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DISSERTATION SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER IN MANAGEMENT (RESEARCH MODE)

FACULTY OF MANAGEMENT AND ECONOMIC
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ABSTRACT

This research aimed to identify the effects of Perceived Ease of Use (PEOU), Readiness (RD), and Resource Availability (RA) on the intention to adopt the Internet of Things (IoT) for marketing among Small and Medium Enterprises (SMEs) in Selangor. Selangor was chosen due to its high concentration of SMEs, making it the state with the largest number of such enterprises in Malaysia. A quantitative survey was conducted, using a sample of 387 respondents consisting of Chief Executive Officers, Board Members, and Managers who serve as decision-makers within these SMEs. The sample was identified through simple random sampling, descriptive data analysis, correlation, and multiple linear regression were applied to assess the effects of the variables. The findings revealed positive relationships between IoT adoption and PEOU ($r = 0.921$, $n = 387$, $p < .001$), RD ($r = 0.892$, $n = 387$, $p < .001$), and RA ($r = 0.686$, $n = 387$, $p < .001$). The high R-Square value of .993 significant F statistic confirm that Perceived Ease of Use, Readiness, and Resource Availability are all crucial predictors of IoT adoption intention among SMEs in Selangor for marketing purposes. These study highlights the significant influence of perceived ease of use and readiness on the intention to adopt IoT among SMEs in Selangor, while the nuanced role of resource availability. The findings of SME marketing professionals in Malaysia can make informed decisions about the factors most impact the intention to adopt IoT, thereby contributing to the broader understanding of new technology and IoT adoption.

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KESAN PERSEPSI KEMUDAHAN PENGGUNAAN (PEOU), KESEDIAAN (RD), DAN KETERSEDIAAN SUMBER (RA) TERHADAP HASRAT MENGGUNA PAKAI INTERNET PELBAGAI BENDA (IOT) UNTUK PEMASARAN DALAM KALANGAN PERUSAHAAN KECIL DAN SEDERHANA (PKS) DI SELANGOR

ABSTRAK

Penyelidikan ini bertujuan untuk mengenal pasti kesan Persepsi Kemudahan Penggunaan (PEOU), Kesediaan (RD), dan Ketersediaan Sumber (RA) terhadap hasrat mengguna pakai Internet Pelbagai Benda (IoT) untuk pemasaran dalam kalangan Perusahaan Kecil dan Sederhana (PKS) di Selangor, yang dipilih kerana mempunyai bilangan PKS terbesar di Malaysia. Kajian kuantitatif ini melibatkan 387 responden yang terdiri daripada Ketua Pegawai Eksekutif, Lembaga Pengarah, dan Pengurus sebagai pembuat keputusan dalam PKS, menggunakan persampelan rawak mudah dan dianalisis melalui analisis deskriptif, korelasi, serta regresi linear berganda untuk mengukur kesan pembolehubah. Dapatan menunjukkan hubungan positif antara penggunaan IoT dengan PEOU ($r = 0.921$, $n = 387$, $p < .001$), RD ($r = 0.892$, $n = 387$, $p < .001$), dan RA ($r = 0.686$, $n = 387$, $p < .001$), di mana nilai R Square yang tinggi sebanyak .993 dan statistik F yang signifikan mengesahkan bahawa Persepsi Kemudahan Penggunaan, Kesediaan, dan Ketersediaan Sumber merupakan peramal penting terhadap niat PKS untuk mengguna pakai IoT bagi tujuan pemasaran. Kesimpulannya, penemuan ini menyerlahkan pengaruh signifikan persepsi kemudahan penggunaan dan kesediaan terhadap hasrat penggunaan IoT dalam kalangan PKS di Selangor serta menunjukkan peranan penting ketersediaan sumber; profesional pemasaran PKS di Malaysia boleh menggunakan cerapan ini untuk membuat keputusan termaklum mengenai faktor utama yang mempengaruhi niat untuk menerima pakai IoT dan memperkaya badan pengetahuan tentang adopsi teknologi baharu serta IoT.

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
B2B	Business to business
BNM	Bank Negara Malaysia
CMS	Customer management services
CSFS	Critical Success Factors
DOI	Diffusion of Innovations Theory
GDP	Gross Domestic Product
IDR	Indonesian Rupiah
IoT	Internet of Things
METP	Malaysia Economic Transformation Program
MYR	Malaysian ringgit
NESDC	National Economic and Social Development Council
NPD	New product development
NSDC	National Skill Development Corporation
ODMS	Out Systems Deployment and Management Solutions
PEOU	Perceived ease of use
QR	Quick-response
RA	Resource availability

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RD	Readiness
RFID	radio frequency identification
RO	Research Objectives
SME	Small and Medium-sized Enterprise
TAM	Technology acceptance model
TOE	Technology -Organizational and Environment
TPB	Theory of planned behavior
TRL	technology readiness level

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CHAPTER 1

INTRODUCTION

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1.1 Introduction

The Internet of Things (IoT) offers significant potential for innovative applications due to its pervasive nature and advancing technologies. IoT can connect anything and anyone at any time and any place, using any path/network and any service. Information sensor devices and systems, the Internet, and various access networks are all part of the IoT, a giant intelligent network capable of providing real-time data and information. However, limited user acceptance could hinder its progress. Most studies focus on specific services, but a broader look at attitudes towards the use of IoT in business is needed.

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1.2 Background Research

The IoT enables various innovative applications, such as smart cities and smart homes (Marikyan et al., 2020). However, early IoT products were mostly existing objects with added sensors or tags, focusing on information collection, processing, and management (Lu et al., 2018). The success and future potential of IoT applications depend heavily on market demand and user acceptance (Kim & Kim, 2016). Based on the progression of how IT/IS was accepted previously, the lesson we could learn is that low user acceptance can hinder IoT implementation (Kim & Kim, 2016).

Thanks to Industry 4.0, manufacturing worldwide is moving from a labor-intensive environment to digitalization and automation according to the research (Frank et al., 2019) Cloud computing, cyber- physical systems, intelligent systems, IoT and robotics are all examples of manufacturing technologies that are contributing to the growing trend of automated data sharing and configuration or production reorganization (Kayikci, 2018). The goal of Industry 4.0 is to provide mass customization of manufactured goods through IT; to enable fully automatic adjustment and adaptation of the production process; track ingredients and products; improve communication between parts, machines and products; using human-computer interaction (HCI) models; and to achieve IoT-based manufacturing optimization in smart factories. The goal of Industry 4.0 is to establish “smart factories” where IoT and cloud technologies are used to improve and revolutionize industrial technology (Zhong et al., 2019).

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The phenomenon that happens when mobile networks, the internet, social networks, and smart products are connected in a manner that is beneficial to end users is referred to as the Internet of Things or IoT (Ande et al., 2020). This is something that can be accomplished across a wide range of network topologies (Cheng et al., 2017). The IoT is a network of linked computer devices and network protocols that enable commonplace objects, sensors, and other devices to generate, send, and analyze data with very little to no assistance from a human being. This system has the capability of connecting people, goods, and activities located all over the globe, which would lead to a rise in the level of global competition (Meneghello et al., 2019)

Businesses are also better able to provide global markets effectively and distribute goods and services to customers through the use of IoT (Harris & Dennis, 2002). The decisions made by business owners and managers play an essential part in the implementation of digital technologies like the IoT (Haddud et al., 2017). IoT creates new potential for businesses by linking real- world devices to a wide variety of sensors.

1.3 Problem Statement

In Malaysia, the economy is transitioning from a conventional, low-tech basic economy to a high- tech, digital economy. An economy that is built on digital computer technology is referred to as a digital economy. The ASEAN nations and the rest of the globe are now undergoing a spectacular sociological and economic revolution that is being driven by technological advancements in the shape of the digital economy. The

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growth of a nation's economy depends heavily on its Small Medium Enterprise (SME) businesses which are sometimes referred to as the "backbone" of an economy. As a developing nation, Malaysia is not an exception to this rule; for example, SMEs in Malaysia are now engaged in an active evolution to innovate and restructure their organizations in preparation for Industry 4.0 (Haddud et al., 2017).

The categorization of SME in Malaysia is based on the annual sales turnover and the number of employees as defined by the National SME Development Council (NSDC) in 2013. This definition covers all sectors such as manufacturing, service, mining, agriculture and others (SME Corp. Malaysia, 2023). Figure 1.1 below is an indicator of the categorization of enterprises in Malaysia for Micro, Small and Medium;

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Figure 1.1

Categorization of enterprises in Malaysia



Source from SME Corp. Malaysia

As of 2020 SME accounts for more than 97% of business establishments in the country. A large portion of SME is concentrated in the service sector (89.2%) (NESDC, 2021). The National Entrepreneur and SME Development Council (NESDC) report that in 2021 the highest number of SMEs by state is in Selangor (19.8%). This data is based

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on the National Economic Census data in 2016. Figure 1.2 below shows the percentage of SME based on each state in Malaysia.

Figure 1.2

Total number and percentage of SME in Malaysia

State	Total MSMEs	%
Selangor	179,271	19.8
WP Kuala Lumpur	133,703	14.7
Johor	98,190	10.8
Perak	75,140	8.3
Pulau Pinang	66,921	7.4
Sarawak	61,036	6.7
Sabah	55,702	6.2
Kedah	48,894	5.4
Kelantan	46,618	5.1
Pahang	37,573	4.1
N.Sembilan	32,721	3.6
Melaka	31,361	3.5
Terengganu	29,324	3.2
Perlis	6,808	0.8
WP Labuan	2,567	0.3
WP Putrajaya	1,236	0.1
Total MSMEs	**907,065**	**100.0**

Source: Economic Census 2016: Profile of Small and Medium Enterprises (reference year 2015), Department of Statistics, Malaysia

Source from NESDC, 2021

A survey by Bank Negara Malaysia (BNM) estimated that SME in Malaysia faces many barriers to stay competitive in the market. This is further explained by studies that SMEs' growth is hindered by financial difficulties, labour shortage, lack of technological adoption, high turnover, and difficulty in expanding the market (Hu, 2017). It is noteworthy that two of the issues mentioned are difficulty in expanding the

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market and lack of technology adoption. This study attempts to investigate two of these issues further, particularly on the use of IoT as a marketing tool.

Along with this, it has been observed that IoT base technology is responsible for providing different types of benefits to SME organizations (Miskiewicz, (2020). These benefits are responsible for reducing the overall cost of the different procedures followed in the business organization in order to perform the necessary business actions. Therefore, when the cost is reduced the yearly revenue of the company is increased. It has been observed that with the help of IoT-based technology the organizations under the SMEs category experienced around 15.7% growth in yearly revenues of the companies (SME Corp. Malaysia, 2023). Moreover, the gross income of the company is also increased which is about 22.3% per annum (SME Corp. Malaysia, 2023).

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When it comes to the difficulty that SMEs have in competing in today's contemporary economy, Malaysia is not alone in this regard. The problem is that there is not enough funding dedicated for marketing purposes, especially when compared to other firms that have been around for longer (Omary et al., 2020). When it comes to growing and reorganizing their firm into something that is more compatible with industry 4.0, these SMEs typically suffer with financial issues. When it comes to making use of the infrastructure linked with the IoT, small and medium- sized businesses in low- and middle-income nations are susceptible to large costs (Aheleroff et al., 2020).

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The organizations under the SMEs need to change their strategy in order to develop the market of the product as well as services provided by the SMEs. These changes are performed with the help of adopting different types of IoT- based technology (De Vass et al., 2021). Therefore, this IoT-based technology can be used in developing the process of collecting different types of data that help to understand the market approach.

Even though Industry 4.0 would generate economic advantages, there remain challenges to its intention to adopt. The early development of Industry 4.0 is a contentious issue among practitioners and researchers. Numerous scientific, economic, social, political, and technical dimensions may be used to recognize the challenges of Industry 4.0 (Ardito et al., 2019). During the preliminary phase of implementing Industry 4.0, organizations will confront barriers to adopting this new revolution that include acknowledging implementation necessity and preparing the corporation's transition procedures (Müller, Buliga, et al., 2018).

However, there is a lack of awareness about the use of IoT in the field of marketing and the significance of this application to the overall performance of marketing. Specifically, there is a lack of understanding regarding the usage of IoT in the domain of marketing. Therefore, the aim of the study is to provide an understanding of the perceived ease of use and resource availability factor to influence the adaptation of IoT in the SMEs.

Apart from that, there are different issues faced by the SMEs while installing advanced technology-based gadgets in the internal work culture of the SMEs (Lin et

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al., 2016). It is necessary to begin by taking into consideration, as internal factors, the capabilities possessed by IoT managers or users when attempting to establish a causal relationship between a dependent variable and an independent variable. The aim of the study is to provide an understanding of the organizational readiness factor to influence the adaptation of IoT in the SMEs.

The decision-makers and business owners who are more focused on these criteria are doing so in order to pick the eligibility of application and implementation of IoT by SMEs, as well as in order to acquire the anticipated advantages and challenges. Moreover, they are doing so in the marketers are needed to adopt the IoT in the process of making decision on evaluating the demand of the markets. In addition to this, decision-makers and business owners are acting in this manner to guarantee that they will be in a position to make the most sensible option possible about the action that should be taken next. This is the reason why they are taking this course of action.

It is possible that the owners and managers of SMEs will be better prepared to make decisions regarding the expansion of their marketing strategy if they gain an understanding of the impact that the incorporation of IoT has on the viability of marketing. This is because the managers are supposed to have gained an understanding regarding the benefits of adaptation and applying the IoT techniques. This is due to the fact that they will have a better understanding of the opportunities that are open to them, which is the primary reason why this is the case.

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1.4 Research Objectives

RO1: To identify the level for perceived ease of use in intention to adopt IoT for marketing among SMEs in Selangor

RO2: To identify the level for readiness in intention to adopt IoT for marketing among SMEs in Selangor

RO3: To identify the level for resource availability in intention to adopt IoT for marketing among SMEs in Selangor

RO4: To determine the effect of perceived ease of use on the intention to adopt IoT for marketing among SMEs in Selangor

RO5: To determine the effect of readiness on the intention to adopt IoT for marketing among SMEs in Selangor

RO6: To determine the effect of resources availability on the intention to adopt IoT for marketing among SMEs in Selangor

1.5 Research Questions

The research questions are developed on the basis of research objectives. Therefore, the research questions are described as follows:

RQ1: What is the level for perceived ease of use in in intention to adopt IoT for marketing among SMEs in Selangor?

RQ2: What is the level for readiness in intention to adopt IoT for marketing among SMEs in Selangor?

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RQ3: What is the level for resource availability in intention to adopt IoT for marketing among SMEs in Selangor?

RQ4: Does PEOU significantly affect the intention to adopt IoT? RQ5: Does RD significantly affect the intention to adopt IoT?

RQ6: Does RA significantly affect the intention to adopt IoT?

1.6 Research Hypothesis

H1: PEOU significantly affects the intention to adopt IoT. H2: RD significantly affects the intention to adopt IoT. H3: RA significantly affects the intention to adopt IoT.

