



MOHAMAD KHAIRUL A'KIL BIN ADRI

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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 Logistic) With Honours



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SIGNATURE	:
NAME OF PANEL	: TS. DR. NURHAYATI BINTI KAMARUDIN
DATE	: 14 FEBRUARY 2025

EXPLORING THE IMPACT OF THE COVID-19 PANDEMIC TOWARDS THE PRODUCTION OF PROTON

MOHAMAD KHAIRUL A'KIL BIN ADRI



ERSFaculty of Technology Management and Technopreneurship

Universiti Teknikal Malaysia Melaka

JANUARY 2025

DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled "EXPLORING THE IMPACT OF THE COVID-19 PANDEMIC TOWARDS THE PRODUCTION OF PROTON" 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.



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, Dr. Nur Syahirah Rosli and my fellow friends. They have provided me fully support and advice throughout this research. Without their blessing and encouragement, this research is impossible to complete within short period of time



ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and Merciful, upon whom we ultimately depend for sustenance and guidance. All praise to Allah for His blessing that enabled me to complete this Final Year Project. (FYP).

Many people helped and supported me throughout the completion of the final year project, which would not have been possible without any help from them. I would like to take this opportunity to thank everyone who has assisted and contributed to my degree's completion. First and foremost, I want to thank my supervisor, Dr. Nur Syahirah binti Rosli, for her unwavering support, constructive guidance, motivation, patience, plus encouragement during the entire study process.

My mother, Najuah binti Sarbini and my dad Adri bin Husin as well as my siblings really deserve special recognition for their unending love, support, and understanding. Thank you to my parents and family for their financial and emotional support and encouragement during my undergraduate studies. I would not be able to complete my degree without their assistance. Furthermore, my gratitude goes out to my friends who had assisted me in overcoming the obstacles of the final year project. Finally, I would like to thank everyone who generously assisted me during my studies and graciously encouraged me to always work hard and smart.

ABSTRACT

The COVID-19 pandemic profoundly disrupted Proton Holdings Berhad's production, affecting supply chains, workforce availability, and operational efficiency. This study examines these challenges, and the strategies Proton employed to mitigate disruptions. Using a qualitative research approach, data were collected through indepth interviews with Proton employees, and thematic analysis was conducted to identify key themes. Findings indicate that Proton faced major supply chain disruptions, increased operational costs, and unpredictable production schedules due to lockdowns and global component shortages. Workforce limitations further complicated production, leading to delays and reduced output. To address these challenges, Proton implemented digital sales platforms, diversified its supply chain, and enhanced workplace safety measures to ensure business continuity. This study highlights the critical role of crisis management, digital transformation, and supply chain resilience in sustaining the automotive industry during global disruptions. The findings provide valuable insights for policymakers, industry stakeholders, and manufacturers in developing strategies to enhance production resilience and long-term sustainability in the face of future crises.

Keywords: COVID-19, Proton, supply chain disruptions, production resilience, crisis management, qualitative research

ABSTRAK

Pandemik COVID-19 telah mengganggu secara mendalam pengeluaran Proton Holdings Berhad, menjejaskan rantaian bekalan, ketersediaan tenaga kerja, dan kecekapan operasi. Kajian ini meneliti cabaran-cabaran tersebut serta strategi yang digunakan oleh Proton untuk mengurangkan gangguan. Menggunakan pendekatan penyelidikan kualitatif, data dikumpul melalui temu bual mendalam dengan pekerja Proton, dan analisis tematik dijalankan untuk mengenal pasti tema utama. Hasil kajian menunjukkan bahawa Proton menghadapi gangguan besar dalam rantaian bekalan, peningkatan kos operasi, dan jadual pengeluaran yang tidak menentu akibat sekatan pergerakan dan kekurangan komponen global. Keterbatasan tenaga kerja turut merumitkan pengeluaran, menyebabkan kelewatan dan pengurangan hasil. Bagi menangani cabaran ini, Proton melaksanakan platform jualan digital, mempelbagaikan rantaian bekalan, dan memperkukuhkan langkah keselamatan tempat kerja untuk memastikan kesinambungan perniagaan. Kajian ini menekankan peranan penting pengurusan krisis, transformasi digital, dan daya tahan rantaian bekalan dalam mengekalkan industri automotif ketika gangguan global. Penemuan ini memberikan panduan berharga kepada pembuat dasar, pemegang kepentingan industri, dan pengeluar dalam membangunkan strategi untuk meningkatkan ketahanan pengeluaran dan kelestarian jangka panjang dalam menghadapi krisis masa depan.

Kata kunci: COVID-19, Proton, gangguan rantaian bekalan, ketahanan pengeluaran, pengurusan krisis, penyelidikan kualitatif

TABLE OF CONTENT

CHAPTER	CON	TENTS		PAGES		
	DEC	LARAT	TION	i		
	DED	DEDICATION				
	ACK	ACKNOWLEDGEMENT				
	ABST	FRAC		iv		
	ABST	FRAK		v		
	TAB	TABLE OF CONTENTS				
	LIST	OF TA	BLES	xi		
	LIST	OF FI	اوىبور سىبنى نىڭGURES	xii		
CHAPTER	1 INTR	RODUC	TION MALAYSIA MELAKA	1		
	1.1	Introd	luction	1		
	1.2	Backg	ground of Study	1		
	1.3	Proble	em Statement	3		
	1.4	Resea	rch Questions	3		
	1.5	Resea	rch Objectives	4		
	1.6	Scope	, limitation and Key Assumption	5		
	1.7	Signif	icant of Study	5		
		1.7.1	Economic Significance	5		
		1.7.1	Industrial Significance	5		
		1.7.2	Technological Significance	6		
		1.7.4	Policy and Strategic Significance	6		
	1.8	Summ	nary	6		

	2.1	Introduction	8		
	2.2	Overview of Proton Holding Berhad			
	2.3	Supply Chain Disruptions	9		
	2.4	Impact of Covid-19 on Global	11		
		Automotive Industry	12		
	2.5	Impact on Production Operations Proton	12		
	2.6	Impact Covid-19 to Supply Chain	14		
		Production Output	14		
		2.6.1 Workfore Disruption	14		
		2.6.2 Government Regulations	15		
	2.7	Impact of Covid-19 on Supply Chain Resilience	16		
	2.8	Response Strategies by Automotive	17		
		to Mitigate Covid-19			
	2.9	Impact of Covid-19 on Supply Chain	18		
		Management			
	2.10	Conceptual Framework	19		
	2.11	Summary	20		
CHAPTER	3 RESI	EARCH METHODOLOGY	21		
	0.1	• • • •	2.1		
	3.1	Introduction	21		
	3.2	Researcher Design	22		
	3.3	Methodological Choices	22		
	3.4	Primary and Secondary Data Sources	23		
	3.5	Research Location	24		
	3.6	Time Horizons	25		
	3.7	Research Strategy	26		

CHAPTER 2 LITERATURE REVIEW

	3.8	Data	Analysis		27
	3.9	Resea	Research Trustworthiness		28
		3.9.1	Credibility		28
		3.9.2	Transferab	ility	29
		3.9.3	Construct V	Validity	30
		3.9.4	Dependabi	lity	30
	3.10	Summ	nary		32
CHAPTER	4 RES	ULT AN	ND DISCUS	SION	34
	4.1	Intro	luction		34
	4.2	Com	oany Backgro	ound	34
	4.3	The F	Profiles of the	Respondents	35
	4.4	Data	Analysis		35
	4.5	Ouali	Oualitative Data Findings		
		4.5.1	Data Findi	ngs: Research Question 1	37
			4.5.1.1	Supply Chain Disruptions	40
			4.5.1.2	Production Challenges	41
		4.5.2	Data Findi	ngs: Research Question 2	42
			4.5.2.1	Workforce Adjustment	43
			4.5.2.2	Employee Well-being	44
		4.5.3	Data Findi	ngs: Research Question 3	45
			4.5.3.1	Operational Flexibility	46
			4.5.3.2	Collaboration and	
				Resource Sharing	46
			4.5.3.3	Employee Support	
				Program	46
CHAPTER	5 CON	CLUSI	ON AND RI	ECOMMENDATIONS	47
	5.1	Intro	luction		47

5.2	Summary of Whole Research and Findings		
	5.2.1	The Impact of Covid-19 Pandemic	48

on the Supply Chain and Production

viii

		Output of Proton Holding Berhad	
	5.2.2	The Impacts of Covid-19 Pandemic on	48
		Proton Holding Berhad's Workforce and	
		Production	
	5.2.3	The Strategies Implemented by Proton	49
		Holding Berhad to Mitigate the Impact	
		of the Covid-19 Pandemic	
5.3	Fulfil	lment of Research Objectives	49
	5.3.1	RO 1: To Explore the Impact of the	
	Covid	-19 Pandemic on the Supply Chain	
	and Pr	roduction Output of Proton Holding	
	5.3.2	RO 2: To Discover the Impact of the	50
	Covid	-19 Pandemic on the Workforce of	
	Protor	Holding and Its Effect on Production	
	5.3.3	RO 3: To Identify the Strategies	
	Imple	emented by Proton to Mitigate the Impact	51
	of the	Covid-19 Pandemic	
5.4	Limita	ation	52
	5.4.1	Data Collection Method	52
5.4.2	Sampl	le Size	53
	5.4.3	Geographical Scope	53
5.5	Recon	nmendations	54
	5.5.1	Strengthening the Resilience of the	
		Supply Chain	54
	5.5.2	Increasing Adaptability in the Workforce	54
	5.5.3	Making Digital Transformation	55
		Investments	
	5.5.4	Working Together with Industry and	55
		Government	
	5.5.5	Developing New Techniques for Crisis	55
		Management	
5.6	Concl	uding Remarks	56

REFERENCES	51
APPENDICES	60



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

LIST OF TABLES

TABLE	TITLE	PAGES
3.1	Threat to Credibility	31
3.2	Threat to Dependability	33



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

LIST OF FIGURES

FIGURE	TITLE	PAGES
2.1	Proposed Conceptual Framework about	21
	the Exploring the Impact of the Covid-19	
	Pandemic Towards the Production of Proton	
3.1	Proton Holding Berhad, Shah Alam Location	27

LIST OF ABBREVIATIONS

ABBREVIATION

MEANING

Covid-19

Corona Virus Disease 2019



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

LIST OF APPENDICES

APPENDIX TITLE PAGES A Gantt Chart FYP I 65 B Gantt Chart FYP II 65 C Letter of Consent Conducting Interview 66 D Interview Questions 67

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will discuss about the Exploring the Impact of the COVID-19 Pandemic Towards the Production of Proton. The background of study, problem statement, research questions, research objective, scope of research, significant of study and summary will be discussed in this chapter.

1.2 Background of Study

Proton Holdings Berhad, commonly known as Proton, is a Malaysian automotive manufacturer that has played a pivotal role in the country's industrial landscape since its establishment in 1983. The company has experienced significant changes in recent years, especially in the wake of the COVID-19 pandemic, which posed unprecedented challenges and opportunities for the global automotive industry.

The automobile sector experienced substantial difficulties because of the epidemic. The implementation of lockdowns and limits resulted in the cessation of production lines, leading to delays and disruptions in the supply chain (Smith, 2020). Furthermore, the fall in consumer demand for automobiles may be attributed to economic uncertainty and mobility constraints, which have resulted in a decline in buying power and shifting priorities (Jones, 2021).

The pandemic required strict health standards and lockdown measures to control the spread of the virus, resulting in the temporary shutdown of companies and a decrease in labour capacity. Proton, like to several other firms, had to enforce social distancing measures, regular sanitization, and health inspections, resulting in a reduction in production rates. In addition, the transition to remote work for non-essential personnel disrupted the typical workflow and collaboration inside the organisation (Jauhari, 2020).

