ADOPTION OF TECHNOLOGY IN RELATION TO SMALLMEDIUM-SIZED ENTERPRISES (SME) PERFORMANCE

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DECLARATION

I declare that this thesis entitled "ADOPTION OF TECHNOLOGY IN RELATION TO SMALL MEDIUM-SIZED ENTERPRISES (SME) PERFORMANCE is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

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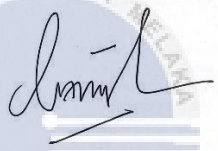
SIGNATURE : 

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APPROVAL

I hereby declare that I have checked this report entitled "Adoption of Technology in relation to Small Medium-sized (SME) Performance", and in my opinion, this thesis fulfils the partial requirement to be awarded the degree of Bachelor Of Technology Management (High Technology Marketing) with Honours

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Date : 26/01/2024

DEDICATIONS

To begin with, I would like to express my thanks to my supervisor, Ts. Dr. Teoh Bak Aun, for giving me the support I needed to complete the report for the thesis. He provided me with constructive remarks, ongoing encouragement, and motivation. After that, I'd like to thank my parents, my biggest support system, for always encouraging and praying for me throughout my degree journey. I am also grateful for having friends like Adha who is always there, accompany me to the library to complete my PSM 2. Irdina, Aina, and Nadiah who taught me about SPSS. Sabrina and Myra always give me those calm vibes whenever I feel stressed in my project report, and somehow, they also give me inspiration to present well in front of a crowd.

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ABSTRACT

The ongoing transformation of conventional industries and the introduction of new technologies that are transforming economies and societies are referred to as the Fourth Industrial Revolution, or Industry 4.0 (IR 4.0). With the widespread use of artificial intelligence (AI), the Internet of Things (IoT), big data analytics, cloud computing, robotics, and sophisticated automation systems, IR 4.0 signifies a digital transformation of sectors. With the help of these technologies, massive volumes of data can be gathered, analyzed, and used to boost production, efficiency, and creativity in a variety of industries. Small and medium-sized businesses (SMEs) are essential for stimulating innovation and economicgrowth. The study examines the complex relationship that exists between SMEs performance and their adoption of technology. Considering the backbone of many economies, SMEs are not exempt to the paradigm shift that technology improvements are having on organizational dynamics in the modern business's scene. The study takes an extensive approach, analyzing the varied impacts of technology adoption on different aspects of SME performance, such as operational effectiveness, financial viability, market competitiveness, and overall growth, using a quantitative methods research methodology. The research seeks to better understand the complex mechanisms through which technology adoption influences SME performance by integrating empirical data from a diverse sample of SMEs across various industries, accounting for factors like industry type, business size, and technological infrastructure. The purpose of this study is to examine how adoption of technologies affects the performance of SMEs. Beyond operational advancements, the deployment of technologies has several other advantages. Greater customer satisfaction, quicker order fulfilment, and fewer shipping mistakes can all result from more efficient packaging. The findings of this study are expected to have a significant impact on academic discourse, practical applications, and the understanding of how technology adoption can be strategically used to improve SME performance in the quickly changing digital era.

Keywords: Industry 4.0, SMEs Business, Technology Adoption, Digital Transformation, Performance Impact.

ABSTRAK

Transformasi berterusan industri konvensional dan pengenalan teknologi baharu yang mengubah ekonomi dan masyarakat dirujuk sebagai Revolusi Perindustrian Keempat, atau Industri 4.0 (IR 4.0). Walaupun ia dibina berdasarkan pencapaian tiga revolusi perindustrian pertama, ia dicirikan oleh tahap penyepaduan teknologi digital, automasi dan operasi dipacu data yang tiada tandingannya. Dengan penggunaan meluas seperti *Artificial Intelligence* (AI), *Internet of Things* (IoT), analisis data besar, pengkomputeran awan, robotik dan sistem automasi yang canggih, IR 4.0 menandakan transformasi digital bagi sektor. Dengan bantuan teknologi ini, sejumlah besar data boleh dikumpul, dianalisis dan digunakan untuk meningkatkan pengeluaran, kecekapan dan kreativiti dalam pelbagai industri. Industri kecil dan sederhana (IKS) adalah penting untuk merangsang inovasi dan pertumbuhan ekonomi. Kajian itu mengkaji hubungan kompleks yang wujud antara prestasi IKS dan penggunaan teknologi mereka. Memandangkan tulang belakang banyak ekonomi, IKS tidak terkecuali daripada anjakan paradigma yang dilakukan oleh penambahbaikan teknologi terhadap dinamik organisasi dalam kancah perniagaan moden. Kajian ini mengambil pendekatan yang meluas, menganalisis kesan pelbagai penggunaan teknologi ke atas pelbagai aspek prestasi IKS, seperti keberkesanan operasi, daya maju kewangan, daya saing pasaran, danpertumbuhan keseluruhan, menggunakan metodologi penyelidikan kaedah kuantitatif. Penyelidikan ini bertujuan untuk lebih memahami mekanisme kompleks yang melaluinya penggunaan teknologi mempengaruhi prestasi IKS dengan menyepadukan data empirikal daripada sampel pelbagai IKS merentas pelbagai industri, mengambil kira faktor seperti jenis industri, saiz perniagaan dan infrastruktur teknologi. Tujuan kajian ini adalah untuk mengkaji bagaimana penggunaan teknologi mempengaruhi prestasi IKS. Di luar kemajuan operasi, penggunaan teknologi mempunyai beberapa kelebihan lain. Kepuasan pelanggan yang lebih besar, pemenuhan pesanan yang lebih cepat dan kesilapan penghantaran yang lebih sedikit semuanya boleh disebabkan oleh pembungkusan yang lebih cekap. Dapatan kajian ini dijangka memberi impak yang signifikan terhadap wacana akademik, aplikasi praktikal, dan pemahaman tentang bagaimana penggunaan teknologi boleh digunakan secara strategik untuk meningkatkan prestasi IKS dalam era digital yang cepat berubah.

Kata kunci: Industri 4.0, Perniagaan IKS, Penggunaan Teknologi, Transformasi Digital, Kesan Prestasi.

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LIST OF ABBREVIATIONS

IR 4.0	-	Industrial Revolution 4.0
SME	-	Small Medium-sized Enterprise
IoT	-	Internet of Things
AI	-	Artificial Intelligence
ICT	-	Information of Communication Technology
RP	-	Responsiveness
UB	-	Usability
PEOU	-	Perceive Ease of Use
TA	-	Technology Adoption
JIT	-	Just-In-Time
SPSS	-	Statistical Package for Social Science
ANOVA	-	Analysis of Variance
TAM	-	Technology Acceptance Models (TAM)
EICT	-	Emerging Information Communication
TMT	-	Technology Top Management Team

CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

An overview of the research project is given in Chapter 1 of the study on the adoption of technologies in SMEs (Small and Medium-sized Enterprises) performance. It is gone into discussion about the background of study that explain the more about the phenomenon of technology adoption in this Industrial Revolution 4.0 from (issues) in SMEs performance. By introducing the research topic, defining the problem statement, research question, research objectives, research gaps, scope, and research significance offering an overview of the full research report, it establishes the context for the study. The chapter's objectives are to capture the reader's interest, demonstrate the importance of the research, and offer direction for the next chapters.

1.2 Background of Study

The context and driving forces behind the research can be used to understand the background of the study on technology adoption in SME performance. SME are important to the economies of many nations, creating a lot of jobs, stimulating innovation, and fostering overall economic progress. Technology has significantly changed how many elements of business operations are conducted in recent years, and SMEs are increasingly realising

how crucial it is to utilise technology in order to stay competitive in a market that is changing quickly. The adoption of technology by SMEs is still a complicated and varied process with varying degrees of success and difficulties, despite the potential advantages. The fourth industrial revolution is currently in progress, and it is inventive and high-quality in nature. Industry Revolution 4.0 (IR 4.0) refers to the variety of technologies, including Internet of Things (IoT), cloud, big data, Artificial Intelligence (AI), robotics, blockchain, autonomous cars, enterprise software, and many more, that are revolutionizing the way we work in the manufacturing industries. The term "Industry 4.0" also refers to new production patterns involving cutting-edge technologies, industrial elements, and labor structuring.

It modifies the manufacturing procedure and establishes a highly effective manufacturing system that lowers production costs and raises product quality. Industrial standards are used to assess performance and control product and service quality (Prakash Tambare et.al., 2021). On the other hand, manufacturing firms are still finding it difficult to comprehend the range of Industry 4.0 technology. Manufacturing companies must continuously improve their production processes and adapt to the shifting market needs if they want to compete in a globalized economy (Pedersen et. al., 2016). Information technology support tools have steadily been added to manufacturing and production systems as a result of the increasing complexity of controlling advanced technologies, addressing the needs of multi-site production, and assisting logistics processes. Innovations and technology adoption is always great challenge to manufacturing companies because it requires a lot of expenses. (Wah Chin et al., 2018). This study aims to provide a deeper knowledge of the elements influencing technology adoption decisions in the SME context by examining the determinants of technology adoption, such as company characteristics, organizational factors, external environment, and management attitudes.

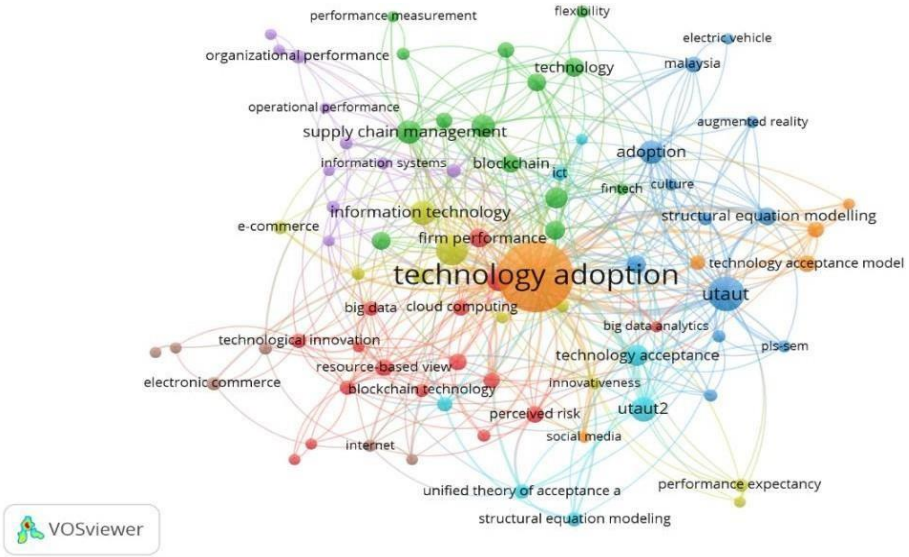

Figure 1.1 The Network Visualization of Technology Adoption

Figure 1.1 shows the visualization of technology adoption that was generated by usingScopus, Bibliometrix and VOSviewer. Researcher used the "technology adoption" keyword to find a journals and articles that is relatable to the study. There were more than 500 articles and journals were acquired, and the main keywords in these articles were located and looked through

1.3 Problem Statement

Many SMEs have challenges and obstacles when trying to effectively adopt and integrate technology into their business operations, which has a negative impact on performance and competitiveness. One of the problems is the small number of Industry 4.0 roadmaps, maturity models, frameworks, and readiness evaluations for SMEs that are currently available represent the unique needs and difficulties of SMEs. (Sameer Mittal et.al., 2018). Because of this gap, the factor could only be able to draw lessons from their own experiences due to a lack of access to information sharing. SMEs outsource out a variety of crucial tasks. SMEs typically have a smaller inventory to look after, and because of this, they depend heavily on them because they only have a small number of suppliers or vendors. The next gap in this study is lack the resources to explore new opportunities outside of their core strengths, primarily

because of their concern about adopting inappropriate practices or investing in the wrong technology (David Romero et.al., 2018). Manufacturing businesses run the risk of launching an unproductive digital transformation that isn't based on their unique qualities but instead is solely motivated by the IR 4.0 hype. Companies could take arbitrary actions without carefully examining their qualities and needs to take advantage of governmental incentives. The success of manufacturing companies is thus questionable dueto the lack of appropriate rules or patterns (Forbes India, 2020). Lastly, inadequate resources in terms of financial, time and human resources to easily adopt the technology (Faisal Iddris, Masud Ibrahim, 2015). Inadequate or extremely diverse organizational structures, a lack of innovation or technology adoption plans, a lack of return on investment (ROI) visibility, and even the perception of rivalry of current firms are further barriers preventing the spread of innovation. Industries today are under enormous pressure to continue implementing technology, such as production processes in manufacturing firms. As the world moves towards a new Industrial Revolution 5.0 (IR 5.0), businesses of all sizes need to examine theirdigital preparedness to fulfil their objectives.