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1.7 Conceptual Framework

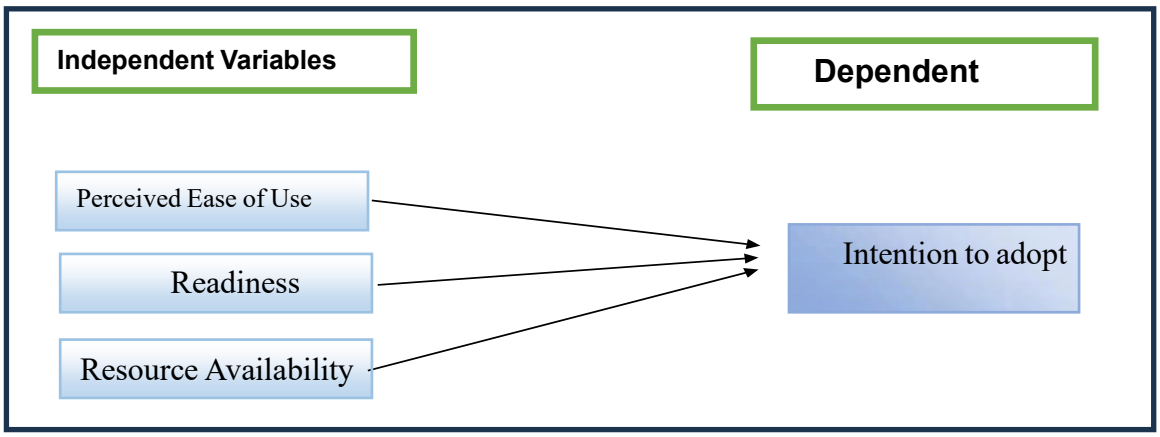
This study applies the Diffusion of Innovation (DOI) theory and Technology - Organizational and Environment (TOE) to determine the effect of IoT which impacts the SMEs in Selangor. Based on these two theories, the relationship between the dependent and independent variables is established. The established hypothesis is able to fulfil the main purpose of study on the effect of intention to adopt IoT for marketing among SMEs in Selangor.

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Figure 1.3

Conceptual framework



The above-developed framework describes the independent variables and the dependent variables as well. The dependent variables are the Intention to adopt Internet of Things. On the other hand, dependent variables are the Perceived Ease of Use, Readiness, and Resource Availability. All the above-discussed the effects of variables.

1.8 Operational Definitions

i. Intention to Adopt IoT

The *Intention to Adopt IoT* refers to the degree to which an organization is willing to implement and use IoT technologies within its operational processes. This intention is a predictive measure that indicates the likelihood of the organization moving forward with IoT integration, based on their evaluation of various influencing factors like

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perceived benefits, ease of use, organizational readiness, and resource availability (Gomes & Osman, 2019).

ii. Perceived Ease of Use

Perceived Ease of Use is the extent to which a person believes that using a particular system, such as IoT, would be free of physical and mental effort. This perception significantly influences the decision to adopt new technologies by affecting the user's attitude towards and the eventual use of the technology. It encompasses beliefs about the lack of complexity and the ease of integrating the new system into daily operations (Davis, 1989).

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iii. Readiness

Readiness refers to the preparedness of an organization to adopt and implement IoT technologies. This involves assessing the existing infrastructures, the mindset of employees, and the alignment of current business processes with the capabilities of IoT. Readiness is multifaceted, encompassing:

- **Technological Readiness:** The current state of technology systems that can support IoT.
- **Organizational Readiness:** The strategic preparedness, including leadership support and the alignment of IoT adoption with business objectives.

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- **Cultural Readiness:** The willingness of employees and the overall organizational culture to embrace changes brought about by IoT adoption (Hwang and Thorn, 1999).

iv. Resource Availability

Resource Availability indicates the extent to which an organization has the necessary resources, including financial, human, and technological, to successfully implement IoT solutions. Specifically:

- **Financial Resources:** The availability of monetary funds to invest in IoT hardware, software, and training.
- **Human Resources:** The presence of skilled personnel who can develop, deploy, and maintain IoT solutions.
- **Technological Resources:** The adequacy of physical and IT infrastructure to support IoT technologies (Boateng et al., 2011).

1.9 Research Limitation

This research focuses on identifying the effects of Perceived Ease of Use, Readiness and Resource Availability onto the intention to adopt IoT among SMEs in Selangor. The Economic Census 2011 indicates that nearly one-third of the SME established in the country are in the Selangor region (Malaysia, 2012). Based on Figure 1.2 (page 4)

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previously, Selangor have the highest percentage of SME's. Therefore, this study focuses on SMEs in Selangor. In relation to the focused population, it might compromise the reproducibility of this type of research. Thus, the findings of this study cannot be generalized in a different setting.

1.10 Research Significance

The research is significantly important for several reasons. Here's a detailed exploration of its significance as below: -

1. Enhancing Strategic Decision-Making in SMEs

This study provides insights into how perceived ease of use, readiness, and resource availability influence SMEs' decisions to adopt IoT in their marketing strategies. By understanding these factors, SMEs can make more informed strategic decisions about whether and how to integrate IoT technologies into their marketing practices. This leads to more effective planning and allocation of resources towards technology adoption (Hair et al., 2017).

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2. Driving Technological Innovation in Marketing

The study explores how IoT can be effectively used in marketing efforts among SMEs, a critical area for innovation and competitive advantage. Insights from this research can help SMEs leverage IoT to improve customer engagement, optimize marketing campaigns, and enhance data-driven decision-making, thereby boosting overall marketing performance (Kumar et al., 2015).

3. Contributing to Regional Economic Development

Focusing on SMEs in Selangor, this research provides localized insights that are crucial for regional economic and technological development. The findings can assist local policymakers and business development agencies in creating supportive environments for SMEs to adopt advanced technologies like IoT, thereby fostering regional innovation and economic growth (Lee & Lee, 2015).

4. Supporting Policy and Educational Initiatives

By identifying the key factors influencing IoT adoption in marketing among SMEs, this research can guide educational and policy-making initiatives. Educators and policymakers can use these insights to design targeted training programs and policies that address specific barriers to IoT adoption, enhancing the overall business ecosystem's resilience and adaptability (Gomes & Osman, 2019).

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5. Facilitating Digital Transformation

This study examines how different factors affect SMEs' readiness to adopt IoT, a cornerstone of digital transformation in marketing. Understanding these dynamics helps SMEs effectively integrate digital technologies into their operations, promoting a more robust digital economy and enhancing their long- term sustainability and competitiveness (Venkatesh, 2020). This research not only contributes to academic knowledge but also provides practical implications for SMEs, policymakers, and educators, particularly in Selangor, to better understand and facilitate the effective intention to adopt IoT in marketing strategies.

1.11 Summary

As IoT is the emerging technology innovation, this study aims to fulfil the gap in knowledge on how the government initiative has assisted SME in the country to adopt IoT in marketing. The research questions are driving this study will be the number of SME that have adopted IoT in marketing in Selangor. The variables are ease of use, readiness and resource availability. The relationship between factor influencing and adoption of IoT in marketing categories is to be investigated.

The chapter summary contains all the areas that are covered in the introduction chapter. Background of the research project is properly described in this chapter. Along with this research objectives as well as research questions are also developed. The main purpose of the research study is illustrated in a proper manner and along with thins

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conceptual framework, the significance of the study, limitation of the study is described in a brief manner.

Based on the above stated variable and research questions review of pass studies are required to fulfil the gap in knowledge. The theories and information received via the literature review is used to determine the relationship between the variables.

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CHAPTER 2

LITERATURE REVIEW

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2.1 Introduction

This chapter offers insights into the objectives of this study by leveraging arguments from prior research. It discusses the theories that inform the study's variables and provides a review based on earlier research. This section gives a general view of SMEs in Malaysia to understand the significance of IoT usage for small businesses in the country. Additionally, it highlights the challenges faced by SMEs in Malaysia and the mitigating factors due to the inclusion of IoT. The importance of marketing for SME development is reviewed, and the applications and benefits of IoT are explored.

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2.2 Theoretical Framework

The Theory of Planned Behaviour (TPB) is a psychological framework that explains individual behaviours through attitudes, subjective norms, and perceived behavioural control. This theory is pivotal in understanding how Small- Medium Enterprises (SMEs) approach the adoption of the Internet of Things (IoT) for marketing purposes. By applying TPB, SMEs can gain insights into customer behaviour, aiding in the development of more effective marketing strategies.

Understanding customer behaviour through TPB divides into three categories. Firstly, behavioural attitudes which TPB posits that positive attitudes towards IoT adoption can significantly influence SMEs' decision to integrate these technologies into their marketing strategies (Ajzen, 1991). This suggests that if SMEs perceive IoT as beneficial, they are more likely to adopt it (Ajzen, 1991). According to TPB, subjective norms is the perceived social pressure to perform or not perform the behaviour and also play a crucial role in influencing SMEs' decisions to adopt IoT (Ajzen, 1991). If influential stakeholders within the SME community advocate for IoT adoption, SMEs are more likely to proceed in that direction (Venkatesh, 2020).

Besides that, perceived behavioural control refers to the perceived ease or difficulty of performing the behaviour and is influenced by past experiences and anticipated impediments (Ajzen, 2020). SMEs that have the necessary resources and knowledge are more likely to adopt IoT technologies (Conner, 2020).

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SMEs can use TPB to strategically plan their IoT adoption by assessing the positive and negative attitudes toward IoT within their organization (Taylor, 1995). This approach helps SMEs to navigate potential barriers and enhances their readiness for technological advancements (Ajzen, 2020). By understanding customer attitudes and behaviours through TPB, SMEs can enhance customer engagement by aligning IoT functionalities with customer expectations (Venkatesh et al., 2003). Effective use of IoT based on these insights can lead to more personalized and responsive marketing strategies (Mital et al., 2018).

Challenges in applying TPB to IoT adoption to overcoming skepticisms and resistance. Resistance to technological change is a significant barrier; however, TPB can help SMEs understand the underlying causes of this resistance and address them effectively (Davis et al., 1989). Engaging with stakeholders and aligning IoT adoption with their expectations and beliefs can mitigate resistance and foster a more conducive environment for change (Conner, 2020). Furthermore, limited resources can restrict SMEs' ability to adopt IoT; however, TPB provides a framework for prioritizing resource allocation based on the attitudes and controls influencing adoption (Hair et al., 2017). By identifying key factors that influence IoT adoption intentions, SMEs can strategically invest in areas that yield the highest returns (Skafi et al., 2020).

By leveraging the Theory of Planned Behaviour, SMEs can more effectively understand and navigate the complexities of IoT adoption for marketing. This approach provides a structured way to assess and influence customer behaviour and organizational decision-making, ultimately leading to more strategic and successful integration of IoT into marketing practices.

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Numerous hypotheses have been established to characterize an individual's or an organization's adoption practices (Oliveira et al., 2014). The Technology Acceptance Model (TAM) according Davis (1989), the Technology- Organization-Environment (TOE) framework by Eveland and Tornatzky (1990), the Diffusion of Innovation (DOI) by A. Khan and Qudrat-Ullah (2020) and the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003) are examples of technology adoption models. These theories have been used by scholars to characterize both individual and organizational innovation adoption behaviours (Alkhalil et al., 2017).

This study reflects the growing need to use IoT to innovate within the SME industry. Understanding the determinants of intention to adopt IoT is fundamental as organizations consider adopting IoT for business process transformation or to support rapid application development in sectors like agriculture, healthcare, and manufacturing. The following sections describe TAM, DOI, TOE, and theorists' viewpoints on innovation characteristics using current publications and critically examine the extent to which these determinants influence the adoption of IoT technologies.

2.2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) has been foundational in understanding how individuals and organizations accept and use new technologies (Janssen et al., 2019). In the context of SMEs and their adoption of the Internet of Things (IoT) for marketing,

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TAM provides a critical lens to understand the facilitators and barriers to this technological adoption (Al-Adwan et al., 2022).

TAM suggests that two primary perceptions influence users' intentions to use a technology (Venkatesh et al., 2016). Perceived Ease of Use (PEOU), this is the degree to which a person believes that using a particular system would be free of effort (Abdullah et al., 2016). For SMEs considering IoT technologies for marketing, if these technologies are perceived as easy to use, they are more likely to be adopted (Almaiah et al., 2022). Ease of use is crucial because it reduces the cognitive burden on users and can lead to higher adoption rates (Huang et al., 2020). Perceived Usefulness (PU), this is the degree to which a person believes that using a particular system would enhance their job performance (Davis, 1989). For SMEs, this means believing that IoT will improve their marketing efforts (Blažinauskytė, 2024). If SMEs perceive significant benefits from IoT, such as improved customer insights or more efficient operations, their intention to adopt these technologies increases (Oliveira et al., 2014). TAM affects the intention to adopt IoT for marketing and influences the intention to adopt IoT for marketing among SMEs, consider the following pathway:

1. Influence of Perceived Ease of Use

When IoT technologies are perceived as easy to use, SMEs are more likely to explore and eventually adopt these technologies for marketing purposes (Almaiah et al., 2022). A user-friendly experience with IoT reduces the perceived complexity and risk associated with these technologies, facilitating adoption (Blažinauskytė, 2024). If an

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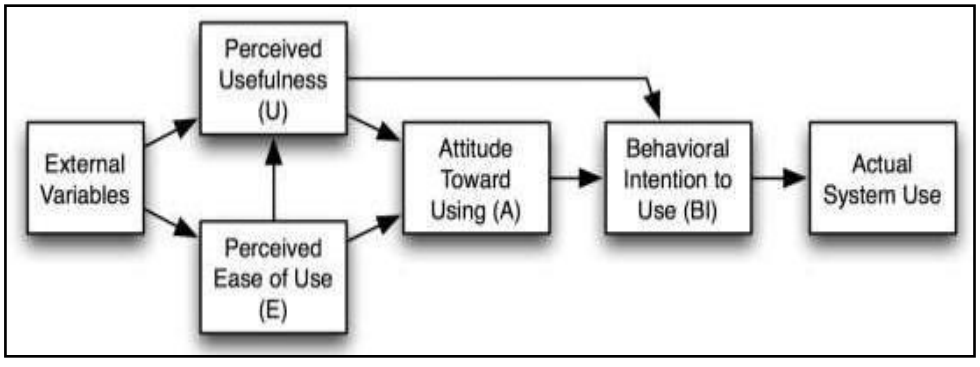
SME finds IoT devices and platforms straightforward and compatible with existing systems, the perceived ease of use will encourage its adoption for marketing activities (Maduakolam, 2022).

2. Influence of Perceived Usefulness

SMEs are more likely to adopt IoT for marketing if they believe it will lead to significant improvements in their marketing strategies and customer understanding (Oliveira et al., 2014). Benefits like improved customer segmentation, real-time marketing feedback, and enhanced campaign efficiency can increase IoT's perceived usefulness (Janssen et al., 2019). If SMEs perceive that IoT enables more targeted marketing campaigns and offers valuable customer insights, this perceived usefulness will drive its adoption (Ghobakhloo & Ching, 2019)

Figure 2.1

Technology Acceptance Model



(Source: Davis, 1989)

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Above is a diagram illustrating how Perceived Ease of Use and Perceived Usefulness directly influence the intention to adopt IoT in SME marketing strategies:

- **Perceived Ease of Use (PEOU):** Directly affects the attitude toward using IoT, making it a critical factor in adoption decisions (Venkatesh et al., 2003)
- **Perceived Usefulness (PU):** Directly influences the behavioural intention to use IoT for marketing (Sum, 2023).
- **Behavioural Intention to Use:** The likelihood that SMEs will employ IoT technologies in their marketing efforts (Ajzen, 2020).