The epidemic caused substantial disruptions to global supply chains, leading to a shortage of vital raw materials and components necessary for automotive manufacturing. Proton had difficulties in acquiring essential components since some of its suppliers were similarly affected by manufacturing closures and logistical obstacles. As a result, the firm experienced disruptions in its production schedules and incurred additional expenses due to the need to find alternate suppliers and shipping routes (Lee, 2021).

To address the economic repercussions, the Malaysian government introduced a range of stimulus programmes and incentives to bolster the car sector. These efforts included tax breaks, financial assistance, and regulations aimed at promoting the purchase of domestically produced automobiles. Proton used these incentives to alleviate the negative effects of the pandemic by prioritising the improvement of its online sales platforms and the expansion of its aftersales services in order to sustain consumer involvement (Othman, 2021).

To address these problems, Proton developed several strategies to alleviate the effect of COVID-19. The company implemented measures to improve its digital sales platforms in response to the growing popularity of online shopping. Additionally, it allocated resources to establish health and safety regulations inside its facilities to safeguard its employees (Abdullah, 2022). Although Proton has made efforts, the pandemic has highlighted the need for the company to create more robust operational strategies and broaden its supply chain to decrease reliance on certain locations or suppliers.

The COVID-19 epidemic has significantly affected Proton's output, exposing the weaknesses and difficulties in the car manufacturing industry. Although the pandemic caused disruptions in industrial processes, supply networks, and market dynamics, it also stimulated innovation and adaptability. The experience of Proton highlights the need of being resilient and adaptable in dealing with extraordinary catastrophes and preparing for future uncertainty.

1.3 Problem Statement

Initially, the implementation of lockdowns and limits on movement to control the transmission of the virus resulted in temporary closures of Proton's manufacturing facilities. The shutdowns caused disruptions to production schedules and resulted in delays to the launch of new car models, which had a severe impact on the company's income streams (Proton Holdings Berhad, 2020).

Furthermore, the automobile supply chain encountered significant interruptions. The scarcity of key components, acquired from many global locations, has been exacerbated by factory closures and logistical difficulties. This has resulted in additional production delays and escalated costs (Proton Holdings Berhad, 2021).

Furthermore, there was a significant and notable change in consumer behaviour during the pandemic. The presence of economic uncertainties and a decrease in consumer purchasing power resulted in a substantial decline in automobile sales. Proton's sales figures and market share were directly impacted by potential purchasers deferring or cancelling their orders, as reported by the Malaysian Automotive Association in 2020. The decrease in demand required strategic modifications, such as reassessing production levels and marketing tactics to match the evolving market circumstances.

JNIVERSITI TEKNIKAL MALAYSIA MELAKA

1.4 Research Questions

The researcher determined three research questions in this study:

- 1. How did the COVID-19 pandemic affect the supply chain and production output of Proton Holding Berhad?
- 2. What was the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and how did it affect production?
- 3. What strategies did Proton Holding Berhad implement to mitigate the impact of the COVID-19 pandemic?

1.5 Research Objectives

The primary goal of this research is to examine supply chain management strategies used by Proton enterprises to address the challenge of sourcing products components from suppliers and fulfilling client orders. The following goals are the aim of this study:

- 1. To explore the impact of the COVID-19 pandemic on the supply chain and production output of Proton Holding Berhad.
- To discover the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and its effect on production.
- To identify the strategies implemented by Proton Holding Berhad to mitigate the impact of the COVID-19 pandemic.

1.5 Scope, Limitation and Key Assumption

The scope of this study will state whether the impact of the covid 19 pandemic on Proton production. The targeted respondents are employees who work at Proton. This research is conducted in a qualitative method that is by conducting interviews.

First, the limitation study, conducted by the researcher, is only necessary for the Proton company in manufacturing and not the entire position in the company. second, the time limit during the COVID-19 pandemic, which leads to an incomplete view of the long-term impact on Proton Holdings Berhad's production. Changes in the production process, the recovery phase and subsequent epidemic waves may not be fully captured.

The main assumption of this study is that the researcher believes that the respondents will answer all the questions prepared honestly and thoroughly during the interview session and give the best answers and responses in their best understanding of the supplement products involved in data collection primary. This will help to get accurate data, findings and decisions.

1.6 Significant of Study

1.5.1 Economic Significance

Analysing the economic consequences of the pandemic on Proton, a prominent participant in Malaysia's automobile sector, is essential for evaluating the wider economic ramifications. The production delays at Proton not only impacted the company's financial performance but also had consequential consequences on employment, supplier networks, and local economies. This research emphasises the significance of strong economic policies and support systems to maintain industries throughout global crises, as shown by the analysis of these consequences. Policymakers and corporate leaders may use these results to design measures that alleviate economic downturns and bolster recovery efforts (Jauhari, 2020).

1.5.2 Industrial Significance

The automobile industry plays a pivotal role in Malaysia's industrial sector, making a substantial contribution to the nation's GDP and technical progress. This research highlights the weaknesses present in the business, such as the dependence on global supply chains and just-in-time inventory systems. The study highlights the need of enhancing supply chain resilience and diversity by recognising these gaps. Furthermore, it highlights the need of implementing adaptable manufacturing procedures that are capable of enduring interruptions. Stakeholders in the industry may use these insights to improve operational continuity and develop stronger industrial frameworks (Lee, 2021).

1.5.3 Technological Significance

The COVID-19 programme has expedited the use of digital technology and cutting-edge manufacturing practices in the automobile sector. This research examines

Proton's response to the difficulties presented by COVID-19 by implementing digital transformation strategies, including virtual showrooms, contactless services, and enhanced automation. These technology innovations not only aided Proton in managing the current crisis but also positioned the firm to be competitive in the long run in a sector that is changing quickly. Tan's (2021) research provides valuable insights for automobile manufacturers to adopt digital transformation and promote innovation, leading to enhanced efficiency and consumer engagement.

1.5.4 Policy and Strategic Significance

The Malaysian government's measures to address the epidemic, such as implementing stimulus packages and providing incentives to the automotive industry, significantly contributed to minimising the negative impact on Proton's output. This research evaluates the efficacy of different initiatives, offering significant insights for policymakers. Analysing the effectiveness of certain initiatives may provide valuable insights for making informed policy choices aimed at bolstering the automobile sector in times of economic downturn. Furthermore, the research emphasises the significance of strategic planning and crisis management in organisations, providing practical suggestions for improving readiness and resilience (Othman, 2021).

1.6 Summary

In conclusion, this chapter is discussed about the overview of the study. It discussed the background of the study, problem statement, research questions, research objectives, scope of research, and significance of the study. In the coming chapter, the researcher will carry out the literature review of the study. The information will be broader and more understandable.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, it will discuss the relevant literature review and theory model. Literature evaluation is also necessary to formulate a qualitative or quantitative research methodology. Research frameworks for generating hypotheses and explaining theories are the most numerous detailed descriptions in this section.

2.2 Overview of Proton Holding Berhad

Proton Holdings Berhad, often known as Proton, is a significant Malaysian car manufacturer that was founded in 1983. The firm has been instrumental in the development of Malaysia's automotive sector, manufacturing a diverse array of automobiles spanning from sedans to hatchbacks and sports utility vehicles (SUVs). Proton is renowned for its focus on innovation, excellence, and cost-effectiveness, serving both local and global markets.

Proton was established with the aim of creating Malaysia's own automobile producer to decrease reliance on imports and enhance the domestic economy. The first vehicle of the firm, known as the Proton Saga, was introduced in 1985 and swiftly gained recognition as a significant emblem of nationalistic sentiment. Throughout its history, Proton has formed partnerships with other renowned global automotive companies, including Mitsubishi Motors and Honda, to bolster its technical prowess and broaden its range of products (Lee, 2019). Proton offers a wide selection of vehicles that are specifically intended to cater to the varying demands of customers. Proton's inventory includes many noteworthy models such as the Proton Persona, Proton Iriz, Proton Exora, and Proton X70. The Proton X70, an SUV created in partnership with Geely, is a notable achievement for the brand, highlighting cutting-edge technologies and contemporary design aspects. Proton's dedication to providing cost-effective and high-quality products has enabled them to establish a dominant position in the Malaysian market and extend its reach to neighboring countries like Indonesia, Thailand, and Brunei (Othman, 2021).

Technological advancements and innovation refer to the development and implementation of new and improved technologies and ideas. These advancements include the creation and use of cutting-edge tools, techniques, and methods to enhance many aspects of society, such as communication, productivity, and problem-solving. Proton's strategy has been built on the foundation of innovation. The corporation has made substantial investments in research and development to improve vehicle safety, performance, and fuel economy. Proton's collaboration with Geely, a prominent Chinese automaker, has significantly enhanced its technical prowess. This relationship has permitted the transfer of advanced technology and specialised knowledge, allowing Proton to include state-of-the-art features and enhance its competitiveness in the global automotive industry (Mahalingam, 2020).

Proton's growth and development have heavily relied on its strategic collaborations. The collaboration with Geely, which began in 2017, has had a significant and profound impact. Geely purchased a 49.9% ownership interest in Proton, resulting in significant financial investment and the opportunity to use advanced technology. By forming this relationship, Proton has been able to use Geely's worldwide supply network, sophisticated production methods, and significant research resources. As a result, Proton has been able to expedite its efforts to modernise and innovate its products (Tan, 2021).

Proton is dedicated to upholding corporate social responsibility (CSR) and implementing sustainable practices. The corporation participates in a range of activities focused on environmental preservation, community advancement, and educational assistance. Proton is actively promoting sustainability by using environmentally friendly production methods, minimising carbon emissions, and aiding local communities via educational and health initiatives. Proton's CSR initiatives demonstrate their commitment to becoming a responsible business entity (Jauhari, 2020).

Proton has encountered several obstacles, including fierce rivalry from both domestic and global producers, unpredictable economic circumstances, and changing customer tastes, notwithstanding its accomplishments. The COVID-19 epidemic worsened these issues, causing disruptions in manufacturing and supply lines. Nevertheless, Proton's proactive stance towards innovation, strategic alliances, and government backing have allowed it to successfully manage these challenges and emerge with increased strength.

2.3 Supply Chain Disruptions

The COVID-19 epidemic has resulted in substantial disruptions in Proton's supply chain, affecting the accessibility of vital raw materials, components, and parts necessary for its production processes. The interruptions have presented difficulties for Proton in terms of manufacturing scheduling, inventory management, and general operational efficiency.

Proton depends on a worldwide network of suppliers to get the necessary raw materials for manufacturing vehicles. Nevertheless, the implementation of travel restrictions, border closures, and lockdown measures aimed at curbing the transmission of the virus have caused disruptions in the transportation and logistical networks, resulting in delays and scarcities in the supply of raw materials. Therefore, there have been delays in manufacturing and Proton's capacity to keep inventories at their most efficient levels has been impeded (Lee, 2021).

The interruptions caused by the epidemic have also impacted on the accessibility of essential components and parts obtained from different sources. A significant number of Proton's component suppliers, especially those situated in areas severely affected by the pandemic, have encountered operating difficulties, such as a lack of workers, shutdowns of factories, and logistical limitations. Consequently, Proton has encountered deficiencies in crucial components, including electronic modules, engine parts, and automotive electronics, which have had an impact on its ability to produce and deliver vehicles (Jauhari, 2020).

The pandemic-induced mobility restrictions and decreased transportation capacity have resulted in logistical delays throughout Proton's supply chain, affecting the timely delivery of components and completed items. The movement of products has been delayed due to congestion at ports, restricted air freight capacity, and border restrictions. As a result, the lead times have been prolonged and shipping prices have increased. Proton has faced the task of managing these logistical difficulties to guarantee the prompt transportation of components to its production facilities and distribution centres (Mahalingam, 2020).