Author (Year)	Independent Variable	Dependent Variable	Relationship	Research Method
Hussein et al., 2023	Adoption of SMEs	Performance evaluation	Adoption of SMEs in Manufacturing and Logistics Sectors	Quantitative
Xingyu et al., 2023	Automation of SME production	Reducing human's energy	Automation of SME production with a Cobot system powered by learning-based vision	Qualitative
Hyunmin Lee (2023)	Smart manufacturing technologies	Improving firm innovation competencies	Converging technology to improve firm innovation	Quantitative

			competencies and business performance: Evidence from smart manufacturing technologies.	
Ruyter et al., 2019	High technology market	Customer- supplier relationship	Customer-supplier relationships in high technology markets 3.0	Quantitative
Hario et al., 2022	Adoption Of Technology 4.0In SMEs	Effect Of Technology, Organization, And External Environment on Business Performance	Effect Of Technology, Organization, And External Environment on Business Performance Mediated by The Adoption of Technology 4.0 In SMEs	Quantitative
Christian Rammer (2023)	Process innovation output in firms	Cost reduction versus quality improvement	Measuring process innovation output in firms: Cost reduction versus quality improvement	Quantitative
Sunday et al., 2022	Information behaviour of SMEs	Emerging information communication technology (EICT) adoption	Multi-dimensional framework of the information behaviour of SMEs on emerging information	Qualitative

			communication technology adoption	
Jonas Soluk et al., 2023	Dynamic capabilities perspective on business networks	Non-disruptive digital technologies in SMEs	Small steps for the big hit: A dynamic capabilities perspective on business networks and non-disruptive digital technologies in SMEs	Qualitative
Guangming Cao et al., 2023	Strategic use of social media in marketing and financial performance:	In the B2B SME context	Strategic use of social media in marketing and financial performance: The B2B SME context	Quantitative
Cristina Del-Castillo et al., (2022)	Social capital and organizational legitimacy as competitive advantages	Information and communications technology sector	Social capital and organizational legitimacy as competitive advantages in the information and communications technology sector	Quantitative
Yaxuan Wanga et al., 2023	Carbohydrate Polymers	Intelligent packaging	Sustainable polysaccharide-based materials for intelligent packaging	Qualitative

Fabio Bertonia et al., 2023	The long-term effects of loan guarantees	SME performance	The long-term effects of loan guarantees on SME performance	Quantitative
Qicheng Lu et al., 2023	Top Management Team (TMT) functional background heterogeneity and SMEs' performance	The role of dynamic capabilities and business environment	TMT functional background heterogeneity and SMEs' performance: The role of dynamic capabilities and business environment	Quantitative

1.4 Research Objectives

Researcher will accomplish these research questions by meeting the following objectives:

1. To determine the factors that influence the adoption of technology by SMEs industry.
2. To examine the relationship between technology adoption and company's performance in SMEs industry.
3. To investigate the most significant variables that influence the adoption of technology in SMEs industry.

1.5 Research Questions

This research question is the initial phase of a research project, and this research will address the following issues:

1. What are the factors influencing SMEs industry to adopt technology?
2. What is the relationship between technology adoption and company's performance in SMEs industry?
3. What are the most significant variables that influence SMEs industry to adopt a technology?

1.6 Scope of Study

The study is focusing on how to measure the variables that will reflect on SMEs' performance. A wide range of independent variables like usability, responsiveness and perceive ease of use will also be examined in this study. However, the researcher will concentrate on the technology adoption of manufacturing companies in Melaka. The adoption of technology in SMEs, including the deciding criteria, implementation tactics, and difficulties encountered during the adoption process, can be explored in the study. It can look at the procedures, including technology selection, system integration, and personnel training. Some more, researchers will also examine the readiness of technology adoption in manufacturing companies like SME. It is essential to investigate whether SMEs are technologically prepared to use manufacturing process equipment. The technology infrastructure, worker skills, and readiness for managing advanced technologies can all be examined in the study. Additionally, it can pinpoint the technical difficulties SMEs encountered during deployment and operation, such as integration problems, the need for technical support, and cybersecurity issues.

1.7 Significance of Study

The purpose of this study is to improve the efficiency and productivity of SMEs' performance. Understanding how adoption of technologies affect SME performance might show where there is room for greater productivity and efficiency. SMEs may streamline operations, cut down on human labor,

eliminate mistakes, and produce more in the same amount of time by the production processes. Cost reductions, quicker order fulfilment, and increased overall operational efficiency can result from this. Adopting new technology can be extremely important for improving SMEs' competitiveness. Improvements in operational process, operational effectiveness, and operational efficiency are the major goals of Industry 4.0. Companies that adopt new technical solutions can gain from them and take use of them, but they also need to be mindful of the risks they may encounter (Elisabetta Raguseo, 2018). Technology adoption is crucial for the development of more intelligent manufacturing processes, which include equipment, machinery, production modules, and products that can independently exchange information, set off actions, and otherwise manage one another. The power of technology to improve operational effectiveness, save costs, and provide SMEs a competitive edge makes it important to research how technology adoption affects the performance of SMEs. This study can help SMEs by assessing the impact and providing best practices, enabling them to make wise decisions, improve their performance, and prosper in a quickly changing business climate.

1.8 Definition of Key Terms

Small Medium-Sized Enterprise (SME)

SMEs in Malaysia can be classified in terms of their sales turnover and number of employees. An organization in the manufacturing sector is considered an SME if it has fewer than 150 employees and an annual sales turnover of less than RM 25 million.

Usability

Usability in the context of technology adoption relates to how simple, intuitive, and effective a new technology or system is for individuals or organizations adopting it. Itemphasizes how well the technology may be utilized by the intended users to complete their duties or reach their objectives.

Responsiveness

The ability of a technology or system to meet the demands and expectations of users or stakeholders quickly and successfully is referred to as responsiveness. It includes how quickly, consistently, and adaptably the technology responds to user interactions, demands, or environmental changes.

Perceive Ease of Use (PEOU)

The Technology Acceptance Model (TAM), a commonly used theoretical framework for explaining users' acceptance and adoption of technology, is closely related to the idea of perceived ease of use. PEOU is one of the important qualities that influence someone's decision to adopt and employ a technology, according to TAM.

SME Performance

Refers to the entire efficiency, success, and results of SMEs in terms of their financial performance, company operations, expansion, and competitiveness. It stands for the evaluation and measurement of how well a SME is functioning across a range of operational factors and the results it has attained.

Technology Adoption

The process through which people, organizations, or communities accept, incorporate,and use new technologies in their regular activities or operations is referred to as technology adoption. It involves the choice-making and action-taking processes that result in the acceptance, purchase, and efficient application of technical advancements.

Industrial Revolution 4.0 (IR 4.0)

The Fourth Industrial Revolution, often known as Industry 4.0 or IR 4.0, is the name given to the current period of technological development and the widespread application of digital technology. It is characterized by the blending of physical systems and digital technologies, which has a profound impact on how we interact, work, and live.

1.9 Summary

In a nutshell, Chapter 1 introduce the research area of technology adoption and the outlines the background of SME in Malaysia and rationale for the current study that also helped to create research questions and research objectives. It briefly reviews why technologyadoption issues that need study and difficulties that are faced by the manufacturing companies in increasing the SMEs productivity towards good performance. It also explains the study's objectives and emphasizes their importance, highlighting the goal of the investigation. This chapter subsequently describes the summary of previous research onrelated topics to give readers an understanding of the developments in technology adoption fields.

CHAPTER 2

LITERATURE REVIEW

2.1 Chapter Overview

In this section, it provides literature of the studies of technology adoption and SMEs Performance. Since SME manufacturing typically takes place in chaotic or semi-organized settings, implementing the technology in terms of production process in SME companies presents significant problems. The research on "Technology Adoption in Relation to SMEs Performance" examines the complex relationship between small and medium-sized enterprises' (SMEs) performance outcomes and their use of new technologies. Examining the past development of technology adoption in SMEs, the research highlights significant turning points and patterns that have influenced these businesses' technical environment. The study's theoretical frameworks are presented, with a focus on ideas related to innovation, technology adoption, and organisational effectiveness. The review methodically looks at the variables that affect SMEs' adoption of technology, including external variables like market trends and regulatory dynamics as well as internal variables like organisational culture and leadership. The review also looks into the difficulties and impediments that SMEs have during the adoption process, such as budgetary limitations, a lack of knowledge, and resistance to change. The literature review provides useful insights into how specific SMEs have effectively used technology to maximise their performance by showcasing success stories and best practices. The research is grounded in the discovery of gaps in the body of existing literature, which highlights the necessity for more

investigation into particular topics. In the end, the literature review informs the research questions and goals by offering a thorough summary that places the study in the larger context of technology adoption and the performance of SMEs. This section also emphasized methods from theory and practice to encourage the adoption of technology. The gap of this research fills has been laid out towards the end of the section. Another suggested solution is a (yet-to-be-created) system that makes technology recommendations based on what other SMEs have implemented.

2.2 Underpinning Theory

2.2.1 Technology Adoption Models (TAM)

The Technology Acceptance Model (TAM) is a theoretical framework that aids in explaining and forecasting how people will accept and use technology. It was initially put forth by Davis in 1989 and has been extensively used in numerous research papers pertaining to the adoption of technology. The researcher will discuss the adaptation or customization of the TAM to suit the research objectives and the technology being studied, as well as how the TAM is specifically applied to the context of technology adoption in SME performance. The researcher may also justify the selection of the TAM based on its applicability and empirical support in related studies. TAM aims to clarify the connection between people's acceptance and use of technology and consequently (Autry et al., 2022). The TAM model for understanding information technology (IT) adoption and usage processes is widely acknowledged. It provides a significant explanation for the variation in users' behavioral intentions regarding the adoption and use of IT in a variety of situations (Hong et al., 2022). It is created to evaluate how well innovative technology is being adopted by consumers. When computers first entered the workplace, Davis, was looking for a means of predicting and explaining system utilization to both suppliers and IT administrators. This research focuses on how the perceived of usefulness and perceived ease of use in the different context from where the theory was developed.

2.3 Technology Adoption

The process of acquiring and integrating new technical advancements into people's existing systems, processes, or activities is referred to as technology adoption. It involves the adoption, use, and efficient use of technology within a particular context. Large companies and services of SMEs have shown that adoption of Industry 4.0 and the technology resulting from it is simple, especially in developed countries (Masood & Sonntag, 2020). A significant amount of literature is also devoted to the study of how mature technologies, like e-business or ICT in general, are adopted, implemented, or accepted (Bakar et al., 2020). The decision to adopt and subsequent steps made by the SMEs to include and utilise new technologies to enhance their performance and competitiveness are referred to as technology adoption. The relationship between technology adoption and SME performance examines how new technology adoption may affect the general performance, productivity, and success of small and medium-sized businesses. It looks into the variables that affect adoption, the difficulties.

SMEs have adopting technology, and the potential advantages and results of effective technology adoption. This study explores the relationship between technology use and a range of SME performance indicators, including profitability, customer satisfaction, market expansion, innovation capabilities, and competitiveness. It evaluates the direct and indirect effects of technology adoption on several performance aspects of SME.

2.4 Small-Medium Enterprises (SMEs)

SME is businesses with annual revenues of less than RM50 million or with fewer than 200 full-time employees. In general, the number of full-time employees and the annual sales turnover were used to determine the size of an establishment. A variety of definitions were chosen for the manufacturing, primary agricultural, and services sectors. According to SME Corp Malaysia official website, the manufacturing companies of SMEs are defined as

businesses having annual sales of less than RM50 million or with fewer than 50 full-time employees, while in service and other sectors for SMEs are companies with annual sales turnover or the number of full-time employees under RM20 million. Industrial businesses all around the world are looking for automated technologies to automate production and manufacturing, increase throughout, and minimize the cost and involvement of their human workers (Mueller et al., 2018). As SMEs, they need to catch up in automating their manufacturing and production processes with the adoption of technologies (Teece, 2022). It is important for SMEs involving the adoption of innovative technology to move forward towards Industrial Revolution 4.0 (IR 4.0). Every country view medium-sized businesses as an essential component of economic prosperity. They help provide employment opportunities and serve as suppliers of goods and services to big businesses. Most SMEs have simple systems and processes that allow for flexibility, quick feedback, short decision chains, higher understanding, and quicker responses to customer needs than do larger organisations (Singh et al., 2022),.