Recent research underscores the importance of aligning marketing strategies with technological capabilities. The expanded TAM model and foundational theories such as DOI and UTAUT continue to provide a robust framework for understanding technology adoption, including IoT in SMEs (Al- Adwan et al., 2022).

The dynamic between customer attitudes and marketing products in the digital age has been analyzed using TAM, revealing how customer engagement and digital interface usability impact customer behaviour and business outcomes (Foroudi et al., 2018).

This framework sets the stage for a comprehensive analysis of IoT adoption in SMEs, highlighting how understanding customer behavior, resource allocation, and technological readiness can significantly enhance strategic planning and operational efficiency in the digital era.

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2.2.2 Diffusion of Innovations Theory

The Diffusion of Innovations (DOI) theory, developed by Everett Rogers, explains how, why, and at what rate new ideas and technology spread through cultures. For SMEs considering adopting IoT for marketing, the DOI theory offers valuable insights into the various factors that influence this innovative technology's adoption rate (Hair et al., 2017).

DOI theory suggests that the adoption of new technologies is influenced by five key elements (Almaiah, Alfaisal, et al., 2022).

1. **Innovativeness:** Refers to how potential adopters perceive the innovation as new. SMEs' perception of IoT as a novel solution can significantly impact their willingness to adopt it for marketing purposes (Almaiah, Alfaisal, et al., 2022).
2. **Relative Advantage:** The degree to which an innovation is seen as better than the preceding idea. If SMEs perceive IoT as superior to traditional marketing tools, their likelihood of adoption increases (Almaiah, Alfaisal, Salloum, Al-Otaibi, et al., 2022).
3. **Compatibility:** How consistent the innovation is with the values, experiences, and needs of potential adopters. IoT needs to align with SMEs' existing marketing practices and business operations to be adopted (Almaiah, Alfaisal, et al., 2022).
4. **Complexity or Simplicity:** The ease of understanding and using the innovation. Less complex IoT solutions are more likely to be adopted by SMEs for marketing (Almaiah, Alfaisal, et al., 2022).

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5. **Trialability:** The extent to which an innovation can be experimented with on a limited basis. IoT products that offer trials or pilot programs encourage SMEs to test these solutions in their marketing strategies without significant initial investment (Almaiah, Alfaisal, et al., 2022).
6. **Observability:** The visibility of the results of an innovation to others. The more observable the benefits of IoT for marketing, the more likely SMEs are to adopt this technology (Almaiah, Alfaisal, et al., 2022).

DOI theory specifically influences the intention of SMEs to adopt IoT for marketing. SMEs that are open to innovation and are early adopters within their industry are more likely to embrace IoT for marketing (Suciu (Vodă) et al., 2021). Innovativeness encourages businesses to explore new technologies to gain a competitive edge, making them more inclined to try IoT solutions (Lo & Campos, 2018). When IoT is perceived as providing a significant advantage over existing marketing tools, SMEs are more likely to adopt it (Koketso Chabalala et al., 2024). Benefits like improved customer engagement and optimized marketing campaigns can heighten the perceived advantage of IoT (Bresciani et al., 2021). If IoT aligns well with SMEs' existing marketing strategies and customer relationship management, its adoption is more likely (Salah & Ayyash, 2023).

Compatibility reduces the perceived disruption and facilitates smoother integration of IoT into marketing operations (Díaz-Arancibia et al., 2024). Less complex IoT solutions that are easier to understand and use are more likely to be adopted by SMEs (Kallmuenzer et al., 2024). Simplicity in technology usage is key to encouraging SMEs to adopt IoT for enhancing their marketing efforts (Ghosh et al.,

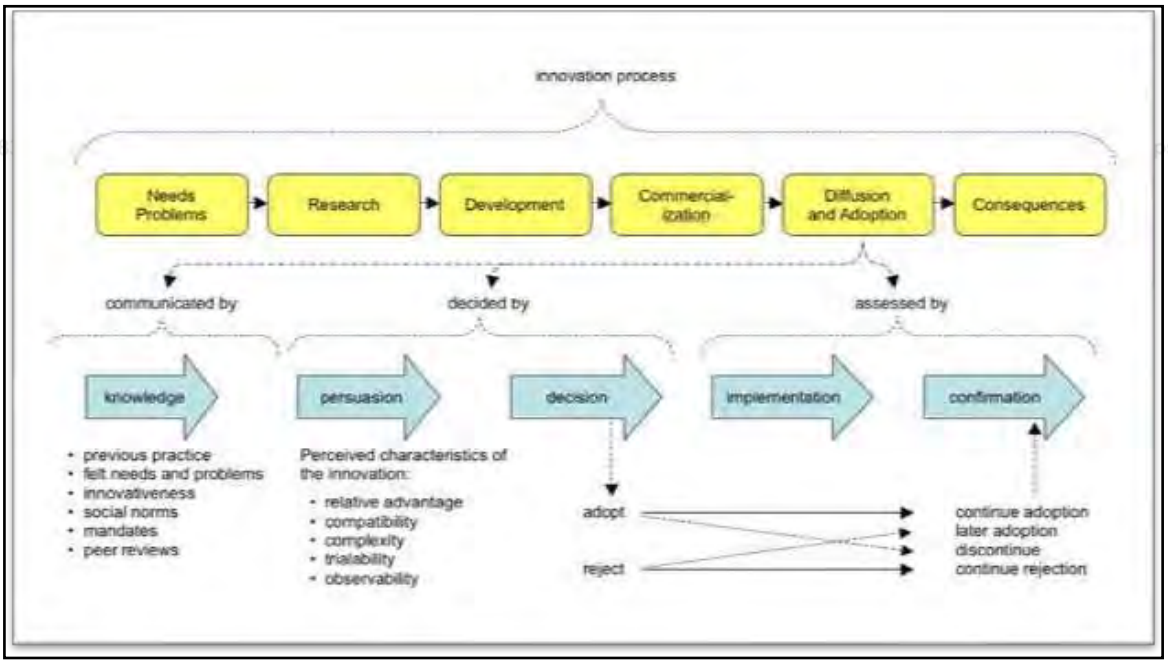
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2020). Trialability allows SMEs to experiment with IoT solutions on a small scale, which can significantly reduce apprehensions and encourage adoption (Hwang & Thorn, 2019). Offering pilot programs or demos can help SMEs understand the practical benefits of IoT without the need for large initial investments (Abideen et al., 2024). The more observable the benefits of IoT in marketing, the more likely SMEs are to adopt it (Kumar et al., 2019). Demonstrating successful case studies and visible improvements in marketing KPIs can drive IoT adoption (Allioui & Mourdi, 2023).

Figure 2.2

Diffusion of Innovations (DOI) Theory



*(*Source: Everett Rogers, 1962)

Above is a diagram illustrating how the core elements of DOI influence the intention to adopt IoT in SME marketing strategies:

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- **Innovativeness:** Encourages SMEs to try new technologies (Almaiah, Alfaisal, et al., 2022).
- **Relative Advantage:** Drives adoption by highlighting IoT benefits (Almaiah, Alfaisal, et al., 2022).
- **Compatibility:** Ensures IoT aligns with current business practices (Almaiah, Alfaisal, et al., 2022).
- **Complexity/Simplicity:** Influences adoption based on ease of use (Almaiah, Alfaisal, et al., 2022).
- **Trialability:** Enables SMEs to test IoT solutions (Hwang & Thorn, 2019).
- **Observability:** Increases adoption when benefits are visible (Allioui & Mourdi, 2023).

The DOI theory provides a multifaceted view of how SMEs decide to adopt IoT for marketing. By analysing factors like innovativeness, relative advantage, compatibility, complexity, trialability, and observability, SMEs can better understand the dynamics influencing their technology adoption decisions. This comprehensive approach enables SMEs to strategically plan and implement IoT solutions to enhance their marketing effectiveness and competitive edge in the digital era.

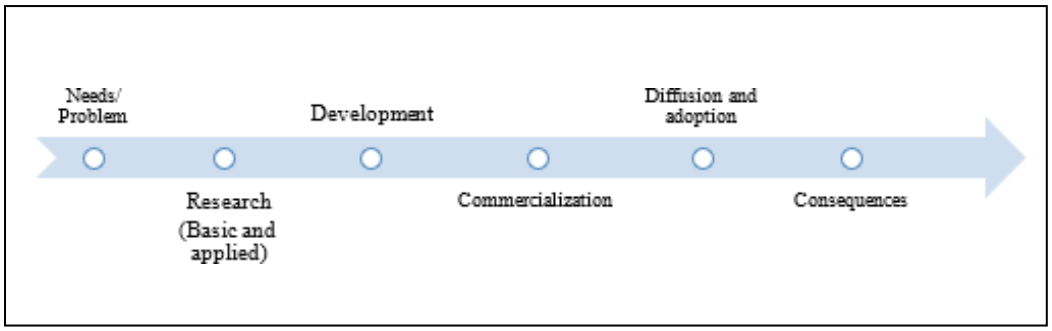
The Diffusion of Innovations (DOI) theory is proposed as it explains the organizational innovativeness comprising of individual characteristics and of the organization (Gomes & Osman, 2019). Rogers has stated six main phases in innovation process as below are steps taken prior to diffusion and adaptation phase.

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Figure 2.3

Six main phases in innovation process



As a result of the process described above, the main focus of attention is placed on the dissemination and use of IoT technologies in marketing for SMEs. According to the idea, there are four different aspects that contribute to successful adoption: communication channels, the qualities of the invention, the traits of the people who adopt it, and the social structure (Gomes & Osman, 2019). Owners or managers who have a constructive outlook on change are better able to encourage their organizations to embrace innovative practices and to encourage others to develop creative mindsets (Gomes & Osman, 2019).

DOI theory is mainly describing about the speed and the patterns regarding the product spread among the huge populations, modern ideas and practices. As per the comment of Sharma et al. (2020) late majority, early adopters, innovators and early adopters are playing a crucial role for the innovation purposes. There are mainly five steps for the innovation those are includes confirmations, decision, knowledge, decision and implementations (Wang et al., 2018). Along with this, the four important elements for the innovation are based on communications channels innovations, social system and time.

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According to the research (Hassan et al., 2020) expanded the DOI theory by examining what variables impact the adoption of ICT in SME businesses in Selangor, Malaysia, using three constructs. The explanation done by them relates to the conductance of examination to determine the motivation factor, which influences the human relationships with the help of resource, practices and commitment in the existing SMEs sector. Innovations, Communication via a certain number of channels, among the members of social teams are beneficial in the DOI theory.

The three dimensions selected for analysis (perceived ease of use, preparedness, and resource availability) were drawn from the literature and prior research, according to aderonke kofo soetan (2018) and were most suited for the study's environment. Findings revealed that a lack of confidence in IoT adoption, as well as a perception of ICT cost-benefit inequity, had a negative impact on ICT adoption, whereas relative advantage, observability, complexity, new business opportunities, effective client communication, business cost reduction, and government incentives all had a positive impact.

2.2.3 Technology– Organization – Environment (TOE)

The third theory proposed was the TOE framework; it is described in Eveland and Tornatzky (1990) the Processes of Technological Innovation. It describes the process of innovation from development to the adoption and Implementation of innovations by users within the context of a firm (Baker, 2011). One of the advantages of the TOE framework is that it has delivered a holistic point of view on adaptation as well as

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execution of technology. As per the view of Eveland and Tornatzky (1990), instead of concentrating exclusively on the technology as well as business organisational circumstances, the framework has identified both the external and internal facets which are significant in the shaping of technology. According to Eveland and Tornatzky (1990), this has permitted investigators to adopt a slight strategy for analysing the adoption of technology. It has also aided business organisations in adequately comprehending the complicated interrelation of facets that have impacted technological determinations.

The TOE framework serves as a useful tool that helps to identify drivers and intrinsic characteristics of innovation and other environmental conditions for adoption (Rui, 2007). TOE study consists of three elements:

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1. **Technological context** is the technology available to the organization be it the current technology being used or the available technology in the market. Liao et al. (2008) stated that its knowledge whether internal or external encourages innovation in organization. For IoT in marketing, this context includes the availability, functionality, and compatibility of IoT technologies with existing systems (Alam, 2021).
2. **The organizational context** denoted the internal factors of the firm itself, such as the organizational culture, management structure and size of the firm (Eveland & Tornatzky, 1990). For SMEs, this might involve the firm's readiness, knowledge, and capacity to implement IoT solutions in marketing strategies (Zhu et al., 2017).

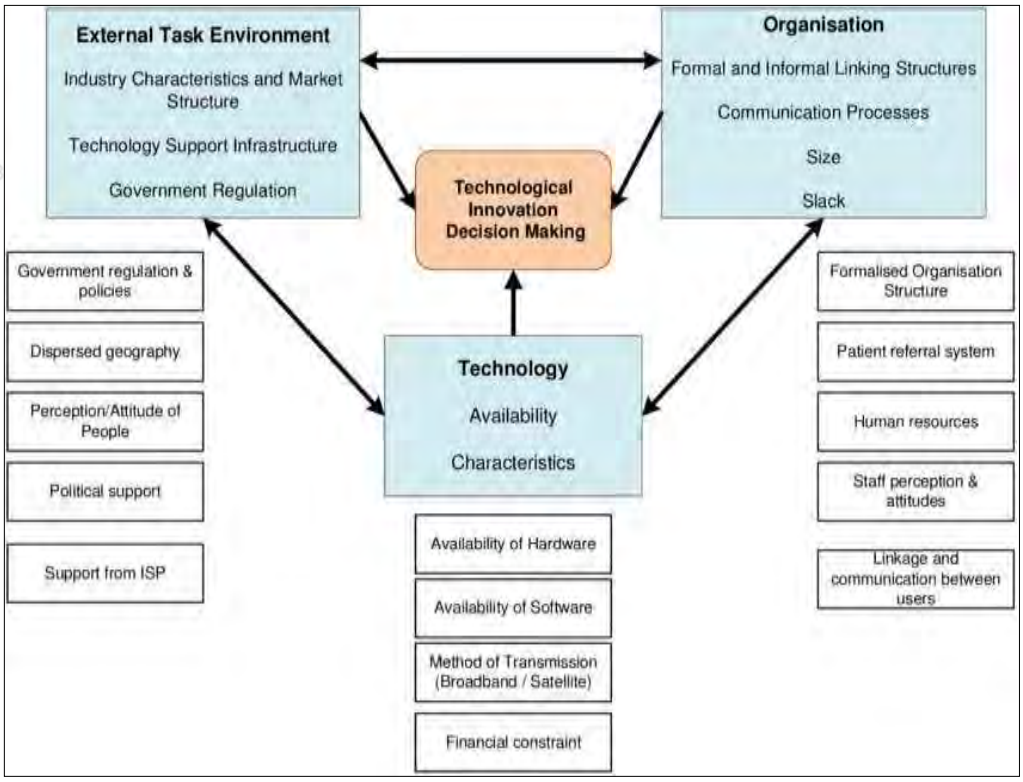
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3. **The environmental context** is related to the external characteristics such as government policy, competition, business practice on organization (Eveland & Tornatzky, 1990). Maduka (2017) postulates that for IT adoption to develop, management support is necessary which includes collaboration within and outside of the company. For SMEs, this could include market demand, competitor pressure, and governmental policies related to IoT and digital technology (Shahzad, 2023).

