A STUDY OF UNDERSTANDING SMEs DIGITALIZATION ADOPTION THROUGH T-O-E FRAMEWORK IN MALAYSIA, KLANG VALLEY

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BY

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A research project submitted in partial fulfillment of the requirement for the degree of

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PREFACE

The study is conducted as part of course requirements for the Degree of Business Studies (International Business) programme in Universiti Tunku Abdul Rahman (UTAR).

The objective of this research being conducted is to gain better understanding on the Relationships among TECHNOLOGY, ORGANIZATION, ENVIRONMENT, and SMEs DIGITALIZATION ADOPTION INTENTION in Klang Valley, Malaysia.

In fact, the main concentration of this study is to understand the underlying factors that hinder the digitalization adoption of SMEs in Malaysia. Therefore, several indicators had been assigned to each of the variables mentioned in above. Then, from the relationship between the mentioned factors, this research would test the degree of each variables affect the digitalization adoption.

ABSTRACT

Digital technology is advancing at a phenomenal pace and it's showing no sign of slowing down. Through the various industries and markets, digital technology has helped today's workforce work smarter. Not only are we working smarter as a global workforce, but we're communicating more efficiently and we're becoming more productive in our workflow. Technology has become an influential factor in our everyday lives.

The main purpose of this study is to identify the relationship between TECHNOLOGY, ORGANIZATION, ENVIRONMENT and SMEs DIGITALIZATION ADOPTION in Klang Valley, Malaysia. The three variables are adopted from the T-O-E Framework, created by Tornatzky & Fleischer (1990).

Judgmental sampling was utilized in this study where the researcher chooses the respondents based on the researcher's professional judgement and knowledge. A total of 199 responses were received and analysed. The results of this study revealed that, TECHNOLOGY and ORGANIZATION are positively related towards SMEs digitalization adoption intention. Meanwhile, there is no significant relationship between ENVIRONMENT and SMEs digitalization adoption intention. In addition, the findings of this research also indicated that the digitalization adoption of SMEs is based on the knowledge, innovativeness, and skilful of personnel or management. Environment has minimal effect to the adoption of digitalization among SMEs.

Key words: TECHNOLOGY, ORGANIZATION, ENVIRONMENT, and SMEs DIGITALIZATION ADOPTION

DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is (16230) words.

Name of Student:	Student ID	Signature:
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Date: 26 November 2018

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Next, we would also like to express our gratitude to University Tunku Abdul Rahman (UTAR) by giving us the opportunity to conduct this research project. From this research project, we are able to learn and gain more experience in conducting a research which is useful in future.

Furthermore, we would also like to thanks to all the respondents who had helped us to fill in the questionnaire. During the progress of distribution of questionnaires, the respondents have given their valuable feedback on the defective parts of questionnaire. Besides, we would like to thanks all the respondents who spent their valuable time and effort to filling up the questionnaires. With the help and support from the respondents, we have successfully completed the part of questionnaire.

Lastly, we have to thank among the group members who have been coordinative and cooperative with each other in the whole research project. Once again, we sincere gratitude to those who had direct and indirect assisted us to brings this research study to its completion.

DEDICATION

This work done is especially dedicated to:

Dr. Low Mei Peng

and

To our families and our loved ones,

Thanks for being there when we needed you the most.

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LIST OF ABBREVIATIONS

IV	Independent Variable
DV	Dependent Variable
DAI	Digitalization Adoption Intention
COMP	Compatible
CP	Competitor Pressure
ECK	Employee Capability and Knowledge
Minnova	Management Innovativeness
PC	Perceived Complexity
RA.	Relative Advantages
TMS.	Top Management Support
VS	Vendor Support
PLS-SEM	Partial Least Square-Structural Equation Model
HTMT	Heterotrait-Monotrait Ratio of Correlation

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

The digital technology has begun in 20 centuries and their maximum capacities are being acknowledged in the business world. The digital revolution is driving up for new market opportunities and providing the competitive advantages for the enterprise.

This research aims to understand the factors underlying digitalization adoption intention by Small Medium Enterprise (SMEs) of Malaysia in Klang Valley. T-O-E framework has selected in this research. This influential framework explains how the technological, organizational and environmental contexts influence the adoption of various technologies, it is a multi-perspective organization-level innovation process (Baker,2011).

Researchers tend to figure out how the technology, organization and environment can pose a significant influence to the adoption of digitalization. Additionally, quantitative approach has adopted. The target respondents are the employees of SMEs in Klang Valley.

1.1 Research Background

1.1.1 The Revolution of Digitalization

Digitalization is the most recent technology transformation in the contemporary society and business environment all over the world. Klötzer and Pflaum (2017) defined digitalization as beyond the digitization process which is the process of encoding data or information into digital form, and it emphasized the utilization of information, communication and technology (ICT) by organization, company or society. It is the change of business model by using the digital technologies and provided more revenue and opportunities (Gartner, 2015). Digitalization is the adoption of wide range of digital technologies (Zimmermann, 2016). This megatrend can be described as the use of Cloud, big data, ubiquitous technology, artificial intelligence (Leviäkangas, 2016; Kylasapathy, Hwa, Haris, & Zukki, 2018.). In addition, e-commerce is also the primary categories as part of digitalization (Hagberg, Sundstrom, Egels-Zandén, 2016). Information, communication, and technology (ICT) and internet of thing (IOT) are the tools to reinforce digitalization.

In the 21st century, society are surrounding with Information and Communication Technology (ICT) and it is being implemented and improved by continuous development of technology environment and rapid adoption of technologies for human. The existence of ICT among society is rising due to fierce market competition and complex business transactions, changing trends in human factors and globalization.

ICT can extensively be characterized as advanced installation platform which deliver data and integration of telecommunication with the availability of infrastructures and services (Asabere & Enguah, 2012). ICT

is also called as the digital workshop of information by using any digital objects which connect to Internet such as computer that allow any transaction of information (Chomba, 2017).

As ICT plays a crucial role in allowing companies to achieve operational success (Froehle & Roth, 2009). ICT involved in digitalization of all industries such as rapid moving consumer products (Balocco, Miragliotta, Perego, & Tumino, 2011), healthcare (Gastaldi & Corso, 2012), aerospace (Cantamessa, Montagna, & Neirotti, 2012), education (Khvilon, Evgueni, Patru, & Mariana, n.d.) and inter-freight transportation (Perego, Perotti, & Mangiaracina, 2011).

Technologies which connected with the Internet considered as Internet of Thing, which is commonly called IOT. By IOT, objects able to identify its functions and objectives by transferring data without human to human or computer interaction (Karimi, 2013). IOT is also characterized as accessible network throughout the entire globe of electrical, wireless and instructed objects which allow to data sharing and reorganizing and changing environments adapting (Madakam, 2015).

Our life and home can be much smarter with IOT (Alsaadi & Tubaishat, 2015). IOT has gifted comfortability, safety, eco-energy and convenience of daily routine (Ning & Hu, 2012). IOT will affect our life as there is the usage of Internet enable to access more entities such as vehicles, home appliances and machinery, the IOT is as known as the fourth wave of digitalization (Davidsson, Hajinasab, Holmgren, Jevinger, & Persson, 2016). In this digitalization world, IOT has given huge impacts to us as these physical intelligent objects such as public transports (Davidsson et al., 2016), agriculture machinery (Monitor, 2017), home appliances control (Dhobi & Tevar, 2017) and vehicles (Petrov et al., 2017).

1.1.2 Global Trend of Digitalization

Many enterprises had evolved themselves into the concept of digitalization. For instance, the buzz of industry 4.0 or enterprise 4.0 are surrounding the business environment globally (Reinhard et al., 2016). The concept of industry 4.0 comes from German. The objective of Industry 4.0 is to transform the manufacturing industrial through digitalization and utilization of the new technologies (Rojko, 2017). Trappey, Trappey, Hareesh Govindarajan, Chuang, and Sun (2017) concluded that industry 4.0 are the use of technologies such as internet of thing, cloud computing and big data analytics, cyber physical system, additive manufacturing and robot.

This initiative later lead to logistics 4.0 (Domingo, 2016), and society 4.0 or 5.0 (Keidanren, 2016). Logistic 4.0 emphasized in labor saving by using robot and auto driving machine through evolution of IOT. Society 5.0 was introduced from Japan. Big data accumulated by IOT will be converted by AI into a new type of intelligence and reach every corner of the society. This aimed to increase the comfortable and sustainability of people life, assisting the aging population and build a technology pace society.

In addition, “Made in China” concept was introduced by China in the year of 2015. The main goal of this initiative is to upgrade the China industry in order to keep pace with the German industry 4.0 concept and adapting to the China needs. China wants everything to be ‘made in China’ in the future and become the world superpower industry in 2049 (Wuebbeke, Meissner, Zenglein, Ives, & Conrad, 2016).

1.1.3 Digitalization Trend in Malaysia

According to Kylasapathy et al., (2018), Malaysia's household, government, business and consumer are likely to embrace the digitalization. The internet users are seen to be double to 21 million from year 2005-2016. Usages of mobile cellular subscription double to 44 million; fix broad brand user increased to 3 million (International Telecommunication Union, 2016). Besides, total 83% of the government services are provided through online (MAMPU, 2016).

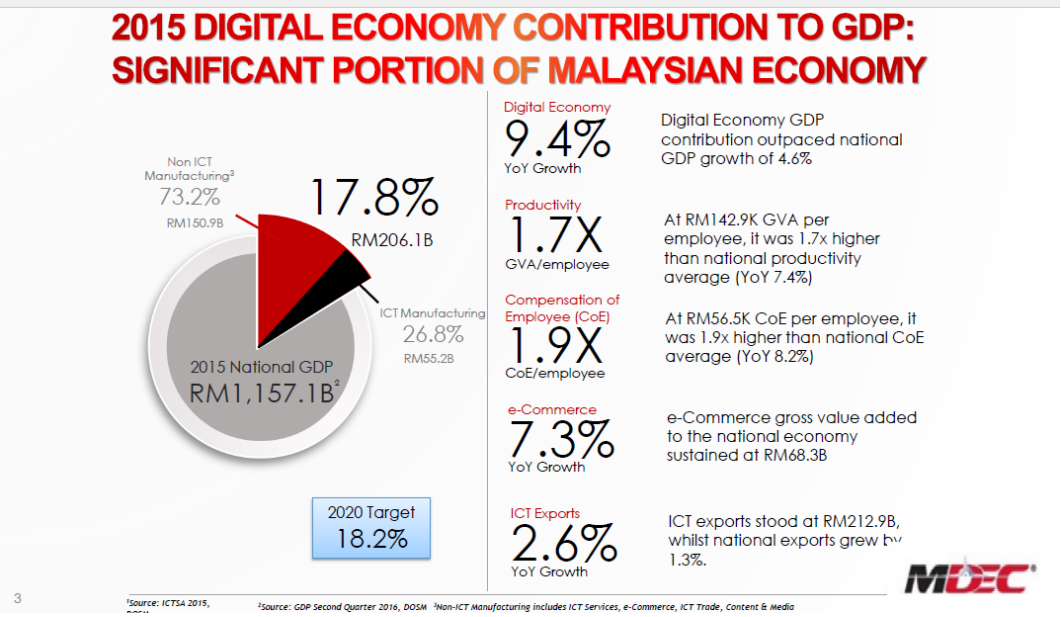
The government had announced the plan called 11th Malaysia plan (Malaysia Productivity Corporation, 2015). This is a holistic plan that focused on the imperative of ICT, improving the digital infrastructure, nurtures high quality ICT talents and building local IT industry. Malaysia government has undergone several initiatives to promote the digitalization to SMEs. One of the most remarkable initiatives is the digital free trade zone. This is the window for SMEs to enter into ASEAN market. SMEs can benefit from partnership with the global big player such as ALIBABA. Four approved Digital hub such as Fintech, Cloud SaaS, Creative/ARVR and sharing platform has been established to foster more start up growth in Malaysia.

According to the report MALAYSIA DIGITAL, ECONOMY, and CORPORATON, (2017), the digital economy of 2015 has contributed significant portion of 17.8 % to the Malaysia economy. As a result, the innovation of digital transformation has slowly pushed the Malaysia firms to form an entirely new business model, move from product centric approach to digital service oriented ones.

Research director of International Data Corporation (IDC) Malaysia stated that Malaysia organization must become digital-native enterprise (Lee, 2018). The enterprise should embrace the new technologies as business benefit become more obvious and clear. Therefore, the new disruptive technologies

nowadays are the key determinant of a firm to strive and success in the future.

Figure 1.1: Malaysia Digital Economy contribution to GDP 2015



Source**:** MALAYSIA DIGITAL, ECONOMY, & CORPORATON. (2017).

1.1.4 SMEs and Digitalization

SME are the major contributors to most industry and countries (Li, Liu, Belitski, Ghobadian, & O'Regan. 2016). DI digital, IVI(MU), and PIN SME, (n.d.) indicated that SMEs are the key driver for the improvement of economy and enhance the job stability. The fast changing environment such as the revamping of advance technology posted a particular challenge to SMEs (DI et al., nd). Empirical evidence showed that SMEs will not achieve competitive advantages unless they adopt the technology properly at the right market (Harvie, 2010; Lip-Sam & Hock-Eam, 2011; Thurasamy, Mohamad, Omar, & Marimuthu, 2009).

Digitalization enhanced the competitiveness of a firm such as increasing the flexibility, market reach, transformed the processes and product in a more effective and efficiency way (Aboelmaged, 2014;Reinhard, Jesper, & Stefan, 2016). For example, the successful story of Uber, Skype, spotify, Whatapss, Netflix, Airbnb and so on. The key success of these companies started from using digital technology to transform their business model (Sharma, 2016). SMEs should not only focus on conventional research and development but to leverage the digital technology to benefit them by transforming their business model (Bouwman, Nikou, Molina-Castillo, & Reuver, 2018).

Currently, 97% company establishment in Malaysia are from SME, they are the players that contribute approximately 36.6% to the country GDP and account for 42% employment rate in Malaysia (Department of Statistics Malaysia, 2017). They heavily depend on repeated sales through satisfying their customer expectation and stay competitive in the market. Therefore, digital technologies are the main driving forces to increase a country's economy.

Figure 1.2 Malaysia SMEs GDP Year 2016

Source: Department of Statistics Malaysia. (2017)

1.2 Problem Statement

World Bank Digital Adoption Index (2016) is benchmarking Malaysia with other countries. The benchmarking measurement utilizes the usage of digital service by business, government and consumer. Unfortunately, the result showed that Malaysia currently is the 'adopter' country (World Bank, 2016). As compared to the 'front-runners' such as United States, Japan, Singapore, South Korea, and Estonia, the economy has still fallen behind them.

In addition, industry 4.0 is the other relevant example that proved Malaysia is not in the pace with digitalization era. Malaysia currently still in the industry 2.0 which are still focusing on labour intensive method (Rubaneswaran, 2017). In the 80s, Malaysia is proud to be part of the Asian tiger with Singapore, Taiwan and Korea. Today, these countries have surpassed Malaysia to become advance technology countries (Rubaneswaran, 2017).

Next, the internet speed in Malaysia ranked 63rd on global internet speed in the latest survey of Akamai Technologies. Malaysia is the slowest mobile internet speed in Asia pacific which falls behind Thailand, Singapore, even India (Kugan 2017). Internet speeds are the most commonly cited obstacles to digitalization (Zimmermann, 2016). Government support is essential for network expansion, especially in those rural industrial areas.

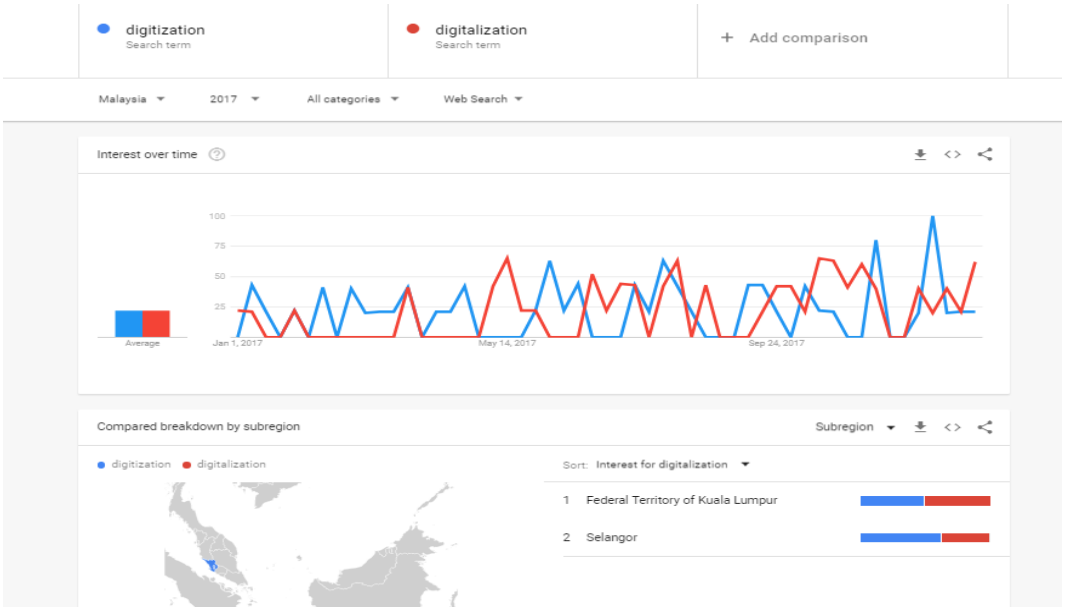
Furthermore, people often misunderstand the meaning between digitization and digitalization (Bloomberg, 2018; Stahl, 2017). They considered themselves as a digitalization company when they are doing the process of digitization. Figure 1.3 showed that digitization still the leading search in Malaysia compares to digitalization. Although the interest in digitalization is increasing, the searching rate is still very low which is not exceeding 100 times in the year of 2017 especially in Selangor. Digitization is the action that converting an analogue information into numerical format (Gartner IT Glossary, 2015). For instance,

convert a physical photo or hand written into digital format. Digitization is much earlier than digitalization, this is the step that happens before industry 4.0.

Upon understanding of the extent of the digitalization in Malaysia, the next logical step is to find out what are the factors that influence the adoption of digitalization in Malaysia. Despite the wide range of benefit that can be enjoyed from adopting the digitalization by SMEs in Malaysia, studies has shown that digitalization adoption such as cloud, big data analytic, AI, and E-commerce are still remains slow in Malaysia (Rubaneswaran, 2017;Kylasapathy et al., 2018; Zainul 2017; MDEC 2017).

Moreover, the factors such as technology, organization and environment affected the adoption of digitalization of SMEs in Malaysia had received less attention. Malaysia and international countries have limited studies regarding how the internal and external environment affected their intention to adopt the digitalization (Kuusisto, 2015).Therefore, this is the reason why T-O-E framework has been selected to discuss and study on how the technology, organization and environment can affect the likelihood of SMEs to adopt digitalization.

Figure 1.3 Google Trend on Digitalization and Digitization in Malaysia



Source: Google Trend 2017

1.3 Research Objectives

1.3.1 General Objective

The main objective of this study is to examine the factor underlying digitalization adoption intention by SMEs through the lens of TOE framework.

1.3.2 Specific Objectives

The specific Objectives of this study are as followed:

RO 1: To determine whether technology influences digitalization adoption intention of SMEs.

RO 2: To determine whether organization influences digitalization adoption intention of SMEs.

RO 3: To determine whether environment influences digitalization adoption intention of SMEs.

1.4 Research Questions

The research questions of this research are:

RQ 1: Does technology affect the digitalization adoption intention of SMEs?

RQ 2: Does organization affect the digitalization adoption intention of SMEs?

RQ 3: Does environment affect the digitalization adoption intention of SMEs?

1.5 Hypotheses of the Study

The hypotheses of this research study include:

H1: Technology has a positive relationship with the digitalization adoption intention of SMEs.

H2: Organization has a positive relationship with the digitalization adoption intention of SMEs.

H3: Environment has a positive relationship with the digitalization adoption intention of SMEs.

1.6 Significance of the Study

Due to the increasing market competition and rapid growth of technology environment in Klang Valley, it is a great opportunity for the researchers to conduct this study. This research findings could provide some insights of current digitalization level and why digitalization in Malaysia still currently stuck in industry 2.0 and in the same time Malaysia is slowly improving towards industry 4.0.

Throughout this research project, it will act a crucial role as "Wake-up call" for Malaysia to fully adopt digitalization in order to increase and motivate country's digital economy. Malaysia must aspire to become a "frontrunner" such United States, Estonia, South Korea, Japan and Singapore on the digital front to fully unlock the digital economic benefits (Kylasapathy et al., 2018). The vast adoption and usage of digitalization in everyday life such as E-commerce, industry, education and health should be promoted and implemented in order to allow Malaysia's digital economy to move from knowledge base economy to competitive knowledge base economy (Jehangir, Dominic, Naseebullah, & Khan, 2011).

Lastly, this research provides the foundation for the further research in understanding digitalization trend in Malaysia which is currently lacking. Researchers have analyzed most researches of digitalization about Malaysia through browsing the internet by using Google Scholar, Emerald Insight, Science Direct and more and visiting UTAR library. Furthermore, researchers have revised through the research project with the assistance of university professor.

1.7 Chapter Layout

The project is organized in total five chapters which each of the chapters filled with various analyses of the study. In the first chapter consists of the background of the study, problem statement and objectives of the study will be stated clearly. In chapter two, theoretical framework and literature review are presented based on the references from past findings and hypotheses developed.

Chapter three displayed research methodology adopted in evaluating the problem statements, follow by solutions on how the problems will be solved and conducted. Inside chapter four, data are retrieved from the research questionnaires which will be resulted and analyzed through tables, diagram and charts.

Lastly, comprehensive conclusion from the findings of the research are being placed in chapter five. In addition, the further implication of the study, findings, limitation and recommendation will be involved.

1.8 Conclusion

This chapter provides an overview of the research project by laying out the research background, research objectives question and significant of study.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In this chapter, past relevant literature review will be studied to understand the interrelationship between the dependent variable and the independent variables of the proposed research model. Secondary data, such as published journals, articles and books are used to support and evaluated this research. A conceptual framework is adopted and presented for the illustration of the research model. The hypotheses are developed after the literature review.

2.1 Literature Review

Shortage of IT skill labours, data protection and privacy, high initial start up investment, operating cost, and internet connect speed are common barrier to the SMEs adoption of digitalization (Zimmermann, 2016). However, removing these obstacles will not sufficient to increase the digitalization adoption progress. Zimmermann (2016) pinpointed that SMEs usually did not aware the advantages and benefit associated with digitalization. SMEs have to realize the potential benefit of digitalization that could bring a drastically change to their company. Digitalization could benefit SMEs in three ways which are internal efficiency, external opportunities, and disruptive change (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017). Internal efficiency is eliminating the manual way, better real time view on operation, integrating data, automation, increased satisfaction of employees and freeing time for the employee to learn new skills. External opportunities are improved response time to market and customer, new way to conduct business, and offer new services and products to customers. Disruptive

change is company able to create a completely new business role caused by digitalization.

2.1.1 Digitalization adoption intention among SMEs

Advance technology has created lot of disruption in our daily lives. Everybody is forced to use and adopt technology. Adoption of innovation or technology studies may occur in individual or organizational level. The adoption of any technologies defines a person or an organization voluntary accepted to use (Khasawneh, 2008; Musawa & Wahab, 2012 ;Mckinnie, 2016). Theories use to understand an individual adoption of technology include: Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis 1989), Theory of Planned Behaviour (TPB)(Ajzen, 1991), Innovation diffusion theory(IDT) (Roger, 1962) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003)

Generally, two main theories are used to analyze the technology adoption process in organizational level which are diffusion of innovation theories (DOI) and technology, organization, and environment framework (TOE). Majority empirical studies referred to "Diffusion of innovation" theory in their review of the literature on technology innovation (HOTI, 2015). This theory was developed by Roger (1995) and has been widely use to facilitate the process of IT adoption (Sahin, 2006). Roger theory is a foundational theory that provided understanding of adoption process. Innovation adoption went through five stages which are knowledge, persuasion, decision, implementation and confirmation (Roger, 1995).

This framework was developed by Tornatzky and Fleischer (1990) and use to identify three aspects that may influence the technology adoption: (1) technology context; (2) organization context; (3) environment context.

Many empirical researches have proven that the TOE is the most extensive use of the innovation adoption theory in organizational level (Hsu, Ray & Li-Hsieh, 2014; Oliveira & Martin, 2011). TOE framework has been used in many studies to explain the various technologies adoption within SMEs. (Shahawai, Hashim, & Idrus, 2014; Chatzoglou & Chatzoudes, 2016; Ramdani, Chevers, & Williams, 2013; HOTI, 2015; Rahayu & Day, 2015).

In this research, TOE approach is adopted because of the nature of the research and the drawback of DOI. TOE framework includes the environment dimension which is not in the discussion of DOI (Zhu, Dong, Xu, & Kraemer, 2006). Alkhater, Walters, and Wills, (2018) indicated that difference countries has the difference aspect of environment and condition that should be take into consideration when SMEs decide to adopt new technology. Moreover, Scupola (2012) also stated that the facilitators of digitalization adoption of organization are external pressure from supplier, customer, or industry, professionalism of the Information system unit such as knowledge of specific system or IT competency, top management support, technologies and external driver such as industry characteristic, supplier, collaboration with software providers and government which are similar to the concept of the TOE. Thus, TOE framework becoming a holistic model that suitable to interpret the technology adoption of a SMEs (Chatzoglou & Chatzoudes, 2016; Hatta, Mikson, Abdullah, Ahmad, Hasim & Maarof, 2015).

2.1.2 Technology Context

SMEs in various industries operate with different procedures where each enterprise has their own information framework (Buonanno, Faverio, Pigni, Ravarini, Sciuto & Tagliavini, 2005). Thus, these required knowledges of the system and, to some extent, which will prompt to technology complexity issues (Shahawai et al., 2014). For instance, ERP adoption is

said to be impacted by ICT usage level (Shiels, McIvor & O'Reilly, 2003) and technological level of transformation (Taylor & Murphy, 2004; Shiels et., 2003). Furthermore, in the technology environment, the characteristics of an innovation also play a critical role in its adoption (Maduku, Mpinganjira, & Duh, 2016). These characteristics signify both the internal and the external advantages of the technology innovation to the firm, which could possibly lead to improved internal processes and productivity (Gu, Cao & Duan, 2012).

Relative advantages is taken as a central indicator to digitalization adoption (Alshamaila, Papagiannidis, & Li, 2012). Innovations that have clear, unambiguous advantage in making strategic effectiveness (for e.g., increase sales) and operational effectiveness (for e.g., decrease operational expenses) has higher impetus for adoption (Greenhalgh, Robert, Macfarlane, Bate & Kyriakidou, 2004). In addition, the managers of SMEs are exceptionally to adopt an innovation if they perceive that its benefits far exceed the risks of its adoption (Gbobakhloo, Arias-Aranda & Benitez-Amando, 2011). For instances, cloud computing can offer numerous advantages which related to capacity, reliability and flexibility (Miller, 2008). Cloud computing able to diminish the cost of entry for SMEs to access a vast pool of computing resources in short time which result in small businesses would have faster time to market with no upfront capital investment (Marston, Li, Bandyopadhyay, Zhang & Ghalsasi, 2011). Cost savings usually referred as the most important, particularly in enterprises like manufacturing where IT is generally consigned to cost efficiencies and business process automation (Mckinnie, 2016). Thus, the adoption choices of most companies are largely motivated by the perceived benefits that the technological innovation may add to the specific organizational setting of the adopting organization (Gu et al., 2012).

Perceived complexity is defined as the degree to which an innovation is perceived to be difficult to understand and use (Vedel, Lapointe, Lussier, Richard, Goudreau, Lalonde & Turcotte, 2012). An IT innovation is less

likely to be adopted if it perceived to be complicated and challenging to use (Alshamaila et al., 2012). For instance, if mobile marketing use is perceived to require considerable learning and effort, it is less likely that SMEs will adopt and make use of mobile marketing platform (Maduku et al., 2016). Adopting a new technology may confront SMEs with obstacles in terms of changing the processes in which they interact with their business system (Alshamaila et al., 2012). New technologies have to be user-friendly and easy to use in order to increase the adoption rate (Sahin, 2006). In addition, some technologies are readily understood by most members of a social system; others are more complicated and will be adopted more slowly (Pardiwala, 2016). Chaudhury and Bharati (2008) concluded that perceived complexity has been found to be a significant factor in the adoption decision. Furthermore in the medical enterprises, the results showed that adoption rates increased when the systems are easy to use, minimal effort required to learn through (Mamatela, 2014).