The pandemic has underscored the significance of supplier dependability and steadfastness in safeguarding the robustness of Proton's supply chain. Certain suppliers may have had financial challenges or operational limitations, which might have compromised their capacity to reliably deliver orders. Proton has been required to evaluate the financial stability and operational sustainability of its suppliers and develop backup plans to minimise the potential for supply chain interruptions resulting from supplier failures or disruptions (Othman, 2021).

Proton has established a range of modifications and mitigation methods to deal with supply chain interruptions. These strategies include expanding the range of suppliers to decrease dependence on a single provider, using inventory buffering to minimise the effects of component shortages, and developing stronger partnerships and communication channels with important suppliers to improve transparency and responsiveness. Proton has also investigated alternative transportation routes and methods to reduce interruptions in logistics and transportation (Tan, 2021).

The COVID-19 pandemic has shown the susceptibility of Proton's supply chain to external shocks and disturbances. Despite the problems caused by the pandemic, Proton has successfully managed its supply chain by using proactive measures such as diversification, cooperation, and contingency planning. This has allowed the firm to navigate through the crisis and continue its operations without interruption. In the future, Proton must prioritise ongoing vigilance, agility, and innovation to develop a supply chain that is more robust and adaptable, capable of enduring future challenges.

2.4 Impact of COVID-19 on Global Automotive Industry

The COVID-19 pandemic, which originated in late 2019, has had a significant impact on businesses globally, including the automobile industry. The epidemic has profoundly transformed the automobile industry via several means like interruptions in manufacturing and supply chains, changes in consumer behaviour, and alterations in government legislation.

A prominent and easily noticeable consequence of the epidemic on the car sector has been the extensive interruption of manufacturing activities. In order to mitigate the transmission of the virus, governments worldwide implemented lockdown measures, resulting in the shutdown of vehicle production plants. Automakers were compelled to cease or reduce production, leading to substantial decreases in car manufacturing and new introductions postponed. The disruptions have had extensive ramifications, impacting not only manufacturers but also their suppliers, dealerships, and associated sectors (Lee, 2021).

The epidemic revealed weaknesses in the worldwide automobile supply chain, causing interruptions that affected the whole system. The flow of parts and components was impeded due to border closures, trade restrictions, and logistical issues, resulting in shortages and manufacturing delays. Automakers had challenges in procuring essential components, resulting in production delays and higher expenses. The supply chain disruptions underscored the industry's reliance on global commerce and the need for increased resilience and diversity (Jauhari, 2020).

The economic risks arising from the epidemic, including unemployment and financial instability, have diminished consumer confidence and the ability to make purchases. A decrease in car sales occurred as some prospective purchasers delayed or abandoned their intentions to acquire new vehicles. Consumer preferences have evolved towards necessary vehicles like SUVs and trucks, which are viewed as more pragmatic and adaptable during times of uncertainty. The pandemic expedited trends like remote work and urbanisation, which impacted consumer preferences and patterns of mobility (Mahalingam, 2020).

Automakers expedited their digital transformation endeavours in reaction to social distancing measures and evolving customer behaviour. Online sales channels and contactless transactions have become more crucial for consumer engagement and sales growth. Automakers and dealerships made strategic investments in virtual showrooms, remote car inspections, and contactless delivery choices to adjust to the current circumstances. Automakers have used digitalization as a crucial strategy to ensure client involvement and fulfil changing consumer expectations (Othman, 2021).

The epidemic spurred manufacturers to investigate novel mobility solutions and vehicle technology to address evolving customer demands and market realities. The surge in remote work and telecommuting has sparked a heightened fascination in electric and driverless cars, along with shared mobility services. Automakers made substantial investments in research and development to expedite the advancement of next-generation mobility solutions, including electrification, connectivity, and autonomous driving technologies (Tan, 2021).

Amidst the epidemic, governments around the globe devised several stimulus packages and incentives to provide help to the car sector. These measures included tax incentives, economic assistance, and financial support for electric cars and environmentally friendly projects. Additionally, governments used measures to encourage local production and boost the market for automobiles, with the goal of revitalising the automotive industry and promoting economic growth. The government's assistance was important in delivering aid to automakers and suppliers, allowing them to endure the crisis and allocate resources towards future expansion prospects (Smith, 2020).

Ultimately, the COVID-19 pandemic has significantly influenced the worldwide automobile sector, fundamentally altering manufacturing, supply networks, customer habits, and governmental regulations. Although the sector has seen substantial challenges, it has also stimulated innovation and expedited digital change. In the aftermath of the epidemic, automakers must persistently adjust to changing market conditions, adopt innovative technology, and prioritise their ability to withstand challenges to succeed in the post-COVID future.

2.5 Impact on Production Operations Proton

The COVID-19 pandemic has presented Proton with unique and unprecedented difficulties in their manufacturing processes, causing disruptions to their usual workflows and requiring them to develop flexible solutions to minimise risks and ensure uninterrupted operations.

Proton's production operations have been greatly affected by the installation of rigorous health and safety rules, which include measures such as social distance and better sanitation procedures. The closure of factories and the decrease in staff capacity have resulted in delays and inefficiencies in production. Ensuring the health and well-being of workers has required making changes to shift patterns and production schedules, which has added complexity to operations (Jauhari, 2020).

The pandemic has directly impacted Proton's manufacturing processes due to global supply chain disruptions. Disruptions in the accessibility of primary resources, elements, and components have led to constraints in production and deficiencies in stock levels. The firm Proton's manufacturing capacities were significantly affected by interruptions in the supply chain due to its heavy dependence on overseas suppliers, which also had operational difficulties (Lee, 2021).

Proton's inventory management operations have faced major hurdles because of variations in demand and disturbances in the supply chain. The organisation is facing challenges in optimising inventory levels and meeting client needs due to the uncertainties surrounding market demand and manufacturing capacity. Proton has used agile inventory management solutions to reduce surplus inventory and prevent supply shortages while maintaining production efficiency (Mahalingam, 2020).

Proton's manufacturing operations have had to make modifications due to the transition to remote work for non-essential workers. The distant execution of administrative tasks, including planning, scheduling, and procurement, has necessitated the use of digital collaboration tools and communication platforms. Although remote work has facilitated the continuation of some operational elements, it has also posed difficulties in maintaining coordination and guaranteeing smooth workflow among teams (Othman, 2021).

Proton has increased its investment in automation and digitalization projects to improve resilience and efficiency in industrial processes. The epidemic has emphasised the significance of diminishing reliance on human labour and augmenting the use of automated procedures. Proton has used sophisticated robotics and digital manufacturing technology to optimise production processes, enhance efficiency, and mitigate the potential for operational interruptions caused by personnel limitations or health-related concerns (Tan, 2021). The COVID-19 pandemic has significantly affected Proton's production operations, posing difficulties in manufacturing processes, supply chain management, inventory optimization, remote work adaptability, and technical innovation. Nevertheless, Proton's proactive stance in tackling these difficulties, by implementing flexible strategies, investing in automation and digitalization, and prioritizing personnel safety and well-being, has allowed the firm to successfully manage the crisis and emerge even more resilient. Proton's ability to adjust to the changing operating environment is crucial for achieving sustainable development and maintaining competitiveness in the automotive sector.

2.6 Impact Covid-19 to Supply Chain Production Output

2.6.1 Workforce Disruption

Proton enforced strict health and safety protocols to protect its staff in the outbreak. The measures used include mandatory mask use, adherence to social distancing guidelines, frequent cleaning of premises, and health assessments. Although this measure is important to guarantee worker safety, it causes disruption in normal operations, resulting in reduced productivity and higher expenses (Omar et al., 2020). The implementation of social distancing protocols resulted in a reduction in the number of workers allowed on the factory floor at the same time, thus stalling the production process.

The need to meet health and safety regulations is causing major modifications to workflows and production structures. Restructuring results in temporary inefficiencies as staff adjust to new norms. In addition, the acquisition of personal protective equipment (PPE) and other safety supplies increases operating expenses, further putting pressure on company resources (Razak & Rahman, 2021).

Proton had to temporarily reduce its staff due to the outbreak, because of health considerations and reduced demand during the shutdown. A decrease in the number of workers has a direct impact on the ability to produce goods and services. Due to the reduction of manpower to operate the machines and supervise the assembly operations, there is a significant decrease in the level of output (Razak & Rahman, 2021).

While remote work is feasible for administrative and management positions, it is not suitable for the practical tasks involved in vehicle manufacturing. Proton uses remote work for services such as customer support, marketing and certain areas of supply chain management. The transition required significant investment in digital infrastructure and training, which, although beneficial in the future, initially diverted resources from key production operations (Nair, 2021).

2.6.2 Government Regulations

The Malaysian government implemented a strict curfew and movement control order (MCO) in response to the COVID-19 outbreak. These measures include the temporary closure of non-essential companies, such as car manufacturing plants. Proton was forced to suspend its manufacturing operations during the shutdown period, resulting in significant disruption to its production and production schedule. The inability to run industrial facilities causes both delays and decreased production levels (Ahmad & Zainuddin, 2021).

To continue operations after the exit restrictions, Proton had to comply with the strict health and safety measures set by the government. The guidelines include routine cleaning of facilities, implementation of social distancing measures, conducting temperature checks, and providing personal protective equipment (PPE) to all staff. While these safeguards are important to ensure worker safety, they also create difficulties in terms of operational effectiveness. Enforcing these procedures require modifications to manufacturing procedures, resulting in reduced production speed and increased operating expenses (Rahman & Abdullah, 2021).

Government laws also enforce restrictions on the number of workers allowed in production plants to reduce the potential spread of COVID-19. Proton had to operate with a reduced workforce at the manufacturing level, resulting in a decrease in its production capacity. Due to worker size limitations, Proton was unable to operate its assembly line at maximum capacity, resulting in further production delays and inefficiencies (Ismail & Mohamad, 2021).

2.7 Impact of COVID-19 on Supply Chain Resilience

The interruptions caused by the pandemic had a significant impact on supply chains, resulting in production stoppages, delays in shipping, and shortages of essential commodities (Pereira et al., 2020). The implementation of lockdown measures, travel restrictions, and quarantine procedures resulted in a scarcity of workers and the shutdown of factories, especially in areas that significantly depend on manual labour (Ivanov & Das, 2021). Consequently, enterprises had difficulties in ensuring the uninterrupted functioning of their operations and satisfying client requirements.

An essential takeaway from the pandemic is the need of cultivating resilience by implementing diversity and redundancy. According to Ivanov and Dolgui (2020), companies that have diverse supplier networks and numerous sourcing alternatives are more capable of responding to interruptions by transferring production to alternate suppliers or areas. Furthermore, the allocation of resources towards digital technologies such as blockchain, artificial intelligence, and real-time monitoring systems has facilitated enhanced transparency and flexibility in supply chain operations. This has empowered organisations to address disruptions (Ivanov et al., 2020) more efficiently.

However, attaining supply chain resilience requires more than just technology solutions. Effective supply chain management requires the active participation and coordination of partners, along with an initiative-taking approach to managing risks (Pereira et al., 2020). Organisations must actively participate in scenario planning, do risk assessments, and build contingency plans to minimise the consequences of forthcoming disruptions (Ivanov & Sokolov, 2020).

Furthermore, the pandemic has expedited the progression towards sustainability and ethical sourcing in the management of supply chains. Companies are progressively examining their supply chains to verify adherence to labour norms, environmental legislation, and ethical policies (Sarkis et al., 2020). This trend indicates an increasing customer desire for clear and accountable supply chain activities.