Figure 2.4

The chart shows the summary of TEO framework.



The organizational structure incorporates a number of different measures that are descriptive (Figure 2.4). An organization's characteristics, such as its size, organizational structure, human resources, management structure and styles, and the

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availability of internal resources, may all be understood by looking at the company in the context of its organizational context (Eveland & Tornatzky, 1990).

According to Eveland and Tornatzky (1990), the organizational structure, business practices, and business mechanics of a company all have an influence on the likelihood that the company will embrace and execute innovation. According to Eveland and Tornatzky (1990), internal and external communications not only communicate business instructions but also foster the generation of new ideas, which may lead to the acceptance of innovation. Despite the fact that Eveland and Tornatzky (1990) assert that the size of an organization and the availability of resources have low empirical proof in the literature, they acknowledge that having access to the appropriate resources is one factor that encourages the adoption of new innovations. According to Eveland and Tornatzky (1990), the leadership characteristics of an organization's top management are crucial to the capacity of the organization to accept technological innovation.

The technical context encompasses not just the internal but also the external technology that is available, as well as the practices that are being used by the company Eveland and Tornatzky (1990) asserted that the compatibility of a new technology with the technology already in use within an organization is just as important as the technology's accessibility. This is due to the fact that the implementation of technology within an organization is as unique as the technology itself. In a manner that is analogous to the DOI hypothesis, Eveland and Tornatzky (1990) put up the idea that compatibility and complexity of technology, in conjunction with integration with the existing environment, enhance the adoption of innovation.

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The term "competitors," "suppliers," and "government agencies," in addition to the industry in which the firm competes, make up "the external environment" Eveland and Tornatzky (1990). According to Eveland and Tornatzky (1990), the adoption of new technology is impacted by the industry in which the firm operates, the level of competition in the market, and the strategic business strategy of the organization. According to Eveland and Tornatzky (1990), the availability of a skilled labor force, in addition to access to related training and consultants, has a positive impact on the likelihood of adopting and implementing innovative technology. This is in part due to more options and flexibility when it comes to executing innovative strategies.

TOE analyzes extra contexts such as organizational and environmental aspects, which could affect technology adoption as these elements change, in contrast to DOI theory, which primarily focuses on the technical context (Rahayu, 2015). Studies on the adoption of the internet of things have made extensive use of the TOE paradigm (Rahayu, 2015).

The TOE was utilized by Rahayu (2015) in order to investigate the factors that influence the decision of SMEs located in developing nations to participate in electronic commerce. In order to carry out their study, Rahayu (2015) used a model that had 11 variables and was separated into the following four categories: technological factors, organizational factors, environmental factors, and individual factors. According to the results of the poll, there are a number of factors that positively influence the adoption of IoT by SMEs, including perceived benefits, technical preparedness, owners' innovativeness, IT aptitude, and IT experience.

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According to Matea Cvjetković (2023) made certain modifications to the TOE model in order to investigate the significant technological, organizational, and environmental factors that impact the adoption of social media in local government. The outcomes of the study indicated that senior management is the most significant factor in predicting the usage of social media. Integration of social media is also impacted by a population's level of technology expertise, the expected benefits, and how well prepared they are.

TOE is superior to other adoption models because it combines aspects that are technological, organizational, and environmental; there are also no restrictions placed on the types of industries or the sizes of firms that may utilize it (Awa, Ukoha, et al., 2016). On the other hand, TOE is subject to some limitations. According to Awa, Ukoha, et al. (2016), TOE is a taxonomy for characterizing variables, and as a result, it does not represent a well- developed theory. According to Awa, Ukoha, et al. (2016) TOE buildings may be used in large businesses. The TOE framework needs to be strengthened by the integration of different models.

With the help of diffusion of innovation theory, the organisations under the SMEs categorisation can be able to understand the speed the organisations need to adopt in order to incorporate the new technology that are proposed by IoT. Along with this the areas are also detected with the help of this theory that the organisation can adopt the IoT based technology (Shaltoni, 2017).

On the other hand, TOE refers to the factors that are present in the internal sector of the organisation and these factors are capable of influencing the adoption process of

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IoT technology in the work culture of the organisation under the SMEs. The TOE framework can specifically influence the intention of SMEs to adopt IoT for marketing in the following ways:

1. Influence of Technology Context

If IoT technologies are perceived as advanced, reliable, and compatible with existing systems, SMEs are more likely to adopt them for marketing (Alam, 2021). The presence of supportive technological infrastructure and the perceived benefits of IoT can significantly impact adoption decisions (Reuban & Hansa, 2023).

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2. Influence of Organizational Context

SMEs' internal processes, cultural readiness, and managerial structure significantly determine the successful integration and adoption of IoT in marketing (Foroudi et al., 2018). Organizational resources, including skills and competencies in digital technology, are crucial for adopting IoT solutions (Jayashree et al., 2022).

3. Influence of Environmental Context

The competitive pressure and the actions of trade partners can motivate SMEs to adopt IoT for marketing (Gibson, 2024). Governmental regulations and support, along with

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industry standards, play a significant role in encouraging or hindering IoT adoption (Lee, 2019).

The TOE framework offers a multidimensional approach to understanding how SMEs decide to adopt IoT for marketing. By evaluating technology readiness, organizational capabilities, and environmental pressures, SMEs can strategically navigate their IoT adoption journey to enhance their marketing efficiency and gain a competitive advantage in the evolving digital landscape.

2.3 Effect of The Intention to Adopt IoT in SMEs

The intention to adopt IoT in SMEs is a critical factor influencing how these businesses integrate new technologies into their operations. This intention is shaped by various elements within the Technology-Organization-Environment (TOE) framework and other related models.

Key Influences on the Intention to Adopt IoT in SMEs

1. Technological Advances and Perceptions

SMEs are increasingly recognizing IoT as a transformative technology that can significantly enhance operational efficiency and marketing effectiveness (Foroudi et

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al., 2018). The perceived benefits of IoT, including increased operational efficiency, enhanced customer experience, and improved decision-making, drive SMEs' intention to adopt these technologies (Jayashree et al., 2022).

2. Organizational Readiness and Resources

The level of digital literacy and the availability of technical skills within SMEs significantly affect their readiness and intention to adopt IoT (Gibson, 2024). Financial resources and investment capacity also play a crucial role in determining SMEs' ability to implement IoT solutions effectively (Lee, 2019).

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3. Environmental Factors and Market Dynamics

External pressures, including market competition and customer expectations, significantly influence SMEs' intention to adopt (Alam, 2021). Regulatory policies and government initiatives supporting IoT adoption can also motivate SMEs to embrace these technologies (Reuban & Hansa, 2023).

4. Impact of Adoption Intention on Business Performance

SMEs that decide to adopt IoT based on strong intentional strategies tend to experience significant improvements in business performance and competitive positioning

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(Odoom et al., 2017). The successful implementation of IoT can lead to enhanced business agility, better customer insights, and more robust data-driven decision-making (Kumar, 2024).

According to the findings that were discovered by (Lee et al., 2022) organizational variables such as compatibility, the benefits of the IoT, the risks of the IoT and perceived use are all elements that have the potential to be used in the process of adoption (Brous et al., 2019). There is no space for argument given that these results are perfectly compatible with those obtained by (MacGregor & Vrazalic, 2005).

ELMAZI et al. (2011) suggested that effective determinants for the utilization of the IoT include both external factors, such as the demand and knowledge of the government, and organizational factors, such as the age, education, and frequency of computer use of the chief executive officer. This led them to the conclusion that external factors and organizational factors are effective determinants for the utilization of the IoT. The amount of interest and comprehension that the general public has towards the IoT is another significant factor that plays a role in determining how widely it will be used.

ELMAZI et al. (2011) discovered that organizational components such as measurement, top management IoT, a focus on information technology (IT), and the establishment of an information technology department are particularly beneficial for the implementation of IoT in SMEs. In addition to the findings for environmental concerns, they found that the outcomes were the same for technical aspects as well, such as reported benefits and perceived suitability (industrial competitiveness). On the

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other hand, Shammout (2022) arrive to the opposite conclusion, which is that technical aspects are more essential than organizational factors. They say this because they find that the correlation between the two is negative. In their research, they report finding such to be the case.

According to the findings of a research project that was led by Zaidi and completed in the year 2017, the IoT has had four important effects on the economy of Malaysia. Each of these effects has contributed to the country's overall growth. These include the enhancement of one's knowledge, the promotion of the growth of governments, the lessening of hazards to the environment, and the improvement of economic efficiency as well as levels of production. However, there are gaps in the literature of each of these government initiatives to help SMEs in Malaysia on the adoption of IoT in marketing and the IoT based systems can easily monitor the alcohol intoxication level in the drivers of the country and the sensors are capable of measuring the health risks of the over consumptions of alcohol of IoT adoption in Malaysia.

Research that was conducted by (Abualrob & Kang, 2016) came to the conclusion that the initial stages of adoption of the IoT are highly variable and heavily dependent on external factors related to market strength (e-readiness of customers and partners), supporting industry e-readiness, and readiness impact on e-government. These findings were presented in a paper that was published in the journal Information Systems Research in 2011. These aspects include the robustness of the market, the e-preparedness of supporting industries, and the influence of readiness on e-government. There is a direct correlation between the degree of preparedness of the market and each and every one of these aspects in some way. The results of this study suggest that an

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organization's current infrastructure may already include the IoT components that are the most crucial and decisive for its deployment. These components include the variables of management of organizational factors, management of technological resources, and management of management factors, respectively. The problem with the preparations of e- markets originates from the fact that the preparation of e-markets is currently the only external component that still has a considerable degree of influencing power at this point of the execution of the project.

Wong and Kee (2022) came to the conclusion, which is very similar to what we have found at this time, that there was a significant correlation between industry readiness (perceived industry standard perception, perceived trade partner preparation, and perceived trust in industry players), on the one hand, and organizational readiness, on the other. This was found to be the case when they compared the perceptions of industry standard perception, perceived trade partner preparation, and perceived trust in industry players (perceived technology perception, perceived organizational resources, and perceived governance). Concerns that are shared on a national scale must be addressed, since this is a prerequisite for achieving preparedness (perceived aid from the government, perceived support services).

In the study that T. Ramayah et al. (2009) carried out, the researchers used a tactic that was similar to the one that Lip-Sam and Hock-Eam had previously utilized in 2012. They examined it based on three distinct categories, and after doing so, they identified 17 different aspects of it as being significant. To clarify, this idea is applicable not just to people and companies, but also to objects like technology and the natural environment, as well as activities that are considered to be cultural and traditional in

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nature. The conclusions of this study indicate that there are just nine factors that should be taken into consideration when determining whether or not something is notable (Hansen & Bøgh, 2020).

Prior experience with information technology, educational background, lack of information technology resources and abilities, lack of interest and awareness are all key elements that should be considered within the category of organizational groups and people. Having prior experience with information technology is not sufficient. It is possible to categorize the features of an e- commerce website as belonging to the theme of "technology and the environment." (Haleem et al., 2022). These attributes include the amount of security that is provided by the website, as well as safe payment procedures and service delivery systems. Along with the historic and cultural factors that must be taken into account, there are two other crucial aspects that must also be taken into account: the infrastructure of telecommunications and logistics.

Tolstoy et al. (2020) discovered that smaller firms had a lower likelihood of being successful in the adoption of computerization in comparison to larger organizations. This was shown to be the case when comparing the two groups. Since the last time this research was carried out around twenty-five years had elapsed. Despite the fact that SMEs still face access and know-how-related disadvantages, it is anticipated that the gap between SMEs and large corporations will narrow in the near future. This is expected to occur largely as a result of two factors that are linked together: costs, and applications that are specialized.

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Over the course of the last twenty years, there has been a considerable reduction in the price of products and services across the board. The amount of computing power that is accessible for each dollar that is spent has grown by a factor of 10,000, whilst the cost of voice transmission has fallen by a factor of 10,000 as a consequence of improvements in fiber optics and low-cost electronics (Roser, 2020). The second factor that has made it possible for SMEs to use computer technology is the proliferation of user-friendly software programs that have been developed specifically to meet the requirements of smaller businesses (Ghobakhloo et al., 2011).

The exponential growth in the number of SMEs that are connected to the internet and making use of it has brought to light two very significant concerns: Studies that were conducted in the past on technologies in general revealed that there are a number of factors that influence the choice to embrace ICTs in businesses. These attributes include the following: Internal factors and external factors (Sin Tan et al., 2009).

Other researchers, using a variety of works and frameworks as guides, tested a collection of elements in order to identify the characteristics that influence SMEs' utilization of the internet of things. In Malaysia, the criteria that are taken into consideration include elements such as extra use, compatibility, organizational preparedness, characteristics of managers, and safety (Roser, 2020). According to Shah Alam *et al.* (2011), and they say that the reasons for the adoption of IoT are connected benefits and observations.

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According to Issa (2020) conducted research in Jordan to investigate the components that go into business partner-driven management. This study looked for factors to be management, management, use of IT skills, consulting availability, and IoT priorities improvement with other projects.

According to the findings of Bayoolushola (2019) several aspects of IoT adoption include, in descending order of significance, perceived utility, consumption, readiness and compatibility, and external pressures. According to the results of a research conducted in Walsh and Kirchhoff (2002) there are seven different ways in which businesses in Ireland might make use of the IoT. The IoT capability, readiness for change / rate of response to new technologies, introduction of technology opportunities, customer orientation, sensitivity to competitive environment / customers, perception of technology feasibility, and e- skills development mechanisms are all factors that come into play.

The researchers employed a large number of factors, which may be broken down into the three primary categories that were presented before. The findings, on the other hand, have produced some contrasting conclusions. In spite of the fact that some academics have suggested that a relative benefit is the most compelling argument for using IoT, other researchers have concluded that this is not a relevant factor. Using a methodology that is quite similar, some research discovered that partner pressure or customer and supplier pressures were important, while other studies found that none of these factors were relevant.

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2.3.1 Perceived Ease of Use

The perceived ease of use is a crucial factor in the Technology Acceptance Model (TAM) that significantly influences the adoption of technologies like the Internet of Things (IoT) by Small and Medium-sized Enterprises (SMEs), particularly in marketing contexts. This concept refers to the degree to which potential users believe that using a particular technology will be effortless.

Perceived Ease of Use (PEOU) is the degree to which a person believes that using a particular system would be free from effort. For SMEs in Selangor, this means that if IoT technologies are user-friendly, these businesses are more likely to implement them in their marketing operations (T. Ramayah & Ignatius, 2005). When IoT is perceived as easy to use, SMEs are likely to adopt this technology more readily as it reduces the complexity and effort needed to integrate new technologies into existing systems (Okafor, 2023)

If IoT solutions are user-friendly, SMEs are more likely to perceive these technologies as beneficial for enhancing marketing strategies, such as improving customer data analysis and engagement (Alam, 2021). A straightforward and intuitive user interface in IoT devices can lead SMEs to perceive these solutions as easy to use, encouraging their integration into existing marketing frameworks (Janssen et al., 2019).