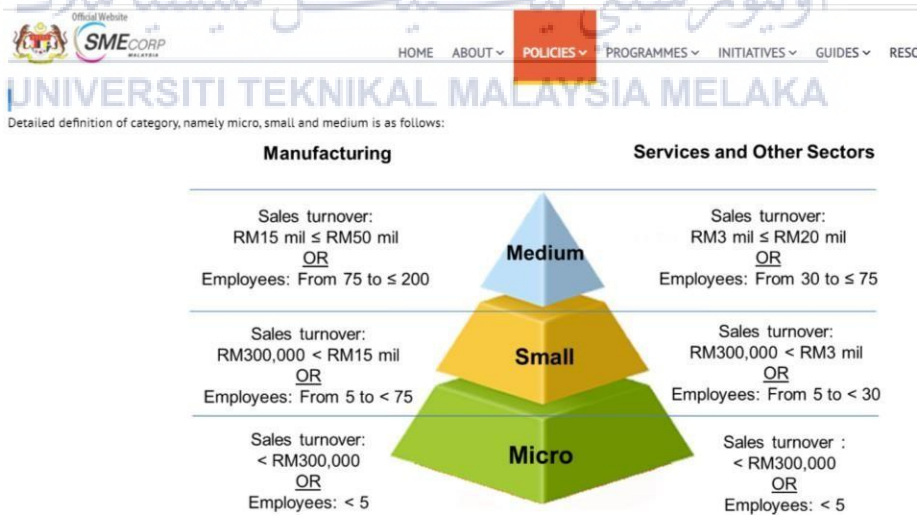

Figure 2.1 Definition of SME category

2.4.1 SME Production

Practically speaking, manufacturing firms need to be able to resolve a variety of production-related problems, including bottlenecks and unbalanced production lines, shutdowns, delayed deliveries, longer workdays, inefficient material handling and movements, as well as high production costs, among others, if they are to maintain their competitiveness. Low productivity in an assembly area was caused by production line imbalances and bottlenecks (Arturo et al., 2015). SMEs frequently lack the funding to explore new opportunities outside of their core skills. Most of the time, they are not "early adopters," mostly out of concern for investing in incorrect technology or implementing inappropriate practices. A few initiatives are intended to concentrate on developing SMEs' supplementary services and industrial enterprises into effective knowledge-intensive and value-creating entities. Several strategies are used by manufacturing systems in SMEs to reduce production-related issues. For example, during the supplier selection process, they pay great attention to qualities like punctuality and dependability, which are essential for any company's performance as well as enable enterprises to persuade customers to place larger orders or pay more for an item (Peng, D.X, 2017). These strategies were used to drive SMEs up the value chains in the manufacturing, agricultural, and service sectors through their acquisition of technologies. It gave technology development capabilities a lot of attention in order to establish product and service distinction and to promote the expansion of more regional technology-based businesses (Whah Chin and Shiang Lim, 2018). This study is innovative in that it may demonstrate the principles of positive results from the use of technology adoption in the manufacturing sector production processes of SMEs, which is based on a critical realism approach.

2.5 Production Process

The assembling of procedures and processes used to convert raw materials, components, and resources into completed products or services is referred to as the production process. There are currently a number of production planning and control management techniques available, such as

Just-In-Time (JIT) from the Toyota Production System, which aims to synchronise production line flows with client-pulled flows (Alexandre Moeuf et.al., 2022). In this study the production process is particularly concerned with how the adoption of new technologies affects SME production operations' efficiency, effectiveness, and overall performance. The first step in fixing the structure that enables small businesses to generate the outcomes they want is to improve business performance (M.Elfan, 2019). In this study, the researcher looks into how adopting technology promotes process optimisation and ongoing manufacturing process improvement. Lean manufacturing techniques, real-time data analytics, performance monitoring systems, and feedback mechanisms might be used in this effort to identify inefficiencies, reorganise workflows, cut waste, and improve overall process effectiveness. The first step in fixing a system that enables small businesses to generate the desired results is to improve business performance. The objective is to provide knowledge and suggestions that will help SMEs in their decision- making, production, and ultimately, overall performance and competitiveness in their respective industries.

2.6 Practicing Technology Adoption in Business

The acknowledged technologies and technical advancements that are perceived as unique in SMEs have long been present in the developed economies. The majority of cutting- edge technologies, such as cloud computing, big data and predictive analytics, which can enhance operations and strategic choices, have yet to gain momentum in most SMEs (Ikpe Justice Akpan et.al., 2020). The actual application and utilisation of new technologies within the SME's operations, procedures, and activities is referred to as practicing technology adoption in business. The subject of this article looks at how SMEs' adoption and efficient use of technology affects their overall performance, productivity, and success. Adoption of technology is the use of intelligent machines, algorithms, systems, and programmes. In more general terms, it refers to a group of instruments that can improve the intelligence of a good, service, or solution (Shankar 2018). The business

organisation analyses the many technologies that are currently on the market to ascertain their applicability, relevance, and possible benefits for their unique needs. This is known as technology assessment. This involves conducting research, evaluating the capabilities and characteristics of various technologies, and taking into account elements like cost, scalability, compatibility, and support. These technology solutions are essential for organisations to improve their managerial practices, performance, and overall performance as well as their products and services due to increasing competition from manufacturing companies (Noorul Ain et. al., 2019).

2.7 Dependent Variable

2.7.1 SME Performance

The performance of the small business sector is affected by two main factors, namely the factors that exist in the external and internal environmental factors (Musran Munizu 2022). In Europe, SMEs account for 98% of manufacturing and primarily manufacture high- mix, low-volume goods (Pieska et al., 2018). SMEs are crucial to the transition to a market economy, contributing significantly to innovation, income generation, and economic and employment dynamism (Marion and Barzcak, 2018). SMEs are frequently judged on their performance, which includes looking at how they contribute to output and employment, how productive they are, and how well they do when it comes to innovation. SME performance is less satisfactory than that of their large equivalents in terms of productivity. According to Jones (2004), businesses must adapt frequently to increase their efficacy. The goal of changes is to discover or build a way of utilizing already-existing resources and skills in order to improve performance and increase value creation. According to its corresponding significance, the SME Masterplan identified six forces that have an impact on SME performance: (1) innovation and technology adoption; (2) human capital development; (3) financing authorization; (4) market access; (5) legal and regulation environment; and (6) infrastructure (Malaysia 2012). All the SMEs performance items were measured on dichotomous scale of (1 until 5) 1 represents strongly disagree, 2 represent disagree, 3 represents neutral, 4

represents agree and 5 represents strongly agree.

2.8 Independent Variable

2.8.1 Responsiveness

Responsiveness defined as the capacity to read and understand actual market signals in real-time (Catalan et.al., 2023). Organizational responsiveness is the measure of how quickly enterprises respond to changes in their environment to take advantage of the opportunities (Bernardes and Hanna, 2022). Adopting new technology benefits society and provides a platform for the methodical development of managerial and organisational skills required to launch competitive actions quickly and effectively and with a significant level of market responsiveness expertise. Enhancing the responsiveness of technology adoption leads to better understanding of customer preferences, business insights, sales forecasting, and supply chain management (Joshi, 2019). The current study investigates how the ability of technology adoption affects the responsiveness in technology adoption and the performance of SMEs, as well as how these two factors interact in conceptual framework. Organizational responsiveness requires the support of relevant expertise as a key competitive advantage (Hoyt et al., 2007). Furthermore, technology adoption moderate the relationship between responsiveness and SME performance. For example, it has been shown that skills like collecting, distributing, analyzing, and storing knowledge have a positive effect on an organization's responsiveness (Wei and Wang, 2011). Companies must have full access to knowledge in order to be responsive, and having a diversity of knowledge kinds makes it possible for an organisation to quickly identify changes in the market.

2.8.2 Usability

Technology adoption’s research has mainly focused on the advantages associated with it, such as usefulness and perceived ease of use, and has heavily relied on TAM or eTAM models to account for customers' adoption of new

technologies. According to the study, perceived usefulness is how much someone thinks adopting technology would help them accomplish their tasks better in the long run (Sungjoon Yoon and Jongchul Oh, 2022). It was claimed that users who believe in the utility of augmented reality would find augmented reality-based products more useful than non-augmented reality-based products. When using goods and services, consumers take the practical advantages into consideration, making perceived usefulness a crucial factor to ensuring the success or excellence of a product. The broad non-technological drivers of perceived usefulness and perceive ease of use have been the topic of some research. However, technology-specific determinants that may offer substantially stronger guidance for successful development and implementation of forms of systems have received far less attention (Susan A. Brown et al., 2022). The SMEs performance expectancy, which is both conceptually and practically equivalent to perceived usefulness from TAM, is the degree to which a person believes that utilizing a system will increase their level of productivity and, as a result, it will result in performance benefits.

2.8.3 Perceive Ease of Use (PEOU)

Technology adoption is also influenced by PEOU which measures the extent to which an organization believes that investment in technology requires minimum effort (Iddris, F., Ibrahim, M., 2022). The perceive usability in the adoption of technology is directly and favourably impacted by the PEOU. Companies will adopt technologies that are appropriate to their industry, but they must first provide comparative benefits, and following that, perceived ease of use will have significant effects on the adoption of Internet technology by SMEs. Organizations are going to utilize technologies that are appropriate for their industry, but these technologies must provide comparative benefits. PEOU makes the assumption that SMEs will use technologies adoption if they are simple to use, flexible to implement, and simple to comprehend. According to empirical research (Dhurup & Dlodlo et al.,2022), PEOU is a major factor that has been shown to have an impact on the willingness of consumers to adopt new technologies. SMEs must have the capital, human resources, and adequate

resources to adapt the technology rapidly in order to implement technology adoption efficiently and successfully.

2.9 Conceptual Framework

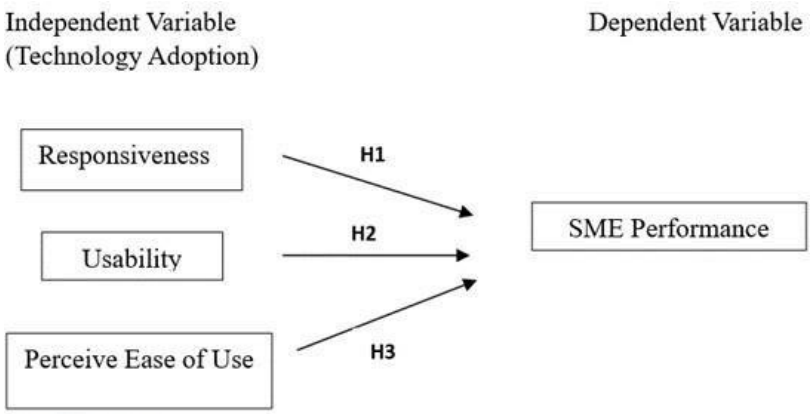

Figure 2.2 Conceptual Framework

Figure 2.1 is the theoretical framework of this study that includes the Independent Variable and Dependent Variable. This conceptual framework was created to highlight the relationship between variables. According to this study, the conceptual framework is visualizing the relationship of responsiveness, usability and perceive ease of use on the performance of SMEs'.

2.10 Hypothesis Testing on Technology Adoption and SMEs Performance

Based on the research's objectives and conceptual framework, the researcher develops research hypotheses. These hypotheses frequently contain predictions regarding the expected correlations between factors related to technology adoption, such as the use of technology adoption, and performance indicators for SMEs. As a result, based on the conceptual framework in Figure 2.1, three research hypotheses are proposed as the following.

2.10.1 Relationship between responsiveness and SME performance

H1: There is a significant positive relationship between responsiveness and SME performance. According to a positive relationship between responsiveness and SME performance, being very responsive to customer needs and market changes can increase customer satisfaction, loyalty, operational efficiency, and financial performance. SMEs who place a high priority on responsiveness are more likely to perform well and gain competitive advantages.

2.10.2 Relationship between usability and SME performance

H2: There is a significant positive relation between usability and SME performance. It emphasizes that usability and SME performance have a beneficial connection. Therefore, it is expected that SME performance will improve as usability does. The greater the beneficial influence on performance indicators, the more usable the product, service, or system is.

2.10.3 Relationship between perceive ease of use and SME performance

H3: There is a significant positive relation between perceived ease of use and SME performance. The positive relationship between perceived ease of use and SME performance shows that when SMEs find a system, service, or product to be simple to use, it improves their performance as a whole. This connection would highlight the beneficial effects of perceived ease of use on different performance measures or outcomes for SMEs.

2.11 Summary

In this chapter's discussion of the adoption of technology in SME performance offers a thorough description and analysis of the relevant academic research, studies, and theories. Its objectives are to review the pertinent literature, identify research gaps, and give a foundation for developing research hypotheses and research questions. This will help to

construct the theoretical and conceptual framework for the study. It concludes by reviewing to provide a better understanding of the relationship of responsiveness, usability, perceived ease of use and SMEs performance. Besides that, there is also an introduction to SME and the performance of their manufacturing company. The industry transformation brought on by technology convergence encourages businesses to think about numerous possibilities for generating economic value (Uzunca et al., 2018). It is up to business entities, especially SMEs, to build their capacities to take advantage of opportunities presented by the adoption of developing technologies. Businesses that use technology adoption as a strategy can also engage customers by personalizing information for each one of them, enabling them to build goods and services that precisely fulfil their needs (Watson, 2022). The research will be undertaken to fill in the gaps since earlier studies have shown differences and various points of view. These justifications can be utilized as groundwork in building the framework of the research and hypothesis in the next chapters. This chapter provides a well-presented study of both variables.