Compatibility is essential for SMEs. This is particularly important where the new innovation technology should consistent with their existing technology, values, needs and work practices (Alshamaila et al., 2012). Compatibility of an innovation also positively influences the speed of adoption in a society (Amini & Bakri, 2015). Kamal (2006) stated that there is an increasing interest in compatibility, which is focused on achieving a high level of integration of new technologies in developer side. Furthermore, compatibility is an important determinant of innovation adoption (Thiesse, Staake, Schmitt & Fleisch, 2011). For instances, perceptions of e-procurement being compatible with preferred work style, existing work practices, prior experience and values of an organization are likely to result in the organization relying more on e-procurement in the organization's core business process (Hassan, 2013).

2.1.3 Organization Context

Organizational dimension focuses on how organization's characteristics and resources influence their decisions to adopt technology innovation (Shahawai et al., 2014). This dimension has a strong impact on organization to adopt innovation technology (Laukkanen, Sarpola & Hallikainen, 2007). Moreover, organization inertias such as cognitive, behavioral, socio-cognitive, economic and political are the barriers for adopting digitalization in organization (Haag, 2014). Cognitive inertia describes managerial insisted not to change to new system even they know it is better than current one. This is based on the mindset that everything has always been the same way in the past. Socio-cognitive is the culture of organization making technology difficult to implement. Economic inertia refers to the cost of adopting new system. Political inertia indicates the environmental reason such as partners, consumers, and government refused to adopt new innovations (Haag, 2014).

Top management is the potential decision maker in an organization (Premkumar & Roberts ,1999). They are the influential factor, which can promote or inhibit the adoption of a technology (Amini & Bakri, 2015). Top management has an effective role in convincing the employees with their persuasions and motivating their work behavior (Gangwar, Date, & Ramaswamy, 2015). They can demonstrates commitment and continuous support for developing conducive implementation environment for digitalization adoption (Gangwar et al., 2015). To foster innovation adoption within an organization, top management support which connects the role of innovation within the organization's overall strategy, emphasizing the significance of creativity and innovation to subordinates and reward innovative initiative (Maduku et al., 2016). It is also important for building a supportive environment and providing adequate resources and overcoming any resistance to change (Low, Chen & Wu, 2011). For instances, top management that recognizes the advantages of cloud computing will likely allocate the necessary resources for its adoption and

influences the staffs of the association to implement the change (Alshamaila et al., 2012).

Having well-qualified employee with great capability and knowledge to manage and adopt the technological innovation are equally crucial (Maduku et al., 2016). Conversely, inadequate capability and knowledge about technology hinders the usage and implementation of technology adoption (Gunasekaran & Ngai, 2008). Furthermore, lack of qualified internal IT experts has serious repercussions for IT sophistication in companies (Ghobakhloo, Hong, Sabouri & Zulkifli, 2012). For instances, in most businesses, especially those in the SME sector, suffer from a lack of internal IS expects and face the consequent challenge of having to hire external IS consultants at prohibitive cost (Maduku et al., 2016). Organization are more likely to adopt and use a technology when their staffs have the capability and knowledge to the technology (Hassan, 2013). Teo, Lim and Fedric (2007) found that employee's capability and knowledge affected human resources information system adoption. Nevertheless, it is reasonable to assume that higher levels of confidence among employees about their capability and knowledge to cope with the nuances of technology use would be associated with a higher likelihood of SMEs' intention to adopt digitalization.

Management innovativeness propose that companies with high entrepreneurial orientation are willingly embark upon experimentation, support novel ideas and depart from existing practices (Tajudeen, Jaafar, & Ainin, 2018). In addition, it can be related to the openness to follow new paths, and the methods of process data, make decisions and solve issues (Marcati, Guido & Peluso, 2008). Companies that are eager to experiment with new innovations, process and methods will be less averse at trying a new computing model (Mckinnie, 2016). On the firm level, the openness of a firm towards new ideas plays a key role in the adoption of innovations in SMEs (Marcati et al., 2008). This propensity for the acquisition of new ideas and better ways of doing tasks can permeate throughout a firm,

which can lead to greater employee acceptance of new information system (Mckinnie, 2016). For instances, from a change management perspective, technology changes are often met with resistance from staff within a medical enterprise, as the changes may require an alteration in existing organizational processes (Mamatela, 2014).

2.1.4 Environment Context

Environment context encompass its industry, competitor, and presence of technology service providers as well as dealing with government (Tornatzky & Fleischer 1990). This context had further studied and divided into two mechanisms which are the external agents such as government and internal influence. Previous empirical studies have revealed significant influence of environment context on innovation technology adoption (Gangwar, 2014; Simamora, Sarmedy & Kom, 2015; Jamali, Samadi & Gharleghi 2015).

Certainly, strength, weakness, opportunity, and threat (SWOT) of the environment influenced the organization's propensity to become innovate and strategy development (Raymond, 2001). Executing innovation involves dealing and responding to the environment trends (Abell, 1978). Awa and Kalu (2010) also indicated an organization has to constantly monitor, anticipated and assessed the environment changes in their decision process. It is because firm has limited resources and the adjustment of key competencies is challenging. Competitive pressure, external support, and government are considered as having high impact of SMEs adoption of digitalization (Chiu, Chen, & Chen, 2017).

Zhu and Kraemer (2005) defined competitive pressure as the pressure felt by the firm within the industry. Competitive pressure also is an encouragement that drives the organization to constantly consider how to

fully exploit and adopt the information technology in order to maintain high sustainability in the highly competitive digital era (Yeh, Lee, & Pai, 2015). Competitor pressure was found being significant facilitator of the technology innovation adoption (Kuusisto, 2015;Duan, Deng, & Corbitt, 2012). Ramdani et al., (2013) stated that competitive pressure play a vital role in facilitating the digitalization adoption by SMEs. When a firm has sensed that the company is under pressure by its competitor, the firm will start to retaliate by following the competitor strategy. For instance, Wamba (2015) proved that competitive pressure will stimulates the increasing of RFID adoption. When their competitors use RFID that provide competitive advantages, they will feel pressure and follow the pace. As a result, this is the encouragement that motivated organization to stay abreast with their competitors by adopting the innovation technology (Gonçalves, Nascimento, Bouzada, & Pitassi, 2016). Therefore, more intense competition will lead to more adoption of innovation technology by firms (Oliveira & Martins, 2010).

The availability vendor support is positively influencing the relationship between SMEs and innovation adoption (Ashamala et., 2013). This is explained by Wamba, (2015) which the adequate external support drive organization willingness to invest even they have no internal expertise to handle it. The adopter and prospect respondents in Alshamala et al., (2013) research emphasized that the supplier effort in promoting, marketing, and the sufficient support is paramount and it will likely expedite their decision making toward the innovation technology adoption. Aside from technical support and marketing, external support such as seminar, training, and guidance will reinforced the adopter and prospect group adoption decision making process (Alshamaila et al., 2013). Important activities as mentioned above able to increase the diffusion of technology adoption and reduce perceived risk of SMEs and lead to adoption of innovation technology (Frambach & Schillewaert, 2002). Thus, comprehensive understanding of innovation technology by adopters will stimulate them to adopt digitalization.

However, Ramdani et. al., (2013) found out that external support is not significantly influencing the adoption of innovation technology because they perceive external support is one of the ongoing expenses to them. Different industries and different sectors have their own ICT policy as there is no 'one size fits all'. The higher capability and knowledge of employees in using the particular technology, the lower the external support needed (Maduku et al., 2016). This could ease the digitalization adoption.

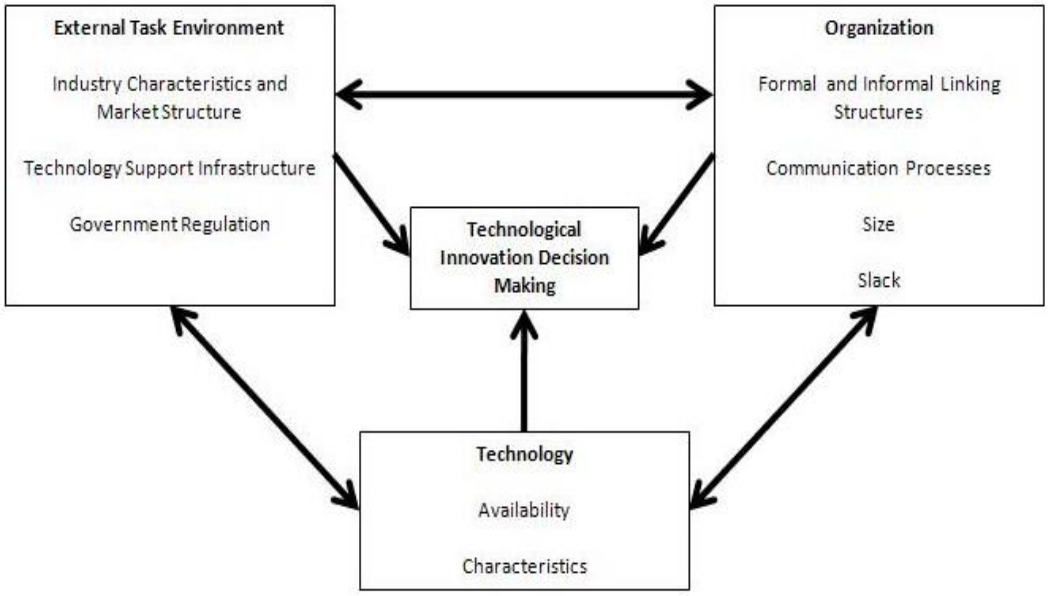
Governments around the globe are encouraging SMEs toward digital company through funding programme because SMEs are the pillar of every modern economy (Chatzoglou & Chatzoudes, 2016). A government support could be in term of subsidies, procurement, or acting as a trusted third party (Papazafeiropoulou & Pouloudi, 2000). As commonly admitted, SMEs has limited financial and IT resources, support from government policies can protect the parties involved and give them more secure, as well as provide incentive to SMEs (Zimmermann, 2016; Abdollahzadehgan, Che Hussin, Gohary, & Amini, 2013). Dahnil, Marzuki, Langgat and Fabeil (2014) emphasized that government policies, attitude, and initiative have the strongest influence to the adoption of innovative technology by SMEs. Therefore, government plays a crucial role by granting some financial support for SMEs to assist them in the process of digitalization (Clarysse, Wright, Bruneel & Mahajan, 2014).

2.2 Review of Relevant Theoretical Models

The Technology-Organization-Environment (TOE) model was introduced by Tornatzky and Fleischer (1990). The author proposed three dimensions that will influence enterprise to adopt new information technology, which are technology, organization, and environment. The technology context included both internal and external technology that will assist the company in improving the organizational

productivity. The organizational context is defined in term of firm size, managerial structure, quality, characteristics of firm, and financial resource. Environment context, which relate to firm industry, dealing with business partner, competitor and government support. The wide scopes of TOE model able to explain how SMEs adopt the digitalization (Yeh et al., 2015).

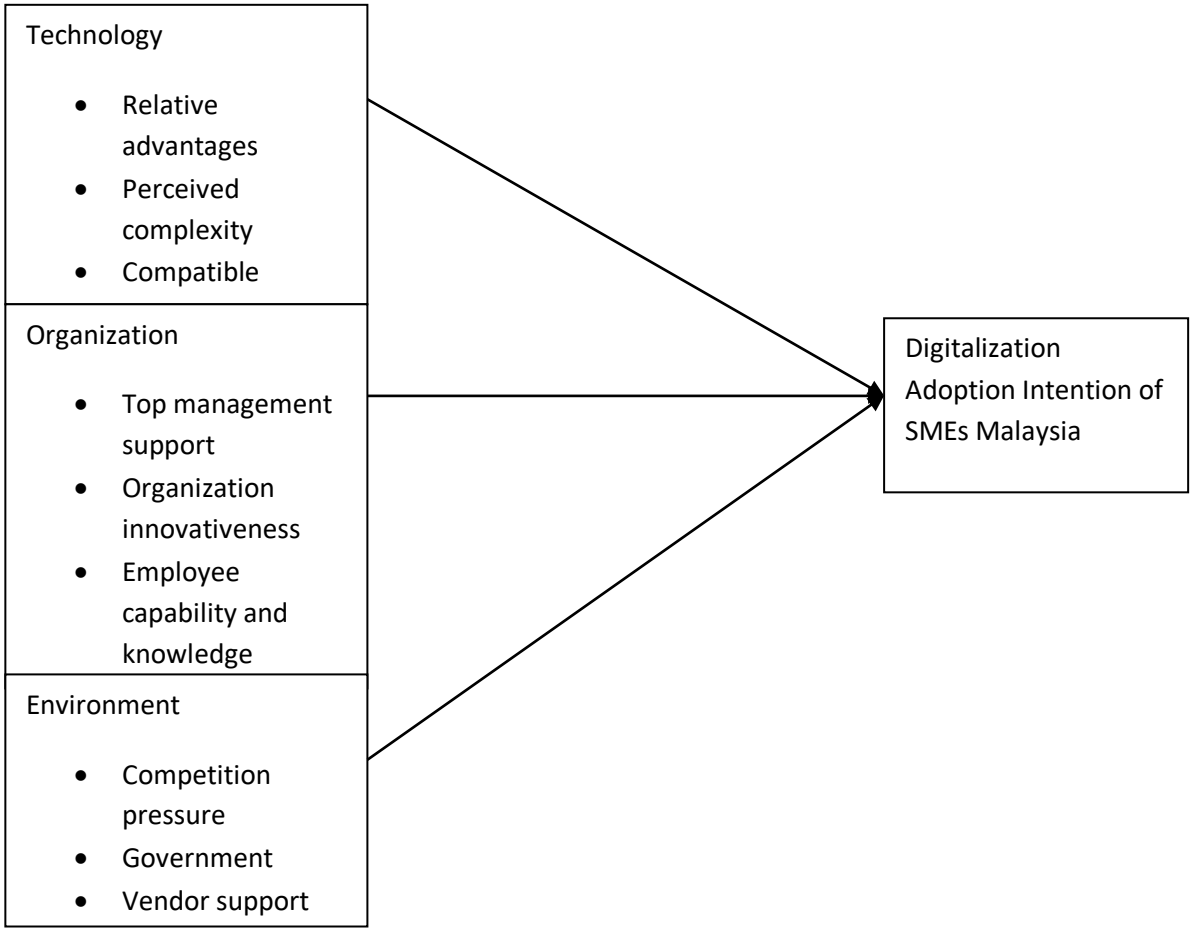
Figure 2.1 T-O-E Framework



Source: Tornatzky and Fleischer (1990)

2.3 Proposed Research Framework

Figure 2.2 Research Framework



Adapted from: Developed from the research

The framework show in figure 2.2 is adopted to guide the research project. Three independent variables which are technology, organization, and environment together with three measurements of each variable will significantly affect the dependent variable which is the digitalization adoption intention of SMEs Malaysia. The next section will further explain the relationship between the dependent and independent variables.

2.4 Hypotheses Development

2.4.1 Technology Context

Based on TOE model, the adoption of digitalization are motivated by the characteristic of technologies. Many empirical studies have proved that technology context has the significant influence of technologies adoption among SMEs. In the findings of Maduku, Mpinganjira, and Duh, (2016); Amini and Bakri, (2015), the results revealed that is a positive relationship between relative advantage and adoption intention. SMEs are more eager to adopt when they see opportunity to increase efficiencies of their entire business operations (Maduku et al., 2016). Moreover, Alshamaila et. al. (2013) found that relative advantages, compatibility and complexity have significant impact of the cloud adoption process.

The studies of Alshamaila, Papagiannidis, and Li (2012); Amini and Bakri (2015) ;Wang, Wang and Yang (2010) further concluded that compatibility of technology constitutes a facilitator for adoption. In addition, Zhu et al.,(2006) conducted a survey of companies in multiple industries from several European countries revealed that compatibility with business processes and values was a stronger driver in explaining the extent of e-business use.

H1: There is a positive relationship between technology and digitalization adoption intention of SMEs.

2.4.2 Organization Context

Organizational context in the TOE model focuses on the how characteristic of organizational influence the digitalization adoption. According to studies of Alshamaila et al., (2012):Ramayah, Ling, Taghizadeh and Rahman, (2016); Maduku et al., (2016); Amini and Bakri, (2015), they found that there is significant positive relationships among the top management support and adoption. The result show that the levels of adoption are higher when there is support at the top management (Amini et al., 2015).

Next, in the studies of Hassan, (2013) and Maduku et al., (2016) show that employee capability and knowledge are an important driver of intention to adopt digitalization among SMEs and have significant positive relationships with digitalization adoption. With the employee capability and knowledge of the advantages and the use of the system, employees will urge or lure their top management in developing a positive intention towards the adoption (Maduku et al., 2016).

H2: There is a positive relationship between organization and digitalization adoption intention of SMEs.

2.4.3 Environment Context

In TOE perspective, environment context is the external area in which the organization conducts its business that will influence an organization to adopt digitalization. In many cases, the competitor pressure has pushed the firm to adopt technology innovation. This is a retaliatory move with endless circle that will facilitate the innovation technology adoption. Thus, high competitive region will drive SMEs to adopt digitalization faster (Chiu et al., 2017).

Besides, Government initiatives influenced the SMEs operation in Malaysia (Shahawai et. al., 2014). Government attidude is considered as one of the pivotal factors influencing the digitalization adoption among SMEs. Dahnil, Marzuki, Langgat and Fabeil (2014) pointed out that government policies and initiatives will determined the adoption of digitalization by SMEs. Lee, Hwang, Kang, & Yoon (2014) also showed that government support is one of the crucial tools to drive the adoption of cloud, which is part of the digitalization technology.

Vendor effort in promoting the digital software or any kind of innovation technology will boost the digitalization adoption by SMEs (Wamba, 2015). Sufficient of training, marketing, promoting, technology support and guidance is a reinforcement of digitalization adoption (Weigelt & Sarkar, 2009). However, vendor support will not influence the digitalization adoption if the employees within the organization deem to have the knowledge and skill to use this technology (Maduku et al., 2016).

H3: There is a positive relationship between the environment and digitalization adoption intention of SMEs.

2.5 Conclusion

Chapter two outlines the literature reviews, proposed research framework, and TOE model that is adopted to support the core framework. Moreover, the research framework is developed in this chapter to examine the relationship between the variables. In addition, hypotheses are formed based on the extensive literature review. The proceeding chapter, Chapter 3 discusses research methodology used to carry out this research.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter outlines the of research design, data collection method, sampling design, research instrument and construct measurement as well as data and statistical analysis. This information guided the researchers throughout the research process.

3.1 Research Design

Research design is a holistic plan that specified the approach and procedures to collect and analyzing the needed information (Zikmund, Babin, Carr & Griffin, 2013). It is a system that customized to look for answers to research questions.

3.1.1 Descriptive Study

Descriptive research is adopted in this research. It is used to describe characteristics of a population or phenomenon being studied through interview, observation or structured questionnaire (Hair, Wolfinbarger, Money, 2011). Standardized general questions and measurement scales are used to test the relationship of technology, organization, and environment toward digitalization adoption of SMEs in this study.

3.1.2 Quantitative Research

This research is conducted by using quantitative methods. It is a method that emphasized in objective measurements, statistical analysis, computational method and traditional mathematical of data collected through questionnaires or survey (Zikmund, Babin, Carr, & Griffin, 2013). The goal of quantitative method is to collect the new data in accordance to the problem from large populations and conduct analysis of the data through hypothesis and theories relating to the study.

Furthermore, self-administered survey is utilized to collect the quantitative data in this research. Respondents are required to fill up the answer without the assistance of researchers (Zikmund, Babin, Carr, & Griffin, 2013). This method boosts up the response rate as the respondent's identity would kept anonymous.

3.1.3 Casual Study

This research is a casual research. Casual research investigates the relationship of causes and effect into the research (Zikmund, Babin, Carr & Griffin, 2013). This method uses to study the end result relationship between independent variables and dependent variable. Therefore, the aim of the study focused on investigating how technology, organization, and environment could influence digitalization adoption intention of SMEs.

3.2 Data Collection

3.2.1 Primary Data

Primary data is collected to address the problem in question specifically and it is conducted by a university, researcher or even marketing firm. Primary data cannot be found elsewhere but can be collected through surveys, focus group, in-depth interview or experiment (Curtis, 2008). Therefore, primary data provided high relevance data to the nature of research topic. Structured questionnaires, in Google form, would be distributed to target respondents to collect primary data. Total 500 set of questionnaire was distributed to 200 SMEs in this research study.

3.2.2 Secondary Data

Secondary data referred to data gather and collect from sources that already exist such as journal article, report, textbook, government publication and other reliable online sources. Relevant sources have been applied by researchers rigorously as not all the secondary data will match the current research. Most of the secondary used in this research is from a journal article, eBook, Science Direct, Google Scholar, Utar database, Emerald Insight and Research Gate.

3.3 Sampling Design

Sampling design is used to estimate the characteristics of the whole population from a subset of a statistical population. Sekaran and Bougie (2013) proposed that

sampling design is the process of choosing sufficient numbers of prospects elements of the population, so that researchers are able to form a good sample and conclusions based on the selected prospects. This process consists of identifying the target population, sample frame and location, sample technique and sample size.

3.3.1 Target Population

Target population is defined as group of people or items which researchers intend to inference and understand their characteristic (Rahi, 2017). Sekaran et al (2013) proposed that target population can be categorized in term of element, geographical boundaries, and time. The target population in this research is any employees of SMEs in Klang Valley, Malaysia who can represent their company.

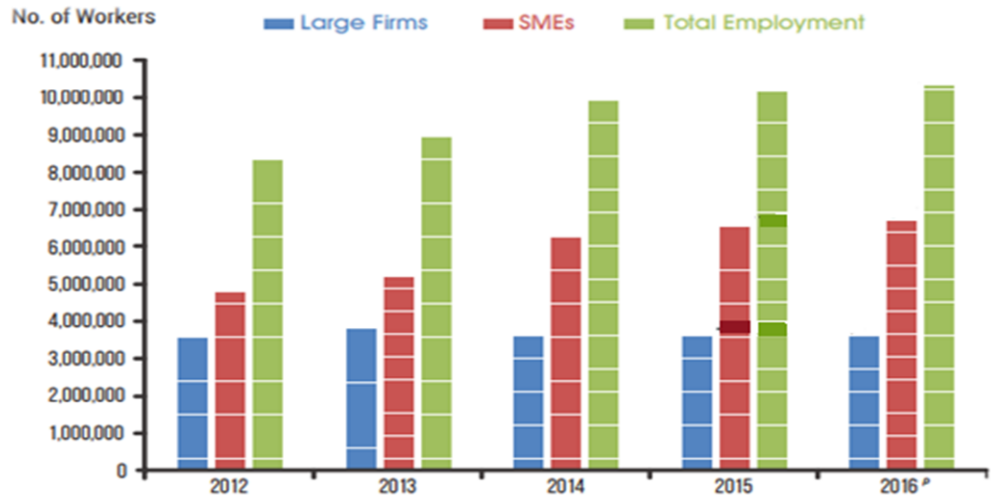
In Malaysia, SMEs are defined based on two criteria such as sales turnover or number of full time employees. Table 3.1 show the definition of SMEs in Malaysia. Therefore, only those companies fulfill the number of employees criteria will be selected in this research study. Next, Figure 3.1 shows the increasing of SMEs establishment that lead to increase of total employment.

Table 3.1 Definition of SME Malaysia

Category	Manufacturing	Service and other sector
Micro	Sales turnover not exceeding RM300,000 or full time employees not exceeding 5	
Small	Sales turnover not exceeding RM 15 million or full time employees not exceeding 75	Sales turnover from not exceeding RM 3 million or full time employees not exceeding 30
Medium	Sales turnover not exceeding RM50 million or full time employees not exceeding 200	Sales turnover not exceeding Rm20 million or full time employees not exceeding 75

Source**:** SME Corporation, Malaysia. (2015). SME Developments and Outlook. *SME Annual Report 2014/2015*, 19–37.

Figure 3.1 Population of SMEs employment, 2012-2016 Malaysia

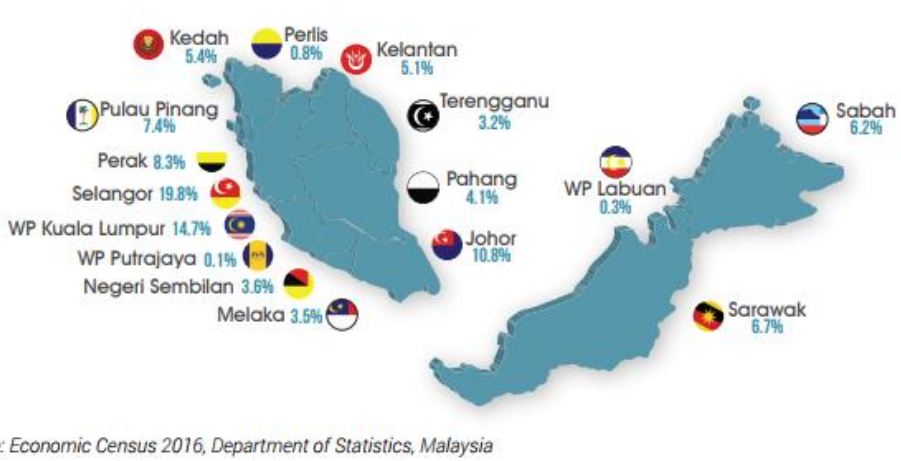


Source: SME Corporation Malaysia. (2015). SME Developments and Outlook. *SME Annual Report 2014/2015*, 19–37.

3.3.2 Sampling Frame and Sampling Location

There is no sampling frame for this research due to the non probability sampling technique has been selected. The sampling location of this research is specified for the area of Klang Valley, which having the highest number of SMEs establishments.

Figure 3.2: SMEs Rate in Malaysia



Source: Economic Census 2016, Department of Statistic, Malaysia, 2017. (2017).

3.3.3 Sampling Elements

The sampling elements of this research are 500 employees who are working in different SMEs, Klang Valley and they are able to represent the company. Researchers would deliberately pick any employees who are relevant to the purpose of studies.

3.3.4 Sampling Technique

Sampling technique divided into two categories which are probability or non probability (Sekaran & Bougie, 2010). Non probability sampling has been utilized by researchers in this research due to the nature of this study where the population of respondents is difficult to obtain. It is a sampling approach in which the probability of each unit to be selected is not confirmed (Rahi, 2017). This technique built on the useful sample that provided helpful opinions and views for the researchers to apply into the study.

3.3.4.1 Judgement Sampling

Judgement sampling is a process that researchers use their own professional judgement and knowledge to select a prospect target respondents who knew the problems (Sekaran & Bougie, 2010;Rahi, 2017). It is also known as purposive sampling because of the involvement of particular purpose (Rahi, 2017). The rationale of judgement sampling in this research is the researchers know a group of prospect and potential respondents that can provide useful and appropriate data for this study.

3.3.5 Sample Size

Sample size has to be carefully selected as it will affect the statistical techniques (Rahi, 2017). The most appropriate sample size suggested will be more than 30 respondents and less 300 respondents (Sekaran et.al., 2003). Total 500 sets of questionnaires were being distributed to the target population who are working in SMEs in Klang Valley.

3.4 Research Instrument

Research instrument is the tool such as questionnaire, test, interview and observation to collect data on the interested research topic by researchers (Zohrabi, 2013). Self completion questionnaire has been used as a research instrument to collect data in this research. The respondent is required to complete the survey by themselves (Zikmund & Babin, 2010). It can help to reduce the prejudice and bias of both respondent and researcher (Bryman, 2012).