There are many factors which make the changes in the perceptions followed by the customers and which in turn makes changes in the equilibrium position of the market. Therefore, it becomes a crucial process to analyse the customer perception and

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attitude change process in an exact manner. This theory makes us understand and link customer behaviour and technological advancement. The author or the developer of this theory named Fred Davis with the help of Richard Bagozzi makes use of two techniques to measure the acceptance level of customers (Kamal et al., 2020). There are four elements in it, which specify the description of the study with the help of five stages inclusion in it.

There are four elements of this theory named perceived ease, attitudes, actual behaviour, and perceived usefulness which serve the purpose of the theory. However, in this study, one of the indirect variables is perceived ease, which has been evaluated to find its impact on, or due to IoT adoption. Therefore, this part of the section makes more specifications of the elements of this theory to execute the approach in making more relevant study conductance.

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TAM model is mainly focusing on the behavioural intention purposes for the uses of the modern technology. In addition, as opined by Sani et al. (2020) it is easily demonstrating the predictiveness for the contexts and takes social influencers and external influencers in a same pathway. For examining the attitudes of the customers, this model is playing a significant role. Along with this, this model is creating relationship among the external and internal variables and affecting actual behaviors.

If a system is extremely beneficial for the task at hand, does not need a significant amount of training to learn, and can be utilized without much effort on the part of the user, then the user will regard the system to be simple to use. Users are more likely to use and accept a system if they believe it to be simple and straightforward to

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employ (Davis, 1989). This also implies that the system will live up to the expectations of users in terms of how easy it is to use. Within the scope of this research, perceived ease of use for IoT consumer products refers to how consumers believe that IoT use is simple and straightforward (Davis, 1989). Previous TAM studies in various fields have found that perceived ease of use has a significant effect on behavioral intentions to use technology such as e-learning Davis (1989b), mobile devices (Zhang et al. (2012) and wearable technology; for example, e-learning (Davis (1989b), mobile devices Zhang et al. (2012) and wearable technology.

Users are more likely to accept and employ information solutions in their firm if they perceive such solutions to be less complicated and easier to use (Teo & Pian, 2004). According to TAM, one of the most important factors in determining the adoption of an information system is the perceived ease of use (PEOU) (Davis *et al.* 1989). PEOU is the degree to which a person feels that utilizing a specific system would be painless (Davis, 1989a) If the right skills and knowledge of technology are in place, using IoT will be simpler, and users will be more inclined to embrace it as a viable method of doing business.

The TAM methodology was used in order to conduct research on people's usage of blogs, which are another relatively recent kind of IT application. It was shown that perceptions of a blog's user-friendliness had a significant effect on users' sentiments about the site (Hsu & Lin, 2008). Gao and Bai (2014) conducted research to investigate how ease of use affects a person's propensity to utilize IoT apps The general finding aligns with the core principle of TAM: ease of use positively impacts perceived usefulness, which in turn influences technology acceptance. Other sources like Hsu &

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Lu (2004) and Venkatesh et al. (2016) have supported similar conclusions across different contexts.

The use of TAM facilitates the use of technology in assurance with the concomitant factors as raised by the long-term benefits at organizational levels. This became a primary importance in understanding the factors that are raised by personal computing of information systems. As stated by Zhang et al. (2012), the validation of TAM has mediated the relationship between attitudinal factors and the course of wide range of areas with regards to stimulating the scales and models significantly. The model is underpinning to the utilization of technology that are shaped by parsimonious approaches.

The goal of TAM is to administer the informed rates of practicum in meeting the prodigies that are embarked by the ideas of initiation (Schorr, 2023). The steps are possibly related to the teams and conditions in analyzing the construct validity prospect stemmed from the concept of operalization. The affectability of TAM in research practices have showed up various reflective ideas that facilitated the managerial and practical actions in the strategies. When people start to believe the importance of technology, it shapes the information system in a way that is the actual adoption of a particular system leading to optimization. As stated by Petcharat and Leelasantitham (2021) the degrees to which people experience the benefits of technical implications are useful in determining the factors intending for customer satisfaction services. In addition to that, the precursors of TAM serve as a sense of explaining the perceived role of action in perceiving usefulness.

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Furthermore, the approaches involved in investigation process moderates the influence in an ease of IS acceptance. The use of TAM in research practices has eased the situational context in proposing new moderators to inculcate the dispositional values. The rate of sustainability can be perceived from the decision-making process facilitated by TAM. The product demonstrations are customised through product differentiation to be implicated as the business marketers. As stated by Khairul Akter et al. (2022), the factors that are raised in the time and effort for making the textile and apparel industries significantly. In order to meet the functional goals of the consumer's buying, goals are recognized as the prudent practice of initiation. Understanding the strategies of small and medium scale industries implies the rate of validity in testing the non-technological based media. As stated by Gurung (2023), specific factors claim the accessibility rate in influencing the sustainability rate that dismantles the barriers thereby interpreting the effectivity of marketing strategies. The notions in building up the impetuses are relevant in establishing preconditioned deployment for a reasoned action. The degree to which a new piece of technology is accepted is dependent on two factors: the first of these is how intuitive people believe it to be, while the second is how beneficial they believe it to be. Both of these facets are dependent upon one another.

These roles are critical to the success of the process overall. This provides an explanation for why the study that we are doing is so important. Individuals are more likely to accept a piece of technology with self-assurance and competence if they have the sensation that it is simple to use, also known as perceived ease of use. This is because when people have this sense, they are more likely to adopt a piece of technology. This is due to the fact that the perceived simplicity of usage is closely

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connected to the perceived ease of use (self-efficacy). It is referred to as "perceived utility," and it describes how individuals believe they will be in a better position as a consequence of making use of a new piece of technological equipment. People are more inclined to embrace something if they feel it will improve their lives in some way (response efficacy).

In the course of our inquiry, we delve further into the components of people's personalities and histories that play a role in the formation of their respective points of view. Other individuals, on the other hand, are self- motivated and ready to learn about developing technologies. This stands in contrast to other people who adopt a more cautious attitude when it comes to trying out new things. When managers have a solid understanding of the characteristics and personalities that influence people's perspectives, they are better equipped to devise methods for improving the amount of time their employees spend using technology. This is because people's perspectives are influenced by the qualities and personalities that people have.

If the individuals who are supposed to utilize an information system (IS) do not embrace it and use it, it will be difficult for the IS to be effective. System adoption may be the single most challenging task that IS managers must confront, with failure rates reaching as high as forty percent or even higher (Gurung, 2023). Everyone need to let out a sigh of relief now that it is generally acknowledged that user acceptance of technology may be leveraged as a measure and as a tool to improve IS adoption. This is excellent news for everyone involved. The outcome of this event is favorable for all parties concerned. One of the most significant goals of research into information systems is to get a knowledge of the elements that users take into account when

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selecting whether or not to accept new technology. As a direct result of this, acquiring this insight is one of the most essential aims. According to Davis (1985) devised a ground-breaking strategy that they call the technology acceptance model (TAM) in order to accomplish this goal (Davis *et al.*, 1989).

According to the concept, the adoption intention or actual adoption of an information system is a consequence of both the perceived utility of the system and the perceived simplicity with which it may be used. This is a consequence of both the perceived utility of the system and the perceived simplicity with which it may be used. This is due to the fact that the implementation of an information system is a natural progression after the first implementation of an information system. According to Davis, the concept of perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance," while perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis *et al.*, 1989). TAM has provided some useful aid to IS managers in the form of exciting insights and implications that may be used while designing IS strategy.

This assistance can be found in the following sentence: The process of developing IS strategies may benefit from the use of these. For instance, Square Inc., a merchant services aggregator and mobile payments company, promotes its Square Register service by highlighting both the ease of use (for example, "It's easy to take credit cards") as well as the utility of the product. Square Register allows users to accept payments from customers using a variety of payment methods, including credit cards,

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debit cards, and Apple Pay. This may be accomplished by making statements such as "It's simple to accept credit cards" (for example, "Sell more with Square").

As shown by the ever-increasing corpus of research that has been carried out over the course of the last several decades on replications, extensions, and adaptations of TAM, TAM may be considered a fundamental concept in the body of work that relates to information systems (Davis, 1989). The identification of the TAM's antecedents and moderators has been the primary focus of the vast majority of the work that has been put into this study (Sun & Zhang, 2006). In addition, a sizeable portion of the most recent research has identified indicators that indicate the intention of consumers to embrace IS for specific services, such as mobile banking, e-learning systems, e-government services, and consumer cellphones. These types of services include mobile banking, e-learning systems, and consumer cellphones. These are the kinds of services that include things like mobile banking and consumer smartphones, as well as online learning systems (Ullah et al., 2022).

In spite of this, "almost no research has deepened TAM in the sense of explaining perceived usefulness [PU] and perceived ease of use [PEU], reconceptualizing existing variables in the model, or introducing new variables explaining how the existing variables produce the effects that they do," according to the authors of the study. This is because "almost no research has deepened TAM in the sense of explaining perceived usefulness [PU] and perceived ease of use [PEU] (Sohn, 2020). There have only been a handful of studies carried out up to this point that have focused on self-efficacy and the part that it plays in the process of information systems (IS) adoption (Najib &Fahma, 2020)

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The purpose of this study is to make a contribution to the TAM literature by broadening the application of the general theory of efficacy appraisal Yousafzai et al. (2009) in order to acquire a more in-depth understanding of the underlying theoretical mechanisms that are responsible for TAM relationships. In other words, the goal is to acquire a deeper comprehension of the underlying theoretical mechanisms that are responsible for TAM relationships. To put it another way, the objective is to get a deeper comprehension of the theoretical processes underpinning TAM connections, which are responsible for forming such ties. In specifically, Yousafzai et al. (2009) makes a distinction between two different forms of effectiveness that are linked to the two primary notions in TAM. However, perceived usefulness exerts its influence on IS adoption via response efficacy, which is the driving force behind the effect that perceived ease of use has on IS adoption. Self-efficacy is the driving force behind the effect that perceived ease of use has on IS adoption (Vahdat et al., 2020).

In addition, researcher hypothesize that the self-regulatory orientation of individuals is a result of the relative weight that they assign to perceived ease of use and perceived utility when they are evaluating a product. This is something that researcher believe to be the case because of the research that we have conducted. This is something that researcher have a strong suspicion about being true. In point of fact, researcher is of the opinion that the predispositions that individuals have toward self-regulation may be responsible for the vast variety of TAM moderators that have been found in the study literature on IS (Chen, 2023).

According to Floerke Javaid et al. (2022), one of the most vital worries that companies have in the modern day is working to enhance the degree of awareness about

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the IoT among their workforce. This is one of the most necessary concerns that businesses have in the modern day IoT. This is one of the most significant obstacles that businesses need to overcome in the modern (Noor & Abu Hanifah Ayob, 2021). This is particularly relevant with relation to the possible reduction in costs. This is especially true when one considers the potential benefits that the IoT may be able to deliver. One of these benefits is an increase in productiveness, and another is a reduction in overall expenditures. Both of these benefits are associated with the elimination of waste. It is essential for business owners and employees to have a solid understanding of the IoT and the many different applications that it may have in order for them to be able to take advantage of new ways of conducting business. Only then will they be able to benefit from new ways of conducting business. They will have the ability to make the most of new opportunities as a direct consequence of this. As a direct result of this, they will have the ability to take advantage of novel methods of doing business (Teece, 2018).

The conceptual framework defines the base for any study related to a different aspect of matter the topic is guiding the overall study. In this study, this section of the conceptual framework is aligning the independent variables and dependent variables and their reason for further usage. The dependent variable in this study mainly focuses on the Adoption of IoT by small entrepreneurs to have more easy opportunities to focus on market exploration. On the other hand, the independent variable is the factors which impact the dependent variable in an excessive manner. Perceived ease, readiness, and resource availability are the three variables which are taken into account to show the concept of the relation between direct and indirect variables (Tu, 2018).

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The perceived ease of use is a decisive factor in SMEs' intention to adopt IoT for marketing in Selangor. By ensuring that IoT technologies are user- friendly, SMEs can better leverage these tools to enhance their marketing strategies, leading to improved operational efficiency and customer engagement. This approach helps SMEs to navigate the complexities of digital transformation more effectively and gain a competitive edge in the market. PEOU significantly affects the intention to adopt IoT (Abdel et al., 2024).

2.3.2 Readiness

Readiness in the context of adopting new technologies like IoT refers to the extent to which an organization is prepared to implement and use these technologies effectively. For SMEs in Selangor, readiness encompasses various aspects, including technological, organizational, and human resource readiness, all of which influence their intention to adopt IoT for marketing (Zaidi, 2017).

Readiness for IoT adoption involves evaluating how prepared SMEs are in terms of infrastructure, knowledge, and attitude towards technology integration (Khin & Mui Hung, 2022). This readiness impacts how effectively SMEs can utilize IoT to enhance their marketing strategies, ultimately affecting their competitive edge and operational efficiency (Mikalef et al., 2020).

Technological readiness refers to the extent to which SMEs possess the necessary technology infrastructure to support IoT implementations (Diana et al.,

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2021). This includes having up-to-date hardware, software, and network systems that can integrate seamlessly with IoT technologies (Zawra et al., 2017).

Organizational readiness involves the internal processes, culture, and structure that influence how prepared SMEs are to adopt and utilize IoT (Oliveira, 2019). It includes the level of support from management, the alignment of IoT adoption with business goals, and the preparedness to change existing workflows to accommodate new technologies (Dwivedi et al., 2021). The degree to which an organization's culture is ready for change and the introduction of new technologies is referred to as the organization's "organizational cultural," or OC readiness. This readiness is assessed in terms of degrees (Clausing & Holmes, 2010). OC readiness is a reflection of organizational goals such as investments made in IT readiness and preparations made for problems related to the IoT (Oliveira, 2014), such as new security challenges and work practices.

Human resource readiness assesses whether SMEs have skilled personnel to implement and manage IoT solutions effectively (Abdulaziz et al., 2023). This includes training employees, hiring new talent with the necessary technical skills, and fostering a culture that embraces digital transformation (Kraus & Kraus, 2023). A few examples of the organization's goals include making investments and preparations of this sort and others like it. "HR readiness" refers to the degree to which a company already has or is capable of acquiring the necessary skills, information, and people in order to make advantage of a newly developed technology. It is vital for the organization to have this preparation in order to be in a position to be able to do so (Clausing, 2010). Because the technical skills required to install IoT are quite specialized in nature, having the

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proper degree of competence in this field is the single most important demand that must be addressed (Oliveira, 2014). However, in light of the fact that the system will be implemented throughout the whole of the company, fundamental organizational abilities are also necessary in order to be effective (Andrieu et al., 2017).

Impact of readiness on adoption intention will lead to high levels of readiness across these dimensions are positively correlated with a greater intention among SMEs to adopt IoT for marketing, as they reduce perceived risks and increase the likelihood of successful implementation (Marimuthu et al., 2011). Readiness ensures that SMEs are not only technically equipped but also organizationally and culturally prepared to leverage IoT to achieve their marketing objectives (Marimuthu et al., 2011).