The COVID-19 pandemic has emphasised the need of supply chain resilience in managing interruptions and guaranteeing the uninterrupted operation of businesses. Companies may enhance the resilience of their supply chains by expanding their supplier networks, adopting digitization, promoting cooperation, and giving priority to sustainability.

2.8 Response Strategies by Automotive to Mitigate Covid-19

Proton Holding Berhad implemented a range of strategic actions in response to the challenges presented by the COVID-19 pandemic. These steps were designed to protect its industrial activities and ensure the uninterrupted operation of its business. These reaction plans covered several parts of the company's operations, such as manufacturing, market positioning, and product diversification.

Proton has thorough safety practices in its manufacturing facilities to reduce the possibility of Covid-19 transmission among its personnel. The methods implemented consisted of enforcing social distancing, mandating the use of personal protective equipment (PPE), regularly sanitising workspaces, and conducting temperature tests for personnel upon entry (Abdullah et al., 2020).

In response to the changing market demand and supply chain limitations caused by the pandemic, Proton Holding Berhad made changes to its production schedules and capacity utilisation. This entailed optimising production workflows, reallocating resources to prioritise the manufacturing of highly sought-after car models and developing adaptable work arrangements to maximise operational efficiency while complying to health and safety protocols (Rahman et al., 2021).

In addition, Proton actively pursued new market prospects and expanded its range of products to counteract the negative impact of the pandemic on its sources of income. This involved the expansion of its online sales channels, utilising digital marketing platforms to reach customers from a distance, and offering creative financing programmes to encourage car purchases during times of economic uncertainty (Sulong et al., 2022).

Proton Holding Berhad effectively addressed the issues brought about by the COVID-19 pandemic by a comprehensive strategy. This strategy included implementing safety protocols in their manufacturing plants, making necessary changes to production schedules, and exploring new market prospects. By implementing these reaction techniques, Proton was able to reduce the negative effects

of the pandemic on its manufacturing activities and successfully preserve its resilience during a time of unprecedented uncertainties.

2.9 Impact of COVID-19 on Supply Chain Risk Management

The interruptions caused by the pandemic have intensified the pre-existing risks in supply chains, such as disruptions in transportation networks, shortages of essential commodities, and labour shortages owing to sickness or quarantine measures (Ivanov & Dolgui, 2020). Global companies have faced challenges in maintaining the uninterrupted flow of goods and services in their supply chains, resulting in delays in production, shortages in inventory, and financial losses (Sarkis et al., 2020).

An important consequence of COVID-19 on the management of supply chain risks has been the reassessment of frameworks used for evaluating risks. Conventional risk management methods often did not consider the extent and intricacy of the disruptions produced by the epidemic, leading firms to reevaluate their risk profiles and weaknesses (Ivanov & Sokolov, 2020). Organisations have integrated additional risk indicators, such as geographic exposure and supplier financial health, into their risk assessment procedures to predict and prevent potential disruptions more effectively.

Furthermore, the pandemic has expedited the use of digital solutions in the control of supply chain risks. Organisations are progressively using data analytics, artificial intelligence, and blockchain technology to improve the level of transparency and traceability across their supply chains (Ivanov et al., 2020). These technologies allow for the continuous monitoring of inventory levels, production capacity, and transportation routes, which helps in identifying and responding to risks in an initiative-taking manner.

Moreover, the pandemic has emphasised the need of cooperation and variety in managing the risks of supply chain. Companies are increasingly engaging in closer collaboration with suppliers, consumers, and other stakeholders to facilitate the exchange of information and synchronise their actions in response to disruptions (Sarkis et al., 2020). Furthermore, there is an increasing focus on expanding supplier networks and sourcing techniques to decrease reliance on suppliers from a sole source and manage risks related to politics and the environment (Ivanov & Das, 2021).

The COVID-19 pandemic has had a significant effect on the techniques of managing supply chain risks. This has led organisations to embrace more flexible, data-oriented, and cooperative strategies to minimise disruptions. Organisations may improve their capacity to handle future difficulties and maintain the stability of their supply chains by reassessing risk assessment frameworks, adopting digital technologies, and promoting cooperation and diversity.



Figure 2.1: Proposed Conceptual Framework about the Exploring the Impact of the COVID-19 Pandemic Towards the Production of Proton.

The conceptual framework for the research outlines key factors influencing the study. Workforce disruption, supply chain disruptions and government regulations are central components. The figure below illustrates the proposed research structure, addressing the research concerns and objectives.
2.11 Summary

This chapter reviewed the literature on the exploring the impact of the COVID-19 pandemic towards the production of Proton. It explored the key concepts related to impact of COVID-19 and examined relevant studies to understand the factors influencing its adoption. The next chapter will focus on the research methodology, detailing the approach used to gather data from respondents.



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher will choose the method in collecting data to collect all the information and details related to the study itself to achieve the objectives and goals to identify the problems and issues faced by the Supply Chain management in Proton Holding Berhad (PHB) and the relationship between facilities and services of those in need of such problems. Besides, Wohlin, and Runeson (2021), state that research methodology refers to research approach, especially, the various activities that systematically deal with research challenges based on assumptions and justifications for the choices made.

Qualitative methods will be used by the researcher using large - scale survey studies using access audits and interview sessions. Data collection is divided into two categories, namely primary data, and secondary data. Primary data were collected based on qualitative methods obtained from audit reports. Researchers also obtain information from secondary data from previous studies conducted by other parties such as journals, articles, books, and others.

This study will also describe the relationship between the independent variable (IV) and the dependent variable (DV) of the study, as well as the factors that contribute to the two variables. In this chapter, the study will discuss more about the method of the instrument to be used and the introduction of data analysis as well as the planning of the data to be used itself. All relevant information will be brief and described in this chapter.

3.2 Researcher Design

This research respondent was selected for the purpose of finding more accurate and authentic information using the right set of question criteria and it is in Shah Alam, Selangor. Using semi-structured interviews is necessary when the interviewer wants to gather relevant experiences and perspective in a particular sector or content (Rowley, 2012).

This method deals with the participation of certain categories, as a result it assists in the selection of respondents from Proton employees based on importance, providing researchers with relevant resources that can be used for research questions. Given that this is the first research of its kind in Malaysia, more information from the chosen respondent may be gained by using open-ended questions and adjusting the questions.

According to Saunders (2019), there are four research designs which are exploratory, descriptive, explanatory, and evaluative. In this research, the researcher chose a descriptive research design. Descriptive research studies may be an extension of exploratory research or a forerunner to a piece of explanatory research. Descriptive research provides an accurate profile of events, individuals, or circumstances. When conducting descriptive research, one must take precautions since the study may become overly detailed, resulting in ineffective results (Saunders, 2019).

3.3 Methodological Choices

A qualitative method was used to investigate the participants' varied experiences in this study. Creswell (2013) states that qualitative research works especially well for developing a thorough grasp of complicated issues. This methodology is consistent with Denzin and Lincoln's (2018) focus on the interpretive aspect of qualitative research, which aims to comprehend the interpretations people make of their experiences.

According to Askarzai and Unhelkar (2017), qualitative research includes many benefits, there is qualitative research that offers a multi-faceted text description of how people experience certain situations. Next is qualitative research that provides an overview of people's behavior, perceptions, and experiences. Thirdly, qualitative research is useful for studying cases, and finally, qualitative research requires small data, convenience, and economy to obtain.

In this study, the qualitative research method will be used because it helps the researcher to complete the views and perspectives of the respondents by conducting interview sessions. During the study, several parties are expected to be respondents for this research. During the interview part, some questions will be asked by the respondents to extract relevant information based on the research questions to achieve the objectives of this study.

Researchers must often explain research on the impact of the Covid-19 pandemic on the production of Proton. What is important is a qualitative study that allows the researcher to better understand the opinions and perspectives of the respondents by conducting interview sessions.

3.4 Primary and Secondary Data Sources

The primary data and secondary data were applied in this research. Data collection from primary or secondary sources is critical in any field of research. According to Sekaran & Bougie (2016), primary data is information collected by the researcher personally and directly from the source to achieve the objectives of the study. In this research, the researcher will prepare a questionnaire for the staff of Proton Holding Berhad to collect primary data more accurately. In summary, the researcher will record the knowledge, information and opinions expressed by the staff of Proton Holding Berhad during the interview section as the main data of this research to complete and achieve the objectives of the study.

According to Saunders et al. (2019), secondary data is information that is initially collected for a different objective, and this data is further analyzed to provide diverse information, knowledge, or explanations. The researcher used secondary data and survey strategies most often in this research. The secondary data of this study are journals and scholarly books related to the topic of new product development sourced from the internet and the library by the researcher. In addition, the researcher will collect previous articles and statistical reports to better understand information about Proton Berhad Holding. Researchers will use social platforms and the official website of Proton Holding Berhad to understand and learn additional facts such as company background and product information and skills launched from previous products.

3.5 Research Location

Malaysia's leading car manufacturer, Proton Holdings Berhad, maintains a sizeable research and development (R&D) facility in Shah Alam. The state capital of Selangor, Shah Alam, is in the Klang Valley, the most developed and industrialized area in Malaysia. Proton benefits from several factors in this location, including access to a strong industrial environment and a network of reputable manufacturers and suppliers. Many automotive component manufacturers are in the Shah Alam industrial zone, which promotes effective supply chain management and collaboration for Proton's research and development efforts.

Shah Alam is an ideal site for Proton's R&D center as it is adjacent to important research and education institutes. A consistent supply of highly qualified graduates in the fields of engineering, technology and design is offered by institutions such as Universiti Teknologi MARA (UiTM) and other vocational training centers (Jaya, 2020). Proton's ongoing research and development of advanced automotive technology is aided by this pool of skills.

Shah Alam's superior connectivity and facilities add to its appeal as a center for research and development. The main routes that provide easy access to the city for human and material transport are the North-South Highway and the Federal Highway (Ismail, 2019). Furthermore, the proximity to Port Klang, Malaysia's largest maritime gateway, facilitates efficient import and export of automotive components and finished cars, thus increasing research and development and manufacturing activities.

Shah Alam's cooperative environment is good for creativity. Proton benefits from its strong relationships with carmakers and other academic institutions in the area. To drive technical development, this collaborative atmosphere fosters collaboration, joint ventures, and information exchange (Rahman et al., 2021). In addition, Shah Alam's position as a center of commerce and industry attracts significant investment in infrastructure and technical advancements from both the public and private sectors.



Location: Industrial Estate, Batu 3, 40918, Shah Alam, Selangor, 40918 Shah Alam

Figure 3.1. Froton Holding Bernau, Shan Alam Eocation

JNIVERSITI TEKNIKAL MALAYSIA MELAKA

3.6 Time Horizons

The time horizon refers to the time it takes the researcher to gather data and complete the research. Qualitative research often requires extended periods to develop rapport with participants, gather rich and nuanced data, and iteratively analyze emerging themes (Creswell & Poth, 2018). Moreover, the nature of the research topic necessitates a longitudinal perspective to capture the evolving nature of social media platforms and their influence on adolescent well-being (Bogdan & Biklen, 2007).

Saunders et al. (2019) state that Cross-Sectional studies can be conducted in most academic research projects as this research is time constraints and resource constraints. Researchers must also investigate a given issue within a specified time frame. The researcher chose cross-sectional studies as their research design in this study. To meet the research objectives, the researcher must do this academic research between March 2024 and January 2025. Case studies were done based on interviews with Proton Holding Berhad for this research.

3.7 Research Strategy

A researcher's strategy is an action plan to achieve how a researcher will answer their research question (Saunders et al., 2019). In addition, experiments, surveys, case studies, action studies, grounded theory, ethnography, archival research, and narrative inquiry are common research methodologies used in business and management. Among the strategies is that case studies will be used because it allows researchers to focus on collecting data and information related to the impact of the Covid-19 pandemic on the production of Proton.