CHAPTER 3

METHODOLOGY

3.1 Chapter Overview

In the previous chapters were explain about the definitions and literature review about the small medium-sized enterprises (SME), the technology adoption in Industry 4.0 roadmaps, maturity models, frameworks, and readiness assessments that are currently available represent the unique requirements and challenges of SMEs, for example. Issues exist in a small number of SMEs like lack the resources to explore new opportunities outside of their core strengths, primarily because to their concern about adopting inappropriate practices or investing in the wrong technology (David Romero et.al., 2018). Next is lack of skills inadequate resources in terms of financial, time and human resources to easily adopt the technology and the factors that can influence the SME companies in acceptance of technology towards a better performance from previous existing journal articles. It also mentioned its conceptual framework and hypotheses. Thus, the purpose for this chapter is to discuss the research on how to explore and produce reliable results, the right approach and procedure are crucial. The research methodologies used in this study will be thoroughly discussed and explained in this chapter.

3.2 Research Design

Research design is a process of collecting, analyzing, interpreting, and exporting data in research studies and answering research questions by

validating its hypotheses (Creswell, 2023). A study can be designed to be exploratory, descriptive, explanatory, evaluative or a combination of these serves different aims and purposes for each study (Sekran & Bougie, 2023). In this stage, items were created for assessing each construct using devices that already existed and could measure the relevant items similarly. The main objective of this stage is to ensure content validity through the appropriate construct item selection. The 27 construct questions used in this study. Furthermore, correlational analysis will be used in the study to assess the relationship between technology adoption and SME performance.

3.2.1 Type of Study

There are three main categories of methodological choices which are numerous methods, qualitative methods, and quantitative methods. The different research techniques used must be appropriate for the desired study topics. An accurate identification of the items from the existing literature and professional opinion ensures their validity. This research will be using questionnaires and surveys to obtain and collect data from respondents which are regularly applied to data collection techniques or data analysis procedures that generate or make use of numerical data. The primary data for this study can be collected utilizing a quantitative research strategy using questionnaires for surveys. It involved the questionnaire reviewing process, which was carried out to verify content validity. This procedure made sure that the survey items accurately reflected the constructs they were intended to measure and that they covered all relevant components of the construct (Mohammed A. Al-Sharafi, et. al., 2019). The objectives of the study and the type of data that was anticipated from the respondents were used to develop the questionnaire.

3.2.2 Questionnaires

Questionnaires are popular because they are simple to create, incredibly versatile, and uniquely able to swiftly gather a significant amount of information in a manner that is easily processed (Zoltan Dornyei, 2022). The

variables that were generated were divided into groups in order to measure the dimension of each construct. The instrument items were developed in accordance with the suggested 6 to 7 of question Likert scales for self-administered surveys. A crucial element of the research plan for analyzing the impact of technology use on SME performance is the systematic collection of data from SME owners, managers, or other relevant employees. The objective is to collect useful data, points of view, and experiences about how automated packaging technologies can impact the performance of SMEs. The purpose of the questionnaire is to investigate the association between SME performance and the deployment of automated packaging technology. It aims to pinpoint the variables affecting adoption, analyze the perceived advantages and difficulties, and assess the overall effect on performance measures. The target audience for the survey is SME owners, managers, or other people in charge of implementing and overseeing the organization's packaging processes. These participants need to be knowledgeable with or have expertise with technology adoption directly.

3.2.3 Surveys

One of the traditional procedures and techniques for gathering primary data is the use of survey questions. A research tool used by the researcher to gather data and information about the study's topic is a survey questionnaire (Serene Dalati and Jorge Marx Gomez, 2018). The use of surveys in the research design for examining the influence of technology adoption on SME performance entails gathering information from a sizable sample of SMEs to gain insights, opinions, and experiences on the impact of technology adoption on their performance. Surveys make it possible to collect data quickly and can give you quantitative information for statistical analysis. The purpose of the survey is to investigate the association between SME success and the deployment of automated packaging technology. It aims to comprehend the driving forces behind adoption, analyze the perceived advantages and difficulties, and assess the overall effect on performance measures. By identifying the SMEs that will be the subject of the survey's target population.

The sample should ideally cover a wide range of industries, sizes, and geographical regions and be representative of the SME in Melaka. To guarantee a representative sample, stratified sampling methods or random sampling procedures may be used.

3.2.4 Pilot Test

The researcher has worked very hard to make sure that the participants, setting, and research instrument are all significant factors associated to doing the pilot testing of this semi structured questionnaire (Nurul Imtiaz Abd Gani et. al., 2020). By conducting a pilot test to the academic expertise of SMEs to discover any problems with question clarity, survey length, or response alternatives before distributing the questionnaires to the target sample it is because to ensure that the questionnaire elicits the appropriate information, this helps for the improvement in this research. Before carrying out the actual study on the topic of technology adoption on SME performance, a pilot test is an essential step in the research process. It entails putting the research tools, like surveys or questionnaires, to the test to spot and address any potential flaws or limitations. The purpose of the pilot test is to determine whether the research instruments (surveys or questionnaires) are suitable for gathering the necessary information regarding the adoption of technologies and its effects on the performance of SMEs. When an actual study is conducted on the adoption of technology and the performance of SMEs, the quality and validity of the research instruments will be improved by the completion of a pilot test, improving the possibility of collecting trustworthy and useful data.

3.2.5 Time Horizon

Time horizon in this study includes the research's time frame. In each semester, there are two separate times when data is collected. It has been shown that the time horizon can affect outcomes significantly, perhaps more so than the discount rate (Tadhg O'Mahony, 2021). Due to a variety of schedule constraints, the researcher used cross-sectional investigations to conduct this

research in two semesters. During these times, the researcher gathers information on factors pertinent to the research question. Surveys, questionnaires, interviews, observations, or a combination of these techniques may be used to collect data, but the researcher will use questionnaires and survey in this study. The researcher then examines the data in order to search for patterns, trends, or relationships. Depending on the type of data, statistical procedures or qualitative methods of analysis may be applied.

3.3 Data Collection Method

3.3.1 Population

The SMEs operating in various industries who have adopted or are considering adopting technologies constitute the target category for this study. SMEs represent most of the population. These businesses often employ fewer people and operate on a smaller scale than larger corporations. This covers businesses that meet the precise requirements for SME classification in the pertinent context and range in size both in terms of labor and revenue. The study focuses on SMEs that are situated in a certain region or location, like Melaka, Malaysia. By doing this, it is made sure that the study is suited to the local environment and elements that might affect the adoption of technologies in that specific area. A wide variety of SMEs are possible in Melaka due to the city's potential for a wide range of industries, including manufacturing, tourism, services, and others. By focusing on Melaka, the study can capture the possible effects of the deployment of technologies across several industries, resulting in a more thorough understanding of the subject. Melaka may have adopted regulations or rewards to promote SMEs' use of cutting-edge technologies, such as the company’s production process. Analyzing the results of such programs can assist in determining their efficacy and offer insights into the most effective strategies for encouraging technology adoption in other areas.

3.3.2 Sampling Techniques

An approach known as stratified random sampling can be used to ensure representative results. This method allows for classification of the population of SMEs according to pertinent traits that may affect performance. Industry sector, size of company, location, and previous adoption of automation technologies are a few examples of these characteristics.

Probability sampling and non-probability sampling are the two types of sampling used in statistics in this research. With the probability sampling technique, each respondent of the population has a known, non-zero chance of being included in the sample. It involves selecting people or things at random from the population to give every component an equal chance of being included in the sample. The researcher can draw statistical conclusions about the population from the characteristics of the sample using probability sampling techniques. While non-probability sampling is a sampling approach where people or things are chosen from the population using criteria that aren't random. The possibility of any specific member being chosen is uncertain and cannot be calculated in non-probability sampling. When it is difficult to compile a complete list of the population or when the research is focused on a particular subset, non-probability sampling approaches are frequently used.

3.3.3 Sample Size

The target population, desired level of precision, statistical power, and expected impact size will all be taken into consideration when determining the sample size. To gather information from SMEs that have adopted the technology, the study will use a quantitative research strategy that will involve survey questionnaires and performance measures. The results will help to improve understanding of how automation affects SME performance and offer guidance to SMEs in Melaka who are thinking about or planning to use automated packaging equipment.

According to G*Power result that uses 3 independent variables, it shows that result of the sample size is 85 respondents, but researcher will try

to get 100 respondents instead to get more result in this research. The reason why researcher wants to use 100 respondents is because usually, with fewer sample sizes, larger effect sizes are simpler to detect. In contrast, higher sample sizes can be necessary to generate sufficient statistical power for lower effect sizes. The statistical power of a study with 50 respondents may differ based on a few variables, including the effect size, the intended level of significance (alpha), and the kind of statistical test being run. In general, a bigger sample size is frequently recommended as it increases the probability of discovering real effects or links and boosts the research's statistical power.

3.3.4 General Questions

The results of the questionnaire are influenced by several factors, including the wording of the questions, the type of questions used, the order in which they are ordered, and many other factors. It is important that the questionnaire is carefully created and validated before usage. It should be guaranteed that the focus stays on the study question throughout the development process (Indian J Anaesth. 2019).

In the questionnaire for Section A of a research study on the adoption of technology in SME performance, the general questions are a little bit of organizational profile before the respondents proceed to the next questions. These general questions assist in establishing the fundamental understanding of the organizations of the respondents and their familiarity with technology adoption. The answers to these questions can provide valuable context and insights for respondents to proceed to the next question.

3.3.5 Demographic Questions

To learn more about the respondents' backgrounds, gender, education level, age races and working experience’s demographic questions are added. This question is important because it shows that researchers regard diversity and equality while doing their research and can assist researchers in gathering

and presenting more accurate information about survey participants' identities (Hughes et al., 2016). The objective of demographic questions is to understand the composition of the sample and explore any potential connections between demographic variables and the research issue.

3.3.6 Measurement Scales

A measurement scale refers to a group of items or indicators meant to assess various constructs or variables linked to the issue. These measurement scales are used to collect data from participants or subjects to quantify and analyze their replies. This construct evaluates the adoption of technology by SMEs. Items that evaluate the degree of implementation, acceptance, or utilization of such systems within SME activities may be included on the measurement scale. Measurement is important in business studies and necessary in various circumstances calling for research. This section examines the nature of measurement, different measuring scales, and different measurement levels (S.Dalati, 2018).

A Likert scale is used as a measurement scale to assess the respondents' opinions, attitudes, perceptions, and levels of agreement or disagreement regarding specific statements or items. Likert scaling is a statistical concept that is frequently employed in survey research, where the subject or respondents of interest are asked to respond to guidance questionnaires with ratings on a scale. It is a commonly used scale in many academic disciplines, but social science research, notably in education, uses it most frequently (Jonald L. Pimentel, 2019). On a preset scale, respondents are asked to rate how much they agree or disagree with each statement. Typically, a Likert scale has a range of 1 to 5, with 1 indicating "strongly disagree" and having the most significance and 5 indicating "strongly agree."

3.3.7 Independent Variables Construct

Section C consists of questions about technology adoption such as

responsiveness, usability and perceive ease of use. Each variable has 6 to 7 questions for respondents to answer the questions.

3.3.8 Dependent Variables Construct

Section C consists of questions about dependent variables, which is SME performance. The questions about the dependent variables are made to measure the variables or outcomes that are predicted to be affected or influenced using technology adoption. These questions are targeted at gathering information on constructs or variables that are viewed as dependent or outcome factors in the context of the study. There are 7 questions for respondents to answer the question.

3.4 Data Analysis

To analyze and interpret the information gleaned via questionnaires or other data collection methods, the data analysis process frequently includes several steps and procedures. It is essential to analyze data because it enables researchers to test their hypotheses and find answers to their research questions. Each research project requires data collection (Dr. Neeraj Kumar Sharma, 2022). Data analysis frequently consists of many different processes, ranging from the use of numerous command-line tools to the creation of graphs (Felix Mölderet et.al., 2021). When running statistical tests and creating visualizations to aid in the interpretation of results, data analysis can be done using statistical software packages like SPSS, R, or Excel.

The Statistical Package for Social Science (SPSS) version 27.0 for Windows will be used by the researchers to analyze the data. SPSS is a statistical programmed that is frequently used for both commercial and social science study (Hilary I. Okagbue et. al.,2020). The specific procedures and techniques utilized will depend on the research plan and the type of data, and SPSS offers a wide range of analytical capabilities.

3.4.1 Descriptive Analysis

The most advanced, adaptable, and often used instrument in the field of sensory analysis is without a doubt descriptive analysis (Sarah E. Kemp et.al., 2018). Calculating summary statistics for the chosen variables is a step in the descriptive analysis process. Measures of central tendency (mean, median), measures of dispersion (standard deviation, range), and measures of relative standing (percentiles) are all common summary statistics. To look at how categorical variables are distributed, the researcher can create frequency distributions. The number and percentage of respondents for each category or response option are shown here. Descriptive analysis, which does not involve experimental manipulation, entails close observation of the target behavior under natural (or naturalistic) conditions in order to discover relevant and potentially significant environmental events. Following that, descriptive analyses identify instances that are linked to the presence of a specific target response. Descriptive analysis is typically used as part of a thorough functional assessment of issue behavior before doing an experimental functional analysis. (Kimberly N. Sloman, 2023).