When it comes to the degree of technical preparation required for the deployment of the internet of things, there are many organizational aspects that must be taken into consideration. Each of these elements has the potential to have an influence on the degree of readiness (IoT readiness). According to (Leitão et al., 2016) the word "IT ready" refers to the existing of resources and organizational competences that are essential for the efficient deployment of IoT technology. Specifically, the term "IT ready" refers to the existence of resources and organizational capabilities. In a nutshell, "IT readiness" refers to the degree to which organization is prepared to make effective use of available technology. Two examples of what are considered to be instances of what is thought to be a component of the concept of IT readiness are the capacity of the electrical grid and other external resources such as high-speed fixed or mobile Internet (Rigg et al., 2016). In addition to information technology systems that are special to a

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certain system, it also encompasses information technology systems that are more generic in nature, such as the configurations of internal (Leitão et al., 2016).

Another facet that has to be taken into consideration is the degree of readiness of the business processes, which is more colloquially known as BP readiness. This pertains to the ease with which organizational procedures can be modified to meet the requirements of a new system and the efficiency with which they are connected with the organization's implementation challenges. Specifically, this relates to the ease with which organizational procedures can be modified to meet the requirements of a new system. This is also tied to the effectiveness with which organizational processes are linked with the difficulties that the organization has in putting its plans into action (Aboelmaged, 2009). Even though the IoT has the potential to speed up business operations, the organization still has to show both the capacity and the desire to react in order to be successful. Only then will the IoT be able to help the organization. Organizations will not be able to fully realize this potential until after that happens (Aboelmaged, 2009).

Even though it is much too soon for any kind of consistent use of IoT in marketing, industry leaders are already making efforts in an attempt to be early adopters of the technology. This is despite the fact that it is still far too early for any kind of use of IoT in marketing. As an example, the IoT was included into Coca- Cola's marketing plan for 2018, which also called for the rollout of linked coolers (NASC Magazine, 2018). These intelligent coolers have the ability to continuously collect data on the buying habits of customers, which would result in an increase in both sales and operations if they were implemented.

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The Amazon Go project is an analogous example of the IoT. Amazon Go is a network of retail outlets in which the entire customer experience is directed by connected devices, beginning from the moment a customer walks in the door until the moment a customer walks out with their purchase. This occurs from the moment a customer walks in the door until the moment a customer walks out with their purchase. This happens from the minute the consumer enters through the door till the moment the customer walks out of the store with their product in their hands. It may seem as if these applications of the IoT belong in the far future; yet, in reality, they are paving the way for future applications that will be utilized more often in the future.

In its report titled "Tech Trends 2019," Deloitte noted how the deployment of 5G networks beginning this year will improve acceptance and make IoT more popular in the sphere of marketing. The study was conducted by Deloitte. Throughout the whole of the study, this prediction was taken into consideration. Since the first 5G networks in the world were successfully constructed in April in South Korea and the United States, widespread adoption of 5G technology is expected to begin within the next few months. This is due to the fact that the first 5G network in the world were successfully constructed in April. This is necessary because it is necessary to establish a causal relationship between a dependent variable and an independent variable. The goal of this step is to discover the nature of the connection that exists. It is necessary to carry out the steps that are detailed in this part in order to figure out the nature of the relationship that exists between a dependent variable and an independent variable when one is interested in doing so. The study helps to highlight the factors of the targeted topic and the goal of this step is to discover the nature of the connection that exists between the variable.

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The number of connected individuals will have surpassed 75 billion by the year 2025, offering businesses with extra channels via which they may interact with the consumers and clients they serve. This milestone is expected to be reached in the year 2025.For receiving the interconnection between the theories and acceptance of SMEs in Malaysia is particularly important to analyze the relevance of the study in the current context. There are certain links between IoT adoption and the growth of the SMEs which can be reflected in their annual growth. In this context, as commented by Ritz et al. (2019), trust and religiosity can easily be fostered when IoT is incorporated into small businesses. This is why the importance of business channels and e-learning platforms are carried out by TAM which is of immense - relevance. In order to get a deeper comprehension of this developing possibility, this study follows the basis of the theory to evaluate interlink between different factor variable which focus on adoption of IoT. Furthermore, the Hypothesis development creates a more focus approach in the view of this study.

A staggering increase in the number of intelligent gadgets that are capable of two-way communication is taking place right before our eyes. What began with the smartphone in the early 2000s has now evolved into a broad variety of intelligent devices, some examples of which include watches, household appliances, vehicles, and product labeling. This trend began in the early 2000s. By the year 2025, the IoT will have a database with a total number of records that has reached 75 billion! When compared to where it stood only ten years ago, this indicator pertaining to the IoT reveals significant growth that is comparable to five times what it was at this point in time.

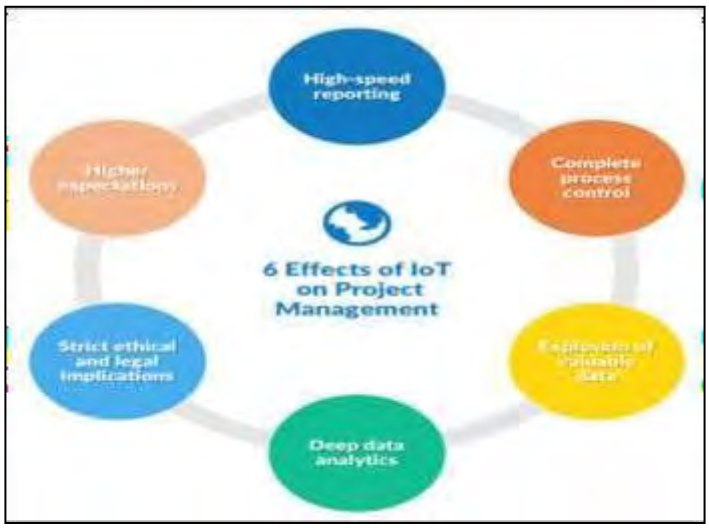
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The IoT provides a broad base of connected consumers who share data, consider several options before making purchases on a single network, and wait to be dazzled by a variety of adverts. Marketers have a significant chance to interact with new people and get a more in-depth understanding of the customers who purchase their goods and services as a result of this development. The IoT is of immense benefit in terms of marketing where project management and performance evaluation can be carried out by managers. There are several roles and responsibilities which are processed through the adept skills of project managers. For this reason, their adeptness is highly essential to pick and choose different IoT techniques over the course of time for their own as well as the organizational benefits.

Figure 2.5

Effects of IoT on project management



(Source: Ghosh et al. 2020)

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As depicted in figure 2.5, real-time data analysis and deep data analyses can be fostered through IoT. A better workplace and continuous monitoring can be done through IoT. This is extremely helpful in data analysis and decision- making strategies.

The use of this approach by marketers or the business developer helps them to use the technology related to IoT which helps them to utilize their resources in a maximum manner. The use of different examination conductance done through the interlink between the direct and indirect variables helps to create more scope of market exploration. Additionally, the adoption of the theory in the calculation of the measurement of the customer gets impacted due to the use of different theories named TAM and TDP. This theory adoption helps the study to get more basic for the study relevance.

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There are four types of networks adhered to IoT named Cellular, Local and PAN, and Mest Networks (Miskiewicz, 2020). The use of this data with the help of the digitized product helps small businesses to develop their marketing strategies by creating more resource utilization. The use of different kinds of technologies with the help of different strategies of marketing helps to create more scope in business enhancement. The small-scale businesses often face financial problems and therefore cost-effectiveness it their topmost priority of them in the conduct of operations. Additionally, the use of different products in IoT helps to create more scope in business development.

The main set of aims as specified makes to have more devices which help to create real- time self-reports and even support improved efficiency. The regular six

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pillars of this concept of IoT include more specification in making the complex workings of the business with more ease. They are network, fog computing, security, management with automation, data analytics, and platform enabling which helps to enhance the network and in turn, help the business to use complex procedures with more perceived ease. The feature included in this type of IoT provides more efficiency in the production and operation process of the business. Therefore, the use of different pillars and elements usage helps to make a more approachable method to be adopted.

Business is the process of operations and production in an efficient manner and then its supply and demand recognition in the market and to maintain its market sustenance. Usage of the IoT in the business helps to keep proper track and monitor of the process they are going through. Additionally, the use of the IoT makes the business develop faster technology in an enhanced manner which in turn provides more execution of the strategic implementation (Bhuiyan et al., 2021).

The prediction process related to business approval is being helped by the adoption of this IoT. IoT being the advanced technology help to create more scope for customer engagement properly adhered to more customer satisfaction. Predictions are being made by past performance and according to the technology are used to create more efficient performance improvement of the quality and service of small businesses (Zhao *et al.* 2020). Moreover, the use of IoT helps to collect the data related to performance appraisal and is used for the maintenance of time which helps to avoid machine resource wastage. The use of different methods to calculate the impact of Iot on the small business sector in Malaysia by doing the survey on some parts of the selected area in the country named Malaysia has added to the study's relevance. The

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link has been properly determined by going through the analysis done on the survey which has been focused on showing the interlink between direct and indirect variables.

This research is focused on the fundamental aspects of IoT adoption, such as modifying the settings on IoT devices and using different types of software for advertising purposes. In addition to that, the simplicity of understanding and sharing data, such as obtaining data for commonly searched things or items that have been bought, will be analyzed in order to determine how to promote products more effectively. The degree to which individuals have adopted IoT devices will be rated on a scale from 1 to 5.

The section of the conceptual framework described above gives a clear look that there is a direct connection between the indirect variables specified and the IoT adoption. The manner in which adoption is made to know the relationship is the important part to evaluate the degree of dependence of the two has been shown in this category of a conceptual framework. The ease of the business can be ascertained to an extent with the adoption of different physical objects of IoT (Hansen & Bøgh, 2020). The use of theories makes the conceptual framework more categorized. Additionally, it includes four things, which can be included by the small business holder and Voice controller, echo plus, doorbell cam, and foot. The other variable is readiness, which is the direct impact of IoT adoption making the business managers, or others improve better readiness in an affluent manner.

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Figure 2.6

Different positive impacts of IoT applications



(Source: Hassan et al. 2021)

As shown in figure 2.6, infrastructural development, data management, predictions, and analysis of the same along with robust security management can be fostered through IoT. Data visualization, data analytics, and data mining are all related to the development of better infrastructure inside the SMEs. Project efficiency and productivity can be enhanced in different areas of action while SMEs are considered. Moreover, supply chain networking and real-time networking are also invariable parts of the IoT management system which is able to handle many issues deftly.

The use of IoT for marketing have been used in several big companies. Because customers are usually interested in the value offered, and likely to be sensitive to cross-selling and upselling, customers are a perfect starting location for any new marketing campaign. Customers have the option to be directed to complementary products, discounts, interesting product trivia, and even experiences that may be experienced

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inside the store by scanning QR labels that have been applied to goods. These labels have been affixed using QR technology. Customers may scan these barcodes using the cameras on their smartphones, which is an example of how the IoT can make better use of the resources that are available (there is no requirement for hardware).

This specific illustration of the IoT was brought to life by Chili's, a multinational restaurant chain, in India a year ago with the assistance of a scannable QR code that was placed on each table during a live soccer tournament. Chilis did this in order to demonstrate the capabilities of the IoT. After scanning this code, guests may be asked to download an application onto their mobile devices, which would then sign them up for a multiplayer Augmented Reality (AR) game. This game would then be played at the venue.

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This is because smartphones are so widely used, conducting experiments in IoT marketing might be carried out successfully by using these devices. This is partly due to the rise in popularity of IoT. When combined with geofencing, a type of location intelligence that utilizes the in-built GPS of a smartphone to map prospects to nearby businesses, this may assist in locating mid-funnel customers who are particularly relevant to your company and are located close to your storefront. This could help you find customers who are more likely to become loyal customers.

For instance, the IoT may send you a notification whenever a potential new client arrives in the area. This gives you the ability to send that individual relevant and targeted messages about a discount that they could take advantage of, a better value offers if they are heading to a rival, or a regular purchase that they might do again. The

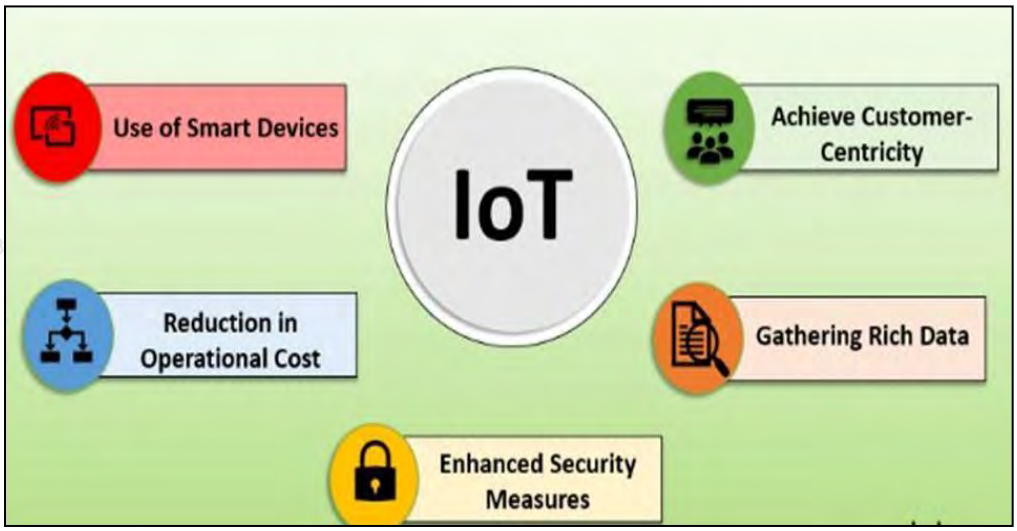
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previous year, Burger King made excellent use of this illustration of how the IoT can be exploited to achieve desired results by developing a promotion known as "Whopper for a Penny." The campaign was a very successful effort overall. Customers of Burger King who were within a radius of 600 feet of a McDonald's restaurant, which is one of Burger King's competitors, would get a notification on their mobile devices that directed them to the location of the closest Burger King restaurant.

Figure 2.7

Different benefits of IoT in smart applications



(Source: Reja& Varghese, 2019)

As shown in figure 2.7, operational costs can be reduced through the application of IoT with the usage of smart devices. Moreover, customer centricity can be easily achieved while rich data are accumulated with the heightening of different security measures. Hence, IoT applications are significant in SMEs from all perspectives. These are the few positive impacts that have influenced the behavior and attitude of the project

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managers toward its sustainability. Thus, the readiness for the IoT is undoubtedly the driving force toward the sustainability of SMEs across Malaysia.

There are various advantages of IoT those are includes cost effectiveness operations, developing productivity, and increasing business opportunities and determining operation management. Along with this, four major applications for the IoT in the smart cities are include creating smart building, handling waste management, saving water and maintain traffic (Thong & Yap, 1996). The advantages of the smart devices are based on the development of the efficiency, smart and advance technology is helping people to save money and setting remainders for controlling the work (Kartajaya et al., 2019).

The growth of industrialization has reached new levels with both Industry 3.0 and, more recently, Industry 4.0. Both of these phases are referred to as the Fourth Industrial Revolution. The progress that has been achieved in information and communication technology has made it possible for these new stages to be implemented. The concept of the smart factory is garnering favorable reception and is gaining popularity as a result of its potential benefits in the areas of efficiency, productivity, return on investment (ROI), technological convergence, and megatrends (Kartajaya et al., 2019). Because of this, a sector of the economy that is lagging behind will have a tough time catching up if it does not make use of technology in order to get to the point where it can be classified as Industry 4.0. It is vital to have clear lines of communication and an information infrastructure that is appropriately constructed in order to assure effectiveness, high productivity, and a satisfying return on investment.