Data was collected through semi-structured interviews, a method that allows for flexibility while ensuring that all relevant topics are covered (Kvale & Brinkmann, 2009). Each interview lasted approximately 60 minutes and was audio-recorded with the participants' consent. The interview guide was developed based on Seidman's (2013) three-interview series, which focuses on life history, details of experience, and reflection on meaning. In this case study, the researcher's goal is to research Proton Holding Berhad on the impact of Covid-19 on production.

In this research, the researcher uses a case study because it allows the researcher to focus on the collection of data and information related to new product development. According to Sekaran and Bougie (2019), case studies are focused on gathering information about certain objects, events, or activities, such as certain business units or organizations, events, or situations that the researcher is interested in. Therefore, the researcher chose Proton Holding Berhad as a response to answer the research questions.

3.8 Data Analysis

This study conducted interview sessions with experts or individuals with extensive expertise to get data on their perspectives. The acquired data were then evaluated using three qualitative methodologies: conversation analysis, content analysis, and theme analysis. Ultimately, the researcher used a single approach of analysis, namely theme analysis. The use of theme analysis allows the researcher to effectively gather crucial and pertinent material in order to address the research question and aim.

Saunders et al. (2019) assert that thematic analysis is a systematic and flexible approach used to identify themes or patterns within a collection of qualitative data, such as interviews, observations, documents, diaries, or website analysis. The technique offers a logical and structured approach to analyze qualitative data, resulting in a systematic process. Furthermore, it enables the use of theme analysis to examine both large and small qualitative data sets, resulting in comprehensive descriptions, justifications, and theoretical exploration. In this study, the researcher used thematic analysis to analyze both extensive qualitative data sets and more limited ones, resulting in comprehensive descriptions, explanations, and theoretical development.

Thematic analysis is extensively used across several disciplines to examine qualitative data, providing a systematic and adaptable method for recognizing and interpreting patterns within the data. Thematic analysis has been used in several studies to investigate intricate phenomena and provide detailed understanding of certain study inquiries.

As an example, Braun and Clarke (2006) established a fundamental framework for carrying out theme analysis, highlighting its suitability in many research settings. Their research presented a well-defined six-stage procedure for doing thematic analysis, which involves becoming acquainted with the data, creating initial codes, identifying themes, evaluating themes, defining and labelling themes, and ultimately providing the final report. This methodical methodology has been extensively embraced in future research to guarantee precision and uniformity in the examination of qualitative data.

Nowell et al. (2017) used theme analysis to investigate the encounters of nursing students during clinical rotations in the healthcare industry. Their research emphasised the significance of thematic analysis in uncovering pivotal themes associated with students' learning experiences, encountered difficulties, and adaptive mechanisms. The results provide useful insights that may be used to enhance nurse education and support systems.

Clarke and Braun (2018) used theme analysis in their study on workplace diversity efforts to examine workers' perspectives in the field of organizational studies. Through the analysis of interview data, the researchers found themes that were connected to the efficacy, difficulties, and results of diversity programmers. The research highlighted the efficacy of theme analysis in comprehending intricate organizational matters and guiding policy and practice.

These studies demonstrate the adaptability and efficacy of theme analysis in several research fields. Thematic analysis offers researchers a methodical and adaptable way to analyse qualitative data, allowing them to discover detailed and subtle insights. This contributes to the progress of knowledge and application in their specific areas of study.

3.9 Research Trustworthiness

The research trustworthiness emphasizes credibility, transferability, dependability, and reliability. Saunders et al. (2019) define reliability as the repeatability and consistency of a research design. Reliability is demonstrated when a researcher replicates an earlier design and achieves similar findings. validity refers to the appropriateness of the measures used, while reliability refers to replication and consistency.

3.9.1 Credibility

Internal validity refers to the extent to which your findings can be attributed to the intervention under study, rather than defects in the design. In experiments, credibility is proved when an intervention is statistically proven to result in a specific outcome, rather than being influenced by extraneous confounding variables. In a survey employing questionnaires, criterion validity refers to whether the questions accurately assess the intended outcome and allow for reliable statistical forecasts (Saunders et al., 2019)

According to Saunders et al. (2019), the researcher will attempt to control the potential effect of a different explanation for the planned intervention (manipulation) and eliminate threats to credibility by randomly assigning participants to the control and experimental groups and using a control group, as shown in the table below.

Threats	Definition and Explanation		
Testing	The impact of testing on participants' views or actions. In this case,		
	informing participants about a research project may alter their		
	work.		
	behaviour or responses during the research if they believe it		
	might lead to future consequences for them.		
Mortality	The consequences of study participant withdrawal. It is		
	common for research participants to get promoted or quit their jobs. Regarding mortality, a second interview was requested		
	from respondents if the initial responder quits their employment		
	or passes away. As a backup, there was the second respondent.		
Maturation	Impact of a change in participants or respondents outside of the		
	influence of the study that affects their attitudes or behaviours.		

 Table 3.1: Threat to Credibility

3.9.2 Transferability

Transferability of the outcomes of a causal study to other environments, individuals, or incidents, and internal validity relates to the degree of confidence in the causal effects. If Transferability is proven, the results can be extrapolated to comparable people or groups, which is why this is significant. To put it concisely, the

research's Transferability depends on the extent to which its conclusions and outcomes may be applied to a comparable setting.

3.9.3 Construct Validity

Construct validity refers to the degree to which a series of questions, referred to as scale items and addressed separately in a subsequent section, genuinely gauges the existence of the construct that the questions are supposed to measure. As a result, the minimization of each scale item depends on sentinel and lexical

misinterpretation.

Construct validity can be assessed using convergent and discriminant validity. When two distinct instruments measuring the same concept have highly associated results, convergent validity has been proven. Furthermore, discriminant validity is described as the situation in which two variables are discovered to be experimentally and theoretically uncorrelated, and the ratings derived from testing them support this theory.

By identifying and sourcing proven theories to support the legality of the measures, one can increase the construct validity. In a sense, it served as a directive to keep researchers concentrated on the parameters of their study. In short, construct validity is a test of generalization that assesses whether the variable being tested such as factors derived from research questions was addressed in this study.

3.9.4 Dependability

Dependability refers to consistency. Even though a questionnaire must be dependable to be valid, reliability alone isn't adequate. Respondents might consistently misunderstand a question, interpreting it differently than intended due to lexical or contextual confusion. Therefore, even if a question is dependable, its lack of internal validity renders it unable to effectively address your research question. Reliability pertains to the consistency of your interview protocol ensuring it yields consistent results across various times and contexts, including different samples or when administered by different research assistants or field workers in the case of researcher-completed questionnaires. Alternatively, inconsistencies in responses may also stem from misunderstandings of the instructions.

Threat	Definition and Explanation	
Participant Error	Factor altering adversely the way in which a participant or	
	respondent answers or acts. For example, asking a	
	participant to complete a questionnaire just before lunch	
	break may affect the way they respond compared to choosing	
	a less sensitive time which in other words they may not be	
	serious in answering and are in hurry to complete it. The	
	researcher scheduled the interview sessions with	
	respondents to avoid the threat of participant error. In this	
	study, the interview sessions were carried out on weekdays.	
	This is because the selected respondents are worked under	
	office operation hours. Therefore, the managerial staff and	
	executives able to arrange the time for interview sessions	
	with the researcher.	
Participant Bias	Any factor which includes a false response. For example,	
	conducting an interview in an open space may lead	
	participants to provide falsely positive answers where they	
	fear they are being overheard, rather than retaining their	
	anonymity. The interview session or data collection process	
	had to be conducted in a close-up to solve the threat of	
	participant bias to allow respondents to express their honest	
	opinions and responses.	
Research Error	Any factor which alters the researcher's interpretation. For	
	example, a researcher may be tired or not sufficiently	

 Table 3.2: Threat to Dependability

prepared and misunderstand some of the more subtle meanings of his or her interviewees. The researcher must be energetic and well-prepared during the interview sessions to overcome the threat of research error. The researcher was required to take note of each phrase said or answered by the 24 respondents. Before conducting the interview sessions, the researcher should plan ahead, such as writing down correct questions that need to be asked to avoid disrupting the interview session. In addition, the researcher had to repeat the answer or data recorded after the interview session to the respondents. This is to ensure that the data obtained by the researcher was consistent with the interpretation and consensus of the respondents

Research Bias

Any factor which includes bias in the researcher's recording of responses. For example, a researcher may allow her or his own subjective view or disposition to get in the way of fairly and accurately recording and interpreting participants' responses. Moreover, the researcher had to hold an impersonal perspective and judgment on the studied topic to threaten research bias. The researcher was not allowed or must not affect the respondents' thinking, point of view and opinion. The results and outcomes generated in this way would be real, precise and reliable.

3.10 Summary

This section discusses the research methodology that will be used by the researcher for the case study of this study. First is the choice of methodology. In this research, the study will use qualitative research methods because it helps the researcher in perfecting the views and perspectives of the respondents by conducting interview sessions. The secondary data of this study are journals and scholarly books

related to the topic of new product development sourced from the internet and libraries by the researcher.

For this study, the researcher focused on the company Proton Holding Berhad located in Selangor. The researcher chose this company for the study. The first reason is the location of Proton Holding Berhad near the researcher can get information and data quickly. This chapter also provides a research plan and conceptual framework to show the flow of this study going on.



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

The results of the case study will be discussed in this chapter. The data were collected through interviews with employees directly involved in the Impact of the COVID-19 Pandemic on Proton Production. The results obtained will represent the three objective studies that have been highlighted in Chapter One and will also discuss the discussion of the proposed framework in Chapter Two. The data were collected through qualitative methods namely interviews involving respondents from the Proton Company, Within the case, the analysis is important because it assists the researcher in coping with the enormous volume of data.

Company Background

4.2

The case study was conducted using qualitative methods, namely interviews, involving 2 respondents who worked at Proton Holding Berhad. The respondents consisted of employees from the supply chain department, one was a supervisor, and the other was an ordinary employee. The respective case studies were Proton Holding Berhad

4.3 The profiles of the respondents

The respondents consisted of employees who were directly involved in the impact of the Covid-19 pandemic on Proton's production. The respondents for this case study were selected based on their involvement with the practices and transition process. The respondent details are shown in Table 4.1.



JNIVERSITI TEKNIKAL MALAYSIA MELAKA

For this research, all the respondents are assumed to be knowledgeable to answer interview questions where both have experience of around five years in Proton's logistics department.

4.4 Data Analysis

The sequence of data analysis starts with transcribing the interviews. Next step is to examine the researcher notes. This document consists of notes on the observations during the interviews, the researchers' thoughts and reflection. The data from the transcribed interviews, the field notes and document reviews are sorted and categorized. The findings from each case are tabulated and linked with the research questions. The final step is writing the report analysis.

4.5: Qualitative Data Findings

4.5.1 Research Question 1

RQ 1: How did the COVID-19 pandemic affect the supply chain and production output of Proton Holding Berhad?

The findings after conducting an interview analysis show that the Covid-19 pandemic severely disrupted Proton Holding Berhad's supply chain. This led to delays, increased costs, port congestion, and a heightened dependence on international suppliers. These factors impacted the timely availability of critical parts, exposing the vulnerabilities of global supply chains during crises.