Table 3.2 : Content of the Questionnaire

Section	**Information**	**Items**	**Adopted from:**
A	General Information	11	Self-developed
B	Digitalization Adoption Intention	4	Mishra, Akman, andMishra (2014)
	Technology		
	-Relative Advantages	5	Ghobakhloo, Arias-Aranda, and Benitez-Amado (2011); Lian, Yen and Wang (2014)
	-Perceived Complexity	5	Ghobakhloo et al. (2011); Lian et al. (2014)
	-Compatible	5	Hassan (2013)
	Organization		
	-Top Management Support	5	Borgman et.al. (2014); Lian et al. (2014)
	-Employee Capability and Knowledge	5	Lin and Ho (2011)
	-Management Innovativeness	5	Mamatela (2014), Venkatesh & Bala (2012)
	Environment		
	-Competitive Pressure	5	Ifinedo (2011);Ghobakhloo,Arias-Aranda, andBenitez-Amado (2011), Wang, Li, Li, & Zhang (2016)

	-Government	5	Azam, (2015),Mamatela (2015)
	-Vendor Support	4	Wamba (2015)

Source: Developed for the research

3.4.1 Questionnaire Design

Questionnaire must be designed in a way of unambiguous, valid, and reliable (Richards & Schmidt, 2002). The questionnaire of this research is designed in closed-ended or structured question. Close-ended questionnaire provide researcher with quantitative data that are easy to analysis (Zohrabi, 2013). Moreover, it allowes the respondent to answer the question more quickly and effectively (Sekaran et.al., 2003).

In this study, the researchers prepared a set of structured questionnaire. The questionnaire is designed in simple English in order to ensure the respondent fully understands the meaning of the questions. Misleading and sensitive questions are avoided. All the data collected is highly confidential and will be used exclusively for educational research purpose. The questionnaire has been separated into two sections which are section A and section B.

Section A consist of some general information from respondents such as to what extent respondent understands about digitization, what is the company ownership, size of their company, what digital software or technology the company currently using, working job position so on and so forth as stated in questionnaire.

While section B is designed in Likert Response Scale. Respondents can indicate their level of agreement or disagreement on an interval scale

based on their opinion and satisfaction. Seven point likert scale has been adopted with 1 to 7 indicators ranging from strongly disagree, disagree, somewhat disagree, undecided, somewhat agree, agree, and strongly agree. Respondents are required to tick one of the options out of the seven. A total of 48 questions are established to all the independent variables and dependent variables in this section.

3.4.2 Survey Method

Researchers will distribute the questionnaire to 500 target respondents through various medias such as email, Whatsapps and Facebook and physically visit to the company located in Klang Valley by asking the respondents to answer the question either through their smart phone or hardcopies prepared by researchers. The timeline of constructing the questionnaire was between Week 3 to Week 14 of Year 3 Trimester 2 in June 2018. A pre-testing questionnaire was conducted before proceed to the actual data collection in order to ensure the validity of the questionnaire.

3.4.3 Pre Testing

Pilot test is defined as small studies that test the research protocols of a larger study (Resnick, 2015). It helps to identify the reliability, accuracy, and feasibility of the question and mitigated the risk of failure in the research project (Fraser, Fahlman, Arscott, & Guillot, 2018). The draft of the questionnaire was checked by experts. After that, 10 questionnaires were distributed to 10 employees who are working in SMEs to test the content and understandability of the questionnaire. Hence, the reliability of the questionnaire remains at acceptable level.

3.5 Construct Measurement

Nominal scale is a categorical data that allows researchers to measure the subjects which belong to certain categories or group (Sekaran, 2003). Sections A of the questionnaire are designed in categorical data.

Section B of the questionnaire measures in Interval scale which also known as Likert scale, where the respondents are required to provide the answers according to the seven point likert scale number ranging from "1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Undecided, 5=Somewhat agree, 6=Agree, 7=Strongly agree". 7 category response scales provide measurement of direction and neutrality as well as three level of attitude intensity to disagree and agree (Alwin, 2013). Thus, this scale provided more information.

3.6 Data Processing

3.6.1 Questionnaire Checking

The researchers perform a manual check on the questionnaire rigorously to make sure all the questions are completely answered by the respondents. It is to ensure that all the questionnaires being collected are correctly filled up because missing data may cause the inaccuracy of the process result.

3.6.2 Data Editing

Data editing is the process of inspecting and checking the information gathered in questionnaires to correct the errors and omissions (Zikmund et al, 2010). Besides, editing, is to ensure the data collected are consistent and complete. Therefore, scrutiny action will be taken by researchers such as adjusting the errors to improve the better quality of the research project.

3.6.3 Data Coding

Data coding is allocating symbols or number to the categories of questionnaire to enhance the ease of converting the responses into database (Sekaran & Bougie, 2003). Coding is use to represent the meaning of the data such as the measurement scale has been utilized to measure the variables in this research instrument instead of using a lengthy alphabetical depiction. Section B comprised 3 independent variables with 4 to 5 measurements of each variable and a dependent variable, with coding of "1" as strongly disagree, "2" as disagree, "3" as somewhat disagree, "4" as undecided, "5" as somewhat agree, "6" as agree, "7" as strongly agree.

3.7 Data Analysis

3.7.1 Partial Least Square Structural Equation Model (PLS-SEM)

Structural Equation Model (SEM) as a second generation techniques, has received much attention in research field. SEM allows the simultaneous modeling of relationships among independent and dependent variable

which cannot be done by regression based approach (Gefen, Straub, & Boudreau, 2000).

Two approaches which are covariance-based (CBSEM) and variance-based (VBSEM) are use to estimate the parameter of SEM. PLS is suitable in this research because this approach can measure as many as indicators per latent variable (Haenlein & Kaplan 2004). In contrast, excessively large number indicator per latent variable will limit the CBSEM. Moreover, PLS required least sample size whereas CBSEM is advisable to exceed 100 sample. PLS consists of measurement model and structural model.

Researchers used SmartPLS to analyze the data. This program is mainly customized for PLS path models (Monecke & Leisch, 2012). The indicators would be assigned to the latent variables and a basic model of the latent variable will be drawn (Hair, Hult, Ringle, & Sarstedt, 2013).

3.7.2 Descriptive Analysis

Descriptive analysis is used to depict and summarize a particular set of measurement (Laerd Statistics, 2013). It also uses to explain the data in a meaningful way. Descriptive analysis will test the data that are collected from the respondents (Sekaran, & Bougie, 2003). Information collected from section A will be translated into frequencies and percentages with graph and chart. Next, central tendencies measurement will apply in section B.

3.7.3 Scale Measurement

3.7.3.1 Reliability Test

Reliability analysis is a crucial indicator to measure the internal consistency in this research. The degree of stability and consistency between multiple measurements of variable is reflected by the level of reliability (Sekaran, 2013). Reliability test is utilized in the section B of the questionnaire through measurement model. The model of this research has both reflective and formative construct, which have different procedures to measure the reliability test. Indicator reliability and internal consistency reliability will determine as an assessment of the reflective construct (Hair, Ringle & Sarstedt, 2011).

Table 3.3 Reliability Test

Validity Type	Criterion	Description
Internal consistency reliability	Composite Reliability	Should be above 0.7 (Hair et al., 2011)
Indicator reliability	Indicator Loading	Should be at least 0.6 and ideally higher than 0.7 (Henseler, Ringle and Sinkovics, 2009)

Source: Developed for the research

3.7.4 Inferential Analysis

The inferential analysis is conducted to measure whether the independent variables have the relationship with the dependent variable that is consistent with the hypothesis development in this study.

Hierarchical component model has adopted in this research. The second order factor will be measured by the all the first order variables which are observable (Chin, 1997). This approach best suit for this research because the lower order construct of this study has the similar number of indicators (Ringle, Sarstedt, and Straub, 2012). Next, the second order constructs of this study have a formative measurement, whereas the first order construct has a reflective measurement (Becker, Klein, & Wetzels,2012). As in the context of TOE model, technology, organization and environment are the second older construct, where relative advantages, perceived complexity, compatible and so on are the first order constructs which consist of multiple indicators.

Hair, Hult, Ringle and Sarstedt (2013) indicated that the structural model is theory based that concentrated on the research questions as well as the research hypotheses. The structural model and the demonstrated connections among the latent variables are viewed as separate from the measurement demonstrate.

The analysis of PLS encompass two phases. In phase one, researchers has to specific the type of measurement model into formative, reflective or both to be investigated. Determining whether the construct is falling under formative or reflective is crucial because misapplication will lead to a false assessment of the relationship in the PLS model (Diamantopoulos, Riefler, & Roth, 2008). With the condition that measurement model assessment provides satisfactory outcome, the researchers proceed to phase 2 which are appraising the structural model.

3.8 Conclusion

Chapter 3 provides an overview of the research methodology used for the research study. Analysis and interpreting of data will be conduct and explain in detail in the following chapter 4.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Data was collected based on the main objective of the research which is to identify the relationship between digitalization adoption, technology, organization, and environment of SMEs Malaysia. Afterward, the data was analyzed by using Smart PLS. The results generated by PLS were then presented in this chapter.

Frequency tables and figures are used to present the descriptive analysis. The inferential analysis is explained based on the measurement and structural models that generated from SmartPLS.

4.1 Descriptive Analysis

Descriptive analysis was exploited to establish the frequency and percentage of all the responses collected from the respondents. Total 500 questionnaires sent out to respondents. Total 199 responses has collected and interpreted in this section by using frequency table, pie charts and bar charts.

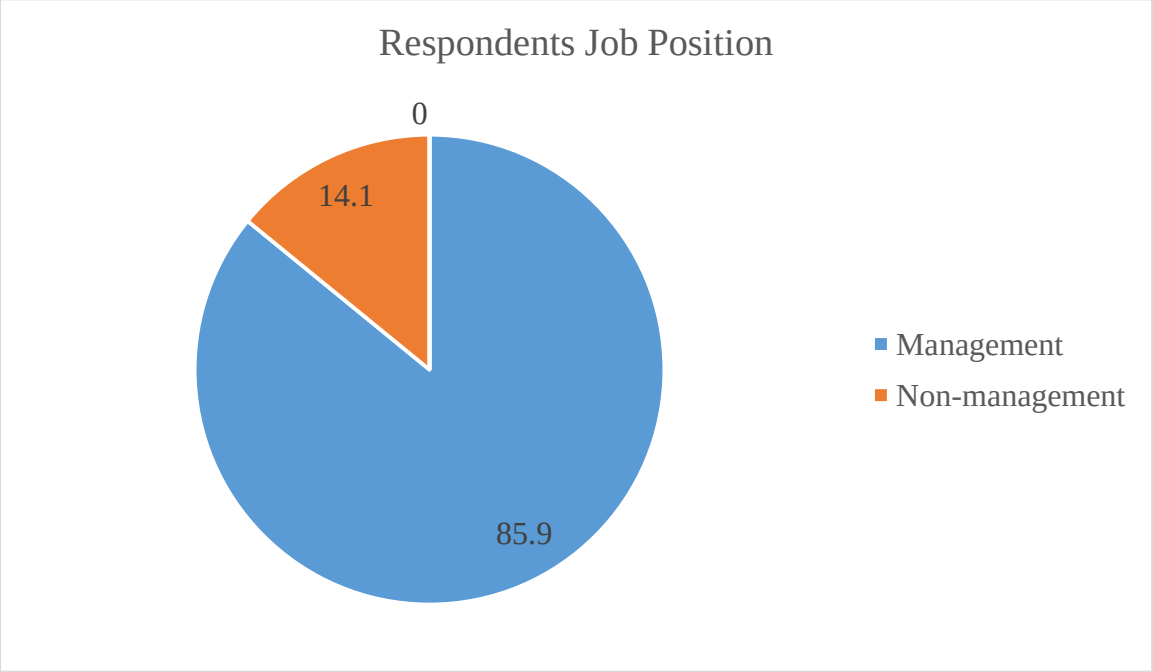
4.1.1 Current Job Position

Table 4.1: Statistic of Respondents' Current Job Position

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Management	171	85.9	85.9	85.9

Non-management	28	14.1	14.1	14.1
Total	199	100	100	

Figure 4.1: Percentage of Respondent Based on Current Job Position



Source: Developed from the research

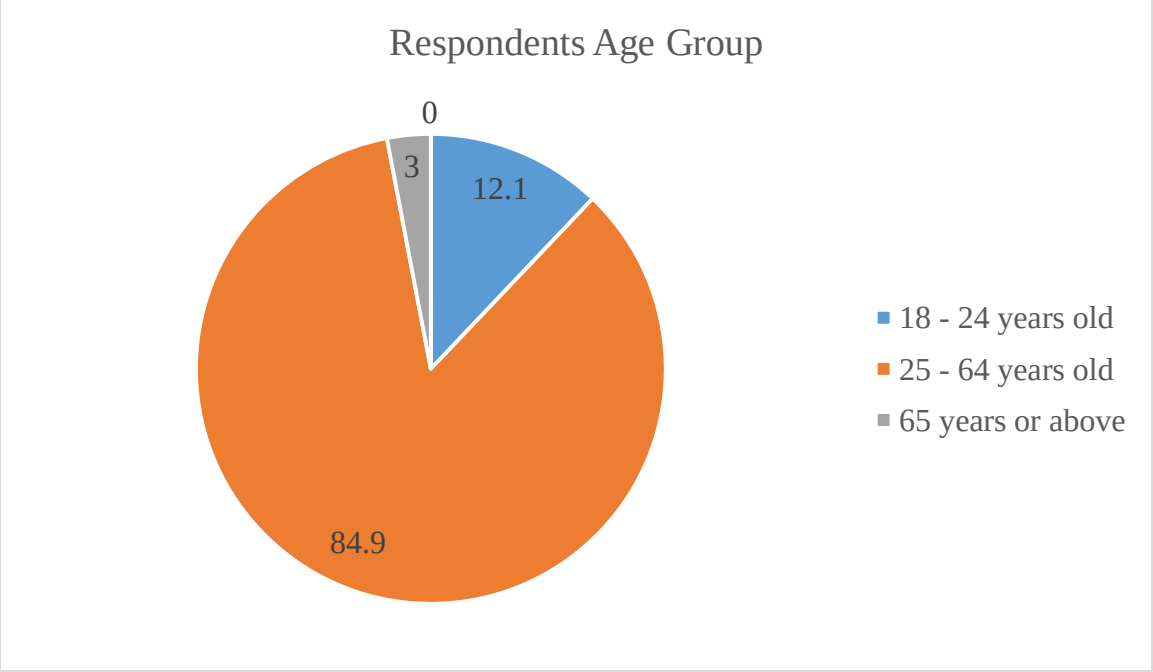
There is a complete of 199 respondents to answer the questions. A total of 171 (85.9%) of respondents are management and a total of 28 (14.1%) of the respondents are non-management which shown above the Table 4.1 and Figure 4.1.

4.1.2 Age Group

Table 4.2: Statistic of Respondents' Age Group

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
18 – 24 years old	24	12.1	12.1	12.1
25 – 64 years old	169	84.9	84.9	84.9
65 years old above	6	3	3	3
Total	199	100	100	

Figure 4.2: Percentage of Respondent Based on Age Group



Source: Developed from the research

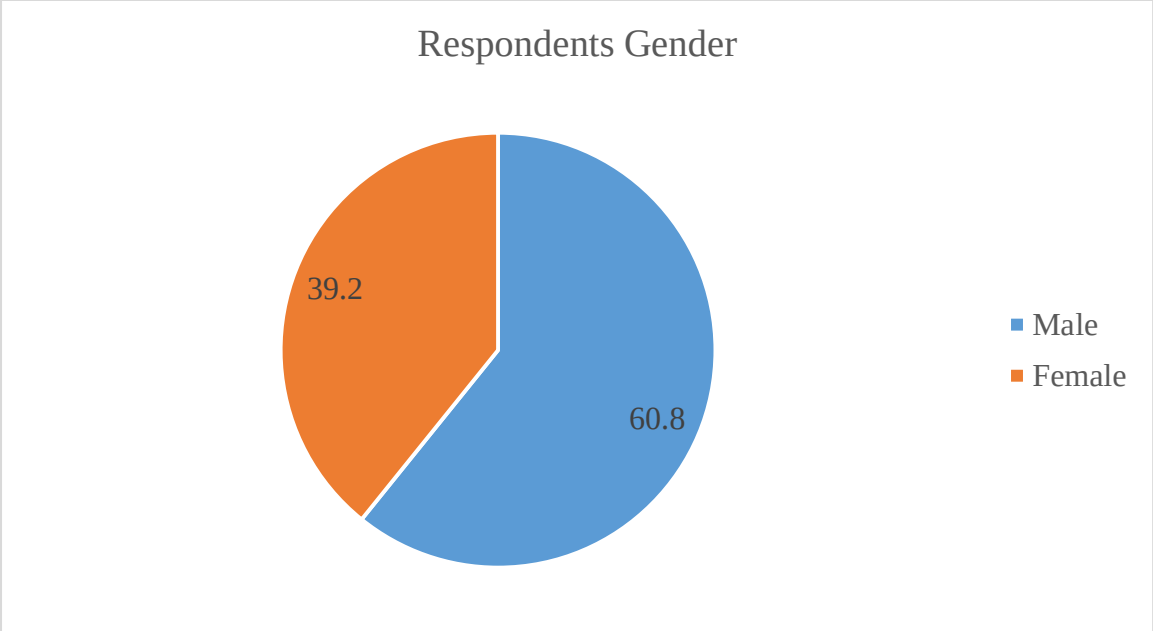
There is a complete of 199 respondents to answer the questions. A total of 24 (12.1%) of respondents are 18 – 24 years old, a total of 169 (84.9%) of the respondents are 25 – 64 years old and a total of 6 (3%) of the respondents are 65 years above which shown above the Table 4.2 and Figure 4.2.

4.1.3 Gender

Table 4.3: Statistic of Respondents' Gender

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Male	121	60.8	60.8	60.8
Female	78	39.2	39.2	39.2
Total	199	100	100	

Figure 4.3: Percentage of Respondent Based on Gender



Source: Developed from the research

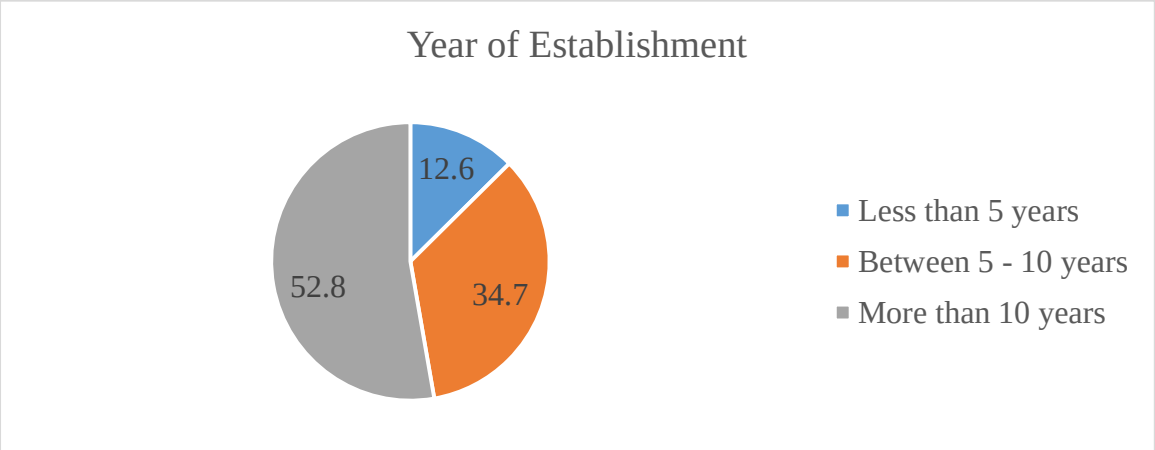
There is a complete of 199 respondents to answer the questions. A total of 121 (60.8%) of respondents are male and a total of 78 (39.2%) of the respondents are female which shown above the Table 4.3 and Figure 4.3.

4.1.4 Year of Establishment

Table 4.4: Statistic of Respondents' Company's Age

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5 years	25	12.6	12.6	12.6
Between 5 – 10 years	69	34.7	34.7	34.7
More than 10 years	105	52.8	52.8	52.8
Total	199	100	100	

Figure 4.4: Percentage of Respondent Based on Company's Age



Source: Developed from the research

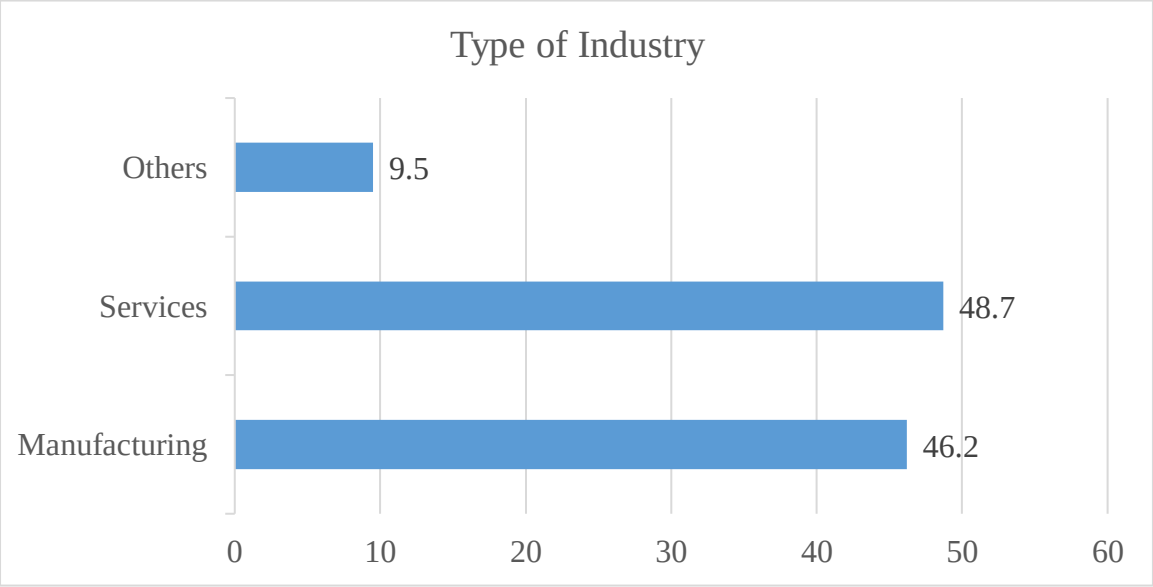
There is a complete of 199 respondents to answer the questions. A total of 25 (12.6%) of respondents are less than 5 years, a total of 69 (34.7%) of respondents are between 5–10 years and a total of 105 (52.8%) of the respondents are more than 10 years which shown above the Table 4.4 and Figure 4.4.

4.1.5 Type of Industry

Table 4.5: Statistic of Respondents' Type of Industry

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing	92	46.2	46.2	46.2
Services	97	48.7	48.7	48.7
Others	19	9.5	9.5	9.5
Total	208	104.4	104.4	

Figure 4.5: Percentage of Respondent Based on Type of Industry



Source: Developed from the research

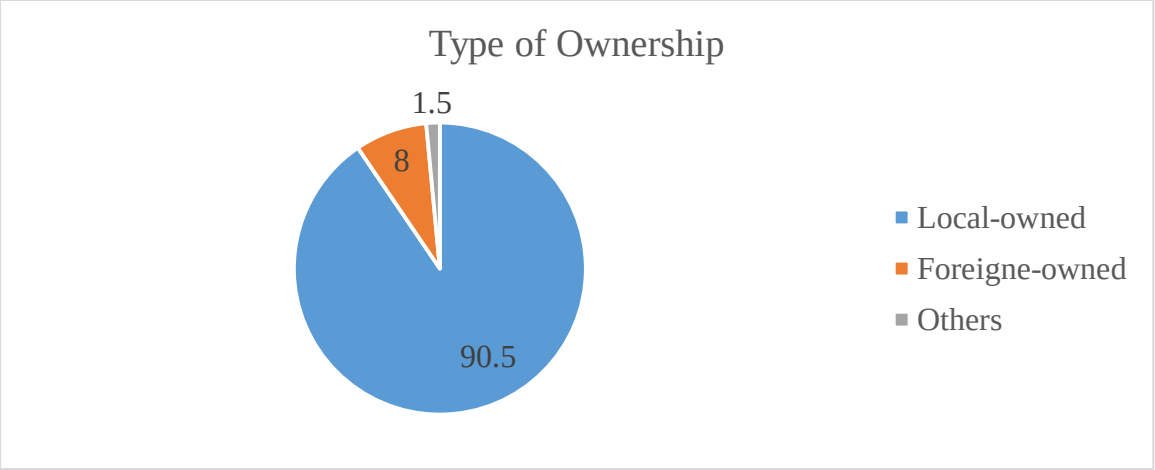
There is a complete of 199 respondents to answer and the total received answers are 208 due to some of the respondents have answers more than one option. A total of 92 (46.2%) of answers are manufacturing, a total of 97 (48.7%) of answers are services and a total of 19 (9.5%) of the answers are others which shown above the Table 4.5 and Figure 4.5.

4.1.6 Type of Ownership

Table 4.6: Statistic of Respondents' Type of Ownership

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Local-owned	180	90.5	90.5	90.5
Foreign-owned	16	8	8	8
Others	3	1.5	1.5	1.5
Total	199	100	100	

Figure 4.6: Percentage of Respondent Based on Type of Ownership



Source: Developed from the research

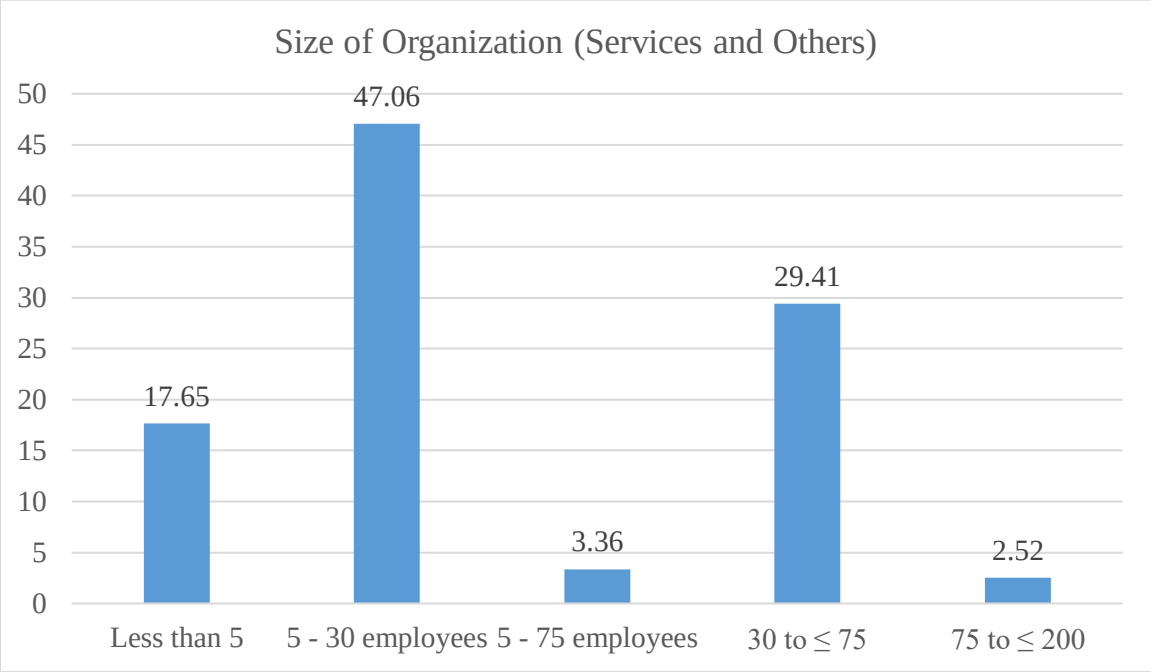
There is a complete of 199 respondents to answer the questions. A total of 180 (90.5%) of respondents are local-owned, a total of 16 (8%) of respondents are between foreign-owned and a total of 3 (1.5%) of the respondents are others which shown above the Table 4.6 and Figure 4.6.