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These are the conditions that must be met. RD significantly affects the intention to adopt IoT.

2.3.3 Resources Availability

In many companies, the implementation of IoT is dependent on a number of factors, such as financial resources, human resources, and technology resources such as computers, telephone lines, digital connection cables, and other network equipment. These many resources consist of: (Al-Qirim, 2007). SMEs frequently do not have the required and sufficient resources to adopt the IoT, despite the fact that many owner managers view the installation of IoT as an essential new technology. This is because SMEs are often unable to afford the required and sufficient resources (Thong & Yap, 1996). According to Ndayizigamiye and Refiloe Gladys Khoase (2018), the resources that are available to SMEs for adopting IoT provide a significant barrier to the integration of IoT. This was found in their research on the topic. Companies that have less than 500 workers are considered to be SMEs. Because of limitations in their financial, technical, and human resources, businesses in less developed countries often lag behind their counterparts in more industrialized nations when it comes to the IoT. This is due to the fact that less developed countries have experienced less economic growth (Huy &Filiatrault, 2006).

Resource availability is a crucial factor that significantly impacts the intention of SMEs to adopt the IoT for marketing in Selangor. This concept encompasses the availability of financial, technological, and human resources necessary for

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implementing and sustaining IoT solutions effectively. Resource availability refers to the extent to which SMEs have the necessary resources, including financial, technological, and human resources, to implement IoT technologies (Oliveira et al., 2019). Adequate resources ensure that SMEs can overcome potential barriers to IoT adoption and support the successful integration of these technologies into their marketing strategies (Elhusseiny & Crispim, 2022).

Financial resources are critical for acquiring IoT hardware and software, as well as for training staff and maintaining IoT systems (Nascimento & Meirelles, 2022). SMEs with adequate financial resources are more likely to invest in IoT technologies, believing that these investments will lead to enhanced marketing outcomes and business growth (Al-Surmi et al., 2021).

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Technological resources include the necessary infrastructure, such as hardware, software, and network capabilities, to support IoT technologies (Dwivedi et al., 2019). SMEs with advanced technological resources are better equipped to deploy IoT solutions, leading to more innovative and effective marketing strategies (Rialti & Zollo, 2023).

Human resources involve having skilled personnel who can manage and utilize IoT technologies effectively (Jones et al., 2021). SMEs that invest in training their staff to use IoT are more likely to integrate these technologies into their marketing operations successfully (Gibson, 2024).

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In addition, Franco and Garcia (2017) found that despite the fact that many businesses based in developing nations have adopted IoT, these businesses still have room for improvement in terms of their skills in ICT. It was shown that this is the case despite the fact that many companies with their headquarters in less developed countries support IoT. According to Looi (2004), industrialized countries have been successful in developing an environment that is conducive to the adoption of ecommerce via the use of ICT infrastructure. This is due to the ready availability of some common network infrastructures, such as ICT standards and supporting applications. On the other hand, less developed countries have not been as successful in cultivating an atmosphere that is amenable to the growth of an ICT infrastructure. In addition, Chieochan et al. (2000) found that the technological infrastructure of various economies had a positive influence on the adoption of IoT. This finding was published in the journal Computers in Human Behavior. Because of the easy access to current technology as well as the availability of human and financial resources, many small and medium-sized businesses in developing countries have been forced to adopt IoT (Teo & Pian, 2004).

If we take into consideration a case study from the field of marketing, it is possible to have a smart refrigerator that is able to monitor product supply in it and suggest to its owner to buy something when there is a shortage of supplies the conclusions of the research indicate that the number of linked devices is likely to reach up to 50 billion by the year 2020. It may be deduced from this that by the year 2020, each person will have access, on average, to 6.5 gadgets that are connected to the IoT.

On the other hand, if we take into consideration the fact that the number of people who use the internet represents just a very tiny percentage of the overall

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population of the world, then the typical number of devices held by individuals who use the internet will be much higher. The potential uses of the technologies behind the IoT are expected to be beyond bounds. Management of infrastructure, monitoring of the environment, transportation, media, home automation, and, of course, marketing are some of the possible uses of this technology. The IoT may also be considered as a tool for advertising products and services, engaging with customers, obtaining data on customers for marketing purposes, targeting particular audiences, and achieving a variety of other marketing aims and objectives. There is a chance that the opportunities for marketing that it gives are really unlimited.

In spite of this, many individuals working in the marketing sector as well as academics see it more as something that will be used in the field of marketing in the future than as something that is already being utilized. Both the IoT and internet marketing in general are examples of disciplines in which the practical application of freshly discovered information is much ahead of the theoretical foundations of those fields. Because of this, there is an increasing need for scientific study despite the fact that it may entail a significant amount of risk and uncertainty.

The more in-depth the scientific inquiry, the higher the number of potential solutions there are to lessen or get rid of problems. When discussing the IoT and the opportunities it provides, one of the issues that come up most often is the need of protecting the personal information of users and ensuring that they maintain their privacy.

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To discover a solution to these problems, all of the stakeholders in the IoT network need to collaborate with one another. This problem provides a particularly tough hurdle for marketers to overcome when it comes to the process of acquiring personal information about clients for the purpose of doing business. The IoT has the potential to develop into a helpful tool that will be able to improve all aspects of marketing. This would be a significant advancement. In addition, the technical capabilities that it has will make it possible for marketers to build and carry out marketing campaigns in a manner that is entirely unique to them.

Having said all of that, there are a few distinct issues that need to be emphasized in this discussion. The enhancement of the user experience is the first and most important priority. This refers to anything that affects the behavior of customers in a manner that is beneficial to a company and the marketing team that works for that particular organization. Neil Patel, an expert in digital marketing analytics and the co-founder of an analytics business called KISS metrics, states that "IoT takes ease to a whole new level." Changes are being made to the procedures that must be followed in order to make a purchase or put an item up for auction.

The level of rivalry and the struggle to earn the continued patronage of consumers both reach its zenith as a direct consequence of the process described here. Customers are no longer happy to be pleased by standard product and service offerings. They have higher expectations. Instead, they will give preference to those business partnerships that come with a number of additional advantages. Obviously, marketers have been using this tactic for a considerable amount of time, but the approaches that will be utilized and the creativeness that will be shown will be completely novel.

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The IoT is a unique opportunity for business people in marketing to learn more about their consumers' wants, needs, and expectations. Philip Kotler presents such a distinction of the parameters. According to Philip Kotler, “A Generic Concept of Marketing,” Journal of Marketing, April 1972, Vol. 36, Issue 2, pp. 46-54, the term "needs" refers to the most fundamental human necessities; the term "desires" refers to specific items that are necessitated by needs; and the term "demands" refers to wants for even more specific products that are supported by the ability to pay. All of these components of client demand will be much easier to identify because to the technical capabilities of the IoT, which will make the process much simpler. Because of this, the level of competition between companies is going to substantially grow, and the only firms that are able to gain the loyalty of their clients are the ones that are able to adapt to the new criteria in an acceptable manner.

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When used to the field of marketing, the IoT provides a degree of personalization in one's interactions with clients that was previously not conceivable. Additionally, new heights have been reached in terms of the degree of accuracy that can be achieved when audience groups are categorized and targeted. One way to look at it is as a whole new subfield of direct marketing, which is something to keep in mind. Businesses will have access to the capability of catering a product or service to the specific requirements of each individual consumer. This feature has the potential to serve as the foundation for ever more sophisticated kinds of targeted marketing. When a consumer signals that they are interested in knowing more about a company's products or services, the amount of aggravation produced by advertising lowers. This is because the customer is less likely to perceive the advertisement as being intrusive.

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Another piece of data implies that the future of interruption marketing is cloudy, but the effectiveness of permission marketing is only going to go higher from here on out. This inclination may be made more manageable by the technologies behind the IoT. When it comes to communication, technologies connected to the IoT provide a large number of previously unavailable options available to marketers. One example of this is the integration of devices connected to the IoT with social media.

Already, businesses are making full use of social media in order to get input from customers about their products. It has an impact on the growth of societal interest, and it also has an impact on the perspectives held by each individual user of social media. In conclusion, an interaction of this kind may have an influence on a product as well as the qualities associated with the product. When the technology of the IoT and social media are combined, a virtual world will be formed in which a user and a company will have a more profound connection to one another.

In addition to the dissemination of information verbally, it is conceivable that a customer could place an order with a company for a product and then request that the company modify the product in accordance with the requirements outlined by the customer. This scenario would be in addition to the dissemination of information verbally. The IoT will, without a shadow of a doubt, become a vital component of integrated marketing communications, and it will change the way in which organizations communicate with their existing or potential clients. On the other hand, this does not always suggest that "traditional" methods will become extinct in the near future.

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In addition to this, they may become more complex, and the only companies that will be able to keep their market share will be those that are successful in utilizing all available channels of communication in an appropriate manner; the technologies related to the IoT will be among the most crucial of these channels. The collection of data pertaining to one's target audience is among the most essential responsibilities of a marketer. When it comes to consumer data, the more particular and comprehensive it is, the more alternatives there are to target the audience that is being sought, increase the conversion rate, and build brand awareness, among other things.

The IoT makes it possible to gather data on customers in an almost uncountable number while maintaining a high level of accuracy. The following are some examples of the sorts of information that may be collected: age, gender, interests, social status, income, preferences, buying and other forms of habits, location, and many other types of behaviors. The opportunities for segmentation are growing, not just in terms of their strength, but also in terms of their accuracy. As a consequence of the high amount of communication that may take place between a client, an IoT device, and the real world, marketers are now in a position to monitor even the most minute facets of customer behavior.

The vast majority of consumers now make purchases in-store using their mobile devices, and a considerable fraction of those customers are willing to pay with their cellphones utilizing touchless or one-click payment methods. When consumers are out and about conducting their shopping, they are demonstrating an increasing propensity to make use of mobile and wearable technology. This fact is particularly interesting for retailers, as they are in a position to collect data about each and every purchase, the type

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of consumer (age, gender, etc.), and build a statistical database that will later assist a marketing team in improving product, delivery method, advertising strategy, targeting strategy, and many other aspects.

It is important to give due thought to the fact that technology enabled by the IoT may track the locations of individual customers. Because "location" is one of the components that makes up the 4P model (which also includes "product," "pricing," and "promotion"), it is of the utmost significance to know where and when customers are during a certain period of time. Before a company can decide on the other three components, however, the marketing team has to know where the product should be distributed in order to make that decision.

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Due to its design, which makes it famously difficult to comprehend, the IoT system is notoriously difficult to understand. This is because it requires communication between a very big numbers of different kinds of devices. This is the reason behind this. Because of this, getting a handle on it may be quite challenging. To put it another way, having understanding of the IoT is infamously difficult owing to the variety of diverse components that make up the network (Almeida et al., 2017). In light of this reality, businesses who have embraced the IoT are making investments in high-tech equipment in addition to people who have been taught to manage the data and gadgets that are connected with the IoT. These investments are being made in order to develop one-of-a-kind solutions that will boost the position that these companies have in the market, and the ultimate consequence of those solutions will be greater sales (Gomes & Osman, 2019). According to De Boer et al. (2021), a person's level of knowledge and capability

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will determine whether or not they are able to embrace IoT and how effectively they can address the challenges that come along with it.

The IoT is the fundamental driver behind the unattended creation of a substantial number of data, which takes place in the background and does not need the engagement of the user. This production of data takes place without the user's knowledge or participation. This is owing to the fact that there is no need for human interaction in order for the IoT to function properly. Anybody who is interested in making use of the IoT will be required to have abilities such as evaluating the settings of the device, visualizing the data, comprehending what the data means, and having the ability to convey that meaning to others.

Because each of these elements is reliant on the others, the loss of even a single one of them might result in problems across the whole marketing chain. Because of this, corporations put forth a lot of effort to collect as much data as they can from as many different sources as they can, and then they use that data to carry out research, develop client profiles, and advance their own financial interests. There is a sizeable population of customers who are willing to provide this information to businesses in exchange for a benefit or a discount, despite the fact that there is a large number of customers who are concerned about the possibility that another person may be able to track their whereabouts. This circumstance needs to become the most alluring opportunity for marketeers to induce clients to part with their personal data, and they should take advantage of it.

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The use of IoT technology across all facets of marketing that is accomplished by Nike+ is without a doubt one of the most impressive examples of such an implementation. This is a really successful illustration of connecting a customer's mobile device, wearable device, and internet connection all together in one seamless experience. In today's society, each of these things is already a reality, and a significant number of people make use of them. By integrating a variety of separate modules into a single mobile application, Nike was able to provide customers with a comprehensive selection of available services.

The program's users have access to three key capabilities, which are the tracking of a person's jogging routes, the measurement of their pace, and the calculation of the number of calories that they have burned. The information is recorded, and a user may check in at any time to see how far along they are in the process. In addition, users are given the ability to share their discoveries on various social networking sites through the application. In addition to this, the application serves as a kind of social network by allowing users to add one another to their friend lists, compete against one another, and view the results of their matches. Users of the program have the opportunity to make purchases of sports clothing via an online shopping platform. This feature was included for strictly commercial reasons.

Some running shoes have specialized sensors on the inside that enable the user's run to be monitored and the data to be transferred to a device. These sensors allow the user's run to be sent to a device. To begin, it is essential to emphasize the fact that by participating in this program, the marketing team at Nike is able to collect valuable information on customers, such as their ages, genders, localities, exercise routines,

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routes, and email addresses, among other things. After collecting this information, Nike uses it to provide its clients with a higher level of service. It is quite doubtful that a study of the market would be able to acquire information that is even somewhat as detailed as this one.

The most important thing to take away from this is that Nike did not have to invest any money in order to get this information. This is in stark contrast to the comparatively high costs associated with doing market research. In addition to this, the incorporation of social media features within the application makes it possible for the company to have an open channel of contact with the customers who purchase its wares. In conclusion, the application offers a financial benefit by allowing users to promote and sell their products directly from inside the program itself, which paves the way for the creation of new chances for business. Because all of the application's separate parts have been combined into a single working whole, it serves as a model for making productive use of the IoT technology.

Resource availability, including financial, technological, and human resources, plays a pivotal role in determining SMEs' intention to adopt IoT for marketing in Selangor. By ensuring they have the necessary resources, SMEs can effectively leverage IoT technologies to enhance their marketing strategies, improve customer engagement, and ultimately achieve sustainable business growth. Adequate resources help SMEs navigate the complexities of adopting IoT and fully capitalize on the benefits this innovative technology offers. RA significantly affects the intention to adopt IoT.

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2.4 Benefits of IoT Adoption by SMEs

Adopting the IoT in marketing strategies provides significant benefits to SMEs. These benefits can transform various aspects of marketing, from how SMEs interact with customers to how they streamline their operations and enhance their competitive position in the market.

Enhanced Customer Insights and Personalization

1. Improved Customer Data Collection:

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IoT devices like sensors and smart beacons enable SMEs to gather detailed, accurate, and real-time data about customer behaviours, preferences, and needs. This wealth of data is invaluable for SMEs as it allows them to understand customer behaviours in depth and tailor their marketing strategies accordingly (Baykal, 2023).