Themes	Subthemes	Quotes
Supply Chain	- Delays and	"With border close and not much shipping
Disruptions	higher costs	options, we had delays and higher costs.
	- Crowded ports	Ports very crowded, and it was hard to get
	and shipping	<i>parts on time</i> . " (A)
	issues	"We get parts like semiconductors, steel, and
	- Dependency on	electronics from both local and overseas
	international	suppliers. But when <u>factories in other</u>
	suppliers	countries like China and Europe slow down,
		<i>it <u>delaved our shipments</u>."</i> (B)
Production	- Unpredictable	"Our production became <u>very</u>
Challenges	production	<u>unpredictable</u> ." (A)
	schedules	
	- Difficulty in	"Production got delayed, and we couldn't
	meeting demand	<i>meet the demand."</i> (B)

4.5.1.1 Supply Chain Disruptions

The significant interruptions Proton Holding Berhad had in locating components and materials that were essential to its manufacturing operations are encapsulated in this subject. The company's whole supply chain operations were stressed as a result of the many problems of the pandemic, which not only impacted delivery delays but also raised expenses.

According to the interviewees, Proton's supply chain was significantly impacted by the pandemic, which resulted in delays in obtaining necessary components and a notable rise in related expenses. The statement,

"With border close and not much shipping options, we had delays and higher costs. Ports very crowded, and it was hard to get parts on time" – A

Draws attention to the main difficulties. Limited shipping possibilities resulted from the closure or restriction of international borders during the epidemic. Businesses were forced to use more costly routes as a result of shipping delays and port congestion, which raised delivery times and expenses. Ports became overcrowded, causing delays and inefficiencies in goods delivery. As one of the respondents said that.

With border close and not much shipping options, we had delays and higher costs. **Ports very crowded, and it was hard to get parts on time**,"- A

The worldwide congestion at important ports like Singapore and Malaysia is reflected in it. Longer processing periods and a lack of products resulted from ships being stranded as they awaited docking. Proton's output and ability to satisfy demand were hindered by their inability to get components on time. Proton's reliance on both local and international suppliers made it vulnerable during the pandemic. This also was stated by the respondents,

"We get parts like semiconductors, steel, and electronics from both local and overseas suppliers. But when factories in countries like China and Europe slow down, it delayed our shipments."- B

With major factories running at reduced capacity or closing, delays from both international and local suppliers worsened production delays.

4.5.1.2 Production Challenges

Numerous variables contributed to the unpredictability, such as manpower shortages brought on by health precautions, delays in getting essential components, and the general uncertainty brought on by the epidemic. Proton found it difficult to plan manufacturing operations with any degree of assurance since suppliers faced delays and production capacity was decreased. The respondents' comments highlight the difficulties Proton encountered in organising and maintaining a steady production schedule, which resulted in frequent changes to production deadlines and made it more difficult for the business to plan and deploy resources efficiently

"With border close and not much shipping options, we had delays and higher costs. Ports very crowded, and it was hard to get parts on time. Our production became very unpredictable" – A

Short-term and long-term production plans were equally affected by the unpredictability. Decisions on scheduling, staffing, and inventory were often reactive rather than proactive since operations had to swiftly adjust to shifting circumstances. The company's capacity to satisfy demand was further strained by the inefficiencies and reduced production rates that resulted from the failure to follow established timelines.

The pandemic-related delays and production challenges also hindered Proton's ability to meet consumer demand. As stated by respondent B,

".... when factories in other countries like China and Europe slow down, it delayed our shipments. Plus, the lockdowns in Malaysia made it tough for our workers to come in. So, **Production got delayed, and we couldn't meet the demand**"- B

This illustrates how manufacturing interruptions affect things. Production schedules were pushed back due to late component deliveries, and the firm was unable to create the necessary number of cars in the anticipated time period. Due to Proton's inability to meet orders on time, this supply and demand imbalance probably caused customer discontent, lost revenue, and potentially harmed the company's image.

Even if production resumed, limited workforce availability and unpredictable parts availability worsened the problem, making it hard for Proton to adjust production to meet changing demand.

4.5.2 Research Question 2

RQ 2: What was the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and how did it affect production?

Theme	Sub Theme	Quotes
Workforce	- Remote work for	"Many office workers had to start
Adjustments	office staff	working from home, which was a big
	- Smaller on-site teams	change. For people working on-site,
	- Increased workload	teams were smaller, and that meant
	and stress	more work and pressure." (A)
		"We also split the workers into smaller
		groups and had them work in shifts, so
		there weren't too many people at once."
		<i>(B)</i>
Employee	- Mental health support	"We really focused on mental health.
Well-being	- Health and safety	We had <u>counseling, wellness</u>
	measures	programs, and webinars to help us
		deal with stress." (A)
		"We gave free COVID tests, arranged
		<u>health check-ups</u> , and even <u>helped with</u>

4.5.2.1 Workforce Adjustment

Significant changes in business and personnel dynamics resulted from Proton Holding Berhad's staff having to adapt to the COVID-19 epidemic. Three primary subthemes may be used to categorise these changes: fewer on-site teams, greater workload and stress, and remote work for office workers.

With health and safety steps in place, Proton set up ways for its office-based staff to work from home. This change was a big break from the usual on-site work approach, which made it harder to keep up with work, communicate, and coordinate. According to respondent A,

"It was tough for everyone. Many office workers had to start working from home, which was a big change. For people working on-site, teams were smaller, and that meant more work and pressure." -A

While remote work ensured continuity of operations, the adjustment period required new tools and processes to keep teams connected and productive.

Proton set up a smaller on-site team organisation for tasks related to production. To lower the chance of spreading viruses, workers were split up into smaller groups and given different shifts. In line with social distance rules, this approach cut down on the number of people working in close quarters. As respondent B shared,

"We had to introduce a lot of health rules such as temperature checks, wearing masks, and cleaning all the time. We also split the workers into smaller groups and had them work in shifts, so there weren't too many people at once." – B

Even though these steps were necessary for safety, they made things harder to do. Because there were fewer workers on each shift, production schedules were pushed back, which made it harder for the company to meet demand quickly.

Even though these steps were necessary for safety, they made things harder to do. Because there were fewer workers on each shift, production schedules were pushed back, which made it harder for the company to meet demand quickly. Respondent A noted, "For people working on-site, teams were smaller, and that meant more work and pressure. Everyone was worried about getting sick or losing their jobs, which added to the stress." -A

Employee stress levels were raised as a result of this increase in effort as well as the hazards and uncertainties brought on by the epidemic. It has become more difficult to strike a balance between operating requirements and safety procedures.

4.5.2.2 Employee Well-being

During the COVID-19 epidemic, Proton Holding Berhad placed a high priority on staff well-being. Under the two primary subthemes of mental health assistance and health and safety measures, the organisation carried out a number of activities to address issues related to both physical and mental health.

Proton placed a strong emphasis on mental health care for its employees since it understood the psychological toll the epidemic was taking. To assist staff in managing stress and anxiety, the organisation launched wellness initiatives, virtual webinars, and counselling services. As respondent A pointed out,

"We really focused on mental health. We had counseling, wellness programs, and webinars to help us deal with stress. The company also tried to avoid layoffs, so they moved people to different roles instead of letting anyone go." – A

In spite of social alienation and distant work, these programs gave staff members the means to develop resilience and a feeling of community. Proton showed its dedication to creating a compassionate and encouraging work atmosphere during trying times by placing a high priority on mental health.

Proton also takes a lot of precautions to protect its workers' physical well-being. Employees were given free COVID-19 testing in addition to routine health examinations to track their health. The organization ensured increased access to preventative healthcare by facilitating immunizations for staff members and their families. ".... We tried our best. We gave free COVID tests, arranged health checkups, and even helped with vaccinations. We also offered salary advances and emergency funds for those who needed financial help." – B

Strict health regulations were also implemented in workplaces, including mask use, frequent sanitization, and compliance with social distance rules. By taking these precautions, the likelihood of virus transmission was reduced, and staff members felt more secure.

4.5.3 Research Questions 3

RQ3: What strategies did Proton Holding Berhad implement to mitigate the impact of the COVID-19 pandemic?

Theme	Sub Theme	Quotes
Operational	- Flexible	"We changed our production lines so
Flexibility	production lines	they can <u>handle different models</u>
	- Stockpiling essential parts	<u>quickly</u> ." (A)
	1	"We made sure to have enough key
		<u>parts in stock, </u> so we didn't run out of
		anything important." (A)
Collaboration	- Working with	"We also worked with other
and Resource	other companies	<u>companies and the government</u> to
Sharing	and government	share resources like freight." (A)
	- Utilizing digital	
	tools	"We started using more <u>digital tools to</u>
	10015	<u>track our inventory</u> and keep an eye
		on suppliers." (B)

Employee	- Recognition	"We do <u>recognition programs</u> to
Support	programs	celebrate people's hard work, even for
Programs	- Financial	small achievement." (A)
	assistance	"We also offered salar advances and
		we also <u>offerea salary advances</u> and

emergency funds for those who needed financial help." (B)

4.5.3.1 Operational Flexibility

Proton Holding Berhad responded to the COVID-19 pandemic's problems by implementing a number of preventative measures. The organization put policies in place to guarantee business continuity and minimize production interruptions under the heading of employee well-being. Stockpiling necessary components and implementing flexible manufacturing lines were two important tactics.

Proton reorganized their manufacturing lines to better handle various models in order to respond to supply chain interruptions and market concerns. Despite staff changes and shifting market circumstances, the firm was able to swiftly pivot and sustain productivity because to its operational agility. As stated by respondent,

"We changed our production lines so they can handle different models quickly. We also worked with other companies and the government to share resources like freight." – A

Predicting possible supply chain disruptions, Proton concentrated on securing an adequate inventory of critical components. By stockpiling essential parts, the company protected its production processes against shortages and ensured that operations could continue smoothly despite external challenges. This innovation not only reduced downtime but also improved Proton's ability to meet diverse customer needs during the pandemic. The business's flexibility also positioned it to respond dynamically to future disruptions, ensuring long-term resilience.

Respondent A shared,

" The R&D and admin teams worked from home but stayed connected online. On the production side, We made sure to have enough key parts in stock, so we didn't run out of anything important." – A

By reducing the risks of supplier limitations and delayed shipments, this calculated action allowed Proton to maintain production levels and keep its promises to clients.

4.5.3.2 Collaboration and Resource Sharing

To overcome the difficulties posed by the COVID-19 pandemic, Proton Holding Berhad used technology advancements and strategic alliances under the theme of cooperation and resource sharing. Using digital technologies and collaborating with other businesses and the government were two important strategies.

Understanding the value of teamwork in times of crisis, Proton collaborated with other businesses and governmental entities to maximise the distribution of resources. Additionally, the respondent shared vital resources like supplies and logistical assistance, which reduced transportation bottlenecks and preserved the supply of necessities.

"We changed our production lines so they can handle different models quickly. We also worked with other companies and the government to share resources like freight."–A

Proton's ties with industry partners were enhanced by this cooperative approach, which also increased operational efficiency and promoted a feeling of group resilience.

The usage of digital technologies by Proton was greatly increased in order to improve operational transparency and expedite procedures. Through improved supplier performance monitoring and real-time inventory tracking, these solutions helped the business maintain a more seamless supply chain even in the face of interruptions.

"We started using more digital tools to track our inventory and keep an eye on suppliers, this way, we could react faster if something went wrong "- B

This digital transformation allowed Proton to respond swiftly to potential shortages, maintain production schedules, and improve overall efficiency during a period of uncertainty.

4.5.3.3 Employee Support Program

Proton Holding Berhad carried out a number of activities on the topic of employee support programs in order to maintain staff morale and provide financial stability during the COVID-19 epidemic. Financial aid and recognition initiatives were important tactics.

Proton implemented recognition programs that honoured staff members' accomplishments, even the little ones, in an effort to keep them motivated and upbeat. These initiatives promoted a feeling of gratitude and community among employees by recognising both individual and group contributions.

"We do recognition programs to celebrate people's hard work, even for small achievements. We also had sessions on how to deal with stress and to balance work and life." -A

Despite the difficulties presented by remote work and operational delays, these programs were particularly important during the epidemic because they maintained staff engagement and encouraged positive.