4.1.7 Size of Organization

Table 4.7: Statistic of Respondents' Size of Organization (Services and Others)

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5	21	17.65	17.65	17.65
5 – 30 employees	56	47.06	47.06	47.06
5 – 75 employees	4	3.36	3.36	3.36
30 to ≤ 75	35	29.41	29.41	29.41
75 to ≤ 200	3	2.52	2.52	2.52
Total	119	100	100	

Figure 4.7: Percentage of Respondent Based on Size of Organization (Services and Others)



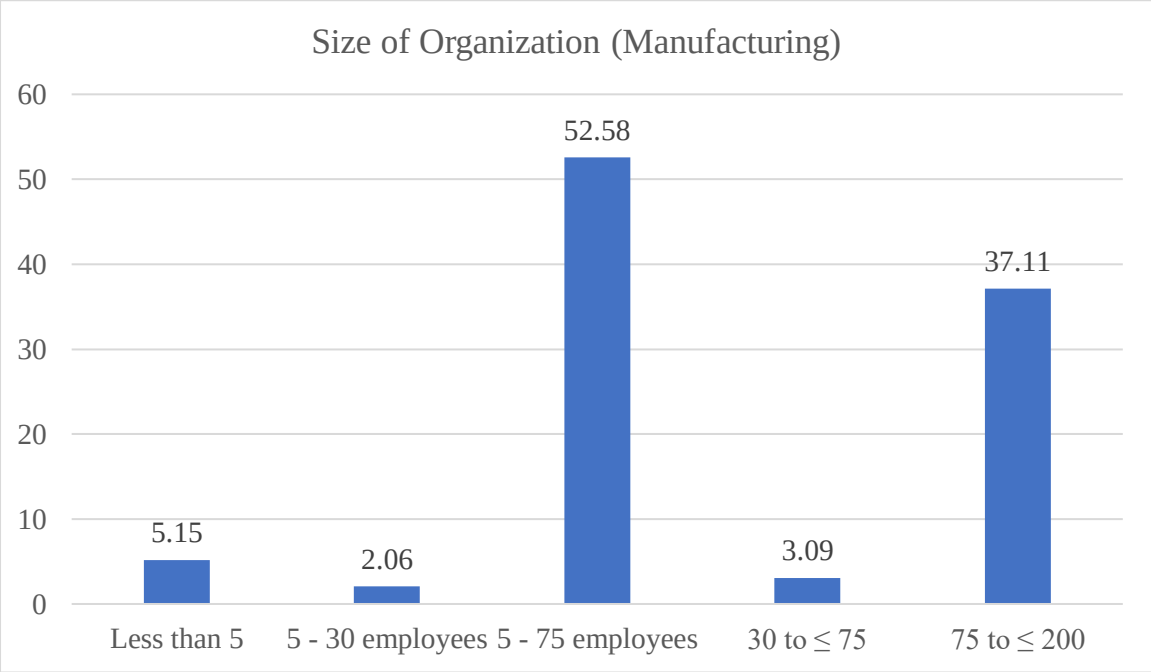
Source: Developed from the research

There are 119 respondents to answer the questions. A total of 21 (17.65%) of respondents are less than 5, a total of 56 (47.6%) of respondents are 5 – 30 employees, a total of 4 (3.36%) of the respondents are 5 – 75 employees, a total of 35 (29.41%) of the respondents are 30 to ≤ 75 and a total of 3 (2.52%) of the respondents are 75 to ≤ 200 which shown above the Table 4.7 and Figure 4.7.

Table 4.8: Statistic of Respondents' Size of Organization (Manufacturing)

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5	5	5.15	5.15	5.15
5 – 30 employees	2	2.06	2.06	2.06
5 – 75 employees	51	52.58	52.58	52.58
30 to ≤ 75	3	3.09	3.09	3.09
75 to ≤ 200	36	37.11	37.11	37.11
Total	97	100	100	

Figure 4.8: Percentage of Respondent Based on Size of Organization (Manufacturing)



Source: Developed from the research

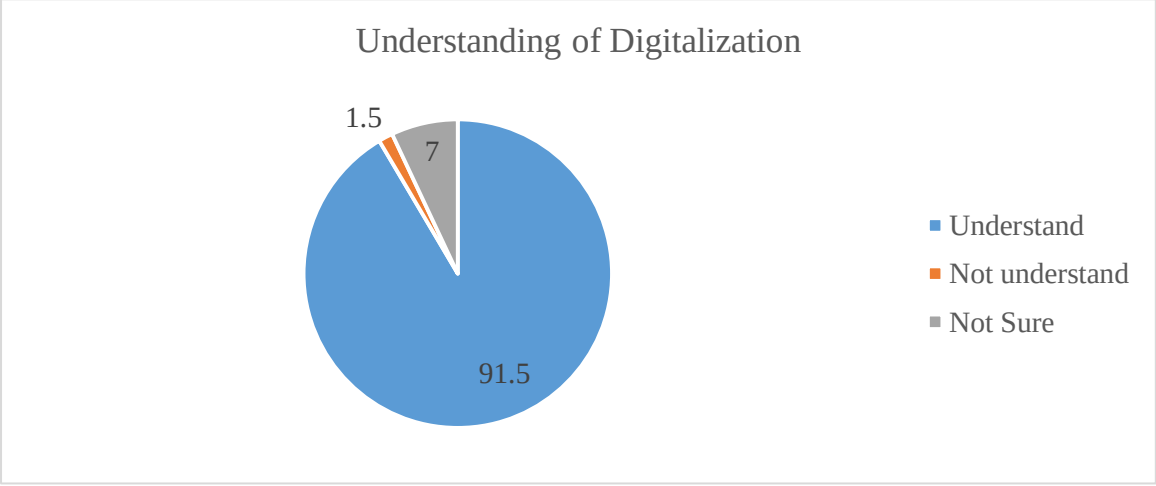
There are 97 respondents to answer the questions. A total of 5 (5.15%) of respondents are less than 5, a total of 2 (2.06%) of respondents are 5 – 30 employees, a total of 51 (52.58%) of the respondents are 5 – 75 employees, a total of 3 (3.09%) of the respondents are 36 to ≤ 75 and a total of 3 (37.11%) of the respondents are 75 to ≤ 200 which shown above the Table 4.8 and Figure 4.8.

4.1.8 Understandings of Digitalization

Table 4.9: Statistic of Respondents' Understandings of Digitalization

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
True	182	91.5	91.5	91.5
False	3	1.5	1.5	1.5
Not Sure	14	7	7	7
Total	199	100	100	

Figure 4.9: Percentage of Respondent Based on Understandings of Digitalization



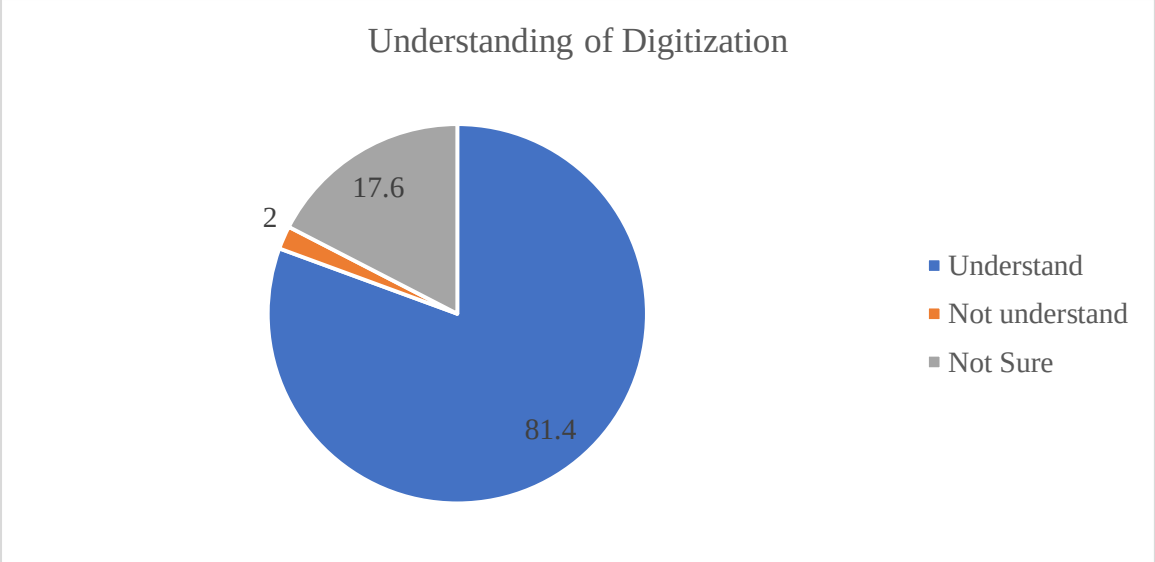
Source: Developed from the research

There is a complete of 199 respondents to answer the questions. A total of 182 (91.5%) of respondents are understand, a total of 3 (1.5%) of respondents are not understand and a total of 14 (7%) of the respondents are not sure which shown above the Table 4.9 and Figure 4.9.

Table 4.10: Statistic of Respondents' Understandings of Digitization

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
True	162	81.4	81.4	81.4
False	2	1	1	1
Not Sure	35	17.6	17.6	17.6
Total	199	100	100	

Figure 4.10: Percentage of Respondent Based on Understandings of Digitization



Source: Developed from the research

There is a complete of 199 respondents to answer the questions. A total of 162 (81.4%) of respondents are understand, a total of 2 (1%) of

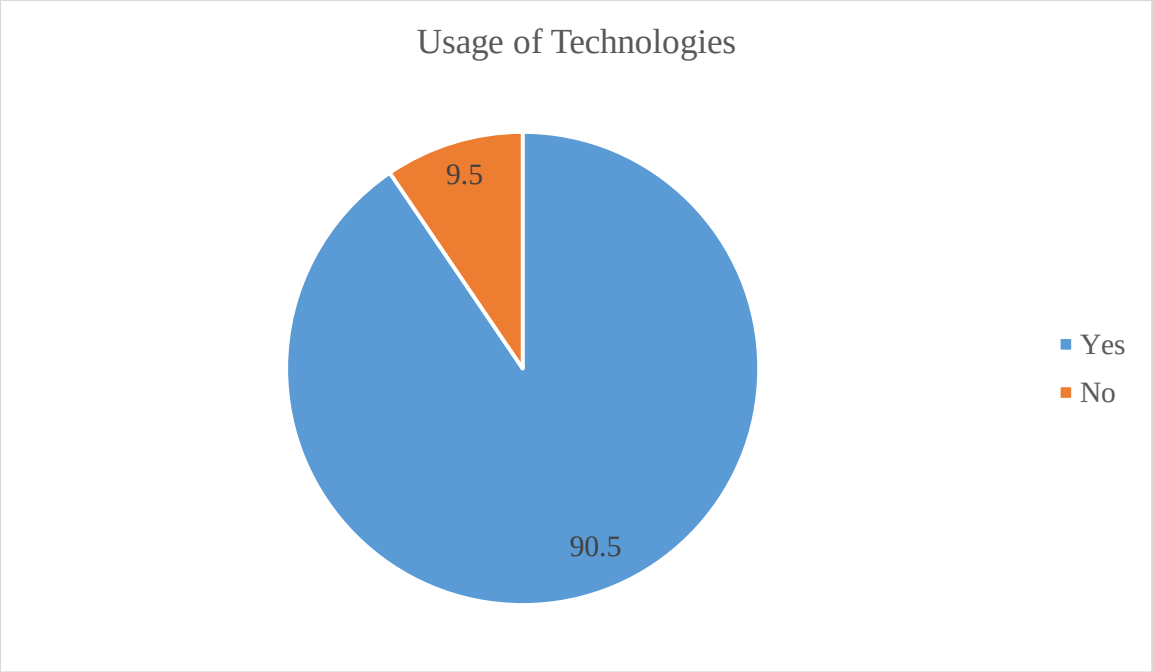
respondents are not understand and a total of 35 (17.6%) of the respondents are not sure which shown above the Table 4.10 and Figure 4.10.

4.1.9 Usage of Digital Technologies

Table 4.11: Statistic of Respondents' Usage of Digital Technologies

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	180	90.5	90.5	90.5
No	19	9.5	9.5	9.5
Total	199	100	100	

Figure 4.11: Percentage of Respondents Based on Usage of Digital Technologies



Source: Developed from the research

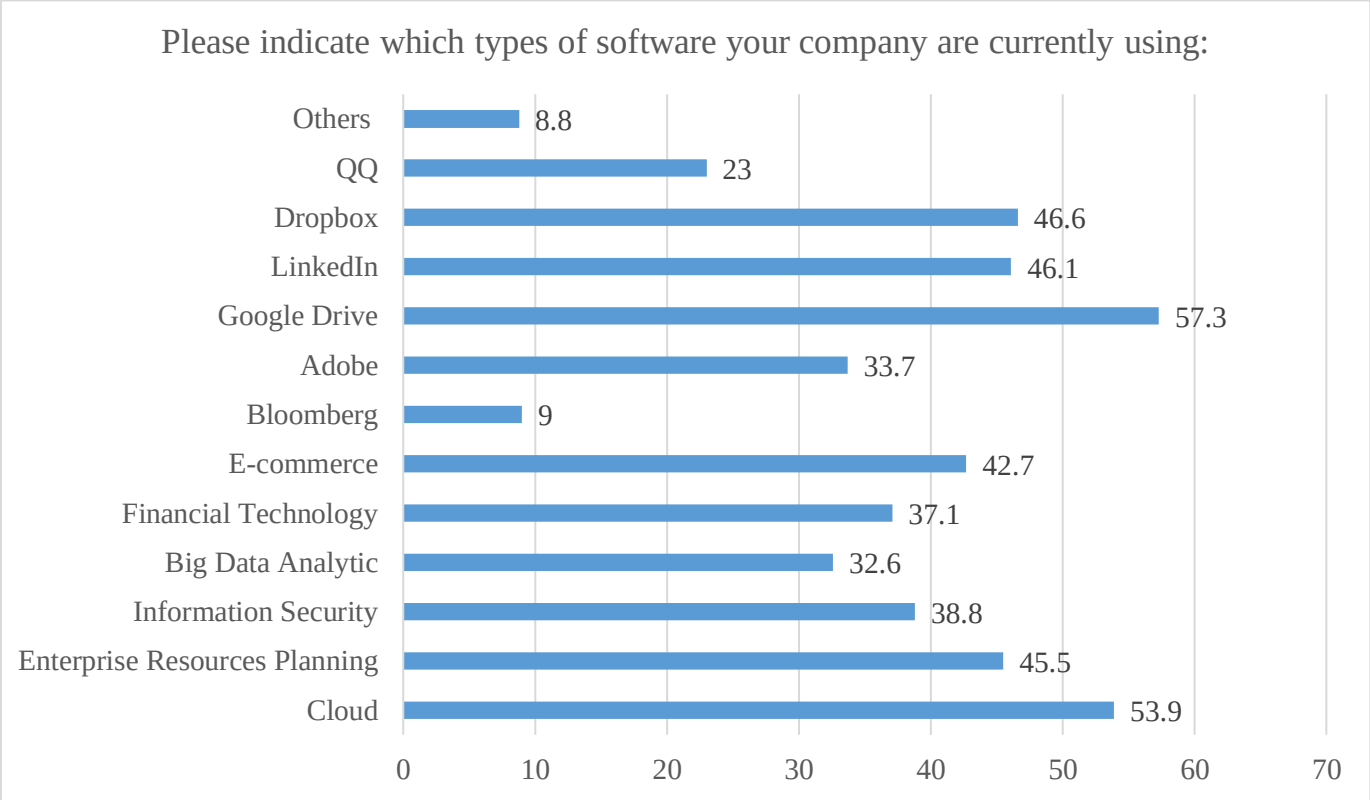
There is a complete of 199 respondents to answer the questions. A total of 180 (90.5%) of respondents are yes and a total of 19 (9.5%) of the respondents are no which shown above the Table 4.11 and Figure 4.11.

4.1.10 Types of Software

Table 4.12: Statistic of Respondents' Types of Software

	Frequency	Percent	Valid Percent	Cumulative Percent
Cloud	96	53.9	53.9	53.9
Enterprise Resources Planning	81	45.5	45.5	45.5
Information Security	69	38.8	38.8	38.8
Big Data Analytic	58	32.6	32.6	32.6
Financial Technology	66	37.1	37.1	37.1
E-commerce	76	42.7	42.7	42.7
Bloomberg	16	9	9	9
Adobe	60	33.7	33.7	33.7
Google Drive	102	57.3	57.3	57.3
LinkedIn	82	46.1	46.1	46.1
Dropbox	83	46.6	46.6	46.6
QQ	41	23	23	23
Others	15	8.8	8.8	8.8

Figure 4.12: Percentage of Respondents Based on Types of Software



Source: Developed from the research

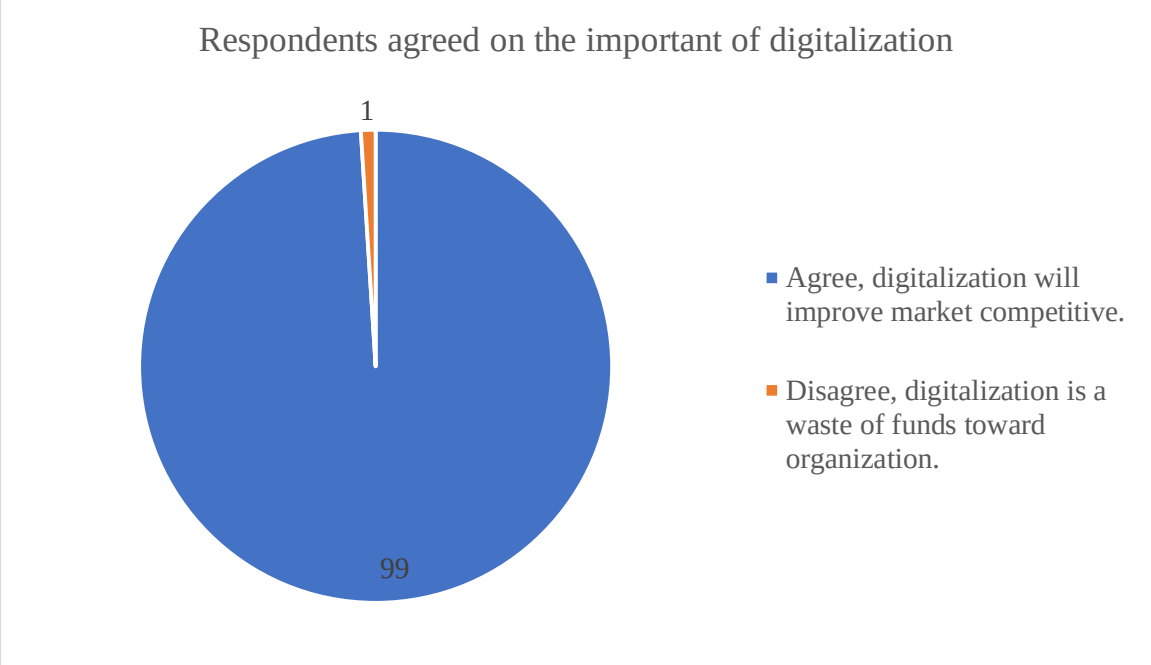
There are total 178 respondents to answer the questions. A total of 102 (57.3%) of respondents using Google Drive, 96 (53.9%) of respondents are using Cloud, 81 (45.5%) respondents are using Enterprise Resources Planning, 69 (38.8%) respondents are using Information Security, 58 (32.6%) respondents are using Big Data Analytic, 66 (37.1%) are using Financial Technology, 76 (42.7%) respondents are using E-commerce, 16 (9%) respondents are using Bloomberg, 60 (33.7%) respondents are using Adobe, 102 (57.3%) respondents are using Google Drive, 82 (46.1%) respondents are using LinkedIn, 83 (46.6%) respondents are using Dropbox, 41 (23%) respondents are using QQ and 15 (8.8%) respondents are using other software such as UBS, SQL Accounting System, Whatapp, FB, Great Eastern Software, Opera System, Sun System, Delphi, Sketchup, 3D MAX, AutoCAD, REVIT, CNC Machine, MITS, Wechat Work, TK Bakery Software, Trello, Slupp, Photoshop or UPS which shown above the Table 4.12 and Figure 4.12.

4.1.11 Importance of Digitalization in Today Business Environment

Table 4.13: Statistic of Respondents' Importance of Digitalization in Today Business Environment

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree, digitalization will improve market competitive.	194	99	99	99
Disagree, digitalization is a waste of funds toward organization.	2	1	1	1
Total	196	100	100	

Figure 4.13: Percentage of Respondent Based on Importance of Digitalization in Today Business Environment



Source: Developed from the research

There are 196 respondents to answer the questions. A total of 194 (99%) of respondents are agree and a total of 2 (1%) of the respondents are disagree which shown above the Table 4.13 and Figure 4.13.

4.2 Central Tendencies Measurement of Constructs

Next in this area, it included ten parts, part one is the dependent variables (Digitalization Adoption). While part two to ten are the independent variable (Relative Advantages, Perceived Complexity, Compatibility, Team Management Support, Management Innovativeness, Employee's Capability and Knowledge, Competitive Pressure, Government and Vendor Support).

4.2.1 Digitalization Adoption

Table 4.14: Central Tendencies Measurement of Constructs: Digitalization Adoption

Statement	Mean	Standard Deviation
Intention1	5.548	1.001
Intention2	5.673	0.966
Intention3	5.648	1.026
Intention4	5.849	0.991

Source: Developed from the research

According to the Table 4.14, there are a total of 4 statements of the question. Firstly, there is an amount of 5.548 of the mean and total of 1.001 of the standard deviation with the question of "Intention1." Secondly,

the option of "Intention2" shows the mean of 5.673 and the standard deviation of 0.966. Thirdly, "Intention3" will show the amount of 5.648 of the mean and the standard deviation of 1.026. Lastly, the option with "Intention4" shows a mean of 5.849 and the amount of standard deviation of 0.991.

4.2.2 Technology - Relative Advantage

Table 4.15: Central Tendencies Measurement of Constructs: Relative Advantage

Statement	Mean	Standard Deviation
T_RA1	5.874	0.929
T_RA2	5.91	0.869
T_RA3	5.925	0.874
T_RA4	5.528	1.12
T_RA5	5.844	0.919

Source: Developed from the research

According to the Table 4.15, there are a total of 5 statements of the question. Firstly, there is an amount of 5.874 of the mean and total 0.929 of the standard deviation with the question of "T_RA1." Secondly, the option of "T_RA2" shows the mean of 5.91 and the standard deviation of 0.869. Thirdly, "T_RA3" will show an amount of 5.925 of the mean and standard deviation of 0.874. Fourthly, the option with "T_RA4" shows a mean of 5.528 and the standard deviation of 1.12. Lastly, the option of "T_RA5" with a mean of 5.844 and the standard deviation of 0.919.

4.2.3 Technology - Perceived Complexity

Table 4.16: Central Tendencies Measurement of Constructs: Perceived Complexity

Statement	Mean	Standard Deviation
T_PC1	4.769	1.185
T_PC2	4.98	1.178
T_PC3	4.799	1.315
T_PC4	4.628	1.401
T_PC5	4.628	1.368

Source: Developed from the research

According to the Table 4.16, there are a total of 5 statements of the question. Firstly, there is an amount of 4.769 of the mean and total 1.185 of the standard deviation with the question of "T_PC1." Secondly, the option of "T_PC2" shows the mean of 4.98 and the standard deviation of 1.178. Thirdly, "T_PC3" will show an amount of 4.799 of the mean and standard deviation of 1.315. Fourthly, the option with "T_PC4" shows a mean of 4.628 and the standard deviation of 1.401. Lastly, the option of "T_PC5" with a mean of 4.628 and the standard deviation of 1.368.

4.2.4 Technology – Compatibility

Table 4.17: Central Tendencies Measurement of Constructs: Compatibility

Statement	Mean	Standard Deviation
T_COMP1	5.296	0.944

T_COMP2	5.342	0.926
T_COMP3	5.442	0.927
T_COMP4	5.543	0.949
T_COMP5	5.508	1.084

Source: Developed from the research

According to the Table 4.17, there are a total of 5 statements of the question. Firstly, there is an amount of 5.269 of the mean and total 0.944 of the standard deviation with the question of "T_COMP1." Secondly, the option of "T_COMP2" shows the mean of 5.342 and the standard deviation of 0.926. Thirdly, "T_COMP3" will show an amount of 5.442 of the mean and standard deviation of 0.927. Fourthly, the option with "T_COMP4" shows a mean of 5.543 and the standard deviation of 0.949. Lastly, the option of "T_COMP5" with a mean of 5.508 and the standard deviation of 1.084.

4.2.5 Organization - Top Management Support

Table 4.18: Central Tendencies Measurement of Constructs: Team Management Support

Statement	Mean	Standard Deviation
O_TMS1	5.492	0.961
O_TMS2	5.548	0.954
O_TMS3	5.583	0.993
O_TMS4	5.523	0.997
O_TMS5	5.407	1.112

Source: Developed from the research

According to the Table 4.18, there are a total of 5 statements of the question. Firstly, there is an amount of 5.492 of the mean and total 0.961 of the standard deviation with the question of "O_TMS1." Secondly, the option of "O_TMS2" shows the mean of 5.548 and the standard deviation of 0.954. Thirdly, "O_TMS3" will show an amount of 5.583 of the mean and standard deviation of 0.993. Fourthly, the option with "O_TMS4" shows a mean of 5.523 and the standard deviation of 0.997. Lastly, the option of "O_TMS5" with a mean of 5.407 and the standard deviation of 1.112.

4.2.6 Organization - Management Innovativeness

Table 4.19: Central Tendencies Measurement of Constructs: Management Innovativeness

Statement	Mean	Standard Deviation
O_MInno1	5.337	0.973
O_MInno2	5.317	1
O_MInno3	5.407	1.061
O_MInno4	5.362	1.093
O_MInno5	5.452	1.128

Source: Developed from the research

According to the Table 4.19, there are a total of 5 statements of the question. Firstly, there is an amount of 5.337 of the mean and total 0.973 of the standard deviation with the question of "O_MInno1." Secondly, the option of "O_MInno2" shows the mean of 5.317 and the standard deviation of 1. Thirdly, "O_MInno3" will show an amount of 5.407 of the

mean and standard deviation of 1.061. Fourthly, the option with "O_MInno4" shows a mean of 5.362 and the standard deviation of 1.093. Lastly, the option of "O_MInno5" with a mean of 5.452 and the standard deviation of 1.128.

4.2.7 Organization - Employee Capability and Knowledge

Table 4.20: Central Tendencies Measurement of Constructs: Employee Capability and Knowledge

Statement	Mean	Standard Deviation
O_ECK1	5.332	0.951
O_ECK2	5.271	0.975
O_ECK3	5.281	1.023
O_ECK4	5.291	1.092
O_ECK5	5.281	1.008

Source: Developed from the research

According to the Table 4.20, there are a total of 5 statements of the question. Firstly, there is an amount of 5.332 of the mean and total 0.951 of the standard deviation with the question of "O_ECK1." Secondly, the option of "O_ECK2" shows the mean of 5.271 and the standard deviation of 0.975. Thirdly, "O_ECK3" will show an amount of 5.281 of the mean and standard deviation of 1.023. Fourthly, the option with "O_ECK4" shows a mean of 5.291 and the standard deviation of 1.092. Lastly, the option of "O_ECK5" with a mean of 5.281 and the standard deviation of 1.008.

4.2.8 Environment - Competitive Pressure

Table 4.21: Central Tendencies Measurement of Constructs: Competitive Pressure

Statement	Mean	Standard Deviation
E_CP1	5.467	0.861
E_CP2	5.271	1.016
E_CP3	5.337	1.076
E_CP4	5.513	1.07
E_CP5	5.427	1.258

Source: Developed from the research

According to the Table 4.21, there are a total of 5 statements of the question. Firstly, there is an amount of 5.267 of the mean and total 0.861 of the standard deviation with the question of "E_CP1." Secondly, the option of "E_CP2" shows the mean of 5.271 and the standard deviation of 1.016. Thirdly, "E_CP3" will show an amount of 5.337 of the mean and standard deviation of 1.076. Fourthly, the option with "E_CP4" shows a mean of 5.513 and the standard deviation of 1.07. Lastly, the option of "E_CP5" with a mean of 5.427 and the standard deviation of 1.258.

4.2.9 Environment – Government

Table 4.22: Central Tendencies Measurement of Constructs: Government

Statement	Mean	Standard Deviation
E_G1	4.196	1.325
E_G2	4.181	1.344

E_G3	4.01	1.543
E_G4	4.09	1.537

Source: Developed from the research

According to the Table 4.22, there are a total of 4 statements of the question. Firstly, there is an amount of 4.196 of the mean and total of 1.325 of the standard deviation with the question of "E_G1." Secondly, the option of "E_G2" shows the mean of 4.181 and the standard deviation of 1.344. Thirdly, "E_G3" will show the amount of 4.01 of the mean and the standard deviation of 1.543. Lastly, the option with "E_G4" shows a mean of 4.09 and the amount of standard deviation of 1.537.

