2023), it highlights how regulatory changes and political instability disrupt production and shipping, aligning with the study's results on the critical influence of geopolitical factors.

According to McCrea (2022), it notes how financial and operational risks from geopolitical changes necessitate adaptive strategies, such as diversifying supplier bases and enhancing regulatory compliance, consistent with the study's recommendations.

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5.3.3 To assess the influence of disruptions caused by natural disasters and global events on the effectiveness of global supply chains.

Disruptions from natural disasters and global events, such as pandemics or earthquakes, were found to moderately affect supply chain effectiveness. These events cause damage to infrastructure, production stoppages, and delays in delivery schedules. The study showed a moderate positive correlation between these disruptions and supply chain effectiveness (r = 0.541, p < 0.001). However, the regression analysis indicated that this variable had the least significant impact compared to transportation constraints and geopolitical risks. This suggests that while natural disasters are impactful, their effects may be mitigated through robust contingency planning, supply chain resilience measures, and diversified sourcing strategies.

According to World Economic Forum (2021), it highlights case studies like Japan earthquake, showing that disruptions vary in their impact depending on lack of preparation, consistent with the study's result that these disruptions have a less direct effect compared to other factors.

According to the Bill Canis (2011), it discusses the variability in disaster impacts, emphasizing the importance of proactive disaster management strategies, which aligns with the study's suggestion for robust contingency planning and resilience measures.

5.4 LIMITATION OF THE STUDY

In this research, the study encounters several limitations rooted in the challenges of data collection from respondents which include workers. The foremost challenge lies in the uncertainty of respondents' willingness to participate, adding a layer of unpredictability to the investigation. Compounded by time constraints, the expedited data collection process, necessitated by a 4-month reporting deadline, may affect the depth and thoughtfulness of responses. Furthermore, adhering to the Krejcie and Morgan (1970) table for sample size determination, where a target of 103 respondents was set, introduces the likelihood of non-response bias as not all approached individuals may

engage. These limitations necessitate cautious interpretation of findings and provide valuable insights for refining future research methodologies.

5.5 <u>RECOMMENDATION FOR THE FUTURE STUDY</u>

This research is about the key challenges in global supply chain management. Researcher has studied the in key challenges in global supply chain management from many literature studies, but this is still a research field to be fully explored because there are some SCM people who still do not know much about the effectiveness of global supply chain brought by the challenges. Therefore, the researcher suggested some recommendations for future researcher engaged in similar study.

First of all, future study can develop comprehensive frameworks. This includes creating risk mitigation frameworks, resilience models, and technology-driven solutions, as well as sustainability and collaboration-focused approaches. Industryspecific frameworks and holistic evaluation metrics can further enhance the practical relevance of these solutions. These efforts aim to advance the field by providing innovative strategies and actionable insights for building resilient and effective global supply chains.

Moreover, future study is encouraged to adopt mixed research methods, combining quantitative and qualitative analysis. Such a comprehensive approach can provide a more comprehensive understanding and deeply explore the key challenges in global supply chain management. Quantitative analysis can provide the trend and correlation of large-scale data, while qualitative analysis is helpful in understanding individual experiences and viewpoints deeply. Combining the two can produce more convincing and in-depth research results and provide more specific suggestions.

Lastly, the future study can be devoted to deepening the understanding of the key challenges in global supply chain management. Through these recommendations, researcher can analyse the challenges and effectiveness to global supply chain more comprehensively and deeply and provide more substantive guidance for practice.

5.6 CONCLUDING REMARK

This research provides insight into the key challenges in global supply chain management. The researcher explained the summary of study findings, limitations, and recommendations. The researcher concluded the result based on data analysis and discussion in Chapter 4 in the summary of the findings. For the limitations, the researcher listed out the problems faced in this research, such as respondents' willingness to participate, time constraints, sample size and geographical restrictions. Therefore, there are also some recommendations suggested, such as develop comprehensive frameworks, adopting mixed research methods, and paying attention to long-term impact and sustainability.