3.4.2 Reliability Analysis

Assessing the consistency and stability of measuring scales employed in the research investigation requires reliability analysis. It makes ensuring that the scales' items are accurate reflections of the underlying constructs being assessed. The researcher can improve the accuracy and reliability of the measuring tools employed in the study as well as the overall reliability of the research findings by completing a reliability analysis. A multi-item scale, such as a Likert scale, will be used by the researcher to measure variables or constructs that have been evaluated in relation to the research issue. These factors might include attitudes towards the implementation of technologies, organizational readiness, or views of the advantages.

3.4.3 Linear Regression Analysis

Finding a dependent variable's value from an independent variable can be done statistically using a technique called linear regression. A measure of the connection between two variables is linear regression. A dependent variable is predicted using this modelling technique based on one or more independent factors (Khushbu Kumari et. al., 2018). The use of linear regression analysis can be used to assess how well independent variables can predict or account for variations in the dependent variable. The researcher can evaluate the strength and importance of the correlations between the adoption of technology and SME performance by using linear regression, shining light on the variables that affect SME performance in the context of the use of technologies.

3.4.4 Multiple Linear Regression

A statistical technique for analyzing the relationship between two or more independent variables and a dependent variable is multiple linear regression. Multiple linear regression allows for the study of complicated connections between multiple variables, compared to simple linear regression, which only uses one variable. The purpose of this approach is to build a predictive model that will evaluate the influence of each independent variable whilst considering the others into consideration. It does this by assuming a linear relationship between the variables that are predicted and the response variable. While examining the combined impact of numerous factors on a result, multiple linear regression is an often-used statistical technique in research.

3.4.5 Cronbach Alpha

The reliability and internal consistency of measurement scales are frequently evaluated using the statistical metric known as Cronbach's alpha. The researcher can assess the degree to which the items on a scale are consistently measuring the same construct by calculating Cronbach's alpha. As

a result, the measurement tools utilized in the research study on the effectiveness of technology adoption SME performance are of high quality and dependability. With more applications now than it did when it was first developed, Cronbach's alpha is also known as a measure of internal consistency used in the context of multi-item measuring instruments. The topic of Cronbach's Alpha, which is still the most popular and often used reliability indices, has drawn significant attention in psychometric literature. This is a reason to use Cronbach Alpha reliability estimation (Muhammad Amirrudin et. al., 2021)

3.4.6 Pearson's Correlation Coefficient

Correlation is a measurement of the relationship between variables in its broadest sense. When two variables change in magnitude, they are correlated with one another, either in the same direction (positive correlation) or the opposite direction (negative correlation) in correlated data (Patrick Schober et. al., 2018). The Pearson correlation coefficient is a common statistical metric for assessing the linear relationship between two independent variables. The researcher can gain insight into any potential associations between the variables of interest in the research study on the adoption of technologies in SME performance by calculating the correlation coefficient, which reveals the degree and direction of the relationship.

3.4.6 G*Power

An essential component of designing an empirical study is defending the sample size that will be employed. The primary objective of a sample size justification for such investigations is to provide an explanation of how the gathered data is anticipated to produce significant information given the researcher's implied goals (D. Lakens, 2022) In statistical power analysis in research investigations, GPower is a popular application of software. It helps researchers evaluate the statistical power of their data and determine the necessary sample size for their study design. To conduct research academic

officer sample size calculations for examples to establish the research sample size that is appropriate for the population size and to calculate sample size using G*Power (Chanuan Uakarn, 2021). The researcher starts by describing the objectives for the study and the particular statistical test(s) that would like to employ. Numerous statistical tests, including t-tests, Analysis of Variance (ANOVA), correlation and regression analysis, are supported by G*Power. Based on the supplied data, such as effect size, significance level, and statistical power, the software uses algorithms and statistical formulas to determine the necessary sample size. The intended balance between Type I and Type II errors and any extra assumptions particular to the selected statistical test are among the additional variables that GPower takes into consideration.

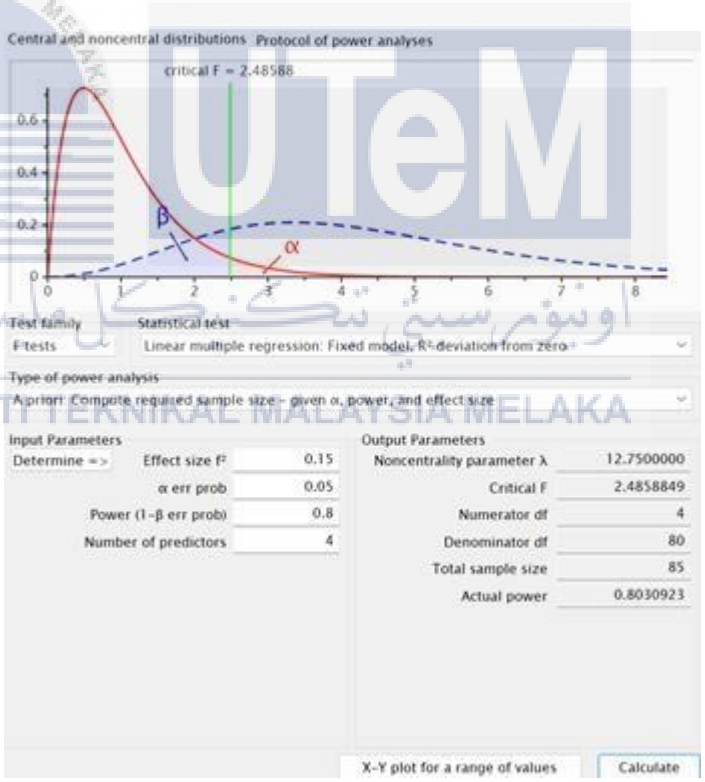

Figure 3.1 G*Power Result

3.4.7 Hypothesis Testing

A crucial part of methodically evaluating the suggested connections and conclusions is hypothesis testing. Clearly defined and measurable theories help us organise the questions.and direct the research as it gets deeper into the details of the study. Using hypothesis testing as an accurate method to

determine whether the observed patterns in the data are statistically significant or if they might have occurred by chance alone. This occurs through comprehensive data gathering and analysise. This procedure contributes to the strength and dependability of th research findings by confirming or disproving the original hypothesis. It is crucial to choose the right tests for statistical analysis that correspond to the characteristics of our data and the particular hypotheses being investigated. The comprehensive evaluation of our hypotheses is made easier by the selection of significance levels, understanding of potential biases, and interpretation of p-values.

Rsquare (R2) in each internal construct (innovation and firm performance), path coefficient, t and p values of each path relationship between constructs, and other metrics can be used to evaluate the outcomes of the structural model test (inner model). The sub- discussion of the hypothesis testing result will provide an explanation of the path coefficient and t value values for each path. The degree of variance in the endogenous variables explained by several influencing variables is measured by the R2 value (Hair et al., 2019). The predicted model of the suggested model is better the higher the R2 value. The expected contribution of the influence of external variables on the intrinsic variable is predicted to be larger the higher the R2 value. High loading factor indicators contribute more to the explanation of their latent constructs. On the other hand, the hidden structure of the indicator with a low loading factor is only partially explained by it. The majority of references state that a factor weight of at least 0.50 has significant validation to explain hidden concepts (Sidek Ismanu et al., 2019)

3.5 Summary

A summary of the research methodology is given in Chapter 3 of the research study on the adoption of technology in SME performance. It includes the research design, strategies for gathering data, methods for analyzing that data, and ethical concerns. The chapter looks for to establishing the credibility and reliability of the research findings as well as to provide a clear explanation

of how the study was carried out. It additionally works as a thorough explanation of the research technique used in the investigation into the effectiveness of technology adoption in SMEs. It lays the foundation for the succeeding chapters and ensures the integrity and accuracy of the study.

CHAPTER 4

DATA ANALYSIS

4.1 Chapter Overview

In this chapter it begins with an extensive overview of the data gathering procedure, highlighting the design of the questionnaire that was used using Google Forms. The respondents' data from 22 questions in a questionnaire will be examined using SPSS version 29.0 in order to clarify the results of the research. The demographic analysis of the respondents, factor analysis, reliability analysis, Pearson Correlation Analysis, and Multiple Regression Analysis are among the subsections that collectively make up this area. The results of the research will then be summarised together in the conclusion section.

4.2 General Information of Data Collected

4.2.1 Data Entry – Codebook

Table 4.1 Codebook

Items	Code
RP	Responsiveness
UB	Usability
PEOU	Perceive Ease of Use
SME	Small Medium-sized Entreprise

4.3 Respondents' Demographic Analysis

Each respondent was asked to complete five questions regarding their demographic profile on the survey form. These questions included whether they have business or not. If the answer from the respondents is yes then they will proceed to the next section, which they must answer regarding their demographic profile such as type of industry level, education level, gender, age and working experience.

According to the Google Form, there are 187 respondents who has answer the survey. Most respondents owned a business (73.3 percent) which represent 137 people of it and the remaining 50 people (26.7 percent) did not have a business. Food and beverage industry have the highest respondents (40.1 percent), followed by clothing and apparel (13.9 percent), beauty and wellness (11.7 percent), e-commerce (9.5 percent), chemical, medical and pharmaceutical (9.5 percent), electrical and electronics (8.8 percent) and transportation (6.6 percent). The sample also represents the majority of the respondents are female (61.3 percent) and male are (38.7 percent). In terms of age, most of the respondents are between 18 to 25 years (72.7 percent), followed by 26 to 35 years (10.1%), between 36 to 40 years (10.1 percent), lastly is 41 and above (7.2 percent).

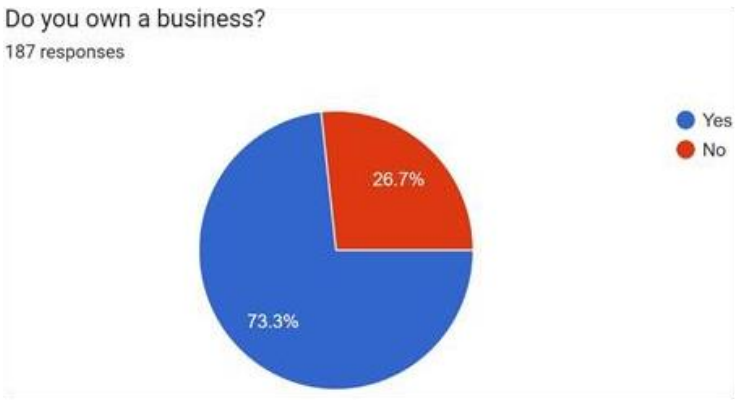

Figure 4.1 Business Owning

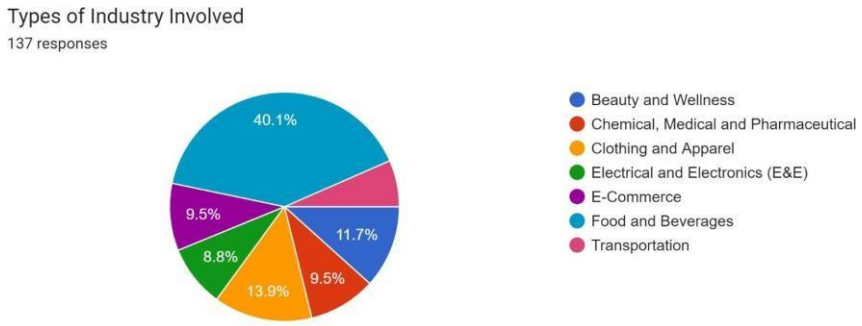

Figure 4.2 Industry Involvement

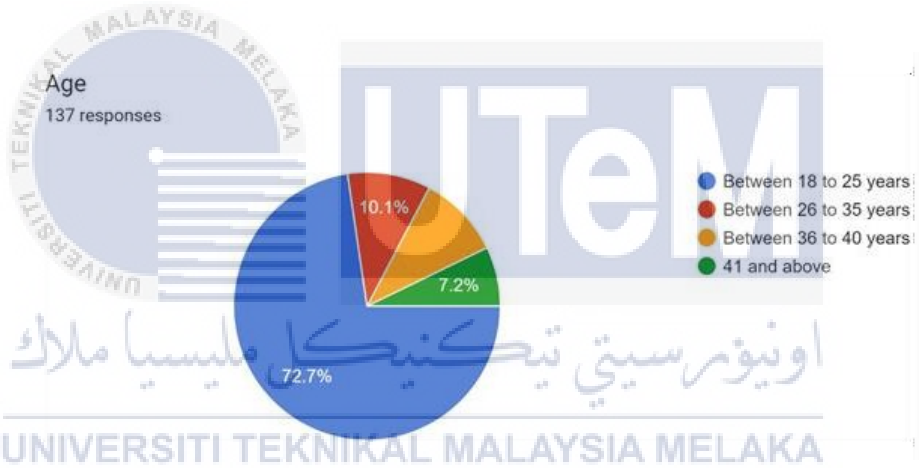

Figure 4.3 Respondent's Age

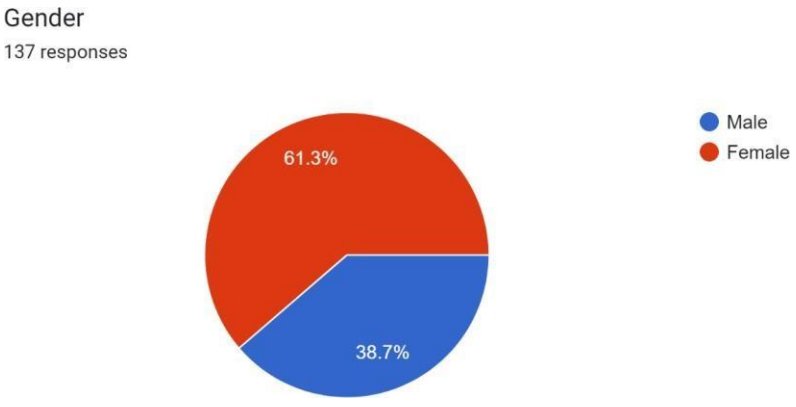

Figure 4.4 Respondent's Gender

As for education level, most of the respondents are bachelor's degree holders (50.7 percent), trailed by diploma holders (29.3 percent), Sijil Pelajaran Malaysia (SPM) (11.4 percent), Sijil Tinggi Pelajaran Malaysia (STPM) (5 percent), and lastly is master holders (3.6 percent). Finally, in respect of working experience, most respondents have about 1 to 2 years (55.4 percent) of experience in working, followed by 3 to 5 years (28.8 percent) and 15.8 percent have 5 years and above of working experience.