4.2.10 Environment - Vendor Support

Table 4.23: Central Tendencies Measurement of Constructs: Vendor Support

Statement	Mean	Standard Deviation
E_VS1	5.302	0.967
E_VS2	5.342	0.969
E_VS3	5.307	1.103
E_VS4	5.151	1.31

Source: Developed from the research

According to the Table 4.23, there are a total of 4 statements of the question. Firstly, there is an amount of 5.302 of the mean and total of 0.967 of the standard deviation with the question of "E_VS1." Secondly, the option of "E_VS2" shows the mean of 5.342 and the standard deviation of 0.969. Thirdly, "E_VS3" will show the amount of 5.307 of the

mean and the standard deviation of 1.103. Lastly, the option with "E_VS4" shows a mean of 5.151 and the amount of standard deviation of 1.31.

4.3 Stage 1 Measurement Model Analysis

Measurement model consists of convergent validity and discriminant validity. This is the part commonly known as outer model. It is used to present and examine the reliability and validity of each reflective construct (Chin & Dibbern, 2010). The measurement of convergent validity is verified by assessing factor loading, Average Variance Extracted (AVE) and also Composite Reliability (CR) (Gholami, Sulaiman, Ramayah, & Molla, 2013)

Table 4.24: Internal Consistency and Convergent Reliability

Construct	Measure	Loading	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Digitalization Adoption Intention	DAI 1	0.911	0.934	0.937	0.953	0.835
	DAI 2	0.944				
	DAI 3	0.91				
	DAI 4	0.89				
T_Relative Advantages	T_RA1	0.895	0.864	0.872	0.909	0.716
	T_RA2	0.916				
	T_RA3	0.851				
	T_RA4	0.706				
T_Perceived Complexity	T_PC1	0.848	0.922	0.927	0.941	0.762
	T_PC2	0.863				
	T_PC3	0.895				

	T_PC4	0.898				
	T_PC5	0.861				
T_Compatible	T_COMP 1	0.867	0.89	0.891	0.924	0.752
	T_COMP 2	0.856				
	T_COMP 3	0.888				
	T_COMP 4	0.848				
O_Top Management Support	O_TMS1	0.769	0.923	0.923	0.942	0.765
	O_TMS2	0.781				
	O_TMS3	0.8				
	O_TMS4	0.738				
	O_TMS5	0.762				
O_Management Innovativeness	O_Minno 1	0.862	0.904	0.906	0.929	0.724
	O_Minno 2	0.891				
	O_Minno 3	0.851				
	O_Minno 4	0.883				
	O_Minno 5	0.763				
O_Employee Capability and Knowledge	O_ECK1	0.819	0.902	0.906	0.927	0.718
	O_ECK2	0.863				
	O_ECK3	0.861				
	O_ECK4	0.866				
	O_ECK5	0.825				
E_Competitiv	E_CP1	0.796	0.885	0.889	0.916	0.685

e Pressure	E_CP2	0.867				
	E_CP3	0.826				
	E_CP4	0.827				
	E_CP5	0.822				
E_Governmen t	E_G1	0.935	0.949	0.952	0.963	0.867
	E_G2	0.94				
	E_G3	0.937				
	E_G4	0.912				
E_Vendor Support	E_VS1	0.856	0.875	0.876	0.914	0.727
	E_VS2	0.881				
	E_VS3	0.826				
	E_VS4	0.848				

Source: Developed for the research

4.3.1 Factor Loading

The Table 4.24 was shown from the final PLS measurement model. According to Chin (1998) and Henseler, Ringle, Sinkovics, (2009), the ideally acceptance of the indicator loading should higher than 0.70 or at least 0.60.

As presented on Table 4.24, all the indicators have exceeded 0.70. Therefore, all the results is accepted according to the (Henseler et.al., 2009). The highest loading was 0.944 from the measure of DAI 2. The remaining items have good loading with values and higher than 0.7.

Rho_A is a effective and helpful method to determine the reliability of the coefficient (Dijkstra & Henseler, 2015). The value considered as reliable must above 0.700. According to the table 4.24 the highest Rho_A was the

value of 0.952 from Government and the lowest is 0.872 from relative advantages. The remaining item has the average value of 0.8. Thus, all the Rho_A are above 0.7 and all the constructs is reliable.

4.3.2 Convergent Validity

Convergent validity is to test the constructs that correspond to one another (Hair, Black, Balin, & Anderson, 2010). The values of Average Variance Extracted (AVE) could be used to explain and support the convergent validity. The acceptable value of AVE should be above 0.500.

As presented in Table 4.24, the highest AVE was Government with 0.867 and the lowest was relative advantages with value of 0.716. Overall, all the constructs in this research have AVE of 0.600 and above.

4.3.3 Internal Consistency Reliability

Composite reliability (CR) is a useful tool to measure the reliability of the assigned indicators which are heterogeneous but similar (Hair, Hult, Ringle, & Sarstedt, 2013). The value of composite reliability should above 0.7 (Hair et al., 2011). Despite the Cronbach's Alpha is still a preferable method to determine the reliability, CR has the potential to determine convergent reliability (Bollen & Long, 1993).

From the Table 4.24, the highest CR was Government with 0.963, whereas the lowest was relative advantages with 0.909. Moreover, all the constructs have an acceptable CR of 0.7 and achieved 0.9. Thus, the constructs have a very high internal consistency.

4.3.4 Discriminant Validity

Table 4.25: Heterotrait-Monotrait Ratio of Correlation (HTMT)

	COMP	CP	DAI	ECK	Government	Minnova	PC	RA	TMS	VS
COMP										
CP	0.431									
DAI	0.629	0.455								
ECK	0.568	0.371	0.417							
Government	0.403	0.203	0.149	0.33						
Minnova	0.641	0.419	0.522	0.544	0.341					
PC	0.408	0.283	0.173	0.433	0.519	0.364				
RA	0.624	0.41	0.765	0.397	0.148	0.488	0.301			
TMS	0.653	0.422	0.619	0.524	0.334	0.736	0.28	0.477		
VS	0.512	0.346	0.319	0.283	0.499	0.406	0.254	0.361	0.387	

Source: Develop for the research

According to Hair, Black, Balin and Anderson (2010), the objective of discriminant validity is to test whether the measurement that are not to be related are actually unrelated. In this research, Heterotrait-Monotrait Ratio of Correlation (HTMT) has been used to determine the discriminant validity.

The rational of utilised HTMT instead of traditional criteria such as Fornell and Larcker because HTMT can achieve higher specifically rate across all simulation condition (Henseler, Ringle, & Sarstedt, 2015). The

acceptable value of HTMT was below 0.85 and 0.9. These are the basic threshold that are suggested by Kline (2011) and Gold, Malhorta and Segar (2001). Any value above the thresholds are indicated a lack of discriminant validity.

As shown in Table 4.25, the HTMT value of all the constructs are below the suggested threshold. Thus, the result proved that discriminant validity has been established.

4.3.5 Collinearity Assessment

Table 4.26: VIF Value

Construct	VIF
COMP	1.545
CP	1.111
ECK	1.402
MINNOVA	1.964
PC	1.172
RA	1.435
TMS	1.923
VS	1.354

Source: Developed for research

The use of VIF is to determine the multicollinearity. Hair, Black, Balin and Anderson (2010) indicated that constructs is considered multicollinearity if the VIF is greater than 10.

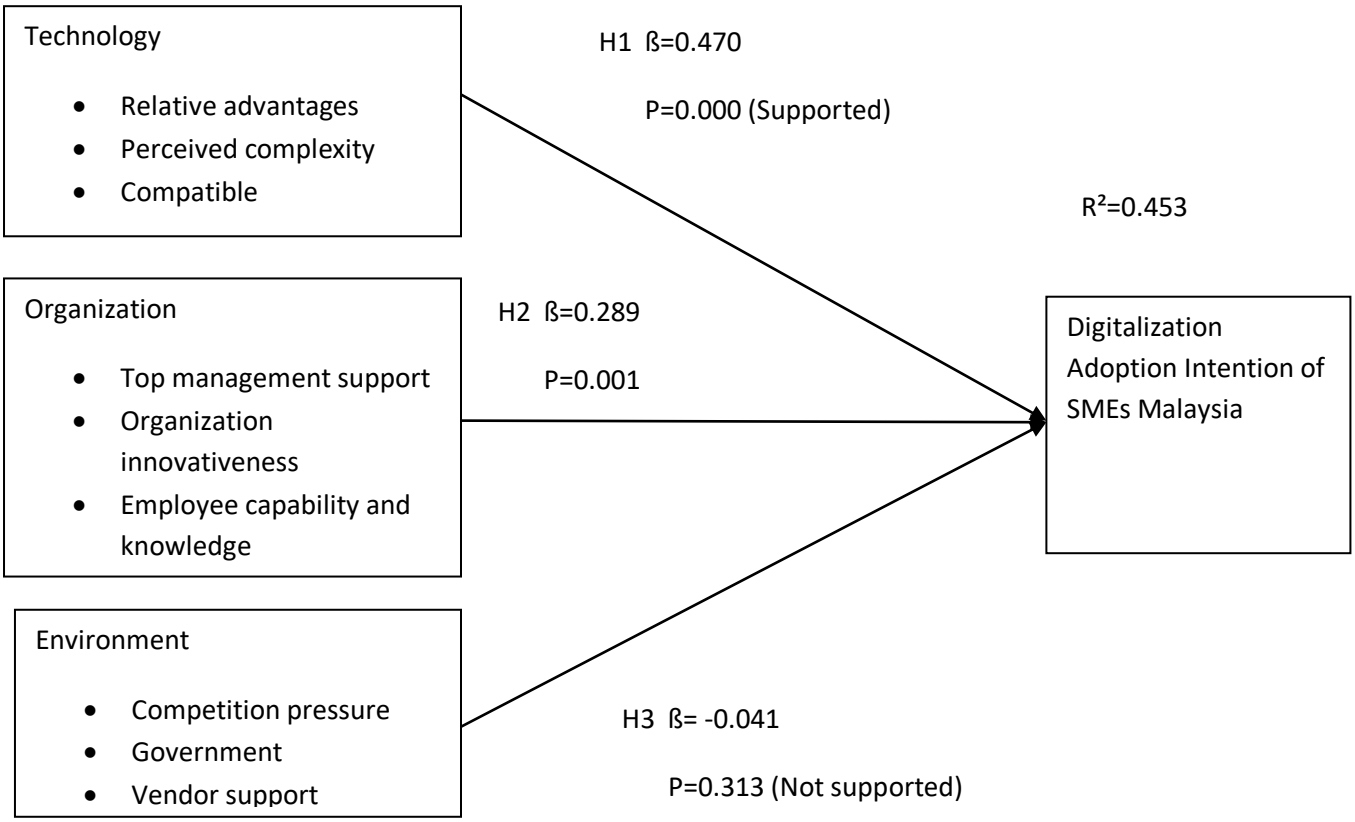
Based on the Table 4.26, the highest VIF value was MINNVOA with 1.964 whereas the lowest was CP with 1.111. Moreover, the remaining construct has VIF values that are less than 10.

Thus, the result proved that there is no multicollinearity in this study. All the constructs are not homogeneous and they are measuring different aspects.

4.4 Stage 2 - Structural Model Assessment

Bootstrapping is conducted on the construct based on the 500 samples. The result shown that all the constructs had p-value below 0.050 except environment which possessed 0.311.

Figure 4.14: Results of Structural Model



Source: Developed for research

As shown in Figure 4.14 of structural model, H1 and H2 are supported with path significance of 0.001 and 0.000, which are below 0.050. Meanwhile, H3 is not supported with figure 0.313 greater than 0.050. The R^2 value of technology, organization, and environment was 1.0 which indicates that 100% of the variance of digitalization adoption can be explain by technology, organization and environment.

4.4.1 Path Coefficient Assessment

Table 4.27: Results of Path Coefficient and Hypothesis Testing

Hypothesis		**Standard Beta**	**T-Statistic**	**P-Value**	**Decision**
H1	**Technology -> DAI**	0.470	4.983	0.000	Supported
H2	**Organization -> DAI**	0.289	3.02	0.001	Supported
H3	**Environment -> DAI**	-0.041	0.475	0.318	Not Supported

Source: Developed for research

The result of the path coefficient and hypothesis of this study is explained in the above Table 4.27. Next, follow by the discussion on decision to reject or accept the hypothesis.

Hypothesis

H1: There is a positive relationship between technology and digitalization adoption intention of SMEs

H2: There is a positive relationship between organization and digitalization adoption intention of SMEs.

H3: There is a positive relationship between environment and digitalization adoption intention of SMEs.

As shown in Table 4.27, the path coefficient for H1 was 0.470 while T-Statistic was 4.983. Therefore, H1 is supported. Path coefficient of H2 was 0.289 while T-Statistic was 3.02. Hence, the result is also supported. The path coefficient of H3 -0.041 and T-Statistic value is 0.475, which is below 1.96. Thus, the H3 is not supported.

Based on the analysis, researchers concluded that TECHNOLOGY and ORGANIZATION have significant positive relationship with digitalization adoption of SMEs. Meanwhile, the result also proved that ENVIRONMENT is not significance with digitalization adoption. The P value of ENVIRONMENT is greater than 0.050.

4.4.2 Determination of Coefficient Assessment, R^2

Table 4.28 Determine of Coefficient

	R^2
DAI	0.453

Source: Developed for the research

As shown in Table 4.28, the R^2 of Digitalization Adoption Intention was 0.453. This indicated that 45.3 of the variance can be explained in this study.

4.4.3 Determination of Predictive Relevance, Q^2

Table 4.29: Predictive Relevance

Predictive Relevance	Q^2
Technology	0.403
Organization	0.476
Environment	0.376
DAI	0.350

Source: Developed for the research

Other than using R^2 to predict accuracy, researchers have also examined Stone-Geisser's Q^2 to predict relevance. In the PLS path model, blindfolding method is being utilised to get Q^2 value. Blindfolding is a sample re-uses technique that deletes data points and provides prognosis of the original values (Hair, Hult, Ringle, & Sarstedt, 2013).

The predictive relevance (Q^2) of technology (0.403) Organization (0.476) were larger than 0. According to Hair, Hult, Ringle and Sarstedt (2013), this indicated that Technology and Organization possessed a predictive capacity over Digitalization Adoption Intention.

4.5 Conclusion

This chapter presents the findings of the data collected and data analysis. The discussion on the result and recommendation will be present in the following chapter 5.

CHAPTER 5: DISCUSSION, IMPLICATION AND CONCLUSION

5.0 Introduction

In this chapter, the results from previous chapter are being discussed. Major findings, the implications, managerial implications and the limitations of the research are included in this chapter. Before the end of this chapter, it will provide with the recommendations for the future and further research.

5.1 Summary of Statistical Analysis

5.1.1 Descriptive Analysis

5.1.1.1 General Information

Based on the Chapter 4 the respondent's general information recorded in the part of the descriptive study, majority respondent are management with 171 (85.9%). Most of them are within the age of 25 - 64 years old with total 169 (84.9%). Among the respondents, there is a total of 121 (60.8%) respondents are male and 78 (39.2%) respondents are female. There is a total of 25

(12.6%) respondents who their companies' age are less than 5 years, 69 (34.7%) are between 5 – 10 years and lastly, there is a total of 105 (52.8%) are more than 10 years. While for the type of industry among these respondents, there is a complete of 199 respondents to answer and total received answers are 208 due to some of the respondents have answers more than one option, the type of industry among the most respondents are services consisting of 97 (48.7%) respondents, followed by 92 (46.2%) respondents are manufacturing and 19 (9.5%) respondents are others. In the services and others category, there is a total of 21 (17.65%) respondents whose size of organization are less than 5, 56 (47.06%) respondents are 5 – 30 employees, 4 (3.36%) respondents are 5 – 75 employees, 35 (29.41%) respondents are 30 to ⩽ 75 and lastly, there is a total of 3 (2.52%) respondents are 75 to ⩽ 200. While in the manufacturing category, there is a total of 5 (5.15%) respondents whose size of organization are less than 5, 2 (2.06%) respondents are 5 – 30 employees, 51 (52.58%) respondents are 5 – 75 employees, 3 (3.09%) respondents are 30 to ⩽ 75 and lastly, there is a total of 36 (37.11%) respondents are 75 to ⩽ 200. Majority respondents with 182 (91.5%) knew the meaning of "Digitalization is the process of leveraging digitization to improve business process". While in the part two, which is "Digitization means the process of converting information from a physical format into a digital version", there is still majority of 162 (81.4%) respondents who stated true, followed by 2 (1%) respondents who stated false and 35 (17.6%) respondents who stated not sure. For the usage of digital technologies, majority of the respondent 180 (90.5%) currently are using digital technology. Inside the types of software, there are top 5 software which are selected by most respondents are Google Drive 102 (57.3%), Cloud 96 (53.9%), Dropbox 83 (46.6%), LinkedIn 82 (46.1%) and Enterprise Resources Planning 81(45.5%). Most of respondent 194 (99%) are agree that digitalization will improve market competition.

5.1.1.2 Central Tendencies Measurement of Constructs

Means for all variables are within the range of between 4 to 6. This means average for all of the respondent answers on "neutral" and "agree" choices in the research questions and the standard deviation also in a small value which is in range of 0.9 to 1.5. It proved that the data is spread near to the mean and most of the respondents agreed with the statements in questionnaire.

5.1.1.3 Inferential Analysis

In measurement model, all the indicators had factor loading exceed 0.70. The convergent validity for all the indicators are above 0.6, the construct is corresponded to one another. Next, composite reliability test are carried out to test the reliability of the assigned indicators. All the indicators are high internal consistency with CR 0.7 and above. Next, in the formative construct of measurement model, Heterotrait-Monotrait Ratio of Correlation (HTMT) has been used to test whether the construct are actually unrelated. All the constructs has high discriminate validity with value below 0.9.

In structural model, path coefficient has been test to explain the hypothesis. All the variables had P value less than 0.05 except Environment with 0.318. Therefore, the result showed that environment is not supported. Furthermore, the coefficient of determination (R^2) for SMEs digitalization adoption is 0.453. This indicates that 45.3% of the variance in digitalization adoption explained by the three independent variables.

5.2 Discussion on Findings

Table 5.1: Summary of the Results for Hypothesis Testing

Hypothesis		**Standard Beta**	**T-Statistic**	**P-Value**	**Decision**
H1	**Technology -> DAI**	0.470	4.983	0.000	Supported
H2	**Organization -> DAI**	0.289	3.02	0.001	Supported
H3	**Environment -> DAI**	-0.041	0.475	0.318	Not Supported

Source: Developed for the research

Hypotheses were formed to examine the relationship among DAI, technology, organization and environment. Based on table 5.1, it is concluded that technology and organization have positive relationship with DAI. Therefore, both H1 and H2 were supported. In addition, H1 has the highest standard beta with 0.470 which indicates that technology is an important variable to affect DAI.

5.2.1 Findings on the Hypotheses

Relationship between Technology and DAI

H1: There is a positive relationship between Technology and DAI.

The results (Standard Beta = 0.470, T-statistic = 4.983, P-value = 0) show that there is a significant positive relationship between Technology and SMEs DAI.

By examining the relationship between technology and SMEs DAI, this research reveals that technology leads to strong impact of SMEs DAI. Technology with high relative advantage, less perceived complexity and high compatibility has a strong positive effect towards SMEs DAI.

Technology offer high relative advantages such as cost savings (Mckinnie, 2016), capacity, reliability and flexibility (Miller, 2008) is a central indicator of technology context to SMEs DAI (Alshamaila et al., 2012). Next, less perceived complexity of technology increase the DAI as SMEs found it is easy to use and understand of technology (Alshamaila et al., 2012). Moreover, Hassan (2003) mentioned that technology with high compatibility that fit into their business culture and type of business prompt the SMEs DAI.

Relationship between Organization and DAI

H2: There is a positive relationship between Organization and SMEs DAI.

The results (Standard Beta = 0.289, T-statistic = 3.02, P-value = 0.001) show that there is a significant positive relationship between Technology and SMEs DAI.

Through this research, it has been discovered that organization relates positively and directly to SMEs DAI. Organization with high top management support, high management innovativeness and high employee capability and knowledge leads huge impact towards SMEs DAI.

Organization with high top management support and innovativeness motivate the employees to adopt and use new technologies to exert high level of DAI. The result is consistent with the research of Purvis, Sambamurthy and Zmud (2010). In addition, the results of Maduku et al., (2016) stated that having employees with high capability and knowledge which strongly impact on DAI. Thus, the characteristics of organization equipped with experiences, knowledgeable and innovativeness personnel would enhance the DAI because of the ability to utilize the digital technologies.

Relationship between Environment and DAI

H3: There is a positive relationship between Organization and SMEs DAI.

The results (Standard Beta = -0.041, T-statistic = 0.475, P-value = 0.318) show that there is no significant positive relationship between Technology and DAI. H3 was not supported as the P-value was higher than 0.05.

By studying the relationship between environment and DAI, this research showed that environment might not be as robust as previous research suggests which stated in literature review. One possible explanation for this inconsistent is that the context of environment such as competitive pressure, government and vendor support has a minimal effect on DAI.

Digitalization is caused by globalization, it is not simply only supported by technologies tools to reduce the work loads of industries and organizations, it slowly immerses into our cultures and societies. For instances, smartphones allows us to call and text without physical presence, with

social media platforms users able to share new stories, with internet we can retrieve tons of information and more as digitalization has drastically change and improve our lifestyle compared to the past (Sutton, 2013).

In the 21st century, the period of information age, human has entered into the new era which known as technology era (Bryant, 2014). Society is worshiping technology as it offers vast of enormous benefits. Despite the intervention of government support, vendor support or competitive pressure are low, SMEs still embrace digital technologies as it is a new revolution of era. Conversely, under the pressure of the societies, SMEs are forced to adopt digitalization. A relevant example can be explained is whereby people discovered the mass produce by using technology in 19 centuries, the culture of American people start to change. People start to purchase good in store and no longer make from scratch and devoted more time to recreation activities such as theaters, social clubs and sports. The linkage between technology and culture is not just an American phenomenon; it can be seen around the world. Therefore, rising digital globalization is the dominant element of the environment context (Burley, 2011).

5.3 Implications of the study

5.3.1 Managerial Implication

There are numerous implications derived from this research that maybe useful for the Malaysian government.

The primary purpose of this research study is to explore how technology, organization, and environment will impact the SMEs digitalization adoption. Throughout this study, the statistic result shows that environment has no significant positive relationship with the adoption process. It is clear to understand that most of the organizations disregard environment such as government support, competitive pressure, and vendor support as a motive of digitalization adoption.

From the results, researchers concluded that the adoption of digitalization is lead by the characteristic of technology and organization. Technology that are less complexity, high relative advantages, and compatible are more likely will boost the adoption process. Moreover, organization with openness, innovativeness and knowledgeable management or personnel will increase the digitalization adoption process. It is clearly stated that the adoption of digitalization is based on the education and the experience of citizens. Thus, Malaysia government intervention in term of the education system is much paramount than financial support.

Although environment variable is not positively influence the digitalization adoption, researchers cannot assumed that government respond to digitalization adoption is not important. Contrary, the amendment of education development plan is a must to cater the need of contemporary society. Malaysia government education system should focus on teach the curriculum of the future, not the past. Problem solving, creative thinking, and digital skill are in greater need in today technology environment. The education system should focuses on teach the digital skill, and emphasized more on how to create the technology. Some of the old topic should be replaced because it is no longer essential in the future world.

Redefining the foundational education of Malaysia to keep up with the evolution of technology is essential. The government should nurtures the future generation with creative, collaborative and digital problem solving

skill of the future. Each school much included syllabus of computer science as part of the curriculum. Computer science is not just about coding, it comprised of data analysis, machine learning, networking and robotic. Generation Y , which is known as Gen Tech and generation Z will be the largest workforce in the future digital world (Verlinden, 2018). Therefore, nurturing these generations with highly capabilities of technology skill will enhance the digitalization adoption of SMEs.

Moreover, the ageing population should not be left behind the trend. Many industries of Malaysia are started by baby boomer and early Gen X in 70s and 80s (Tung & Comeau, 2014). They are still the decision maker in the most of the organizations. Both generations are heading to their retirement age and some of them are already above 65. Malaysia government should provide the digital courses in any University for the aging population. The courses should include the contemporary issue and knowledge of technology. This is initiative has done by China. China offered lifelong learning to China elderly and target to have at least one such institution by year of 2020 (Wen, 2017). The schools teach them how to use digital technology such as online shopping and extra. Only through continuing learning and upgrading knowledge, they will be better integrated into the contemporary society (Hua, 2017). In a nutshell, creating, instilling and nurturing a digital workforce and technology society eventually release the potential of digital economy.

5.4 Limitation of the Study

The researchers identified several limitations throughout this research. Each of the limitations will reveal as below.

First, this study neglected the drawbacks of digitalization. Many studies only indicate that digitalization bring enormous benefit to the company and society.

Limited studies emphasize on pin point out the disadvantages of digitalization. Researchers must include the side effect that digitalization brought to the company and society so that it will give a clear picture of their intention to adopt digitalization.

Second, majority of the respondents of this research are Chinese, which are homogeneous. Researchers found it difficult to engage in Malay owned company. Although this study met the objectives, it might be good if the researchers able to engage with Malay business owner. It could be ideal that if the researchers is provided with the list of Malay owner companies. This research could then be conducted with high reliability and validity that reflect the whole population of SMEs digitalization in Malaysia.

Third, researchers only can conduct the study in Klang Valley due to the time constraint. Questionnaires will only distribute to the target respondents who claimed themselves as management team. Some of them are in the confusion of their job level. Moreover, researchers encounter obstacles in making appointment with each of the business owners or top management. Therefore, the results are lack of affirmative and accuracy.

Fourth, insufficient time as the research was conducted in a very short period of time. Time is a paramount element. Researchers had force to scale down the target population in order to ensure the validity of the result. The result might be more validity and accuracy if the researchers are provided with longer time frame.

Fifth, the formative measure of the measurement model of this research only focused on those stated in the framework. Researchers are not able to provide a comprehensive study as there are too many other factors will affect the technology, organization, and environment that eventually affect the relationship between the digitalization adoption.

5.5 Recommendations for Future Research

There are several possible improvements to overcome the limitation discussed above. First, to identify the downside of digitalization, future studies are recommended to investigate digital capitalism. This is a hot topic that discussed the crisis of digitalization (Robinson, 2018). Robinson (2018) stated that digitalization and forth industrial revolution technology are creating a new capitalist restructuring, yet they also can create underlying crisis such as bubble to the world. Therefore, more in depth reasons hinder the digitalization adoption in Malaysia will be discovered.

Second, future studies are recommended to target the respondents from different ethnic. This required larger sample size in order to identify the better results. Sufficient sample size are more representative of the population (Lenth, 2001). Therefore, greater time commitment is required. Hence, increasing the sample size can avoid the misleading and bias result.

Third, in order to obtain more in-depth and clearer picture, this research could be replace by qualitative research. Researchers are able to obtain more reliable information from the target population through interview. By doing so, researchers can get more precise information and data from qualified respondents.
Lastly, in order to establish a more comprehensive result, the measurement model could added in more different measures, for instance, implementation and adoption cost, financial resource, consumer and partner readiness, age and size of organization, level of business type, and internet skill. Hence, more accurate findings will acquire in this field.

5.6 Conclusion

The research revealed that TECHNOLOGY and ORGANIZATION are positively related toward the SMEs digitalization adoption in Klang Valley, Malaysia. Nevertheless, there is no significant relationship between ENVIRONMENT and SMEs digitalization adoption. The result H3 indicates that the support of government, competitive pressure, and vendor support will not attract SMEs to adopt digitalization.

Digitalization is undergone massive promoting through globalization. It is the trend of future era in 21 centuries. Industrial economic has slowly become digital economy to prevent collapse. This is an era that required more high skill and high education labor force. Therefore, nurturing and equipped the society and generation with technology and knowledge is an only way to explore the potential of digital economy. Thus, researchers have outlined the managerial implication for Malaysia government in this research. Lastly, researchers also provided recommendation for future research.

REFERENCES

Abdollahzadegan, A., Hussin, C., Razak, A., Moshfegh Gohary, M., & Amini, M. (2013). The organizational critical success factors for adopting cloud computing in SMEs.

Abell, D. F. (1978). Strategic windows. *The Journal of Marketing*, 21-26.

Aboelmaged, M. G. (2014). Predicting e-readiness at firm-level: An analysis of technological, organizational and environmental (TOE) effects on e-maintenance readiness in manufacturing firms. *International Journal of Information Management*, *34*(5), 639-651.