In conclusion, the researcher hopes this study will provide helpful information regarding the effectiveness of global supply chain brought by the challenges. Most respondents strongly agree that transportation constraint impact effectiveness global supply chain negatively. The hypotheses testing showed a significant relationship between transportation constraint, geopolitical risk and disruption caused by natural disaster and global events with effectiveness of global supply chain. Therefore, there were significant relationships between transportation constraint, geopolitical risk and disruption caused by natural disaster and global supply chain in the hypotheses testing. However, disruption caused by natural disaster and global supply chain in the hypotheses testing. However, disruption caused by natural disaster and global supply chain. As a result, the hypotheses (H1a, H1b) are accepted but hypotheses (H1c) is rejected.

The study findings will benefit the employees and employers in supply chain management, logistic and transportation as they can refer to this research to provide employees with guidance to manage their work better and help employers understand the positive and negative impacts of effectiveness of global supply chain.

LIST OF ABBREVIATION

ABBREVIATION	MEANING
SCOR	Supply Chain Operations Reference
SSPS	Statistical Package for the Social Sciences



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APPENDIX A



QUESTIONNAIRE RESEARCH PROJECT SURVEY

NAVIGATING THE COMPLEXITIES: IDENTIFYING THE KEY CHALLENGES IN GLOBAL SUPPLY CHAIN MANAGEMENT

Dear respondent,

I am Moo Shao Wei, a final year student from Universiti Teknikal Malaysia Melaka (UTeM) studying Bachelor of Technology Management (Supply Chain Management & Logistic) with Honours.

You are invited to take part in a research study being undertaken to examine "Navigating the Complexities: Addressing Key Challenges in Global Supply Chain Management." The purpose of this survey is to explore key factors such as transportation constraints, geopolitical risks, and disruptions caused by natural disasters and global events, and their impact on supply chain effectiveness.

This questionnaire consists of five (5) main sections such as section A, B, C, D and E. Please read the questions carefully and answer them with a tick or in the space provided. The survey will take approximately 10 minutes to be completed and your participation is highly appreciated. Thank you.

For further clarification and or instruction, please contact:

Name: MOO SHAO WEI

E-mail:

Tel:

Supervisor: PROFESOR DATUK DR. IZAIDIN BIN ABDUL MAJID

E-mail:

Demographic

This section aims to obtain your personal information with several questions listed. Please select the answer options provided. *

1.Gender

□ Male

□ Female



- 3.Education Level
- □ High school
- □ Bachelor's degree
- □ Master's degree
- Doctorate degree
- 4.Industry
- □ Supply Chain Management
- □ Manufacturing
- Logistic / Transportation
- □ Freight Forwarder

5.Position

□ Manager

□ Executive

□ Officer

Clerk

6. How long you serve for the job?



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Challenges (TRANSPORATION CONSTRAINTS) faced by

During serving for global supply chain, we will facing transportation constraints such as flight delay, port congestion & etc. Please give some reply about below questions.

 $7. {\rm To}\ {\rm what}\ {\rm extent}\ {\rm do}\ {\rm transportation}\ {\rm constraints}\ {\rm affect}\ {\rm your}\ {\rm supply}\ {\rm chain}\ {\rm operations}\ {\rm ?}\ {\rm (Rate}$

on a scale of 1 to 4, with 1 being "Strongly Not" and 4 being "Strongly Yes")

	1	2	3	4
Affect				

8.**How frequently do you experience the following transportation issues?** (Rate on a scale of 1 to 4, with 1 being "Never" and 4 being "Always")

and the second s	1	2	3	4
Shipping				
delays due to				
congestion				
Limited				
transportation				
options	کل ملیسہ	zis	ىرىيىتى نە	اونىق
Increased		•*		
transportation	SITI TEKNI	KAL MAL	AYSIA MEI	AKA
costs				
Carrier				
availability				
issues				

9. How was the tranportation constraints affect the effectiveness of the supply chain management? (Rate on a scale of 1 to 2, with 1 being "Positive" and 4 being "Negative")

	1	2
Effect		

Challenges (GEOPOLITICAL RISKS) faced by

During serving for global supply chain, we will facing geopolitical issues such as political, social issues & etc. Please give some reply about below questions.