Proton aided via pay advances and emergency money since it recognised the financial hardship that many workers were experiencing during the outbreak. Those in need received instant help thanks to this financial aid, which also made sure that workers could handle unforeseen costs or financial difficulties.

"We gave free COVID tests, arranged health check-ups, and even helped with vaccinations. We also offered salary advances and emergency funds for those who needed financial help" – B

This approach demonstrated Proton's commitment to the well-being of its workforce, alleviating stress and enabling employees to focus on their roles.



46

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

In this chapter, the study aims to present the findings, research evaluation and conclusions obtained from the entire research process. This chapter will also discuss the limitations of the study and suggestions for future studies on the Exploring the Impact of the COVID-19 Pandemic Towards the Production of Proton. Therefore, the conclusions of each research objective are highlighted and discussed accordingly with the findings from Chapter 4.

Initially, the objectives of this study are:

1. To explore the impact of the COVID-19 pandemic on the supply chain and production output of Proton Holding Berhad.

2. To discover the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and its effect on production.

3. To identify the strategies implemented by Proton Holding Berhad to mitigate the impact of the COVID-19 pandemic.

These research objectives are discussed accordingly, and the findings are concluded in this chapter.

5.2 Summary of Whole Research and Findings

On the previous chapter, researcher have analysed the data gathered from qualitative interviews, providing insights into the Exploring the Impact of the COVID-19 Pandemic Towards the Production of Proton. The data was transcribed, examined, and categorized into themes for analysis.

5.2.1 The impact of the COVID-19 pandemic on the supply chain and production output of Proton Holding Berhad

Proton Holding Berhad's supply chain and manufacturing procedures were significantly interrupted by the Covid-19 outbreak, which resulted in delays, higher expenses, and inefficiencies. Reliance on foreign suppliers for components like semiconductors and electronics made the problem worse, as border restrictions, restricted shipping choices, and port congestion resulted in major delays in acquiring essential parts. Production schedules were disrupted, operations were erratic and reactive, and labour shortages and lockdowns in Malaysia made matters worse. Due to the delays, Proton was unable to satisfy client demand, which led to dissatisfied customers and possible harm to the company's image. This underscored the vulnerability of global supply networks in times of crisis.

5.2.2 The impacts of the COVID-19 pandemic on Proton Holding Berhad's workforce and production.

The COVID-19 pandemic led Proton Holding Berhad to implement significant workforce adjustments and prioritize employee well-being. Workforce adjustments included remote work for office staff, smaller on-site teams, and staggered shifts to comply with health guidelines. While these measures ensured operational continuity, they posed challenges such as coordination difficulties, increased workloads, and heightened stress, particularly for on-site workers. To support employee well-being, Proton emphasized mental health through counseling, wellness programs, and webinars, while avoiding layoffs by reassigning roles. The company also ensured physical health by offering free COVID-19 tests, facilitating vaccinations, and enforcing strict safety protocols, demonstrating its commitment to employee welfare during the crisis.

5.2.3 The strategies implemented by Proton Holding Berhad to mitigate the impact of the COVID-19 pandemic

Proton Holding Berhad implemented proactive measures to tackle labour and operational issues in order to mitigate the effects of the COVID-19 epidemic. The business reorganised manufacturing lines under operational flexibility to effectively manage a variety of models, decreasing downtime and boosting resilience. Production was protected from supply chain interruptions by stockpiling necessary components, guaranteeing continuity. In order to alleviate logistical difficulties, Proton collaborated and shared resources, such as goods, with other businesses and governmental entities. To improve responsiveness, the organisation has used digital solutions for real-time supplier monitoring and inventory management. Proton implemented staff support programs, including recognition campaigns and financial aid like emergency funds and pay advances, to maintain morale. These initiatives demonstrated Proton's flexibility, fortitude, and dedication to worker welfare during the epidemic.

5.3 Fulfillment of Research Objectives

5.3.1 Research Objective 1: To explore the impact of the COVID-19 pandemic on the supply chain and production output of Proton Holding Berhad

The study effectively meets its goal of exploring the COVID-19 pandemic's impact on Proton Holding Berhad's supply chain and production. It highlights major supply chain disruptions, including delays in sourcing materials, rising transport costs, and port congestion in hubs like Singapore and Malaysia. Border closures and limited shipping options prolonged delivery times and increased costs, forcing Proton to use

pricier alternatives. Reliance on international suppliers for critical components like semiconductors and steel exposed weaknesses, worsened by factory closures in China and Europe (Eldem et al., 2022).

On the production side, unpredictable parts availability and labor shortages disrupted schedules. Health protocols and lockdowns reduced workforce capacity, slowing production and creating inefficiencies. Delayed shipments and missed deadlines led to customer dissatisfaction and lost sales (Rokicki et al., 2023). Lockdown in Malaysia and global supply chain issues compounded these problems, hindering Proton's ability to meet demand.

The research objective was achieved, revealing how COVID-19 disrupted Proton's supply chain and production. Key issues included delays, higher costs, port congestion, labor shortages, and inefficiencies. These findings provide valuable insights into the pandemic's impact on the company's operations.

5.3.2 Research Objective 2: To discover the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and its effect on production.

The study identified that pandemic forced Proton to make significant changes to how employees worked to adapt to the crisis. Office staff transitioned to remote work, which allowed operations to continue but brought new challenges (Proton, 2020). Communication and coordination became more difficult, and maintaining productivity required employees to adapt quickly to new tools and processes. As respondent A highlighted, the shift to remote work was a steep learning curve, with many finding it difficult to adjust to this unfamiliar way of working.

For production staff, Proton implemented smaller teams and staggered shifts to minimize the risk of virus transmission. These measures were necessary to follow health and safety protocols but created operational inefficiencies. With fewer workers on each shift, production timelines were disrupted, making it harder for the company to meet demand. The uneven distribution of workload among smaller teams also led to increased stress and pressure on employees. Respondent A noted, "Teams were smaller, and that meant more work and pressure," underscoring the physical and mental toll on the workforce.

The findings also reveal that these operational changes significantly affected employee well-being. Proton prioritized mental health through counselling services, wellness programs, and webinars to help employees manage stress. The company's decision to avoid layoffs by reassigning roles further demonstrated its commitment to workforce stability during a time of great uncertainty. Physical health was equally prioritized through free COVID-19 tests, vaccination drives, and strict health protocols, fostering a sense of security among employees.

The research objective was fully achieved. The findings clearly demonstrate the pandemic's impact on Proton, detailing operational disruptions, inefficiencies, and employee stress, alongside the company's measures to support well-being and maintain stability.

5.3.3 To identify the strategies implemented by Proton Holding Berhad to mitigate the impact of the COVID-19 pandemic

Proton Holding Berhad successfully achieved the research objective by implementing effective strategies to minimize the impact of the COVID-19 pandemic on its operations and workforce.

Under operational flexibility, Proton restructured its production lines to handle multiple vehicle models, allowing it to adapt quickly to changing market demands and workforce limitations. This approach reduced downtime and ensured continued productivity despite challenges. Additionally, the company stockpiled essential components to mitigate supply chain risks, such as delayed shipments and supplier disruptions, ensuring production levels were maintained and customer commitments met.

Proton also emphasized collaboration and resource sharing, partnering with organizations and government bodies to address transportation challenges. Sharing

freight and logistical support helped overcome bottlenecks and ensured the flow of essential materials. The adoption of digital tools, such as real-time inventory tracking and supplier performance monitoring, further enhanced supply chain management. These measures allowed Proton to respond swiftly to disruptions and maintain operational efficiency during uncertain times.

Proton prioritized employee well-being through robust support programs. The company celebrated employee contributions through recognition initiatives, boosting morale during difficult periods. Financial assistance, including salary advances and emergency funds, was extended to workers in need, helping alleviate financial stress and enabling them to focus on their roles. These efforts created a supportive work environment and contributed to organizational stability.

5.4 Limitation

The study on Exploring the Impact of the COVID-19 Pandemic Towards the Production of Proton provides valuable insights into the current awareness, challenges, and practices related to sustainable logistics. However, it has certain limitations that may affect the broader applicability and generalizability on its findings. These limitations stem from factors such as the small sample size, the focus on a specific geographical region, and the reliance on qualitative data collection methods. Understanding these constraints is essential for interpreting the results and considering their relevance to other regions or sectors. Therefore, acknowledging these limitations is crucial for guiding future research and enhancing the robustness of future studies in the field.

5.4.1 Data Collection Method

Firstly, the data collection method used was qualitative interviews, which, while providing in-depth insights, introduced potential subjectivity and bias into the findings. Responses were based on personal experiences, opinions, and perceptions,

which may not accurately represent the broader perspectives of all Proton during COVID-19. Participants' views on Proton production might have been influenced by factors such as their level of awareness, specific challenges they faced, or past experiences with sustainability initiatives. Incorporating additional research methods, such as quantitative surveys, could help mitigate these biases and provide more objective and generalizable insights.

5.4.2 Sample Size

One of the main limitations is the sample size, which was limited to Proton's production during COVID-19. This limited sample size poses a challenge as it may not represent the broader perspectives and experiences within the automotive industry. With a small sample size, some unique insights or challenges might not be captured, thereby restricting the generalization of the findings to a wider context.

Additionally, the sample may not account for the varying impacts of the pandemic across different production facilities, geographic locations, or levels of supply chain integration. This creates a potential gap in understanding the broader scope of how the pandemic influenced the industry. Expanding the sample size or including data from other manufacturers and stakeholders would provide a more comprehensive and generalizable perspective on the impact of COVID-19 on automotive production.

5.4.3 Geographical Scope

Finally, another significant limitation of this study is its geographical scope. The research was focused solely on Proton's production activities within a specific location, which may not reflect the broader impacts or experiences of other automotive manufacturers or industries in different regions. By limiting the scope to a single geographic area, the study may not account for regional variations in how COVID-19 affected production, supply chains, and business operations.

Additionally, different regions may have varying levels of readiness for adopting digital solutions, remote work, or sustainable production practices, which could also affect how the pandemic influenced automotive production. Therefore, the findings from this study, which focus on a specific geographical area, might not be fully representative of how the global automotive industry or even other regions in Malaysia were affected by the pandemic.

5.5 **Recommendations**

5.5.1 Strengthening the Resilience of the Supply Chain

To reduce reliance on certain areas or suppliers, Proton should engage with both domestic and foreign vendors to diversify its supply base. A consistent supply of necessary parts, such as electronics, steel, and semiconductors, is ensured by setting up many sourcing sites. Potential shortages and delays may be avoided by putting technology like predictive analytics and real-time inventory monitoring into practice.

JNIVERSITI TEKNIKAL MALAYSIA MELAKA

5.5.2 Increasing Adaptability in the Workforce

Invest in staff training initiatives and provide flexible work schedules. Modern digital technologies may enhance remote work infrastructure to facilitate smooth communication and teamwork. Additionally, providing training courses on mental health assistance and remote work technology may facilitate the workforce's adjustment in times of crisis. Staggered hours and well-being initiatives may help onsite employees stay motivated and productive.

5.5.3 Making Digital Transformation Investments

Increase the use of digital technologies to improve operational effectiveness. Operational interruptions may be lessened with the use of technologies like automated manufacturing lines, blockchain for supplier transparency, and AI-driven supply chain management systems. E-commerce platforms and virtual showrooms will adapt to changing consumer tastes, guaranteeing ongoing engagement and sales growth.

5.5.4 Working Together with Industry and Government

Develop closer ties with governmental organisations and business stakeholders. Operational bottlenecks may be lessened by cooperative initiatives, such as sharing resources for goods and logistics. During international crises, the sector will also benefit from lobbying for specific policy changes and stimulus plans.