Accenture Strategy and the Oxford Institute for Economic Research (2016) By 2020, digitalization will generate 2 trillion output for the world.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

Alkhater, N., Walters, R., & Wills, G. (2018). An empirical study of factors influencing cloud adoption among private sector organisations. *Telematics and Informatics*, *35*(1), 38-54.

Alsaadi, E., & Tubaishat, A. (2015). Internet of Things: Features, Challenges, and Vulnerabilities. *International Journal of Advanced Computer Science and Information Technology (IJACSIT)*, *4*(1), 1–13.

Alshamaila, Y., Papagiannidis, S., & Li, F. (2013). Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework. *Journal of Enterprise Information Management*, *26*(3), 250-275.

Alwin, D. F. (1997). Feeling thermometers versus 7-point scales: Which are better?. *Sociological Methods & Research*, *25*(3), 318-340.

Amini, M., & Bakri, A. (2015). Cloud Computing Adoption by SMEs in the Malaysia: A Multi-Perspective Framework Based on DOI Theory and TOE Framework.

Awa, H. and Kalu, S. (2010), "Repositioning the non-incremental changes and business strategic windows correlates", International Journal of Business and Management, Vol. 5 No. 2, pp. 184-193.

Asabere, N., & Enguah, S. (2012). Use of Information & Communication Technology (ICT) in Tertiary Education in Ghana: A Case Study of Electronic Learning (E-Learning). *International Journal of Information*, *2*(1), 62–68.

Baker, J. (2012). The technology–organization–environment framework. In *Information systems theory* (pp. 231-245). Springer, New York, NY.

Balocco, R., Miragliotta, G., Perego, A., & Tumino, A. (2011). RFId adoption in the FMCG supply chain: an interpretative framework. *Supply Chain Management: An International Journal*, *16*(5), 299–315.

Bank Negara Malaysia. (2013). Small and medium enterprise (SME) annual report 2012/13. Retrieved from http://www.smecorp.gov.my/vn2/node/717 (Accessed 19 April 2014).

Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models. *Long Range Planning*, *45*(5-6), 359-394.

Bhattacharya, M., & Wamba, S. F. (2018). A conceptual framework of RFID adoption in retail using TOE framework. In *Technology Adoption and Social Issues: Concepts, Methodologies, Tools, and Applications* (pp. 69-102). IGI Global.

Bloomberg, J. (2018, May 17). Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril. Retrieved April 19, 2018 from https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/#521c29f92f2c

Bollen, K. A. (1993). Bootstrapping goodness of fit measures in structural equation models. *Testing structural equation models*.

Bouwman, H., Nikou, S., Molina-Castillo, F. J., & de Reuver, M. (2018). The impact of digitalization on business models. *Digital Policy, Regulation and Governance*, *20*(2), 105-124.

Bryant, A. (2014, December). Thinking about the information age. In *Informatics* (Vol. 1, No. 3, pp. 190-195). Multidisciplinary Digital Publishing Institute.

Bryman, A. (2012). Social Research Methods 4e. Oxford, UK: Oxford University Press.

Buonanno, G., Faverio, P., Pigni, F., Ravarini, A., Sciuto, D., & Tagliavini, M. (2005). Factors affecting ERP system adoption: A comparative analysis between SMEs and large companies. *Journal of Enterprise Information Management*, *18*(4), 384-426.

Cantamessa, M., Montagna, F., & Neirotti, P. (2012). Understanding the organizational impact of PLM systems: evidence from an aerospace company. *International Journal of Operations & Production Management*, *32*(2), 191–215.

Chatterji, A. K., Findley, M., Jensen, N. M., Meier, S., & Nielson, D. (2016). Field experiments in strategy research. *Strategic Management Journal*, *37*(1), 116-132.

Chatzoglou, P., & Chatzoudes, D. (2016). Factors affecting e-business adoption in SMEs: an empirical research. *Journal of Enterprise Information Management*, *29*(3), 327-358.

Chaudhury, A., & Bharati, P. (2008). IT outsourcing adoption by small and medium enterprises: A diffusion of innovation approach. *AMCIS 2008 Proceedings*, 390.

Chin, W. W. (1997). Overview of the PLS Method. Retrieved April 19, 2018 from http://disc-nt.cba.uh.edu/chin/PLSINTRO.HTM

Chin, W. W. (1998). Commentary: Issues and opinion on structural equation modeling.

Chin, W.W. and Dibbern, J. (2010), "Handbook of partial least squares", in Esposito Vinzi, V., Chin, W.W., Henseler, J. and Wang, H. (Eds), Handbook of Partial Least Squares, Springer Berlin Heidelberg, Berlin, Heidelberg, pp. 171-193.

Chiu, C. Y., Chen, S., & Chen, C. L. (2017). An integrated perspective of TOE framework and innovation diffusion in broadband mobile applications adoption by enterprises. *International Journal of Management, Economics and Social Sciences (IJMESS)*, *6*(1), 14-39.

Chomba, C. (2017). The International Journal of Multi-Disciplinary Research E-Government, E-Democracy, Freedom of Information and Open Government Data in Sub-Saharan Africa: An Overview of Progress, Challenges and Remedies The International Journal of Multi-Disciplinary Res.

Clarysse, B., Wright, M., Bruneel, J., & Mahajan, A. (2014). Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems. *Research Policy*, *43*(7), 1164-1176.

Curtis, K. R. (2008). Conducting Market Research Using Primary Data. *Assessment and Strategy Development for Agriculture*.

Dahnil, M. I., Marzuki, K. M., Langgat, J., & Fabeil, N. F. (2014). Factors influencing SMEs adoption of social media marketing. *Procedia-social and behavioral sciences*, *148*, 119-126.

Davidsson, P., Hajinasab, B., Holmgren, J., Jevinger, Å., & Persson, J. A. (2016). The fourth wave of digitalization and public transport: Opportunities and challenges. *Sustainability (Switzerland)*, *8*(12).

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Dhobi, P. A., & Tevar, N. (2017). IoT based home appliances control. *2017 International Conference on Computing Methodologies and Communication (ICCMC)*, (Iccmc), 648–651.

Diamantopoulos, A., Riefler, P., & Roth, K. P. (2008). Advancing formative measurement models. *Journal of business research*, *61*(12), 1203-1218.

DI digital, IVI(MU), & SME, P. (n.d.). Digital Skills for SMEs. About the Grand Coalition for Digital Jobs

Dijkstra, T. K., & Henseler, J. (2015). Consistent Partial Least Squares Path Modeling. *MIS quarterly*, *39*(2).

Domingo Galindo, L. (2016). *The Challenges of Logistics 4.0 for the Supply Chain Management and the Information Technology* (Master's thesis, NTNU).

Dos Santos, B. L., & Peffers, K. (1998). Competitor and vendor influence on the adoption of innovative applications in electronic commerce. *Information & Management*, *34*(3), 175-184.

Duan, X., Deng, H., & Corbitt, B. (2012). Evaluating the critical determinants for adopting e-market in Australian small-and-medium sized enterprises. *Management Research Review*, *35*(3/4), 289-308.

Economic Census 2016, Department of Statistic, Malaysia, 2017. (2017). Chapter 1 The Malaysian Economy Special Highlights Economic Census 2016: Profile of SMEs.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*.

Frambach, R. T., & Schillewaert, N. (2002). Organizational innovation adoption: A multi-level framework of determinants and opportunities for future research. *Journal of business research*, *55*(2), 163-176.

Fraser, J., Fahlman, D. W., Arscott, J., & Guillot, I. (2018). Pilot Testing for Feasibility in a Study of Student Retention and Attrition in Online Undergraduate Programs. *The International Review of Research in Open and Distributed Learning*, *19*(1).

Froehle, C. M., & Roth, A. V. (2009). A Resource-Process Framework of New Service Development. *Production and Operations Management*, *16*(2), 169–188.

Gartner, G. (2015, June 23). Digitalization. Retrieved November 8, 2018, from https://www.gartner.com/it-glossary/digitalization/

Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information Management*, *28*(1), 107-130.

Gangwar, H., Date, H., & Raoot, A. D. (2014). Review on IT adoption: insights from recent technologies. *Journal of Enterprise Information Management*, *27*(4), 488-502.

Gastaldi, L., & Corso, M. (2012). Smart healthcare digitalization: Using ICT to effectively balance exploration and exploitation within hospitals. *International Journal of Engineering Business Management*, *4*(1), 1–13.

Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the association for information systems*, *4*(1), 7.

Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, *111*(8), 1238-1269.

Ghobakhloo, M., Hong, T. S., Sabouri, M. S., & Zulkifli, N. (2012). Strategies for successful information technology adoption in small and medium-sized enterprises. *Information*, *3*(1), 36-67.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, *18*(1), 185-214.

Gonçalves, A., Nascimento, L., Bouzada, M., & Pitassi, C. (2016). Factors that impact on the adoption and implementation of SPED in the evaluation of managers of Brazilian Companies. *JISTEM-Journal of Information Systems and Technology Management (Online)*, *13*(2), 193-218.

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. *The Milbank Quarterly*, *82*(4), 581-629.

Grover, V., & Goslar, M. D. (1993). The initiation, adoption, and implementation of telecommunications technologies in US organizations. *Journal of management information systems*, *10*(1), 141-164.

Gu, V. C., Cao, Q., & Duan, W. (2012). Unified Modeling Language (UML) IT adoption—A holistic model of organizational capabilities perspective. *Decision Support Systems*, *54*(1), 257-269.

Gunasekaran, A., & Ngai, E. W. (2008). Adoption of e-procurement in Hong Kong: an empirical research. *International Journal of Production Economics*, *113*(1), 159-175.

Gutierrez, A., Boukrami, E., & Lumsden, R. (2015). Technological, organisational and environmental factors influencing managers' decision to adopt cloud computing in the UK. *Journal of Enterprise Information Management*, *28*(6), 788-807.

Haag, S. (2014). Organizational inertia as barrier to firms' IT adoption–multidimensional scale development and validation.

Haenlein, M., & Kaplan, A. M. (2004). A beginner's guide to partial least squares analysis. *Understanding statistics*, *3*(4), 283-297.

Hagberg, J., Sundstrom, M., & Egels-Zandén, N. (2016). The digitalization of retailing: an exploratory framework. *International Journal of Retail & Distribution Management*, *44*(7), 694-712.

Hair, J. F., Black, W. C., Balin, B. J., & Anderson, R. E. (2010). Multivariate data analysis. London: Maxwell Macmillan International Editions.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, *19*(2), 139-152.

Hair, J. Wolfinbarger, M. Money, A. (2011). Essentials of Business Research Methods. 2nd-ed. New York: M.E. Sharpe. P34-56.

Harvie, C. (2010). East Asian production networks–the role and contribution of SMEs.

Harrison, D. A., Mykytyn Jr, P. P., & Riemenschneider, C. K. (1997). Executive decisions about adoption of information technology in small business: Theory and empirical tests. *Information systems research*, *8*(2), 171-195.

Hassan, H. (2013). *Factors affecting the extent of e-procurement use in small and medium enterprises in New Zealand: a thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Business Information Systems at Massey University, Manawatu Campus, New Zealand* (Doctoral dissertation, Massey University).

Hatta, N. N. M., Miskon, S., Ali, N. M., Abdullah, N. S., Ahmad, N., Hashim, H., ... & Maarof, M. A. (2015). Business intelligence system adoption theories in SMES: A literature review. *ARPN Journal of Engineering and Applied Sciences*, *10*(23), 18165-18174.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, *43*(1), 115-135.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing* (pp. 277-319). Emerald Group Publishing Limited.

Hoti, E. (2015). The technological, organizational and environmental framework of IS innovation adaption in small and medium enterprises. Evidence from research over the last 10 years. *International Journal of Business and Management*, *3*(4), 1-14.

Hsu, P. F., Ray, S., & Li-Hsieh, Y. Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management*, *34*(4), 474-488.

Hua, X. (2017, May 09). Education boost for China's aged. Retrieved September 20, 2018 from https://archive.shine.cn/nation/Education-boost-for-Chinas-aged/shdaily.shtml

International Telecommunication Union (ITU), 2016, Country ICT Data. Retrieved April 29, 2018 from https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

Jamali, S. K., Samadi, B., & Gharleghi, B. (2015). Factors Influencing Electronic Commerce Adoption: A Case Study of Iranian Family SMEs. *International Journal of Business and Social Science*, 6(2), 207-221.

Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of information technology*, *21*(1), 1-23.

Jehangir, M., Dominic, P. D. D., Naseebullah, & Khan, A. (2011). Towards digital economy: The development of ICT and E-commerce in Malaysia. *Modern Applied Science*, *5*(2), 171–178. https://doi.org/10.5539/mas.v5n2p171

Kamal, M. M. (2006). IT innovation adoption in the government sector: identifying the critical success factors. *Journal of Enterprise Information Management*, *19*(2), 192-222.

Karimi, D. A. K. (2013). What the Internet of Things (IoT) Needs to Become a Reality. *Freescale White Paper*, 16.

Keidanren (Japan Business Federation) (2016). Toward realization of the new economy and society: Reform of the economy and society by the deepening of Society 5.0. *Keidanren: Policy & Action*, 2016.

Kline, R. B. (2005). Principles and practice of structural equation modeling: Methodology in the social sciences.

Khasawneh, A. M. (2008). Concepts and measurements of innovativeness: The case of information and communication technologies. *International Journal of Arab Culture, Management and Sustainable Development, 1*(1), 23-33.

Khvilon, Evgueni, Patru, & Mariana. (n.d.). Information and communication technology in education: a curriculum for schools and programme of teacher development; 2004.

Klötzer, C., & Pflaum, A. (2017). Toward the development of a maturity model for digitalization within the manufacturing industry's supply chain.

Kugan (2017). Malaysia has the Slowest Average Mobile Internet Speed in Asia Pacific - Akamai. Retrieved June 18, 2018 from https://www.malaysianwireless.com/2017/06/akamai-malaysia-slowest-internet-speed/

Kuusisto, M. (2015). Effects of Digitalization on Organizations. *Tampere University of Technology*.

Kylasapathy, B. P., Hwa, T. B., Haris, A., & Zukki, M. (2018). Unlocking Malaysia' s Digital Future : Opportunities , Challenges and Policy Responses.

Laerd Statistic. (2013). Understanding Descriptive and Inferential Statistics. Retrieved August 18, 2018 from https://statistics.laerd.com/statisticalguides/descriptive-inferential-statistics.php

Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, *6*(4), 239-242.

Laukkanen, S., Sarpola, S., & Hallikainen, P. (2007). Enterprise size matters: objectives and constraints of ERP adoption. *Journal of enterprise information management*, *20*(3), 319-334.

Lee, J. (2004). Discriminant analysis of technology adoption behavior: A case of Internet technologies in small businesses. *Journal of computer information systems*, *44*(4), 57-66.

Lee, L. (2018). Becoming Digital-Native: IDC's Top 2018 Predictions Unveiled for Malaysia. Retrieved July 30, 2017, from https://www.enterpriseitnews.com.my/becoming-digital-native-idcs-top-2018-predictions-unveiled-for-malaysia/

Lee, S. G., Hwang, S. W., Kang, J. Y., & Yoon, S. (2014). Factors Influencing the Adoption of Enterprise Cloud Computing. *Internet Technology Journal 15*(1), 65-75.

Lee, Y., & Larsen, K. R. (2009). Threat or coping appraisal: determinants of SMB executives' decision to adopt anti-malware software. *European Journal of Information Systems*, *18*(2), 177-187.

Lenth, R. V. (2001). Some practical guidelines for effective sample size determination. *The American Statistician*, *55*(3), 187-193.

Leviäkangas, P. (2016). Digitalisation of Finland's transport sector. *Technology in Society*, *47*, 1-15.

Lip-Sam, T., & Hock-Eam, L. (2011). Estimating the determinants of B2B e-commerce adoption among small & medium enterprises. *International Journal of Business & Society*, *12*(1).

Li, W., Liu, K., Belitski, M., Ghobadian, A., & O'Regan, N. (2016). e-Leadership through strategic alignment: An empirical study of small-and medium-sized enterprises in the digital age. *Journal of Information Technology*, *31*(2), 185-206.

Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial management & data systems*, *111*(7), 1006-1023.

Marcati, A., Guido, G., & Peluso, A. M. (2008). The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations. *Research Policy*, *37*(9), 1579-1590.

Madakam, S. (2015). Internet of Things: Smart Things. *International Journal of Future Computer and Communication*, *4*(4), 250–253.

Maduku, D. K., Mpinganjira, M., & Duh, H. (2016). Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework. *International Journal of Information Management*, *36*(5), 711-723.

Malaysia Productivity Corporation. (2015). Malaysia : The Digital Economy. Empowering the Digital Wave to Enhance National Competitiveness and Productivity. Global Competitiveness Article.

Malaysia, S. C. (2013). Guideline for new SME definition. *National SME Development Council, Malaysia*.

Malaysian Administrative Modernisation and Management Planning Unit (2016). The Malaysian Public Sector ICT Strategic Plan 2016-2020, MAMPU, Putrajaya.

Mamatela, M. (2014). *An empirical study of the technological, organisational and environmental factors influencing South African medical enterprises' propensity to adopt electronic health technologies* (Doctoral dissertation).

Manyika, J., Lund, S., Bughin, J., Woetzel, J. R., Stamenov, K., & Dhingra, D. (2016). *Digital globalization: The new era of global flows* (Vol. 4). San Francisco: McKinsey Global Institute.

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing—The business perspective. *Decision support systems*, *51*(1), 176-189.

McKinnie, M. (2016). Cloud computing: TOE adoption factors by service model in manufacturing.

MDEC. (2017). Malaysian Businesses Must Accelerate Its Digital Transformation to Keep Up. Retrieved July 18, 2018, from https://mdec.my/blog/?p=80

Miller, M. (2008). *Cloud computing: Web-based applications that change the way you work and collaborate online*. Que publishing.

Monecke, A., & Leisch, F. (2012). semPLS: structural equation modeling using partial least squares.

Monitor, D. T. (2017). Industry 4.0 in Agriculture : Focus on IoT aspects, (July).

Musawa, M. S., & Wahab, E. (2012). The adoption of electronic data interchange (EDI) technology by Nigerian SMEs: A conceptual framework. *Journal of Business Management and Economics*, *3*(2), 55-68.

Ning, H., & Hu, S. (2012). Technology classification, industry, and education for Future Internet of Things. *International Journal of Communication Systems*, *25*(9), 1230–1241.

Oliveira, T., & Martins, M. F. (2010). Firms patterns of e-business adoption: evidence for the European Union-27. *Electronic Journal of Information Systems Evaluation*, *13*(1), 47.

Oliveira, T., & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *Electronic Journal of Information Systems Evaluation*, *14*(1), 110.

Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management*, *51*(5), 497-510.

Panji, A. (2014). 4 Challenge Business E-commerce di Indonesia, Tekno, Kompas. Retrieved from http://tekno.kompas.com

Papazafeiropoulou, A., & Pouloudi, A. (2000). The government's role in improving electronic commerce adoption. *ECIS 2000 Proceedings*, 188.

Pardiwala, A. (2016). Factors Affecting the Adoption of Production Digital Printing Technologies by Commercial Printers in India.

Parker, B. (2011). Business Strategy: Cloud Computing in Manufacturing. *IDC Manufacturing Insights*.

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. *International journal of information systems and project management*, *5*(1), 63-77.

Pavlou, P. A., & El Sawy, O. A. (2010). The "third hand": IT-enabled competitive advantage in turbulence through improvisational capabilities. *Information systems research*, *21*(3), 443-471.

Perego, A., Perotti, S., & Mangiaracina, R. (2011). ICT for logistics and freight transportation: a literature review and research agenda. *International Journal of Physical Distribution & Logistics Management*, *41*(5), 457–483.

Petrov, V., Samuylov, A., Begishev, V., Moltchanov, D., Andreev, S., Samouylov, K., & Koucheryavy, Y. (2017). Vehicle-Based Relay Assistance for Opportunistic Crowdsensing over Narrowband IoT (NB-IoT). *IEEE Internet of Things Journal*, (February), 1–1.

Pham, L., Pham, L. N., & Nguyen, D. T. (2011). Determinants of e-commerce adoption in Vietnamese small and medium sized enterprises. *International Journal of Entrepreneurship*, *15*

Pierce, J. L., & Delbecq, A. L. (1977). Organization structure, individual attitudes and innovation. *Academy of management review*, *2*(1), 27-37.

Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega*, *27*(4), 467-484.

Purvis, R. L., Sambamurthy, V., & Zmud, R. W. (2001). The assimilation of knowledge platforms in organizations: An empirical investigation. *Organization science*, *12*(2), 117-135.

Rahayu, R., & Day, J. (2015). Determinant factors of e-commerce adoption by SMEs in developing country: evidence from Indonesia. *Procedia-Social and Behavioral Sciences*, *195*, 142-150.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, *6*(2), 1-5.

Ramayah, T., Ling, N. S., Taghizadeh, S. K., & Rahman, S. A. (2016). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics*, *33*(1), 150-164.

Ramdani, B., Chevers, D., & A. Williams, D. (2013). SMEs' adoption of enterprise applications: A technology-organisation-environment model. *Journal of Small Business and Enterprise Development*, *20*(4), 735-753.

Raymond, L., & Blili, S. (1997). Adopting EDI in a network enterprise: the case of subcontracting SMEs. *European Journal of Purchasing & Supply Management*, *3*(3), 165-175.

Reinhard, G., Jesper, V., & Stefan, S. (2016). Industry 4.0: Building the Digital Enterprise. *2016 Global Industry 4.0 Survey*, 1-39.

Resnick, B. (2015). The definition, purpose and value of pilot research. *Geriatric Nursing*, *36*(2), S1-S2.

Richards, J. C., & Schmidt, R. W. (2013). *Longman dictionary of language teaching and applied linguistics*. Routledge.

Ringle, C. M., Sarstedt, M., & Straub, D. (2012). A critical look at the use of PLS-SEM in MIS Quarterly.

Rogers, E. M. (1962). Diffusion of innovations (1st ed.). Glencoe: Free Press.

Rogers, E. M. (1995). Diffusion of Innovations: modifications of a model for telecommunications. In *Die diffusion von innovationen in der telekommunikation* (pp. 25-38). Springer, Berlin, Heidelberg.

Rojko, A. (2017). Industry 4.0 concept: background and overview. *International Journal of Interactive Mobile Technologies (iJIM)*, *11*(5), 77-90.

Rubaneswaran, S. T. (2017). Why should Malaysia focus on Industry 4.0? Retrieved from June 20, 2018 http://www.smartinvestor.com.my/why-should-malaysia-focus-on-industry-4-0/

Sahin, I. (2006). Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *Turkish Online Journal of Educational Technology-TOJET*, *5*(2), 14-23.

Sani, I. (2017). Microsoft research: Malaysian banks slower in digital transformation compared to regional peers. Retrieved from http://english.astroawani.com/business-news/microsoft-research-malaysian-banks-slower-digital-transformation-compared-regional-peers-151004

Scupola, A. (2012). ICT adoption in facilities management supply chain: the case of Denmark. *Journal of Global Information Technology Management*, *15*(1), 53-78.

Sekaran, U., &Bougie, R. (2003). Research method of business (4th ed.). A Skill Building Approach. New York: John Willey & Sons.

Sekaran, U., & Bougie, R. (2010). Research methods for business: A skill building approach (5th ed.). Chichester, West Sussex: John Wiley and Sons Ltd.

Sekaran, U., & Bougie, R. (2013). Research methods for business: A skill building approach (6th ed.). Chichester, West Sussex: John Wiley & Sons, Inc

Shahawai, S. S., Hashim, K. F., & Idrus, R. Enterprise Resource Planning Adoption among Small Medium Enterprises (SME) in Malaysia.

Sharma, D. (2016). Why Digital Tech Is a Competitive Advantage for Small Businesses. Retrieved May 18, 2018 from https://www.forbes.com/sites/sap/2016/08/15/why-digital-tech-is-a-competitive-advantage-for-small-businesses/#541d0ecc3755

Shiels, H., McIvor, R., & O'Reilly, D. (2003). Understanding the implications of ICT adoption: insights from SMEs. *Logistics Information Management*, *16*(5), 312-326.

Simamora, B. H., & Sarmedy, J. (2015). Improving Services through Adoption of Cloud Computing at Pt Xyz in Indonesia. *Journal of Theoretical & Applied Information Technology*, *73*(3).

Sin Tan, K., Choy Chong, S., Lin, B., & Cyril Eze, U. (2010). Internet-based ICT adoption among SMEs: Demographic versus benefits, barriers, and adoption intention. *Journal of enterprise information management*, *23*(1), 27-55.

SME Corporation Malaysia. (2015). SME Developments and Outlook. SME Annual Report 2014/2015, 19–37. Retrieved from http://www.smecorp.gov.my/vn2/node/1856

Stahl, R. (2017). The difference between digitalisation, digitisation and digitalisation. Retrieved May 19 2018 from https://www.etmm-online.com/the-difference-between-digitalisation-digitisation-and-digitalisation-a-652820/

Sutton, B. (2013). The effects of technology in society and education.

Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Information & Management*, *55*(3), 308-321.

Taylor, M., & Murphy, A. (2004). SMEs and e-business. *Journal of small business and enterprise development*, *11*(3), 280-289.

Teo, T. S., Lim, G. S., & Fedric, S. A. (2007). The adoption and diffusion of human resources information systems in Singapore. *Asia Pacific Journal of Human Resources*, *45*(1), 44-62.

Thiesse, F., Staake, T., Schmitt, P., & Fleisch, E. (2011). The rise of the "next-generation bar code": an international RFID adoption study. *Supply Chain Management: An International Journal*, *16*(5), 328-345.

Thompson, V. A. (1965). Bureaucracy and innovation. *Administrative science quarterly*, 1-20.

Thurasamy, R., Mohamad, O., Omar, A., & Marimuthu, M. (2009). Technology adoption among small and medium enterprises (SME's): A research agenda. *World Academy of Science, Engineering and Technology*, *53*, 943-946.

Tornatzky, L. and Fleischer, M. (1990) The process of technology innovation, Lexington, MA, Lexington Books.

Trappey, A. J., Trappey, C. V., Govindarajan, U. H., Chuang, A. C., & Sun, J. J. (2017). A review of essential standards and patent landscapes for the Internet of Things: A key enabler for Industry 4.0. *Advanced Engineering Informatics*, *33*, 208-229.

Tung, L. C., & Comeau, J. D. (2014). Demographic Transformation in Defining Malaysian Generations: The Seekers (Pencari), The Buiders (Pembina), The Developers (Pemaju), and Generation Z (Generasi Z). *International Journal of Academic Research in Business and Social Sciences*, *4*(4), 383.

Vedel, I., Lapointe, L., Lussier, M. T., Richard, C., Goudreau, J., Lalonde, L., & Turcotte, A. (2012). Healthcare professionals' adoption and use of a clinical information system (CIS) in primary care: Insights from the Da Vinci study. *International journal of medical informatics*, *81*(2), 73-87.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Verlinden, N. (2018). The Future (of the) Workforce: Meet Generation Z. Retrieved July 20, 2018 from https://www.digitalhrtech.com/future-workforce-meet-generation-z/

Wamba, S. F. (2015). A Conceptual Framework of RFID Adoption in Retail Using TOE Framework A Conceptual Framework of RFID Adoption in Retail Using TOE Framework, *5*(1), 1–38. https://doi.org/10.4018/IJTD.2015010101

Weigelt, C., & Sarkar, M. B. (2009). Learning from supply-side agents: The impact of technology solution providers' experiential diversity on clients' innovation adoption. *Academy of Management Journal*, *52*(1), 37-60.

Wen, C. Y. (2017). Universities Offer Lifelong Learning to China's Elderly. Retrieved September 20, 2018 from http://www.sixthtone.com/news/1840/universities-offer-lifelong-learning-to-chinas-elderly

Wilson, H., Daniel, E., & Davies, I. A. (2008). The diffusion of e-commerce in UK SMEs. *Journal of marketing management*, *24*(5-6), 489-516.

World Bank Group. (2016). *World Development Report 2016: Digital Dividends*. World Bank Publications.

Wuebbeke, J., Meissner, M., Zenglein, M. J., Ives, J., & Conrad, B. (2016). Made in China 2025: The making of a high-tech superpower and consequences for industrial countries. *MERICS Papers on China*, (2), 76.

Yeh, C. H., Lee, G. G., & Pai, J. C. (2015). Using a technology-organization-environment framework to investigate the factors influencing e-business information technology capabilities. *Information Development*, *31*(5), 435-450.