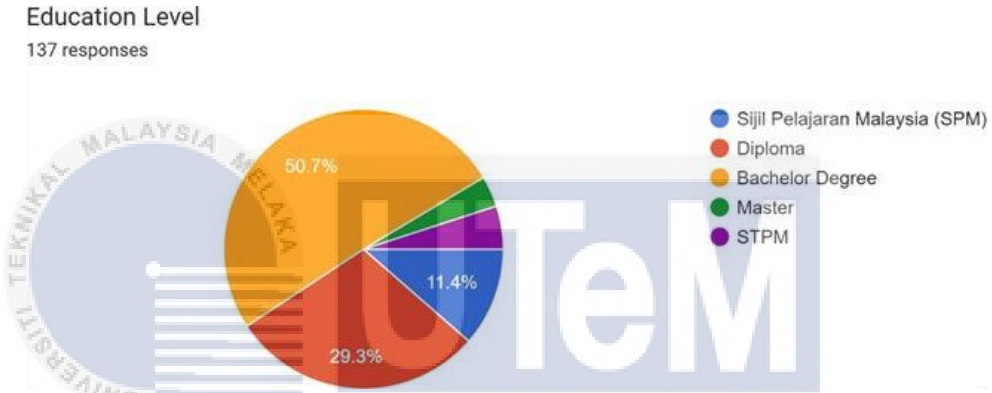

Figure 4.5 Education Level

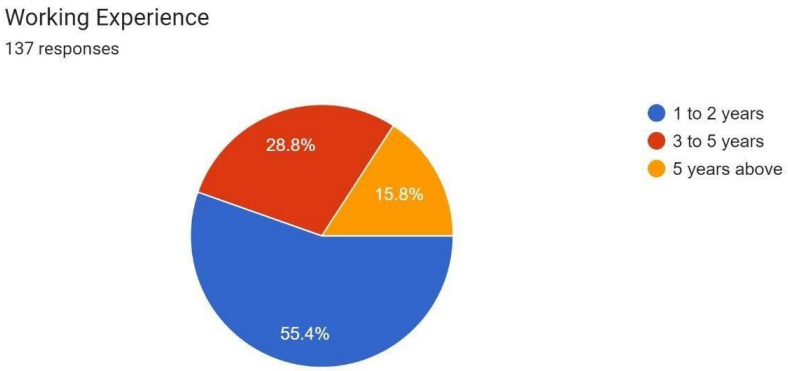

Figure 4.6 Working Experience

Table 4.2 Respondents Demographic Analysis

Demographic Variables	Categories	Frequency	Percentage
Business Owning	Yes	137	73.3
	No	50	26.7
Types of Industry Involved	Food and Beverages	55	40.1
	Clothing and Apparel	19	13.9
	Beauty and Wellness	16	11.7
	E-Commerce	13	9.5
	Chemical, Medical and Pharmaceutical	13	9.5
	Electrical and Electronics (E&E)	12	8.8
	Transportation	9	6.6
Age	Between 18 to 25 years	101	72.7
	Between 26 to 35 years	14	10.1
	Between 36 to 40 years	14	10.1
	Between 41 and above	10	7.2
Gender	Female	84	61.3
	Male	53	38.7
Working Experience	1 to 2 years	77	55.4
	3 to 5 years	40	28.8
	5 years above	22	15.8
Education Level	Bachelor's degree	71	50.7
	Diploma	41	29.3
	Sijil Pelajaran Malaysia (SPM)	16	11.4
	Sijil Tinggi Pelajaran Malaysia (STPM)	7	5
	Master	5	3.6

4.4 Pilot Test

A pilot test is an early, small-scale investigation carried out prior to an experiment or research project being fully implemented. Evaluating the viability and potential problems related to the study's approach is an essential stage. Pilot test is referred to as a small-scale trial that allows the researcher to test the questionnaire validity and reliability in order to reduce the problems when collecting respond in the future (Saunders et.al, 2016). In this pilot test, 12 respondents who currently work within SMEs or who is also a business owner of SME were chosen to conduct this test. Researcher have used about two weeks to complete this test.

Early testing is crucial for improving research protocols and making sure the selected techniques are workable and efficient before the real survey is conducted. Researchers change experimental structures, survey questions, and other components based on their observations from the pilot test, which improves the research's overall structure.

4.4.1 Validity Test

Validity testing is a necessary procedure for evaluating a measuring instrument's or research tool's appropriateness and accuracy. It seeks to ascertain whether the tool successfully measures what it is designed to measure, guaranteeing that the outcomes are significant and trustworthy. In this study, researcher has conducted a validity test and have tested 21 items that included in this questionnaire were valid. As a result, the purpose of this pilot test is to ascertain the link between the dependent and independent variables, demonstrating internal validity.

4.4.2 Reliability Test

The reliability of the variables is tested in the study using Cronbach's Alpha. According to the Cronbach's Alpha technique, a value of 0.7 or higher in the range of 0 to 1 is considered acceptable; a value of 0.9 or above counts as a good result.

Table 4.3 Reliability Test

(Source: SPSS Output)

Variables	Original number of items	Number of items utilized	Cronbach's Alpha
RP	5	5	0.938
UB	6	4	0.932
PEOU	5	4	0.942
SME	6	4	0.940

Note: RP = Responsiveness, UB = Usability, PEOU = Perceived Ease of Use
SME = Small Medium-sized Enterprises

Table above indicates the value of Cronbach's Alpha that represents all dependent and independent variables. The questionnaire consists of a total of 22 items for the reliability test in this study, Cronbach's Alpha is higher than 0.7. It indicates that the questionnaire was dependable and had a high level of reliability.

4.5 Descriptive Analysis

Descriptive analysis was used in this study to examine the respondents' demographic backgrounds. Types of industry involve, gender, age, working experience, education level in the present of SMEs industry are among the research concerns. Target respondents were given the questionnaire via an online Google Form; 187 people answered the inquiry in total. The respondent's demographic background was described using percentage and frequency.

4.5.1 Business Owning

Table 4.4 Business Owning

(Source: SPSS Output)

Do you own a business?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	50	26.7	26.7	26.7
	Yes	137	73.3	73.3	100.0
	Total	187	100.0	100.0	

From the table above, its state that there are 137 respondents that have business which were around 73.3% of the total respondents. Besides, there are 50 respondents that do not have business which are also involved in this research whereby the percentage of respondents is 26.7%.

4.5.2 Types of Industry

Table 4.5 Type of Industry

(Source: SPSS Output)

Types of Industry Involved

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		50	26.7	26.7	26.7
	Beauty and Wellness	16	8.6	8.6	35.3
	Chemical, Medical and Pharmaceutical	13	7.0	7.0	42.2
	Clothing and Apparel	19	10.2	10.2	52.4
	E-Commerce	13	7.0	7.0	59.4
	Electrical and Electronics (E&E)	12	6.4	6.4	65.8
	Food and Beverages	55	29.4	29.4	95.2
	Transportation	9	4.8	4.8	100.0

	Total	187	100.0	100.0	

Table 4.3 above shows the range of 137 respondents as there were only 137 respondents that have business out of 187 respondents that answer the survey. The majority of the respondents were in the food and beverages industry, there were a total of 55 respondents (29.4%), followed by clothing and apparel comprise 19 respondents (10.2%). Furthermore, respondents who are in the beauty and wellness industry contains 16 respondents (8.6%). In the chemical, medical and pharmaceutical contains 13 respondents (7.0%) which also have the same percentage with e-commerce industry that is also 13 respondents (7.0%). There is 12 respondents (6.4%) in the electrical and electronics industry and last but not least is the transportation industry which there were only 9 respondents (4.8%).

4.5.3 Gender

Table 4.6 Gender

(Source: SPSS Output)

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		50	26.7	26.7	26.7
	Female	84	44.9	44.9	71.7
	Male	53	28.3	28.3	100.0
	Total	187	100.0	100.0	

Table above showed the gender of 137 respondents in this research as the remaining of 50 respondents did not have a business and not proceed to the next section. From the table above, it states that only 84 female respondents involved in this research which were found 44.9% of the total respondents. Besides that, there are 53 male respondents involved in this research, which is 28.3%. Hence, the majority of the respondent were female.

4.5.4 Education Level

Table 4.7 Education Level

(Source: SPSS Output)

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		50	26.7	26.7	26.7
	Bachelor Degree	71	37.9	37.4	64.2
	Diploma	41	21.9	20.9	85.0
	Master	5	2.6	2.7	87.7
	Sijil Pelajaran Malaysia (SPM)	16	8.5	7.0	94.7
	STPM	7	3.7	3.7	100.0
	Total	187	100.0	100.0	

As illustrated in Table 4.5, it shows the education level of 137 respondents. The most respondent's education level was Bachelor's Degree holder which is 70 respondents with 37.9% in this research. Then, followed by 41 respondents with 21.9% were Diploma level while 16 respondents with 8.5% were Sijil Pelajaran Malaysia (SPM) education level. There were only 7 respondents from Sijil Tinggi Pelajaran Malaysia (STPM) out of the total 137 respondents that answered the survey, and the remaining 5 respondents were Master holder. The majority of responders have a bachelor's degree in education and are knowledgeable about technology (Syabila, Noris et.al, 2018).

4.5.5 Age

Table 4.8 Age

(Source: SPSS Output)

Age

Frequency	Percent	Valid Percen	Cumulative Percent

				t	
Valid		50	26.7	26.7	26.7
	41 and above	10	5.3	5.3	32.1
	Between 18 to 25 years	101	54.1	52.9	85.0
	Between 26 to 35 years	12	6.4	6.4	92.5
	Between 36 to 40 years	14	7.5	7.5	100.0
	Total	187	100.0	100.0	

Table above shows the range of 137 respondents were from 18 years old until 41 years old and above. The majority of respondents were in the range of 18 to 25 years old, there were total 101 respondents (54.1%), followed by between 36 to 40 years old, which contains 14 respondents (7.5%). In the age range of between 26 to 35 years old, there were 12 respondents (6.4%). Finally, for age 41 and above it consists of 10 respondents (5.3%). Due of their extensive exposure to the usage of advanced technology, the researcher focuses on the majority of the middle management in the SMEs business.

4.5.6 Working Experience

Table 4.9 Working Experience

(Source: SPSS Output)

Working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		50	26.7	26.7	26.7
	1 to 2 years	77	41.3	40.1	66.8
	3 to 5 years	38	20.3	20.3	88.2
	5 years above	22	11.8	11.8	100.0
	Total	187	100.0	100.0	

From the Table 4.8 shows the working experience of SMEs industry's business owner. The majority of the respondents have about 1 to 2 years of experience in working which has 77 respondents (41.3%), followed by 3 to 5 years that consists of 38 respondents (20.3%) and 5 years and above, 22 respondents (11.8%).