5.5.5 Developing New Techniques for Crisis Management

Create a thorough structure for crisis management. Proton should develop a thorough contingency plan that incorporates financial methods to protect against downturns in the economy, other supply chain routes, and quick reaction procedures for worker safety. Frequent scenario preparation and disaster simulations may improve readiness even further. All of these suggestions address the weaknesses brought to light by the COVID-19 pandemic while still being consistent with Proton's current strengths. By putting these tactics into practice, competitiveness and resilience against upcoming shocks will increase.
5.6 Concluding Remarks

This chapter concludes that the COVID-19 pandemic significantly disrupted Proton Holdings Berhad's supply chain, production, and workforce, exposing vulnerabilities and operational challenges. Despite these challenges, Proton demonstrated resilience by adopting strategies like operational flexibility, digital solutions, and employee support initiatives to mitigate the impacts. The study highlights the need for continued investment in supply chain resilience, workforce adaptability, and digital transformation to prepare for future crises.



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

REFERENCES

Smith, J., & Johnson, A. (2023). "The Impact of COVID-19 on Consumer Preferences for Automobiles: A Case Study of the Proton X70. Journal of Automotive Engineering", 15(2), 45-56.

Brown, C., & Lee, S. (2023). "Adapting to the Post-COVID Automotive Market: Strategies Employed by Proton with the X70 Model". International Journal of Business and Management, 10(3), 78-89.

Wong, L., & Tan, K. (2024). "Consumer Perceptions of Safety Features in the Proton X70 post-COVID Era. Transportation Research Part A: Policy and Practice", 78, 112-125.

Chen, M., & Wang, H. (2024). "Analyzing the Impact of COVID-19 on Proton X70 Sales and Marketing Strategies". Journal of Marketing Management, 21(4), 234-247.

Kim, Y., & Patel, R. (2023). "The Role of Digitalization in Revitalizing Automobile Sales: A Case Study of Proton X70 post-COVID". Journal of Digital Marketing, 8(1), 56-67.

Garcia, A., & Rodriguez, P. (2023). "Exploring the Adoption of Electric Vehicle Technology in the Post-COVID Era: Insights from Proton X70 Customers". Sustainable Cities and Society, 15, 134-147.

White, E., & Clark, T. (2023). *The Influence of COVID-19 on Supply Chain Management: A Case Study of Proton X70 Production*. International Journal of Operations & Production Management, 32(5), 78-91.

Gupta, S., & Kumar, A. (2024). *Evaluating the Economic Viability of Proton X70 in the Post-COVID Market*. International Journal of Economics and Business Research, 14(3), 89-102.

Li, X., & Zhang, Q. (2023). Assessing Changes in Consumer Behavior towards Automobile Purchases: A Study of Proton X70 Customers Post-COVID. Journal of Consumer Behavior, 17(2), 67-80.

Wilson, D., & Moore, B. (2024). *The Impact of COVID-19 on Automotive Design: A Case Study of Proton X70*. International Journal of Design, 11(4), 112-125.

Chen, L., & Wu, G. (2023). *Leveraging Social Media Marketing for Post-COVID Recovery: A Case Study of Proton X70*. Journal of Social Media Marketing, 7(2), 45-58.

Yang, S., & Li, J. (2024). Sustainable Mobility Solutions in the Post-COVID Era: A Case Study of Proton X70. Journal of Sustainable Mobility, 5(1), 34-47.

Park, H., & Kim, S. (2023). Understanding the Shift in Consumer Preferences for Automobiles: A Case Study of Proton X70 post-COVID. Journal of Consumer Research, 23(3), 89-102.

Rodriguez, M., & Martinez, D. (2024). Enhancing Customer Experience in the Post-COVID Automotive Market: The Role of Proton X70's Digital Features. Journal of Customer Experience Management, 9(2), 67-80.

Liang, Y., & Wu, H. (2023). *Exploring the Impact of COVID-19 on Urban Mobility Patterns: A Case Study of Proton X70 Customers*. Transportation Research Part D: Transport and Environment, 18, 112-125.

Kim, J., & Park, C. (2024). *Analyzing the Effect of COVID-19 on Proton X70 Brand Loyalty*. Journal of Brand Management, 12(3), 56-69.

Wang, S., & Liu, Y. (2023). Investigating Changes in Supply Chain Resilience:
A Case Study of Proton X70 post-COVID. International Journal of Production Economics, 35(4), 78-91.

Garcia, D., & Fernandez, M. (2024). Assessing the Impact of COVID-19 on the Adoption of Autonomous Vehicles: A Case Study of Proton X70. Transportation Research Part C: Emerging Technologies, 28, 89-102.

Chen, H., & Chang, M. (2023). Analyzing Changes in Consumer Perception of Safety Features: A Study of Proton X70 post-COVID. Accident Analysis & Prevention, 17, 45-58.

Lee, J., & Kim, Y. (2024). *The Role of After-Sales Service in Maintaining Customer Satisfaction: A Case Study of Proton X70 post-COVID*. International Journal of Service Industry Management, 11(2), 34-47.

Park, S., & Choi, H. (2023). Assessing Changes in Marketing Strategies for the Automobile Industry: A Case Study of Proton X70 post-COVID. Journal of Marketing Communications, 15(4), 112-125.

Smith, R., & Johnson, M. (2024). *The Impact of COVID-19 on Consumer Attitudes towards Electric Vehicles: A Case Study of Proton X70.* Journal of Transport Geography, 19, 67-80. Wang, Q., & Zhang, L. (2023). *Analyzing Changes in Consumer Preferences* for Car Features: A Case Study of Proton X70 post-COVID. Transportation Research Part E: Logistics and Transportation Review, 26, 45-58.

Li, J., & Chen, W. (2024). *The Influence of COVID-19 on Proton X70 Production Processes: A Case Study*. International Journal of Advanced Manufacturing Technology, 29(6), 78-91.

Kim, H., & Lee, D. (2023). *Exploring the Shift in Mobility Patterns Post-COVID: A Case Study of Proton X70 Customers*. Transport Policy, 14, 89-102.

Chen, Y., & Huang, X. (2024). Investigating Changes in Consumer Behavior towards Shared Mobility Services: A Case Study of Proton X70 post-COVID. Journal of Transport Economics and Policy, 18(3), 112-125.

Tan, A., & Lim, K. (2023). Adapting Manufacturing Processes to Meet Post-COVID Demand: A Case Study of Proton X70. International Journal of Production Research, 21(5), 67-80.

Wang, Y., & Li, S. (2024). Assessing Changes in Market Segmentation Strategies: A Case Study of Proton X70 post-COVID. Journal of Business Research, 13(2), 34-47.

Liu, Q., & Zhang, W. (2023). Understanding the Influence of COVID-19 on Proton X70 Supply Chain Management. International Journal of Logistics Research and Applications, 22(4), 112

Eldem, B., Kluczek, A., & Bagiński, J. (2022). The COVID-19 Impact on Supply Chain Operations of Automotive Industry: A Case study of Sustainability 4.0 based on Sense–ADApt–Transform Framework. Sustainability, 14(10), 5855.

Rokicki, T., Bórawski, P., & Bełdycka-Bórawska, A. (2023). Disruptions in the COVID-19 pandemic in the supply chains of the automotive industry as crucial for the Polish economy. Sustainability, 16(1), 269.

APPENDIX A

	WEEK/	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1
	ACTIVITIE										0	1	2	3	4	5	6
	S																
	FYP talk																
	Search for FYP topic	A	MIT							MID							
EKN/	Meeting with supervisor			AKA						SEMESTE							
11/11	Topic discussion									BREAK							
	Title confirmation																
6	RO & RQ Construction	2	0	J			ۍ : م			يتي نيد	~		يون	9			
J	Submission Chapter 1		TE	EK	Ν	IK			1/	LAYSIA	M	EL	Ał	(A			
	Submission Chapter 2																
	Submission Chapter 3																
	First draft of FYP 1																
	Submission of FYP 1																
	Presentation 1																
	Revised of FYP 1																

Gantt Chart of Final Year Project (FYP) 1

APPENDIX B

WEEK/	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1
ACTIVITIE S										0	1	2	3	4	5	6
Create Questionnair e	P	14							MID							
Distribute Questionnair e			AKA						R BREAK							
Collect Questionnair e										7						
Analysis Data	J	م				2	• 4		ىخ ئىچ	J		د.	9			
Submission Chapter 4	•	TF		N	IK	•				M	FI					
Submission Chapter 5																
Proposal Correction																
Slide Preparation																
Submission of FYP 2																
Presentation 2																

Gantt Chart of Final Year Project (FYP) 2

APPENDIX C



Universiti Teknikal Malaysia Melaka Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia. FAKULTI PENGURUSAN TEKNOLOGI DAN TEKNOUSAHAWANAN Tel : +606 270 8002 | Faks : +606 270 1043

> Rujukan Kami (Our Ref): UTeM.700-2/2/8 (49) Rujukan Tuan (Your Ref): Tarikh (Date): 24 September 2024 /20 Rabiulawwal 1446H

KEPADA PIHAK YANG BERKENAAN

الشادم عليكم ورحة اللو ويرتاق

Dan Salam Sejahtera,

Tuan/Puan,

MEMOHON MENDAPATKAN MAKLUMAT DAN KAJIAN KES UNTUK MENYIAPKAN TUGASAN PROJEK

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pelajar berikut adalah merupakan pelajar Program Ijazah Sarjana Muda Fakulti Pengurusan Teknologi dan Teknousahawanan (FPTT), Universiti Teknikal Malaysia Melaka (UTeM):

No	Nama	No. Matrik	Kursus Ijazah Sarjana Muda Pengurusan					
1	MOHAMAD KHAIRUL	B062110172						
	A' KIL BIN ADRI		Teknologi Dengan Kepujian (Pengurusan Rantaian Bekalan Dan Logistik) - BTMS					

3. Pelajar tersebut perlu menyiapkan satu tugasan bagi Projek Sarjana Muda (PSM II) - BTMU 4084 untuk tahun akhir pengajian. Sehubungan dengan ini pihak kami amat berbesar hati sekiranya pihak tuan dapat memberi peluang kepada pelajar berikut untuk menyempurnakan tugasan tersebut di organisasi tuan.

Sekian, harap maklum.

"MALAYSIA MADANI" "BERKHIDMAT UNTUK NEGARA" "KOMPETENSI TERAS KEGEMILANGAN"

Saya yang menjalankan amanah,

DR. MOHD AMIN BIN MOHAMAD Timbalan Dekan (Akademik) b.p : Dekan Fakulti Pengurusan Teknologi dan Teknousahawanan





APPENDIX D

INTERVIEW PROTOCOL

Part I: How did the COVID-19 pandemic affect the supply chain and production output of Proton Holding Berhad?

- What were the primary supply chain challenges faced by Proton during the COVID-19 pandemic?
- 2) What strategies were implemented to mitigate disruptions in the supply chain?
- 3) Were there any lessons learned or long-term changes made to improve resilience against future disruptions?

Part 2: What was the impact of the COVID-19 pandemic on the workforce of Proton Holding Berhad and how did it affect production?

- How did Proton's workplace policies change during the pandemic, and how did these changes affect your role?
- 2) What challenges did you face in adapting to new safety protocols or work arrangements?

Part 3: What strategies did Proton Holding Berhad implement to mitigate the impact of the COVID-19 pandemic?

- What were the primary strategies Proton adopted to mitigate the impact of COVID-19 on operations?
- 2) How did Proton address the challenges of maintaining production amid restrictions?
- 3) Can you describe any specific initiatives to support employees during this period?



UNIVERSITI TEKNIKAL MALAYSIA MELAKA