Zainul, E. (2017). Small players slow to adopt big data. Retrieved April 25, 2018 from http://www.theedgemarkets.com/article/small-players-slow-adopt-big-data

Zhu, K., Dong, S., Xu, S.X, & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: cross-country evidence from the retail industry. *Information systems research*, *16*(1), 61-84.

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods*. Cengage Learning.

Zimmermann, V. (2016). SMEs and digitalisation: The current position, recent developments and challenges. KfW Research, 138, 1–7.

Zohrabi, M. (2013). Mixed Method Research: Instruments, Validity, Reliability and Reporting Findings. *Theory & practice in language studies*, *3*(2).

Appendix A: Survey Questionnaire

UNIVERSITI TUNKU ABDUL RAHMAN (UTAR)
FACULTY OF ACCOUNTANCY AND MANAGEMENT (FAM)

Bachelor of International Business (Hons)

Academic Research on Understanding SMEs Digitalization Adoption in Klang Valley

Survey Questionnaire

Dear respondents,

We are students from Universiti Tunku Abdul Rahman (UTAR), Faculty of Accountancy and Management (FAM), pursuing degree in Bachelor of International Business (Hons). We are currently conducting a study on "Understanding SMEs Digitalization Adoption in Klang Valley" for our final year project. The objective of this research project is to understand the contribution factors for digitalization adoption among SMEs in Klang Valley.

We appreciate that you could help us to complete the questionnaire. This questionnaire will only take you 10-15 minutes of your time.

Your response is important for us to complete our study. The information gathered from this questionnaire is strictly for academic purposes. We will assure that all information that you provided to us will be kept **PRIVATE AND CONFIDENTIAL**.

Thank you for your participation and cooperation in this study.

Yours faithfully

Raymond Disu (Student ID: 16UKB01021)
Yo Ming En (Student ID: 16UKB00042)

Section A General Information

1. What is the level of your current job position?

   ☐ Management ☐ Non- management

2. What is your age group?

   ☐ 18-24 years old ☐ 25-64 years old ☐ 65 years or above

3. Gender: ☐ Male ☐ Female

4. How long your company has been established?

   ☐Less than 5 years ☐Between 5 – 10 years ☐More than 10 years

5. What type of industry your organization is in?

   ☐Manufacturing ☐Services ☐Others

6. What type of ownership your company is?

   ☐Local-owned ☐Foreigner-owned ☐Others. Please specify _____

7. What is the size of your organization?

(Services and Others)	(Manufacturing)
☐Less than 5	☐less than 5
☐5 to 30 employees	☐5 to 75
☐30 to ⩽ 75	☐75 to ⩽ 200

8. To what extent you understand about digitalization?

   Digitalization is the process of leveraging digitization to improve business process.

   ☐ True ☐False ☐Not Sure

   Digitization means the process of converting information from a physical format into a digital version.

   ☐ True ☐False ☐Not Sure

9. Is your company currently using any kind of digital technologies?

   ☐If Yes, please proceed to question number 9

   ☐If No, please proceed to question number 10

10. Please indicate which types of software your company are currently using:

☐Cloud	☐Enterprise Resources Planning (ERP)	☐Information Security	☐Big Data Analytic
☐Financial Technology	☐E-commerce	☐Bloomberg	☐Adobe
☐Google Drive	☐LinkedIn	☐Dropbox	☐QQ
☐Others. Please state: _____			

11. Do you agree digitalization is obligated in today business environment?

☐Agree, digitalization will improve market competitive.

☐Disagree, digitalization is a waste of funds toward organization.

Section B: Construct Measurement

Based on each statement below, please **CIRCLE** on the most appropriate response to indicate the importance rating of attributes with the statement on a scale of 1 to 7 as below.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree

Digitalization Adoption Intention	Strongly ←→ Strongly Disagree Agree						
Our enterprise intends to adopt digitalization.	1	2	3	4	5	6	7
Our enterprise intends to start using digitalization regularly in the future.	1	2	3	4	5	6	7
Our enterprise would highly recommend digitalization for other enterprises to adopt.	1	2	3	4	5	6	7
Our enterprise intends to adopt digitalization to support business function such as accounting, product and service, warehousing and inventory, purchasing, electronic data interchange with trading partner and information sharing.	1	2	3	4	5	6	7
Technology: Relative Advantages	Strongly ←→ Strongly Disagree Agree						
Digitalization would enable our enterprise to market our products/services in a better way.	1	2	3	4	5	6	7
Digitalization would enable our enterprise to communicate with our customers effectively.	1	2	3	4	5	6	7
Digitalization facilitates better management of our business activities.	1	2	3	4	5	6	7
Digitalization reduces operational costs.	1	2	3	4	5	6	7

Digitalization improves competitive advantage.	1	2	3	4	5	6	7
Technology: Perceived Complexity	Strongly Disagree ←→ Strongly Agree						
The use of digitalization would be easy.	1	2	3	4	5	6	7
Digitalization would be easy for our marketing activities.	1	2	3	4	5	6	7
The skills needed to use digitalization would be easy for employees and our enterprise.	1	2	3	4	5	6	7
Interactions with digitalization are clear and understandable	1	2	3	4	5	6	7
It is easy to become skillful at using digitalization.	1	2	3	4	5	6	7
Technology: Compatible	Strongly Disagree ←→ Strongly Agree						
Digitalization adoption fits our organization's preferred way for conducting our business activities.	1	2	3	4	5	6	7
Digitalization adoption is consistent with the way our purchasing activities should be conducted.	1	2	3	4	5	6	7
Digitalization adoption is consistent with our business strategy.	1	2	3	4	5	6	7
Digitalization adoption is compatible with our information technology infrastructure.	1	2	3	4	5	6	7
Digitalization is a new business experience for our organization.	1	2	3	4	5	6	7
Organization: Top Management Support	Strongly Disagree ←→ Strongly Agree						
Top management would provide necessary resource such as fund for the adoption of digitalization.	1	2	3	4	5	6	7
Top management would provide necessary support for the adoption of digitalization.	1	2	3	4	5	6	7
Top management would be enthusiastic about adopting digitalization.	1	2	3	4	5	6	7
Top management provided strong leadership and engages in the process when it comes to information systems company.	1	2	3	4	5	6	7

Top management is willing to take risk involved in adoption of any kind of digital technology	1	2	3	4	5	6	7
Organization: Employee Capability and Knowledge	Strongly ←→ Strongly Disagree Agree						
I believe I would be capable of learning new digitalization related technology easily.	1	2	3	4	5	6	7
I believe I would be capable using any digital system to solve my company problem easily.	1	2	3	4	5	6	7
I believe I would be capable to use any kind of new digital system to interact with the customers.	1	2	3	4	5	6	7
I believe I would be capable to provide new ideas on any kind of new digital technology use for my enterprise.	1	2	3	4	5	6	7
I believe I have the knowledge and would be capable to start using any kind of new digital system.	1	2	3	4	5	6	7
Organization: Management Innovativeness	Strongly ←→ Strongly Disagree Agree						
Our management communicated the importance of the digitalization to meet the changing technology trends.	1	2	3	4	5	6	7
Our management makes the effort to convince others staff of the benefit of digitalization.	1	2	3	4	5	6	7
Management encourages other staff to use new technology system.	1	2	3	4	5	6	7
Management actively seeks innovation ideas.	1	2	3	4	5	6	7
Innovation is readily accepted in the organization.	1	2	3	4	5	6	7

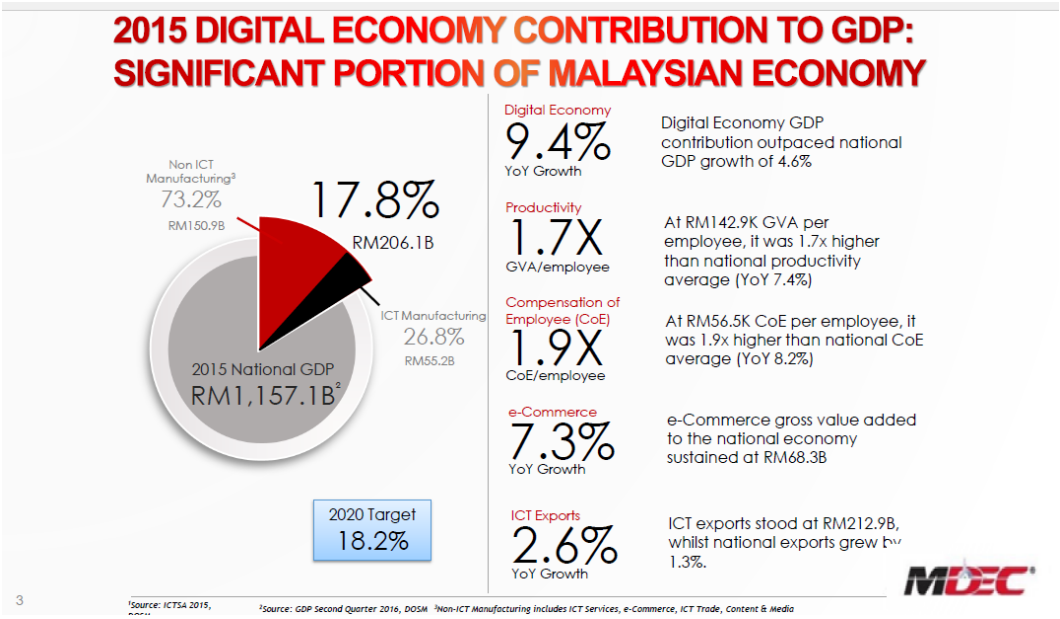
Environment: Competitive Pressure	Strongly ←→ Strongly Disagree Agree						
Our choice to adopt digitalization would be strongly influence by what competitors in the industry are doing.	1	2	3	4	5	6	7
Our enterprise is under pressure from competitors to adopt any kind of digital system.	1	2	3	4	5	6	7
Our enterprise has would adopt any kind of digital system in response to what competitors are doing.	1	2	3	4	5	6	7
Our enterprise would have experience competitive disadvantages if digitalization had not been adopted.	1	2	3	4	5	6	7
Our enterprise will lose customers to our competitors if we do not adopt digitalization.	1	2	3	4	5	6	7
Environment: Government	Strongly ←→ Strongly Disagree Agree						
Malaysia Government provides sufficient motivational programs.	1	2	3	4	5	6	7
Malaysia Government provides varieties of grants.	1	2	3	4	5	6	7
Malaysia Government offers subsidies.	1	2	3	4	5	6	7
Malaysia Government is adequately driving for the use of any digital system by providing incentive.	1	2	3	4	5	6	7
Malaysia Government demonstrates a strong commitment to promote digitalization.	1	2	3	4	5	6	7
Environment: Vendor Support	Strongly ←→ Strongly Disagree Agree						
There are third party provides technical support for effective use of digital technology.	1	2	3	4	5	6	7
There are agencies that provide training on digitalization.	1	2	3	4	5	6	7
Technology vendor actively market any kind of digitalization system by providing incentive for adoption.	1	2	3	4	5	6	7
Technology vendor promotes any kind of digitalization system by offering free training session.	1	2	3	4	5	6	7

THE END

THANK YOU FOR YOUR PARTICIPATION

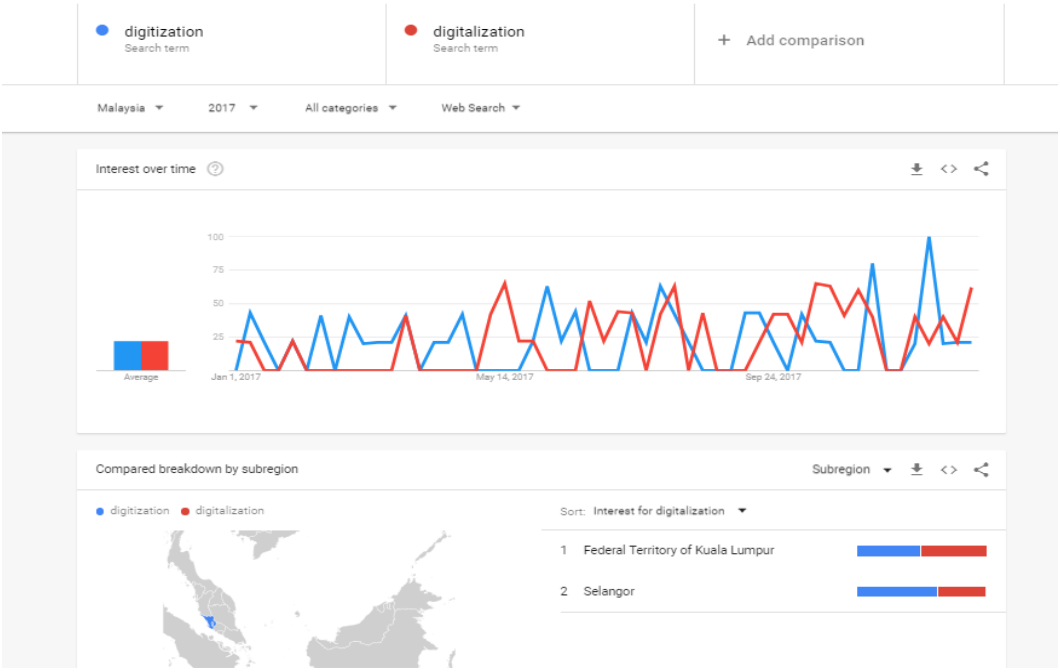
Appendix B: Tables and Figures

Appendix 1.1: Malaysia Digital Economy Contribution to GDP 2015

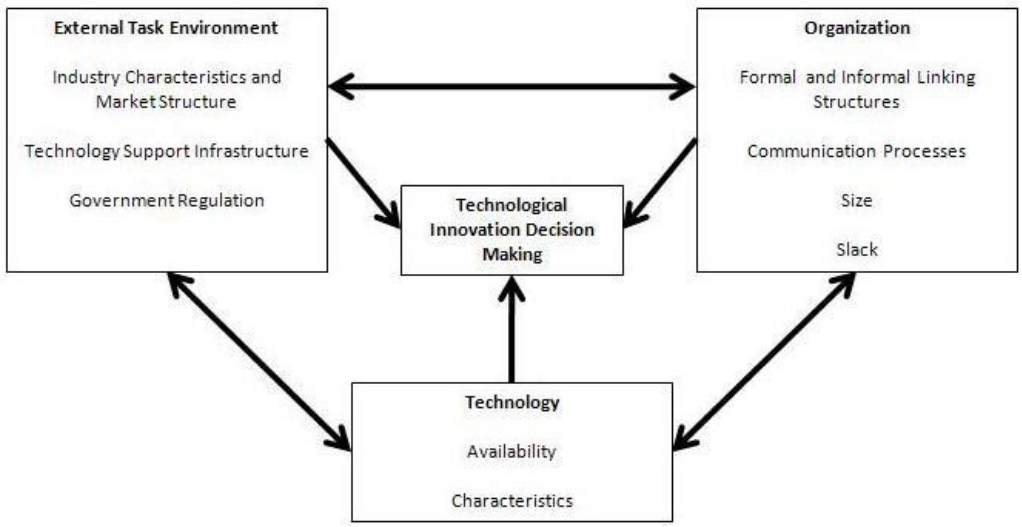


Appendix 1.2: Malaysia SMEs GDP Year 2016

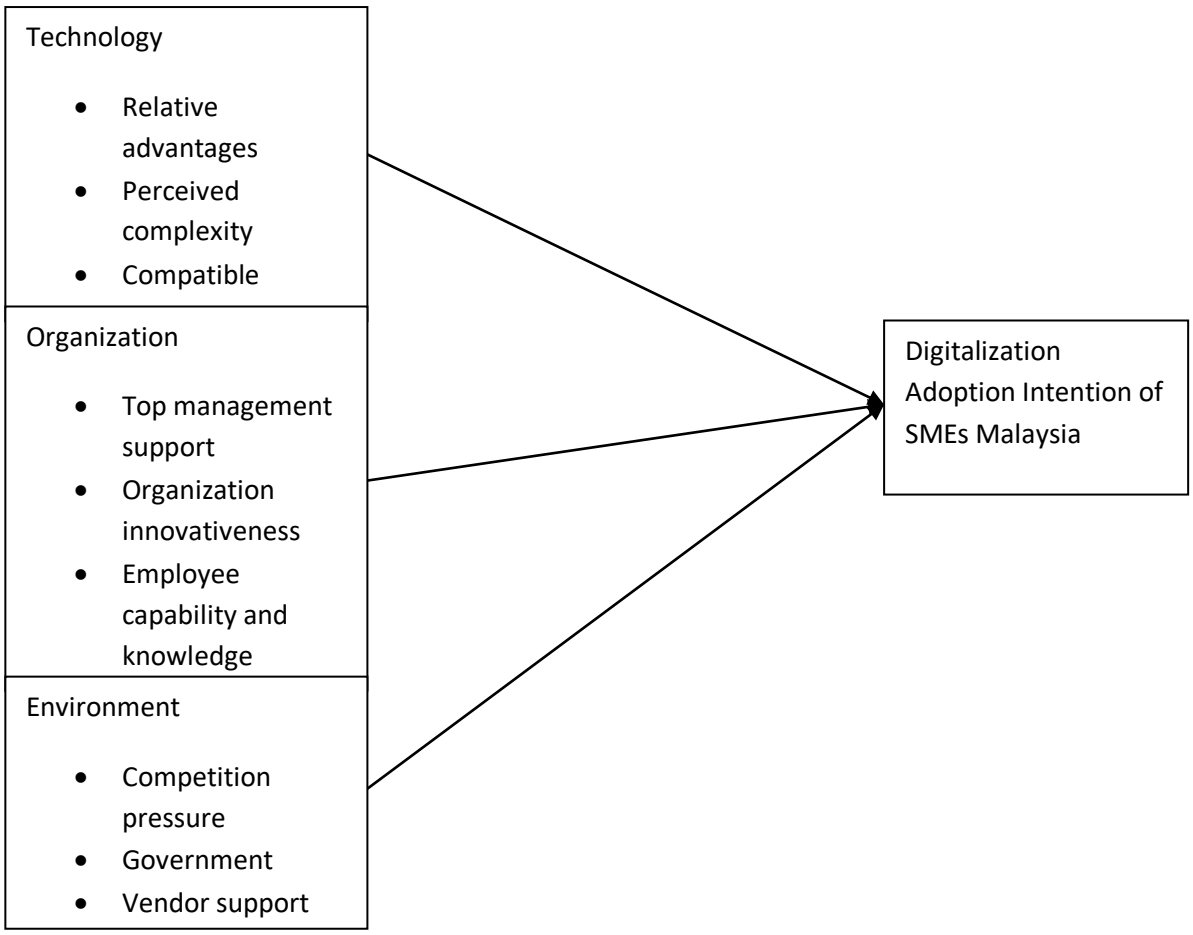
Appendix 1.3: Google Trend on Digitalization and Digitization in Malaysia



Appendix 2.1: T-O-E Framework



Appendix 2.2: Proposed Research Framework

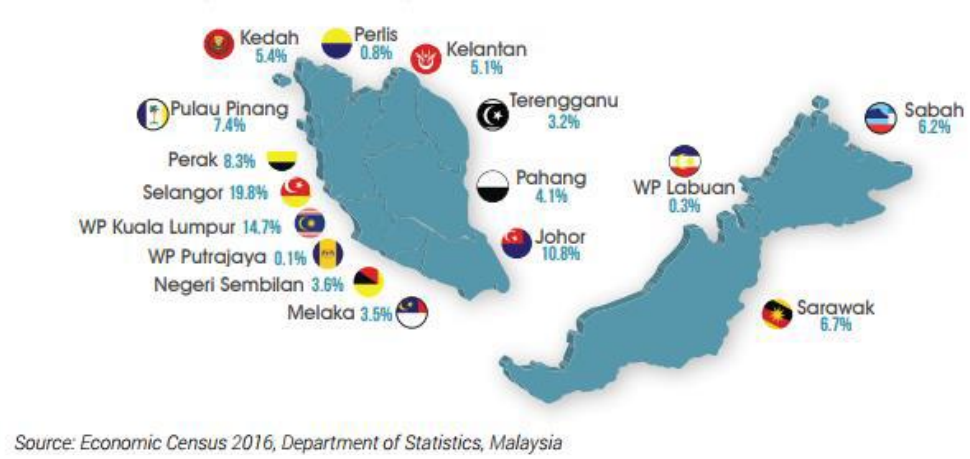


Appendix 3.1: Definition of SMEs Malaysia

Category	Manufacturing	Service and other sector
Micro	Sales turnover not exceeding RM300,000 or full time employees not exceeding 5	
Small	Sales turnover not exceeding RM 15 million or full time employees not exceeding 75	Sales turnover from not exceeding RM 3 million or full time employees not exceeding 30
Medium	Sales turnover not exceeding RM50 million or full time employees not exceeding 200	Sales turnover not exceeding Rm20 million or full time employees not exceeding 75

Appendix 3.2: Population of SMEs employment 2012-2016 Malaysia

Appendix 3.3: SMEs Rate in Malaysia



Appendix 3.4: Content of Questionnaire

Section	**Information**	**Items**	**Adopted from:**
A	General Information	11	Self-developed
B	Digitalization Adoption Intention	4	Mishra, Akman, andMishra (2014)
	Technology		
	-Relative Advantages	5	Ghobakhloo, Arias-Aranda, and Benitez-Amado (2011); Lian, Yen and Wang (2014)
	-Perceived Complexity	5	Ghobakhloo et al. (2011); Lian et al. (2014)
	-Compatible	5	Hassan (2013)
	Organization		
	-Top Management Support	5	Borgman et.al. (2014); Lian et al. (2014)
	-Employee Capability and Knowledge	5	Lin and Ho (2011)
	-Management Innovativeness	5	Mamatela (2014), Venkatesh & Bala (2012)

	Environment		
	-Competitive Pressure	5	Ifinedo (2011);Ghobakhloo,Arias-Aranda, andBenitez-Amado (2011), Wang, Li, Li, & Zhang (2016)
	-Government	5	Azam, (2015),Mamatela (2015)
	-Vendor Support	4	Wamba (2015)

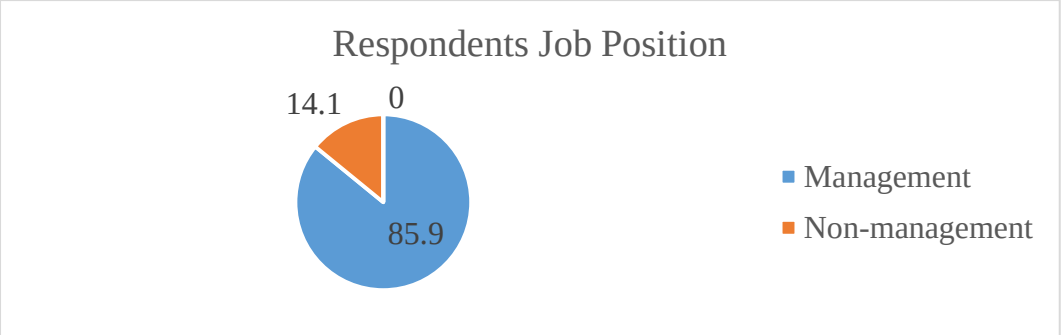
Appendix 3.5: Reliability Test

Validity Type	Criterion	Description
Internal consistency reliability	Composite Reliability	Should be above 0.7 (Hair et al., 2011)
Indicator reliability	Indicator Loading	Should be at least 0.6 and ideally higher than 0.7 (Henseler, Ringle and Sinkovics, 2009)

Appendix 4.1: Statistic of Respondents's current Job Position

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Management	171	85.9	85.9	85.9
Non-management	28	14.1	14.1	14.1
Total	199	100	100	

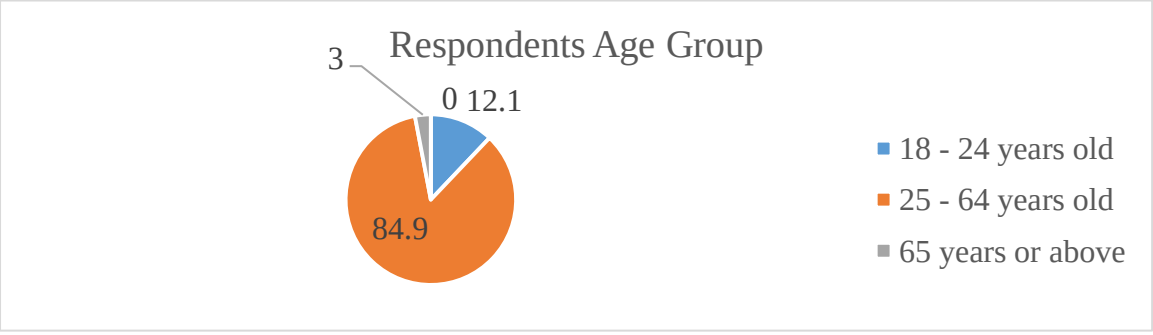
Appendix 4.2: Percentages of Respondents Based on Current Job Position



Appendix 4.3: Statistic of Age Group

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
18 – 24 years old	24	12.1	12.1	12.1
25 – 64 years old	169	84.9	84.9	84.9
65 years old above	6	3	3	3
Total	199	100	100	

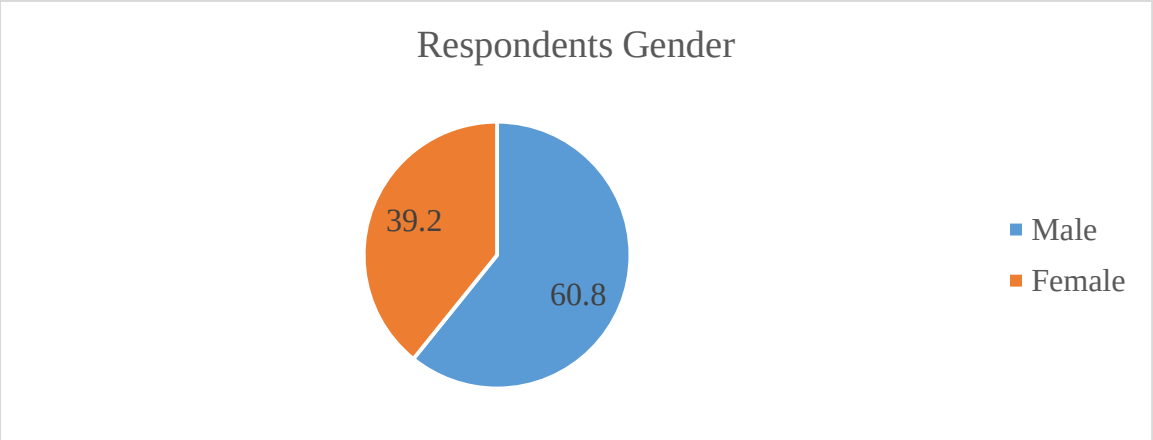
Appendix 4.4: Percentage of Respondent Based on Age Group



Appendix 4.5: Statistic of Respondents' Gender

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Male	121	60.8	60.8	60.8
Female	78	39.2	39.2	39.2
Total	199	100	100	

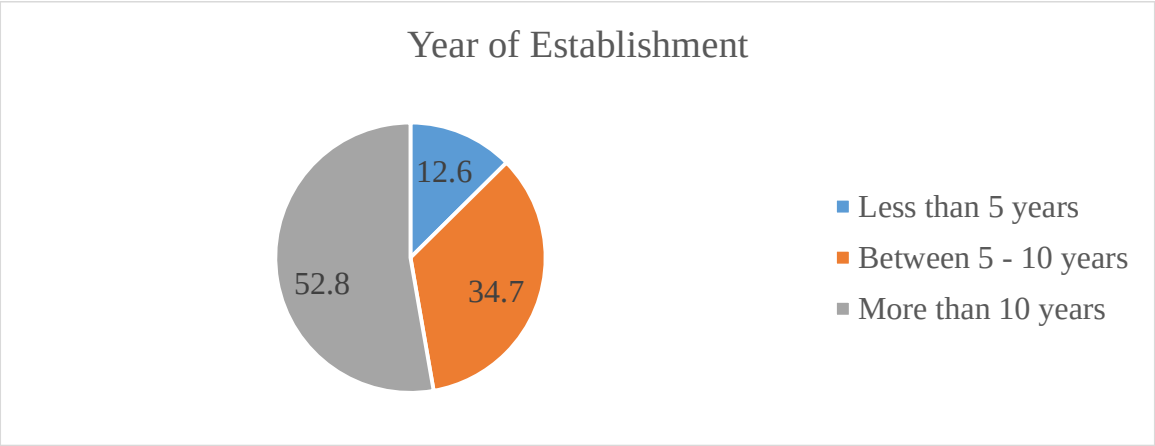
Appendix 4.6: Percentage of Respondent Based on Gender