Table 4.10 Descriptive Analysis for Independent Variable

Independent Variable

Frequency

Item	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TA 1	Our company capable to provide a wide range of product to quickly respond to market demand by adopting technology.	2 (1.1%)	4 (2.1%)	38 (20.3%)	61 (32.6%)	32 (17.1%)
TA 2	Our company capable to leverage competencies to quickly respond to market demand by adopting technology.	1 (0.5%)	3 (1.6%)	27 (14.4%)	71 (38.0%)	35 (18.7%)
TA 3	Our company will have good responsiveness to expectations of our customers.	1 (0.5&)	2 (1.1%)	26 (13.9%)	65 (34.8%)	43 (23.0%)
TA4	By adopting technology in production process able to meet special customer specification.	0 (0%)	3 (1.6%)	26 (13.9%)	66 (35.3%)	42 (22.5%)
TA5	All departments are involved in learning about technology adoption in our company.	1 (0.5%)	6 (3.2%)	28 (15%)	63 (33.7%)	39 (20.9%)
TA6	Will the technology adoption help your company be more effective?	1 (0.5%)	2 (1.1%)	20 (10.7%)	57 (30.5%)	57 (30.5%)
TA7	Will the technology adoption help your company be more productive?	2 (1.1%)	0 (0%)	17 (9.1%)	58 (31%)	60 (32.1%)
TA8	Will the technology adoption help to save your time?	2 (1.1%)	1 (0.5%)	10 (5.3%)	56 (29.9%)	68 (36.4%)
TA9	Adopting technology in operations is quick.	2 (1.1%)	2 (1.1%)	28 (15%)	52 (27.8%)	53 (28.3%)
TA10	Adopting technology	1 (0.05%)	1 (0.05%)	20 (10.7%)	59 (31.6%)	56 (29.9%)

	achieve good performance in doing operation.					
TA11	Adopting technology in business is useful in the rapid demand from the customers.	1 (0.05%)	2 (1.1%)	18 (9.6%)	60 (32.1%)	56 (29.9%)
TA12	Technology adoption is easy to use in production process in business.	2 (1.1%)	3 (1.6%)	26 (13.9%)	63 (33.7%)	43 (23%)
TA13	It would be easy for company to become skilful in using the technology.	2 (1.1%)	0 (0%)	23 (12.3%)	61 (32.6%)	51 (27.3%)
TA14	Learning to use the technology would be ease for company.	1 (0.05%)	3 (1.6%)	18 (9.6%)	65 (34.8%)	50 (26.7%)
TA15	Adopting the technology in production process would be clear and understandable.	1 (0.05%)	2 (1.1%)	26 (13.9%)	65 (34.8%)	43 (23%)
TA16	Adopting the technology in production process would be clear and understandable.	1 (0.05%)	2 (1.1%)	28 (15%)	61 (32.6%)	45 (24.1%)

Table 4.11 Descriptive Analysis for Dependent Variable

Dependent Variable

Frequency

Item	Statement	Strongly Disagree	Disgree	Neutral	Agree	Strongly Agree
SME1	Did your company haveadequate budget to invest in new technology?	2 (1.1%)	18 (9.6%)	44 (23.5)	50 (26.7%)	23 (12.3%)
SME2	Did your company's lack of resources to develop higher value-added products that will improve the	2 (1.1%)	12 (6.4%)	56 (29.9%)	47 (25.1%)	20 (10.7%)

	competitiveness of the company?					
SME3	Did your company's have difficulty to build up the existing capacity and improved the quality of production?	3 (1.6%)	15 (8%)	47 (25.1%)	51 (27.3%)	21 (11.2%)
SME4	Did your company's frequently implement new research?	1 (0.05%)	16 (8.6%)	47 (25.1%)	51 (27.3%)	22 (11.8%)
SME5	Did your company's face low productivity due to inefficient technology?	2 (1.1%)	13 (7%)	45 (24.1%)	53 (28.3%)	24 (12.8%)
SME6	Did your company frequently utilise new knowledge to design new peoducts?	1 (0.05%)	10 (5.3%)	36 (19.3%)	51 (27.3%)	39 (20.9%)

4.6 Descriptive Statistics

The dependent and independent variables in this study are analysed using the descriptive method of analysis. The variable's mean, median, and multiple were determined using a single centralised trend measure.

Table 4.12 Descriptive Statistic of Independent Variable

(Source: SPSS Output)

Independent Variables	N		Minimum	Maximum	Mean	Std. Deviation
	Valid	Missing				
Responsiveness	137	50	1.40	5.00	3.99	0.64
Usability	137	50	1.00	5.00	4.24	0.67
Perceived Ease Of Use	137	50	1.00	5.00	4.10	0.69

The table above illustrate the descriptive statistical analysis for independent variables. Independent variables from the table above are responsiveness, usability and

perceived ease of use. Among the independent variables, usability has the highest mean, which is 4.24, followed by perceived ease of use 4.10. Usability was the highest mean because majority of the respondents agreed that adopting a technology is easy to use whereby employees are more likely to use it. However, for mean of responsiveness only 3.99. It shows that there are a few respondents concern on this variable.

Besides, standard deviation of perceived ease of use was the highest which is 0.69 followed by usability 0.67 and responsiveness with 0.64 which is the lowest standard deviation among those independent variables. Perceived ease of use obtains the highest standard deviation has demonstrated that the respondents' answers diverged from the average, but the lowest standard deviation for responsiveness indicated that the outcomes were more linear and similar to the average. To sum up, the minimum and maximum value of the responsiveness, usability and perceive ease of use are 1.00 and 5.00 respectively.

4.7 Pearson's Correlation Coefficients Analysis

Researchers utilise a statistical technique to assess the strength of the linear relationship between the dependent and independent variables in this study is Pearson's Correlation Coefficient (r). The Pearson's Correlation Coefficient can be utilised to evaluate the degree of association between the variables derived from data statistics (Saunders et. al, 2016).

Table 4.13 Pearson's Correlation Coefficient
(Source: Saunders et. al, 2016)

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

Table 4.14 Correlation analysis for all variables

(Source: SPSS Output)

Correlation

		RP	UB	PEOU	SME
RP	Pearson Correlation	1	.779**	.725**	.885**
	Sig. (1-tailed)		<.001	<.001	<.001
	N	137	137	137	137
UB	Pearson Correlation	.779**	1	.831**	.908**
	Sig. (1-tailed)	<.001		<.001	<.001
	N	137	137	137	137
PEOU	Pearson Correlation	.725**	.831**	1	.897**
	Sig. (1-tailed)	<.001	<.001		<.001
	N	137	137	137	137
SME	Pearson Correlation	.885**	.908**	.897**	1
	Sig. (1-tailed)	<.001	<.001	<.001	
	N	137	137	137	137

**. Correlation is significant at the 0.01 level (1-tailed).

Table above illustrated the correlations between the independent variables and dependent variables. The independent variables in this research are responsiveness, usability, and perceived ease of use while the dependent variable is technology adoption in SMEs performance. The correlation value for the responsiveness was 0.885 with significant level <0.001 ($p<0.001$). This showed that there was a very strong relationship between responsiveness and technology adoption in SMEs performance. Furthermore, the correlation between usability and technology adoption in SMEs performance was 0.908 with significant level <0.001 ($p<0.001$), this showed that there was a very strong relationship between usability and technology adoption in SMEs performance. Lastly, the correlation between perceived ease of use was 0.897 with significant level <0.001($p<0.01$), this showed that there was a strong relationship between perceived ease of use and technology adoption in SMEs performance.

4.8 Multiple Linear Regression

Multiple regression analysis is used to measure the strength of relationship between independent variables and dependent variables (Saunders 2016). Thus, the objective of this study's multiple regression analysis is to determine the significance of the relationship between the dependent variable (SMEs performance) and the independent variables (responsiveness, usability and perceived ease of use).

Table 4.15 Model Summary of Multiple Regression Analysis

(Source: SPSS Output)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.972[a]	.944	.943	.14196

a. Predictors: (Constant), PEOU, RP, UB

Table above illustrate the model summary that demonstrates the relationship between the independent variables and dependent variable. The value of correlation (R) is 0.972 which mean there was a strong correlation between the variables. Besides, the coefficient of determinant, R square 0.944. This indicates that the technology adoption in SMEs performance were 94.4% affected by responsiveness, usability, and perceived ease of use, while 5.6% was explained by other factors that are not taken into this research.

Table 4.16: ANOVA

(Source: SPSS Output)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.217	3	15.072	747.891	<.001[b]
	Residual	2.680	133	.020		
	Total	47.897	136			

a. Dependent Variable: TA

b. Predictors: (Constant), PEOU, RP, UB

Based on Table above, the result of F-test value was 754.891 wish a significant level <0.001 which is lower than 0.05. Therefore, we can conclude that there is a significant relationship between responsibility, usability, perceived ease of use and technology adoption in SMEs performance. Furthermore, the null hypothesis would be rejected because the significant level of regression model is less than 0.05.

Table 4.17 Coefficient of Multiple Regression Analysis

(Source: SPSS Output)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.112	.083		1.354	.178
	RP	.354	.031	.381	11.346	<.001
	UB	.272	.037	.307	7.392	<.001
	PEOU	.316	.033	.366	9.677	<.001

a. Dependent Variable: TA

Table above indicates that the beta of responsiveness was 0.354, beta of usability is 0.272 and beta perceived ease of use was 0.316 with <0.001 significant levels. According to the Table above, the equation of multiple regressions was

developed as below:

Technology adoption in SMEs performance = 0.112 + 0.354RP + 0.272UB + 0.316PEOU

There were three of the independent variables used to determine the technology adoption in SMEs performance. From the linear equation, there was a positive relationship between responsiveness (RP), usability (UB), perceived ease of use (PEOU) on the technology adoption in SMEs performance. As shown in the table, responsiveness was the most significant which the beta value is 0.381 points. Next, followed by perceived ease of use was the second significant with 0.366 points and usability was the least significant which the beta value is 0.307 points.

4.9 Hypothesis Testing

Table 4.18 Results of Hypothesis Testing

	Hypothesis	Significant Level	Result
H1	Relationship between responsiveness and technology adoption in SME performance	<0.001	Significant relationship (accept)
H2	Relationship between usability and technology adoption in SME performance	<0.001	Significant relationship (accept)
H3	Relationship between perceived ease of use and technology adoption in SME performance	<0.001	Significant relationship (accept)

i. Responsiveness

H1: There is a significant relationship between responsiveness and technology adoption in SMEs performance.

H0: There is no significant relationship between responsiveness and technology adoption in SMEs performance.

Accept H1

Table above indicates the results of regression analysis of responsiveness (independent variable) and technology adoption in SMEs performance (dependent variable). The significant value of independent variables toward dependent variable is <0.001 which is lower than 0.05. Hence, it proves that there is a significant relationship between responsiveness and technology adoption in SMEs in performance. Responsiveness positively impacts their ability to respond to the market. The use of information technology enhances the relationship between dependence on SMEs and market responsiveness (M. Cho et al., 2018). As a result, the alternative hypothesis (H1) is accepted, and the null hypothesis (H0) are rejected.

ii. Usability

H2: There is a significant relationship between usability and technology adoption in SMEs performance.

H0: There is no significant relationship between usability and technology adoption in SMEs performance.

Accept H2

Table above indicates the result of regression analysis of usability (independent variable) and technology adoption in SMEs performance (dependent variable). The significant value of independent variables toward dependent variable is <0.001 which is lower than 0.05. Therefore, it proves that there is a significant relationship between usability and technology adoption in SMEs performance. The results of the study provided empirical evidence that interface usability significantly influences users' assessments of the technology's utility and ease of use, which in turn influences attitudes and intention to utilise it (T. Ramayah et al., 2016). As a result, the alternative hypothesis (H2) is accepted, and the null hypothesis (H0) are rejected.

iii. Perceived Ease of Use

H3: There is a significant relationship between perceived ease of use and technology adoption in SMEs performance.

H0: There is no significant relationship between perceived ease of use and technology adoption in SMEs performance.

Accept H3

Table above indicates the indicates the result of regression analysis of perceived ease of use (independent variable) and technology adoption (dependent variable). The significant value of independent variables toward dependent variable is <0.001 which is lower than 0.05. Hence, it proves that there is a significant relationship between perceived ease of use and technology adoption in SMEs performance. perceived ease of use can increase perceived usefulness and increase comprehension about technology adoption (Barhoumi. 2016). As a result, the alternative hypothesis is accepted, and the null hypothesis (H0) are rejected.

4.10 Summary

In this chapter, the researcher's analysis of the information collected by respondents using questionnaires. Data analysis was conducted by using SPSS software version 29. Analyse method include reliability analysis for pilot test, descriptive analysis, Pearson's Correlation Coefficient analysis, Multiple Regression analysis and ANOVA analysis. The result shows that all the independent variable (responsiveness, usability and perceived ease of use) for this research have significant relationship with dependent variable (technology adoption in SMEs performance). To sum up, the following chapter will be discussed about the explanation of the limitations, results outcome, and recommendations for the overall research.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

The researcher will go through the summary of the research's findings and the general result's conclusion in this chapter. This chapter's first section elaborates on the summary of the findings, while the second half provides an explanation of the research aims and their justification. Additionally, the third section of this chapter includes a discussion of study limitations. Finally, the researcher will write up recommendations for additional research in this chapter's last part. The purpose of this chapter is also to provide SMEs and stakeholders with an informative guide for navigating the constantly shifting technology adoption market in order to maintain competitiveness and long-term growth.