10.**How significant are geopolitical risks to your supply chain?** (Rate on a scale of 1 to 4, with 1 being "Strongly Not" and 4 being "Strongly Yes")

	1	2	3	4
Significant				

11. In past year, have geopolitical events had impacted your supply chain?

D No

12. Which of the following geopolitical challenges has most affected your supply chain operations? (Rate on a scale of 1 to 4, with 1 being "Never" and 4 being "Always")

	. 10	2	S3	4
Trade tariffs				
Political		MAL	ATSIA MEI	
instability				
Border				
restrictions				
Export/import				
restrictions				
Sanctions				

Challenges (NATURAL DISASTER & GLOBAL EVENTS) faced by

During serving for global supply chain, we will facing natural disaster & global events such as flood, earthquake, diseases & etc. Please give some reply about below questions.

13. How frequently do natural disasters or major global events impact your supply chain? (e.g., pandemics, floods, earthquakes) (Rate on a scale of 1 to 4, with 1 being "Not Frequently" and 4 being "Very Frequently")

	1	2	3	4
Frequently				

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14. What are the main impacts of these events on your supply chain? (Rate on a scale of 1 to 4, with 1 being "Not impacted" and 4 being "Highly impacted")

E	1	2	3	4
Disruption in				
supply	-			
availability				*
Increased cost			م شوی م	او دیو.
Delays in			••	
shipments	SITI TEKNI		AYSIA MEI	_AKA
Damage to				
goods				

15. Does your organization have contingency plans for natural disasters and global events?

□ Yes, fully implemented

□ No plans in place

Effectiveness of Supply Chain Management

16.**Overall, how effective is your organization's current supply chain in terms of meeting its objectives?** (Rate on a scale of 1 to 4, with 1 being "Not Effective" and 4 being "Highly Effective")

	1	2	3	4
Effectiveness				

17.**How do the following factors influence the effectiveness of your supply chain?** (Rate on a scale of 1 to 4, with 1 being "No influence" and 4 being "High influence")

A CONTRACTOR	1	2	3	4
Transportation constraint				
Geopolitical risks				
Natural disasters and global events	کل ملیسہ		ىرىيىتى تې	و نيو

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APPENDIX B

Gantt Chart of Final Year Project (FYP) 1

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ACTIVITIES																
FYP TALK																
SEARCH FOR FYP																
TOPIC																
MEETING WITH																
SUPERVISOR																
TOPIC DISCUSSION	1						Μ									
TITLE	P	~					Ι									
CONFIRMATION							D									
RO & RQ	-						ĺ									
CONSTRUCTION							S				7					
SUBMISSION							E									
CHAPTER 1			-				М							1		
SUBMISSION	٩ ر	F		~			В	3				~	3	91		
CHAPTER 2							R									
SUBMISSION	E	K		K A		Μ	E	Â	YS	βIA			ALK.	A		
CHAPTER 3							A									
FIRST DRAFT OF FYP							K									
1																
SUBMISSION OF FYP																
1																
PRESENTATION 1																
REVISED OF FYP 1							1									

APPENDIX C

Gantt Chart of Final Year Project (FYP) 2

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ACTIVITIES																
CREATE																
QUESTIONNAIRE																
DISTRIBUTE																
QUESTIONNAIRE																
COLLECT																
QUESTIONNAIRE	1															
ANALYSIS DATA	Y	X														
SUBMISSION																
CHAPTER 4																
SUBMISSION																
CHAPTER 5																
PROPOSAL																
CORRECTION				R				2.		5.	بالله	2	يبر			
SLIDE PREPARATION									4							
SUBMISSION OF FYP	E	K		S A		M	AL	A	YS	βİÂ	M		ÂΚ	A		
2																
PRESENTATION 2																
REVISED OF FYP 2																