Appendix 4.7: Statistic of Respondents' Company's Age

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5 years	25	12.6	12.6	12.6
Between 5 – 10 years	69	34.7	34.7	34.7
More than 10 years	105	52.8	52.8	52.8
Total	199	100	100	

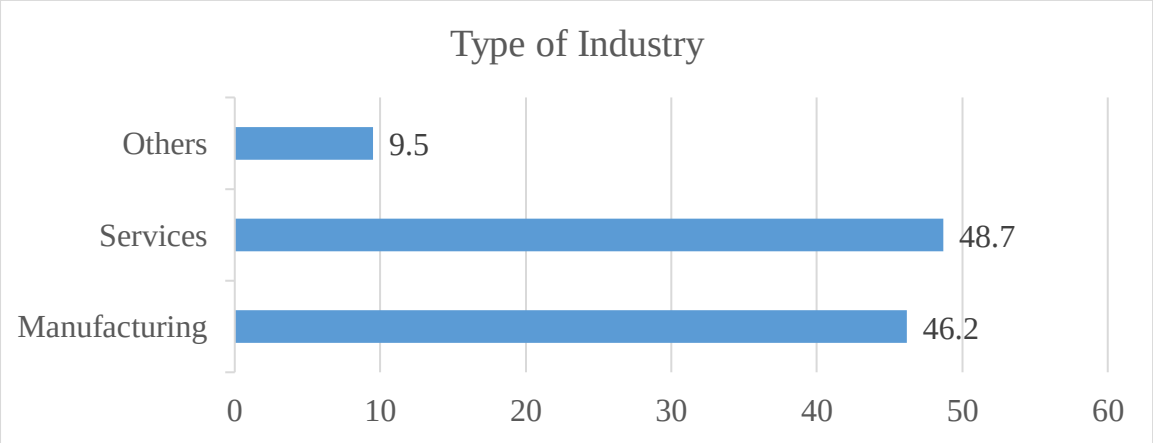
Appendix 4.8: Percentage of Respondent Based on Company's Age



Appendix 4.9: Statistic of Respondents' Type of Industry

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing	92	46.2	46.2	46.2
Services	97	48.7	48.7	48.7
Others	19	9.5	9.5	9.5
Total	208	104.4	104.4	

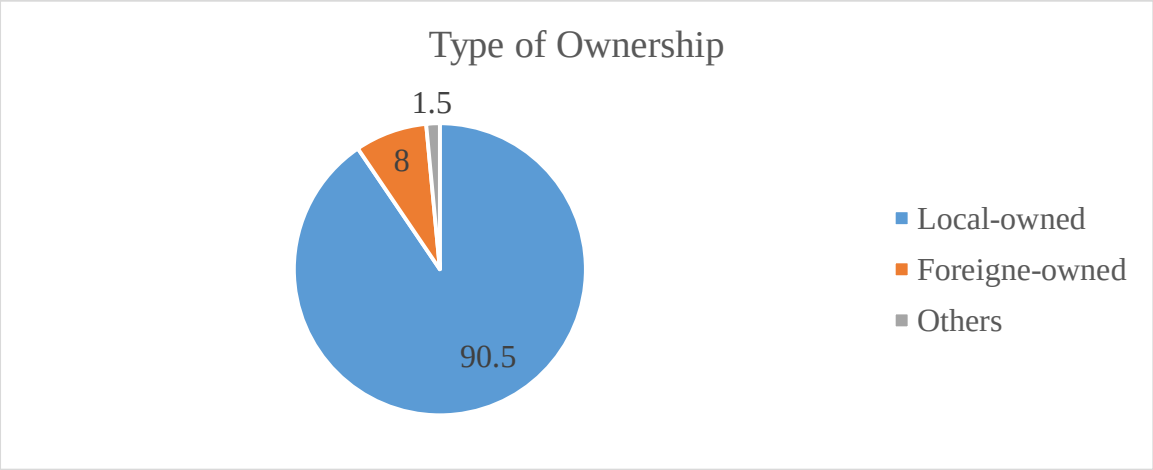
Appendix 4.10: Percentage of Respondent Based on Type of Industry



Appendix 4.11: Statistic of Respondents' Type of Ownership

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Local-owned	180	90.5	90.5	90.5
Foreign-owned	16	8	8	8
Others	3	1.5	1.5	1.5
Total	199	100	100	

Appendix 4.12: Percentage of Respondent Based on Type of Ownership

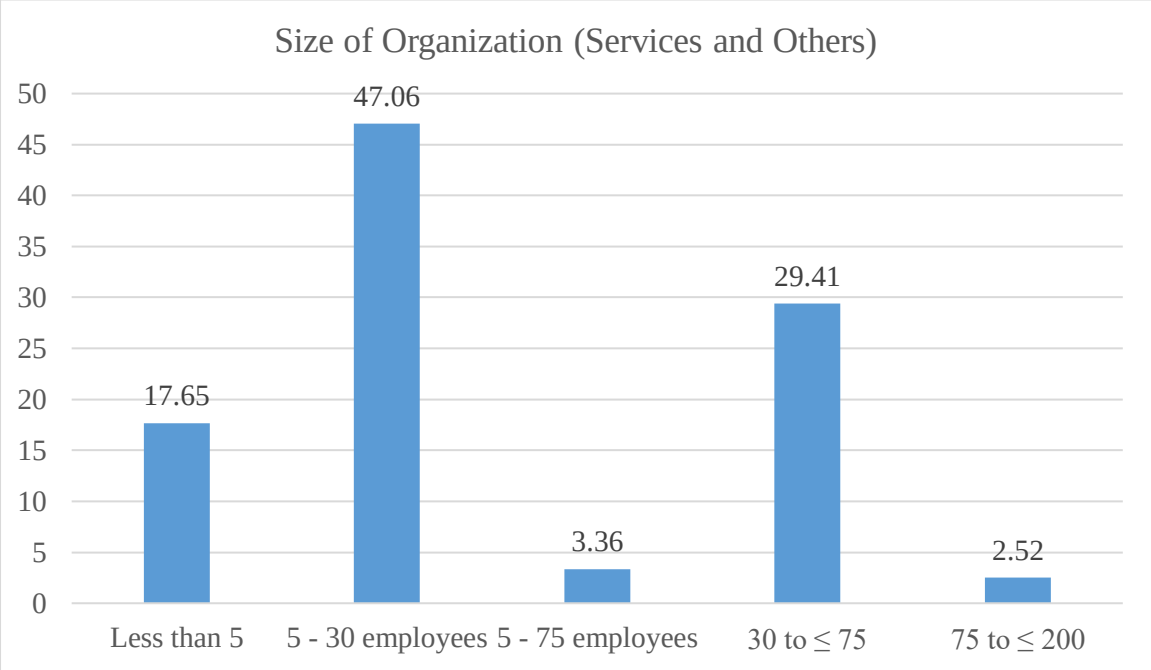


Appendix 4.13: Statistic of Respondents' Size of Organization (Services and Others)

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5	21	17.65	17.65	17.65
5 – 30 employees	56	47.06	47.06	47.06
5 – 75	4	3.36	3.36	3.36

employees				
30 to ≤ 75	35	29.41	29.41	29.41
75 to ≤ 200	3	2.52	2.52	2.52
Total	119	100	100	

Appendix 4.14: Percentage of Respondent Based on Size of Organization (Services and Others)

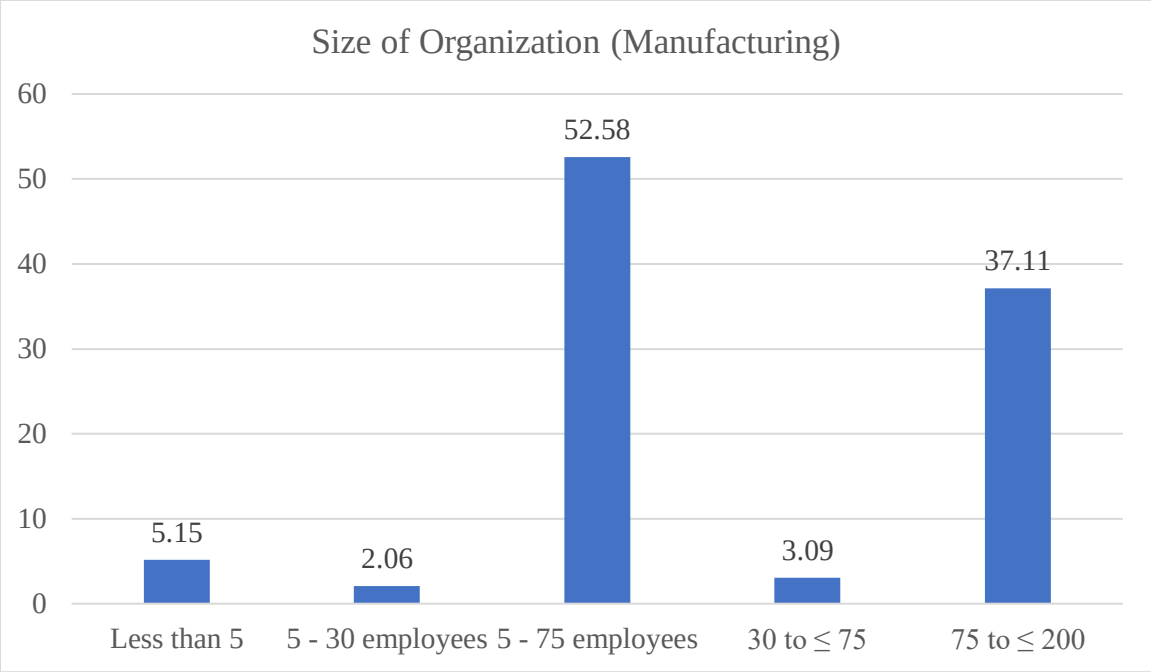


Appendix 4.15: Statistic of Respondents' Size of Organization (Manufacturing)

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5	5	5.15	5.15	5.15
5 – 30 employees	2	2.06	2.06	2.06
5 – 75 employees	51	52.58	52.58	52.58

30 to ≤ 75	3	3.09	3.09	3.09
75 to ≤ 200	36	37.11	37.11	37.11
Total	97	100	100	

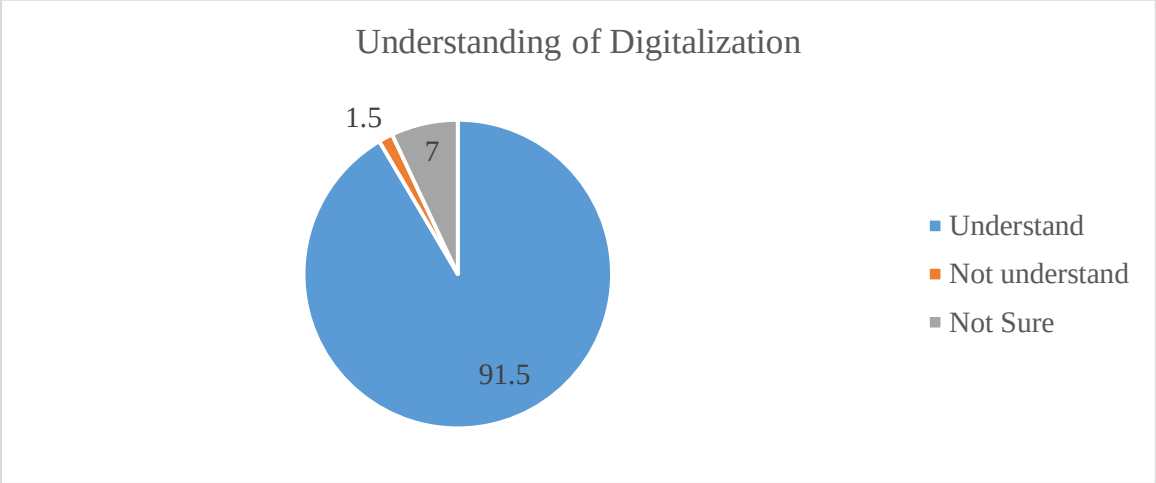
Appendix 4.16: Percentage of Respondent Based on Size of Organization (Manufacturing)



Appendix 4.17: Statistic of Respondents' Understandings of Digitalization

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
True	182	91.5	91.5	91.5
False	3	1.5	1.5	1.5
Not Sure	14	7	7	7
Total	199	100	100	

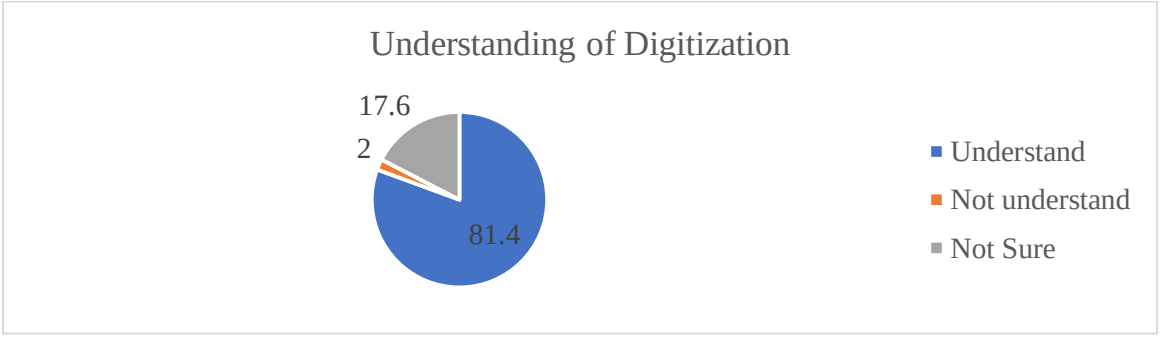
Appendix 4.18: Percentage of Respondent Based on Understandings of Digitalization



Appendix 4.19: Statistic of Respondents' Understandings of Digitization

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
True	162	81.4	81.4	81.4
False	2	1	1	1
Not Sure	35	17.6	17.6	17.6
Total	199	100	100	

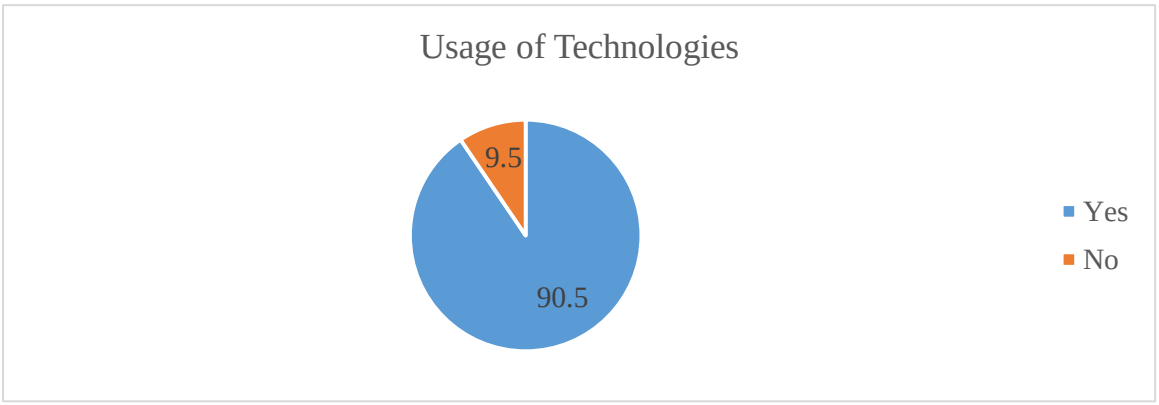
Appendix 4.20: Percentage of Respondent Based on Understandings of Digitization



Appendix 4.21: Statistic of Respondents' Usage of Digital Technologies

Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	180	90.5	90.5	90.5
No	19	9.5	9.5	9.5
Total	199	100	100	

Appendix 4.22: Percentage of Respondents Based on Usage of Digital Technologies

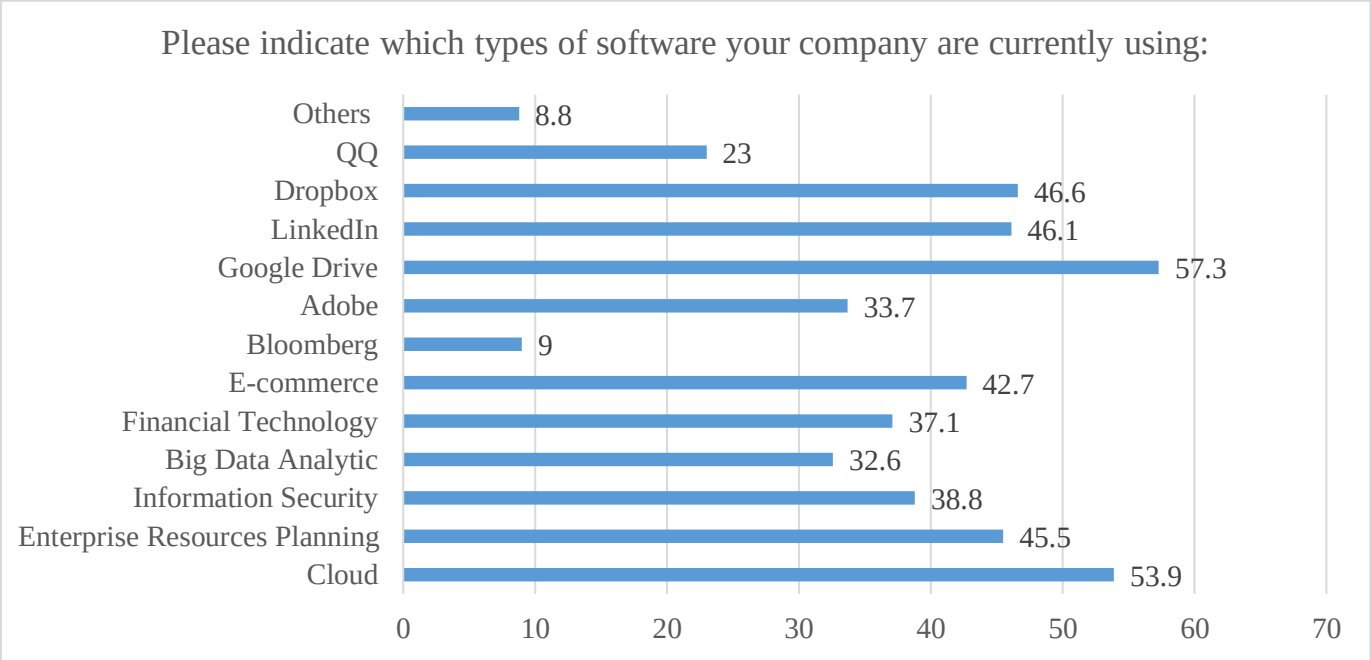


Appendix 4.23: Statistic of Respondents' Types of Software

	Frequency	Percent	Valid Percent	Cumulative Percent
Cloud	96	53.9	53.9	53.9
Enterprise Resources Planning	81	45.5	45.5	45.5
Information Security	69	38.8	38.8	38.8
Big Data Analytic	58	32.6	32.6	32.6
Financial Technology	66	37.1	37.1	37.1
E-commerce	76	42.7	42.7	42.7
Bloomberg	16	9	9	9

Adobe	60	33.7	33.7	33.7
Google Drive	102	57.3	57.3	57.3
LinkedIn	82	46.1	46.1	46.1
Dropbox	83	46.6	46.6	46.6
QQ	41	23	23	23
Others	15	8.8	8.8	8.8

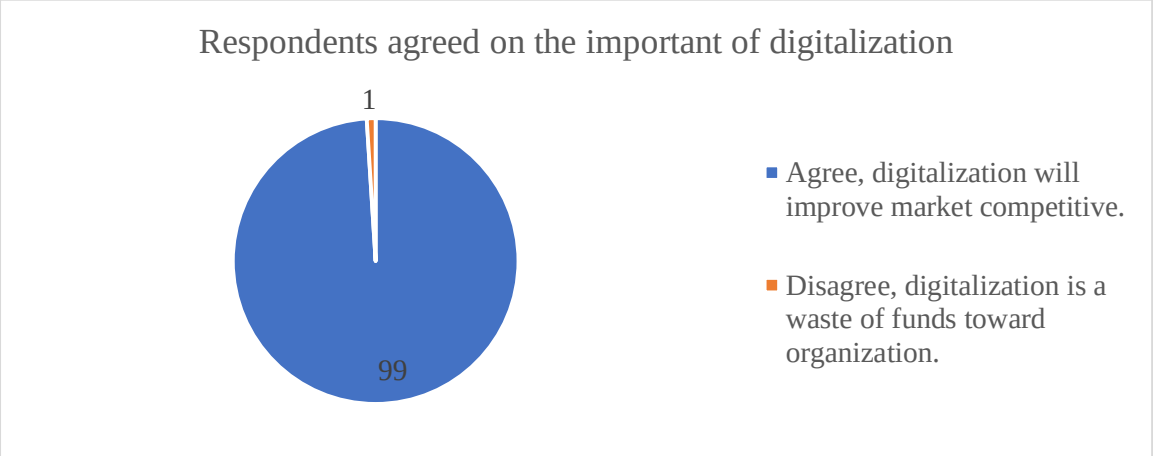
Appendix 4.24: Percentage of Respondents Based on Types of Software



Appendix 4.25: Statistic of Respondents' Importance of Digitalization in Today Business Environment

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree, digitalization will improve market competitive.	194	99	99	99
Disagree, digitalization is a waste of funds toward organization.	2	1	1	1
Total	196	100	100	

Appendix 4.26: Percentage of Respondent Based on Importance of Digitalization in Today Business Environment



Appendix 4.27: Central Tendencies Measurement of Constructs: Digitalization Adoption

Statement	Mean	Standard Deviation
Intention1	5.548	1.001
Intention2	5.673	0.966
Intention3	5.648	1.026
Intention4	5.849	0.991

Appendix4.28: Central Tendencies Measurement of Constructs: Relative Advantage

Statement	Mean	Standard Deviation
T_RA1	5.874	0.929
T_RA2	5.91	0.869
T_RA3	5.925	0.874
T_RA4	5.528	1.12

T_RA5	5.844	0.919

Appendix 4.29: Central Tendencies Measurement of Constructs: Perceived Complexity

Statement	Mean	Standard Deviation
T_PC1	4.769	1.185
T_PC2	4.98	1.178
T_PC3	4.799	1.315
T_PC4	4.628	1.401
T_PC5	4.628	1.368

Appendix 4.30: Central Tendencies Measurement of Constructs: Compatibility

Statement	Mean	Standard Deviation
T_COMP1	5.296	0.944
T_COMP2	5.342	0.926
T_COMP3	5.442	0.927
T_COMP4	5.543	0.949
T_COMP5	5.508	1.084

Appendix 4.31: Central Tendencies Measurement of Constructs: Team Management Support

Statement	Mean	Standard Deviation
O_TMS1	5.492	0.961
O_TMS2	5.548	0.954

O_TMS3	5.583	0.993
O_TMS4	5.523	0.997
O_TMS5	5.407	1.112

Appendix 4.32: Central Tendencies Measurement of Constructs: Management Innovativeness

Statement	Mean	Standard Deviation
O_MInno1	5.337	0.973
O_MInno2	5.317	1
O_MInno3	5.407	1.061
O_MInno4	5.362	1.093
O_MInno5	5.452	1.128

Appendix 4.33: Central Tendencies Measurement of Constructs: Employee Capability and Knowledge

Statement	Mean	Standard Deviation
O_ECK1	5.332	0.951
O_ECK2	5.271	0.975
O_ECK3	5.281	1.023
O_ECK4	5.291	1.092
O_ECK5	5.281	1.008

Appendix 4.34: Central Tendencies Measurement of Constructs: Competitive Pressure

Statement	Mean	Standard Deviation
E_CP1	5.467	0.861
E_CP2	5.271	1.016
E_CP3	5.337	1.076
E_CP4	5.513	1.07
E_CP5	5.427	1.258

Appendix 4.35: Central Tendencies Measurement of Constructs: Government

Statement	Mean	Standard Deviation
E_G1	4.196	1.325
E_G2	4.181	1.344
E_G3	4.01	1.543
E_G4	4.09	1.537

Appendix 4.36: Central Tendencies Measurement of Constructs: Vendor Support

Statement	Mean	Standard Deviation
E_VS1	5.302	0.967
E_VS2	5.342	0.969
E_VS3	5.307	1.103
E_VS4	5.151	1.31

Appendix 4.37: Internal Consistency and Convergent Reliability

Construct	Measure	Loading	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Digitalization Adoption Intention	DAI 1	0.911	0.934	0.937	0.953	0.835
	DAI 2	0.944				
	DAI 3	0.91				
	DAI 4	0.89				
T_Relative Advantages	T_RA1	0.895	0.864	0.872	0.909	0.716
	T_RA2	0.916				
	T_RA3	0.851				
	T_RA4	0.706				
T_Perceived Complexity	T_PC1	0.848	0.922	0.927	0.941	0.762
	T_PC2	0.863				
	T_PC3	0.895				
	T_PC4	0.898				
	T_PC5	0.861				
T_Compatible	T_COMP1	0.867	0.89	0.891	0.924	0.752
	T_COMP2	0.856				
	T_COMP3	0.888				
	T_COMP4	0.848				
O_Top Management Support	O_TMS1	0.769	0.923	0.923	0.942	0.765
	O_TMS2	0.781				
	O_TMS3	0.8				

	O_TMS4	0.738				
	O_TMS5	0.762				
O_Management Innovativeness	O_Minno 1	0.862	0.904	0.906	0.929	0.724
	O_Minno 2	0.891				
	O_Minno 3	0.851				
	O_Minno 4	0.883				
	O_Minno 5	0.763				
O_Employee Capability and Knowledge	O_ECK1	0.819	0.902	0.906	0.927	0.718
	O_ECK2	0.863				
	O_ECK3	0.861				
	O_ECK4	0.866				
	O_ECK5	0.825				
E_Competitive Pressure	E_CP1	0.796	0.885	0.889	0.916	0.685
	E_CP2	0.867				
	E_CP3	0.826				
	E_CP4	0.827				
	E_CP5	0.822				
E_Government	E_G1	0.935	0.949	0.952	0.963	0.867
	E_G2	0.94				
	E_G3	0.937				
	E_G4	0.912				
E_Vendor Support	E_VS1	0.856	0.875	0.876	0.914	0.727
	E_VS2	0.881				
	E_VS3	0.826				
	E_VS4	0.848				

Appendix 4.38: Heterotrait-Monotrait Ratio of Correlation (HTMT)

	COMP	CP	DAI	ECK	Government	Minnova	PC	RA	TMS	VS
COMP										
CP	0.431									
DAI	0.629	0.455								
ECK	0.568	0.371	0.417							
Government	0.403	0.203	0.149	0.33						
Minnova	0.641	0.419	0.522	0.544	0.341					
PC	0.408	0.283	0.173	0.433	0.519	0.364				
RA	0.624	0.41	0.765	0.397	0.148	0.488	0.301			
TMS	0.653	0.422	0.619	0.524	0.334	0.736	0.28	0.477		
VS	0.512	0.346	0.319	0.283	0.499	0.406	0.254	0.361	0.387	

Appendix 4.39: VIF Value

Construct	VIF
COMP	1.545
CP	1.111
ECK	1.402
MINNOVA	1.964
PC	1.172
RA	1.435
TMS	1.923
VS	1.354

Appendix 4.40: Result of Path Coefficient and Hypothesis Testing

Hypothesis		**Standard Beta**	**T-Statistic**	**P-Value**	**Decision**
H1	**Technology -> DAI**	0.470	4.983	0.000	Supported
H2	**Organization -> DAI**	0.289	3.02	0.001	Supported
H3	**Environment -> DAI**	-0.041	0.475	0.318	Not Supported

Appendix 4.41: Determine of Coefficient

	R^2
DAI	0.453

Appendix 4.42: Predictive Relevance

Predictive Relevance	Q^2
Technology	0.403
Organization	0.476
Environment	0.376
DAI	0.350

Appendix 5.1: Summary of the Result for Hypothesis Testing

Hypothesis		**Standard Beta**	**T-Statistic**	**P-Value**	**Decision**
H1	**Technology -> DAI**	0.470	4.983	0.000	Supported
H2	**Organization -> DAI**	0.289	3.02	0.001	Supported
H3	**Environment -> DAI**	-0.041	0.475	0.318	Not Supported