5.2 Summary of the Findings

In this research, researcher used Pearson's Correlation Coefficient analysis to test the relationship between three independent variables and one dependent variable. Responsiveness, usability, and perceived ease of use is the independent variable, while dependent variable was technology adoption in SMEs performance. All independent variables shared a strong relationship towards technology adoption in SMEs performance which the significant level is <0.001.

Through Multiple Regression analysis, researcher able to determine the relationship between independent variables and dependent variable. There were 94.4%

of the dependent variable can be explained by independent variable which are responsiveness, usability and perceived ease of use, while 5.6% was explained by other factors that are not taken into this research. In terms of ANOVA analysis, there is a significant relationship between these variables since the significant level of regression is lower than 0.05.

According to hypothesis testing, there are significant relationship among responsiveness, usability, and perceived ease of use with technology adoption in SMEs performance, the alternative hypothesis (H1, H2, and H3) is accepted.

5.3 Research Implications

5.3.1 Theoretical Implications

This research contributes to existing models such as Technology Acceptance Model (TAM), by including variables like responsiveness, usability, and perceived ease of use which related to the performance of SME. This also enhances the theoretical understanding of technology adoption in a particular context.

This study helps to advance the use of technology in particular industry contexts by focusing on the performance of SMEs in Melaka. This can help to make clear how components like accountability, usability, and perceived ease of use function in the context of SME performance. The results may provide light on the relationships between and relative importance of the factors influencing the intention to continue. This could improve upon existing theories and models on how users respond while adopting new technology.

The study finds a constant correlation between responsiveness, usability, and perceived ease of use. The findings support the widely accepted theory from technology adoption models that responsiveness has a significant impact on company's intention to stick with technology. This demonstrates the ongoing applicability of the Technology Acceptance Model (TAM) and its extensions to business behaviour in the context of SME success.

5.3.2 Practical Implications

The positive effects of responsiveness, usability and perceived ease of use can be leveraged by business owner in the SMEs industry. Findings have practical implications for business initiatives aimed at promoting the use of new technology. Numerous studies on the adoption of innovations have emphasised how important perspectives are (R. Argawal, et al., 2023). Results of this study comes with a suggestion that perception can play a different role in technology adoption for different individuals. Adoption of technology has broad and significant practical implications for many different areas. Embracing new technologies promotes efficiency, productivity, and innovation.

Furthermore, in terms of SMEs automation may help businesses run more smoothly, data analytics can help with decision-making, and digital platforms can help them reach a wider audience. Adoption implications are theories that can be employed in studies to examine and investigate the needs and consequences related to a technology's possible future adoption (Joseph Lindley et al., 2017). By streamlining repetitive activities, automation and artificial intelligence allow employees' time to concentrate on more complex and creative elements of their work. This change improves productivity but also makes workers increasingly in need of a mindset of constant learning because they must adjust to rapidly changing technology environments.

5.4 Limitations of Study

In this research, the major limitations that is faced by researcher is the survey was ignored by respondents although researcher have reminded them two or three times to answer the survey. Other than that, the honesty and time constraints of the respondents are also the limitations that is faced by the researcher. Researcher only has about 3 to 4 months to distribute the questionnaire to the respondents and should finished the report in 3 months. Furthermore, most respondents somehow ignored the questionnaire because they do not want to waste their time to answer which research cannot follow up with them in a specific time, that is why researcher need to remind

them to answer the survey. Finally, some respondents to the survey are not providing a full corporation as they simply checked the appropriate box without carefully reading the questions, this will have an impact on the data's accuracy.

5.5 Recommendation for Future Study

In this research, researcher has examined the factors that facilitate the technology adoption in SMEs performance through a variety of literature reviews, more research in this area is still necessary because there is a lot of SME in Malaysia did not adopt a technology in their business. As a result, the researcher made some recommendations for the next researcher to undertake similar topic in their research.

Firstly, this study can be conducted in different states. The researcher has conducted this study in Melaka; a future study may be conducted in a state that has a lot of industries in it. This is because, a respondent from a different state could have another point of view. Future researchers may potentially choose to focus their studies on states with large populations due to time restrictions. Large-scale population data may produce precise and accurate results.

Next, it is encouraged that future research could use mixed methods, which include both qualitative and quantitative methods to conduct its research. A mixed method interview allows for the collection of detailed information without limiting the respondent's ability to express their own ideas. This is to encourage respondents to participate and provide the researcher with more inputs. Furthermore, the qualitative method will provide more in-depth understanding of the decision-making procedures, difficulties encountered, and achievements of SMEs that have purposefully matched their use of technology with corporate objectives. Throughout the interview, the researcher can go into more information about technology adoption to help the respondent understand more clearly the purpose of this research.

5.6 Concluding Remark

In conclusion, this research is focus on technology adoption in relation to SMEs performance in Melaka. Researcher also aims to investigate the relationship

between technology adoption and responsiveness, usability, and perceived ease of use. Comprehending the influence of these variables on technology adoption is essential to understanding the part SMEs play in streamlining internal business operations. The results of this research have showed that three which are responsiveness, usability and perceived ease of use which indicated in Chapter 2 is accepted, while the willingness of SMEs to adopt the technology has grown with the knowledge. All the three independent variables were significantly positive. In the context of SMEs in Melaka, some of the businesses were preferring to adopt the technology by themselves or through direct purchase from High-Tech Companies.

However, the limitations are existed in this study where the researcher did not have an accurate result as the respondents did not gives a full cooperation in answering the survey. There are also gaps in industry differences, changing of market demand and changing nature of technology. These considerations demonstrate ways that further study might improve methodology, investigate a range of impacts on users, and increase the ability to generalise of results. To a certain extent, businesses are more focused on the usefulness of technology than its complexity, highlighting its relative advantages. It is important for SMEs to adopt technology to adapt to the changing environment of operations, since it will significantly impact current methods. Given that, SMEs must start planning for the future today.

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APPENDICES

APPENDIX A

QUESTIONNAIRES

SECTION A: GENERAL QUESTIONS/ *SEKSYEN A: SOALAN UMUM*

(Answer the following questions to proceed to the next section/
Sila jawab soalan berikutuntuk meneruskan ke bahagian seterusnya)

Q1: What is your business industry sector? / *Apakah sektor industri perniagaan anda?*

_____

Q2: Are you adopting technologies to your business? / *Adakah anda menggunakan teknologiuntuk perniagaan anda?*

_____

SECTION B: RESPONDENT'S BACKGROUND/ *SEKSYEN B: LATAR BELAKANGRESPONDEN*

(Please tick in the box besides options matching your response)
(Sila tandakan kotak selain pilihan yang sepadan dengan respons anda)

Gender/Jantina :

Male/Lelaki ☐

Female/Perempuan ☐

Education Level/*Tahap Pendidikan* :

Sijil Pelajaran Malaysia (SPM) ☐

Diploma/*Diploma* ☐

Bachelor Degree/*Ijazah Sarjana Muda* ☐

Master/*Ijazah Sarjana* ☐

Others/*Lain-Lain*

Please Stated/*Sila Nyatakan* _____

Age/*Umur :*

Between 18 to 25/*Antara 18 ke 25* ☐

Between 26 to 35/*Antara 25 ke 35* ☐

Between 36 to 40/ *Antara 35 ke 40* ☐

41 and above/ *41 dan keatas* ☐

Working experience/*Pengalaman bekerja:*

1-2 years/*1-2 tahun* ☐

3-5 years/*3-5 tahun* ☐

5 years above/*5 tahun keatas* ☐

SECTION C*/SEKSYEN C:*

This section contains 6 questions. Please circle in the relevant column according to the scale below/ *Bahagian ini mengandungi 7 soalan. Sila lingkarkan dalam jadual yang berkaitan mengikut skala di bawah*

1	2	3	4	5
Strongly Disagree/*Sang at Tidak Setuju*	Disagree/*Tidak Setuju*	Less Agree/*Kurang Setuju*	Agree/*Setuju*	Strongly Agree/*Sang at Setuju*

Responsiveness						
No	**Questions**	**1**	**2**	**3**	**4**	**5**
1	Our company capable to provide a wide range of product to quickly respond tomarket demand by adopting technology. *Syarikat kami mampu menyediakan pelbagai jenis produk untuk bertindak balasdengan cepat kepada permintaan pasaran dengan menggunakan teknologi.*	1	2	3	4	5
2	Our company capable to leverage competencies to quickly respond to marketdemand by adopting technology. *Syarikat kami mampu memanfaatkan kecekapan untuk bertindak balas denganpantas kepada permintaan pasaran dengan menggunakan teknologi.*	1	2	3	4	5
3	Our company will have good responsiveness to expectations of our customers. *Syarikat kami akan mempunyai responsif yang baik terhadap jangkaan pelangganka*mi.	1	2	3	4	5
4	By adopting technology in production process able to meet special customerspecification. *Dengan mengguna pakai teknologi dalam proses pengeluaran dapat memenuhi spesifikasi pelanggan yang istimewa.*	1	2	3	4	5
5	All departments are involved in learning about technology adoption in our company.*Semua jabatan terlibat dalam mempelajari tentang penggunaan teknologi di syarikat kami.*	1	2	3	4	5

Usability						
No	**Questions**	**1**	**2**	**3**	**4**	**5**
1	Will the technology adoption help your company be more effective? *Adakah penggunaan teknologi membantu syarikat anda menjadi lebih berkesan?*	1	2	3	4	5
2	Will the technology adoption help your company be more productive? *Adakah penggunaan teknologi membantu syarikat anda menjadi lebih produktif?*	1	2	3	4	5
3	Will the technology adoption help to save your time? *Adakah penggunaan teknologi membantu menjimatkan masa anda?*	1	2	3	4	5
4	Adopting technology in operations is quick. *Mengguna pakai teknologi dalam operasi adalah pantas.*	1	2	3	4	5

5	Adopting technology achieve good performance in doing operation. *Mengguna pakai teknologi mencapai prestasi yang baik dalam melakukan operasi.*	1	2	3	4	5
6	Adopting technology in business is useful in the rapid demand from the customers.*Mengguna pakai teknologi dalam perniagaan adalah berguna dalam permintaan yang pesat daripada pelanggan.*	1	2	3	4	5

Perceived Ease of Use						
No	**Questions**	**1**	**2**	**3**	**4**	**5**
1	Technology adoption is easy to use in production process in business. *Penerapan teknologi mudah digunakan dalam proses pengeluaran dalamperniagaan.*	1	2	3	4	5
2	It would be easy for company to become skilful in using the technology. *Adalah mudah bagi syarikat untuk menjadi mahir dalam menggunakan teknologi*	1	2	3	4	5
3	Learning to use the technology would be ease for company. *Belajar untuk mengendalikan sistem pembungkusan automatik adalah mudah untuksyarikat*.	1	2	3	4	5
4	Adopting the technology in production process would be clear and understandable.*Mengguna pakai teknologi dalam proses pengeluaran adalah jelas dan mudah difahami.*	1	2	3	4	5
5	Workers feel confident in using the technology during the production process. *Pekerja berasa yakin menggunakan teknologi semasa proses pengeluaran.*	1	2	3	4	5

SME Performance						
No	**Quest i ons**	**1**	**2**	**3**	**4**	**5**
1	Did your company have adequate budget to invest in new technology? *Adakah perniagaan anda mempunyai kewangan yang cukup untuk melabur dalamteknologi baharu?*	1	2	3	4	5
2	Did your company's lack of resources to develop higher value-added products thatwill improve the competitiveness of the company? *Adakah syarikat anda kekurangan sumber untuk membangunkan produk nilaitambah yang lebih tinggi yang akan meningkatkan daya saing syarikat?*	1	2	3	4	5
3	Did your company's have difficulty to build up the existing capacity and improvedthe quality of production? *Adakah syarikat anda menghadapi kesukaran untuk membina kapasiti sedia ada danmeningkatkan kualiti pengeluaran?*	1	2	3	4	5
4	Did your company's frequently implement new research? *Adakah syarikat anda kerap melaksanakan penyelidikan baharu?*	1	2	3	4	5
5	Did your company's face low productivity due to inefficient technology? *Adakah syarikat anda menghadapi produktiviti yang rendah disebabkan teknologiyang tidak cekap?*	1	2	3	4	5
6	Did your company frequently utilise new knowledge to design new products? *Adakah syarikat anda sering menggunakan pengetahuan baharu untukreka produk baru?*	1	2	3	4	5

APPENDIX B

TURNITIN REPORT

FYP NURHAZIEYAH AQYLAH

ORIGINALITY REPORT

14%	7%	6%	10%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	pdfs.semanticscholar.org Internet Source	1%
2	Submitted to Universiti Teknologi MARA Student Paper	1%
3	Submitted to Higher Education Commission Pakistan Student Paper	1%
4	Submitted to Coventry University Student Paper	1%
5	Arturo Realyvásquez-Vargas, Francisco Javier Flor-Moltalvo, Julio Blanco-Fernández, Joanna Denisse Sandoval-Quintanilla et al. "Implementation of Production Process Standardization—A Case Study of a Publishing	1%