By analyzing data collected from IoT devices, SMEs can identify patterns and trends that help predict customer needs and preferences, leading to more effective marketing planning (Hojnik & Huđek, 2023).

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2. Targeted Marketing Campaigns:

IoT enables SMEs to create highly targeted and personalized marketing campaigns based on real-time data. For example, using IoT, SMEs can send personalized offers and promotions to customers based on their location or previous buying behaviour (Cardinali et al., 2024).

This level of customization improves customer engagement and satisfaction, as customers receive offers that are relevant to their interests and needs, thereby increasing conversion rates (Marabelli et al., 2021).

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Increased Efficiency and Cost Savings

1. Operational Efficiency

By automating various marketing processes such as customer data collection, campaign management, and even customer feedback collection, IoT significantly increases operational efficiency for SMEs (Bi, 2017).

This automation reduces the need for manual intervention, lowers labor costs, and minimizes human errors, allowing SMEs to focus on more strategic activities (Surmi et al., 2021).

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2. Reduced Marketing Costs

IoT helps SMEs optimize their marketing strategies by ensuring that they target the right customers at the right time, thereby reducing wastage of resources and marketing spend (Janssen et al., 2019).

Additionally, by using IoT data to improve decision-making, SMEs can allocate their marketing budgets more effectively, focusing on strategies that deliver the best return on investment (ROI) (Nascimento & Meirelles, 2022).

3. Improved Customer Experience Real-Time Customer Service:

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IoT enables SMEs to provide real-time customer service and support, which significantly enhances the overall customer experience. For instance, IoT can notify SMEs immediately when a customer faces issues, allowing for quick resolution (Paluch et al., 2020). This immediate responsiveness not only solves customer issues faster but also improves customer loyalty by showing customers that the SME values their satisfaction and is proactive about service quality (Liu et al., 2021).

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Competitive Advantage and Market Position

1. Strategic Competitive Advantage

By leveraging IoT, SMEs can gain a strategic competitive advantage by using data-driven insights to respond more quickly to market changes and customer needs (Wamba & Queiroz, 2020). IoT allows SMEs to be more agile in their marketing, enabling them to innovate and respond to emerging trends and customer preferences more effectively than competitors who do not use IoT (Porter & Heppelmann, 2015).

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2. Improved Market Position

IoT adoption helps SMEs improve their market position by allowing them to serve their customers more effectively and innovate in their product and service offerings (Papert & Pflaum, 2017). Additionally, IoT enables SMEs to track and analyze market trends in real-time, ensuring that they can adapt their strategies to maintain a strong position in the market (Marabelli et al., 2021).

Aydemir (2017) of Turkey conducted study on the IoT, which served as the major focus of their investigation, as part of the scope of their inquiry. The purpose of the research that was carried out was to conduct an analysis of the many advantages as well as the potential disadvantages that are associated with the use of IoT. In a similar vein, Standing (2019), discovered that the advantages included the following: access to

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a larger market, greater partnership potential, flexibility in administration and communication, accessibility, information, improved customer service, updated information, lower transaction costs, differentiation products and services, and the ability to enter the supply chain for larger companies. In addition, they found that the ability to enter the supply chain for larger companies was another advantage.

According to Standing (2019) also discovered that the capability of entering the supply chain for bigger organizations was an additional benefit. This was shown to be beneficial. They also found that being able to access the supply chain for larger firms was an extra advantage to working with them, which was a pleasant surprise. It was discovered that this had positive effects. They discovered, to their joyful surprise, that one additional benefit of working with them was the ability to access the supply chain of bigger companies. This was an unexpected and welcome development. It was found out that doing this had a favorable impact.

According to the findings of Wanyoike et al. (2012), the benefits of utilizing IoT include the simplification of work tasks, the assurance of dependable communication, an increase in customer satisfaction, the introduction of new products and services, a reduction in expenses, and an increase in output.

Additionally, these benefits can be achieved through the introduction of new products and services. In addition, the possibility for a boost in production is one of the advantages of adopting IoT that ranks among the most important of its benefits. According to research conducted by Olatokun and Kebonye (2010), the primary reasons for using IoT technology are to gain a competitive advantage and to respond to the

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demand placed on businesses by both customers and suppliers. One of the most important goals of this activity need to be to bring down the expenses while simultaneously raising the amount of production achieved.

IoT is of immense benefit while project management is considered by SMEs. Business intelligence, hyper speed, quicker process management, collaboration with the stakeholders, and performance management can be fostered through IoTs. The valuable information of the IT industries can be explored with the internet of things with stern ethical and legal implications. Risk analysis can be carried out with the implementation of IoT in SMEs. According to Correani et al. (2020), the entire global network which is catered through blockchain edge can be connected through IoTs to give superior levels of workflows. In addition, industry 4.0 is of immense benefits while surfeit data storage is fostered. The IoT acts as a procedure of interchanging system which is carried out through cloud storage.

According to the findings of a study that was carried out by Al-Abdallah (2013), on a framework that consisted of three independent variables (customer loyalty, customer retention, and attracting new customers) representing customer-enterprise relationships and one dependent variable (the application of IoT) representing the use of IoT, one of the advantages of utilizing IoT is an increase in customer loyalty. One further advantage is that it led to an increase in the number of new customers that were brought in. The implementation of solutions that are connected to the IoT has very little influence, if any effect at all, on either the process of maintaining already-existing customers or the process of obtaining brand-new customers. If anything, the implementation of these solutions actually has no effect at all. According to Zahedi and

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Dehghan (2019), trust is one of the most important issues that has to be resolved before the IoT can be fully implemented. This is due to the fact that confidence is very necessary for the development of the IoT. This is one of the most significant aspects to take into account, and it deserves some of the attention that you can offer it. When all of the parties involved have acquired a level of comfort with one another, it will then be feasible for business transactions to take place.

The potential to collect data from customers is one of the aspects of the IoT that, in the perspective of marketers, presents one of the most alluring opportunities. Despite this, it raises issues about the right to privacy of consumers as well as the safety of their personally identifiable information. If the data is correctly evaluated, it has the potential to be extremely accurate, and it may contain information that may be utilized in a number of different applications. The data that can be acquired via the use of IoT technology has the potential to be used in a variety of different applications. If hackers were to get their hands on this information, they may put it to use for malicious purposes. It will be difficult to completely get rid of all of the possible dangers and threats since the network of IoT devices will be so ubiquitous. The fact that the sources of personal information in the case of the IoT are probably countless and include not only computers and mobile devices, but also any other kind of wearables, cars, house equipment, medical implants, and so on, makes this task the most difficult one in this process. In addition, in the context of the IoT, the sources of personal information include not just computers and mobile devices, but also any other sort of wearables that a person could have on their body at any one time. The platform is designed in such a way that it is capable of monitoring the actions of its users in real time and in any imaginable area.

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The management of traditional internet technologies and the management of IoT technologies are quite distinct from one another in a number of important respects. These distinctions include the control over the flow of information as well as the creation of a number of different options. Web technologies and users themselves are the active parties in the case of data input, but in the case of the IoT, people play a passive role while devices serve as the data source; In the event that data needs to be exchanged with other providers, web technologies make this possible, in contrast to the IoT, which facilitates data sharing with other devices; For instance, in the case of data input, web technologies and users themselves are the active parties.

In the real world, actions are carried out as part of the IoT; meanwhile, in the virtual world, people carry out activities online. When it comes to making judgments, the devices that make up a network of IoT will often place themselves in the viewpoint of the people that utilize the network. They put themselves in jeopardy by being so dependent on technologies in the real world, which puts them at risk of having those devices break down, which may have a negative impact not only on their personal lives, but also on their health and their ability to make ends meet.

This is a direct outcome of the fact that the situation exists. Customers, while using IoT technologies, unknowingly invest a tremendous amount of confidence in service providers, which in this instance refers to marketing teams, and allow them access to a significant quantity of personally identifiable information. Customers also unknowingly invest a tremendous amount of confidence in service providers, which in this instance refers to marketing teams.

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Hacking is without a doubt one of the instances that are brought up when discussing possible hazards; in fact, it is one of the examples that is brought up the most often when discussing potential threats. In the case of IoT devices, the risk is even larger than usual since the targets of hackers are not just databases but also physical goods, many of which have the potential to be detrimental to human health. This fact elevates the significance of the problem to a far higher level. Because of this, the circumstance as a whole is quite a bit riskier than it was before for instance, hackers may focus their attacks on autos in the event that these automobiles are linked to the network of IoT.

An attack on the database of a company that contains the personal information of customers can be harmful not only for the customers who are the victims of the attack, but also for the company, which can suffer a significant amount of financial loss, damage to its reputation, a crisis in public relations, and even go bankrupt as a result of the attack. Customers can be the victims of an attack on the database of a company that contains the personal information of customers which might result in the customers becoming the target of the attack. This is something that we should keep in mind. In the event that a consumer's personal information is stolen or unlawfully given to a third party, the consumer has the legal right to initiate a lawsuit against the company that was responsible for the breach and seek both moral and monetary restitution.

These sorts of incidents have the potential to inflict a significant amount of damage to a company; however, the extent of that damage will vary based on the quantity of data, the kind of data, and the number of individuals who were impacted by the breach. Even though there are already regulations that make it illegal to transmit personally identifiable information and to gain unauthorized access to databases, the

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law needs to be updated to reflect the new challenges that are presented exclusively by the utilization of technology that is associated with the IoT.

In other words, the law needs to be updated to reflect the fact that the IoT presents its own unique set of problems. For instance, information that pertains to a person is required to be removed from public view after a certain amount of time has elapsed in accordance with the regulation that governs the protection of personal data in the European Union and is known as "the right to be forgotten." This regulation was created by the European Union. Despite this, it is likely that it will be a very difficult procedure to complete since the majority of the time, information is saved on internet sites such as the cloud.

As a result, it is possible that it will be extremely difficult to achieve. To be able to duplicate and disseminate digital material, all that is needed of you is to possess the most essential technical skills. If you do not have these abilities, you will not be able to copy or share digital information. As a direct result of this, it is quite possible that the law that was referred to as "the right to be forgotten" would be made completely ineffective. One possible understanding of the term "the right to be forgotten" is as described above. When it comes down to it, one of the most significant challenges associated with marketing solutions that are based on the IoT is the difficulty of storing and transmitting the personal information of individuals in a way that is secure. This is one of the most important obstacles to overcome.

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2.5 Barriers of IoT Adoption by SMEs

While the adoption of IoT presents numerous benefits for SMEs, several barriers can hinder their ability to effectively integrate this technology into their marketing strategies. Understanding these obstacles is crucial for SMEs to navigate and leverage IoT solutions effectively.

Technical and Technological Barriers

3. Complexity of IoT Technologies

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Many SMEs find the complexity of IoT solutions a significant barrier, as they often lack the technical expertise to implement and manage these systems (Rialti & Zollo, 2023). The integration of IoT with existing systems can be challenging, requiring a level of technical knowledge that many SMEs do not possess (Mikalef et al., 2020).

4. Lack of Standardization

The absence of standardized protocols and technologies in IoT can create interoperability issues, making it difficult for SMEs to ensure consistent and reliable integration across different platforms Reuver et al. (2016). This lack of standardization

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can lead to increased costs and complexity, discouraging SMEs from adopting IoT technologies (Wamba & Queiroz, 2020).

Financial Barriers

1. High Initial Costs

The initial investment required for IoT infrastructure, including sensors and data processing capabilities, can be prohibitively expensive for many SMEs (Li et al., 2021). The costs associated with training employees and upgrading existing systems to support IoT can also be a significant financial burden (Frank, Mendes, et al., 2019).

2. Ongoing Operational Costs:

- Beyond initial setup, the ongoing costs of maintaining IoT systems, including regular updates and security measures, can be a deterrent for SMEs (Paluch et al., 2020).
- Managing and analyzing the large volumes of data generated by IoT devices requires additional resources, which can strain SME budgets (Oliveira, 2019).

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3. Organizational and Cultural Barriers

i. Resistance to Change

In many SMEs, there can be significant resistance to change, particularly when it comes to adopting new technologies like IoT, which can alter established workflows and roles (Tarhini et al., 2016). The cultural shift required to integrate IoT into daily operations can be challenging for SMEs that are not accustomed to relying heavily on technology (Liu et al., 2019).

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ii. Lack of Skilled Personnel

SMEs often face challenges in finding and retaining skilled personnel who are proficient in IoT technologies and data analysis (Kraus & Kraus, 2023). The skills gap can hinder the effective implementation and use of IoT in marketing, as SMEs struggle to manage and leverage IoT effectively without the right talent (Marabelli et al., 2021).

These barriers highlight the multifaceted challenges SMEs face in adopting IoT for marketing. By recognizing and addressing these issues— ranging from technical complexities and financial constraints to organizational resistance and skills shortages—SMEs can better position themselves to leverage IoT technologies and enhance their marketing efforts, ultimately leading to improved business outcomes and a stronger market presence.

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The IoT is still not widely adopted by SMEs, most likely because SMEs are distinguished from big firms by a number of distinguishing traits. According to Cacciolatti and Lee (2015) some of the distinguishing characteristics of SMEs include a small management team, a strong owner influence, a lack of staff in specialized areas such as information technology, multifunctional management, limited control over their business environment, limited market share, low employee turnover, a reluctance to take risks, and avoidance of sophisticated software or applications. Because of these qualities, SMEs are notoriously sluggish when it comes to the adoption of new technologies and have more challenges in maximizing the benefits of technology than big corporations (Pathan et al., 2017).

According to Standing (2019) there are two types of impediments to the usage of IoT: internal and external. The following are examples of internal barriers: determining profitability, international commerce, limited financial resources, chain integration, and the provision of and use of electronic environments.

The lack of a general standard technology, industrial sector e- competencies, and awareness of the demands of SMEs are all examples of external impediments. According to the findings of Sievers et al. (2021) a significant number of company managers are unhappy with the IoT applications in their organizations. Email is the sole method that companies utilize to leverage IoT. The IoT is underutilized for a variety of reasons, including those that are technological, environmental, economic, financial, commercial, and legal in nature. According to Costa et al. (2023), the obstacles include being inconsistent with the demands of the company, having no apparent advantages, having a lack of training, and being expensive. Cost issues is considered one of the

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main problems faced by the organization under the SMEs categories at the time of implementing IoT-based technology in the internal sector of the organization. It has been observed that the installation of IoT-based technology requires different instruments which are high in price. Therefore, this condition results in the development of cost-related issues.

Security and connectivity can be considered as the biggest obstacles while the adoption of IoT in SMEs is considered. Moreover, compatibility issues that deal with getting adopted with new things can act as barriers in this case (Jones et al., 2021). Additionally, potential standards are supposed to be followed to maintain integrity and transparency of the same. Innovation challenges particularly the decentralization of the IoTs can be a big threat for hackers to gain access to unknown individuals and destroy or alter their personal information, this phishing can be detrimental while the SMEs are deprived of robust and effective management of IoT applications in their systems. Hence, IoT designs are supposed to be made by experts where IoT framework and redesigning with the recent innovations are considered. Tracking down overall performances is supposed to be described by the internet of things which is cumbersome at times and acts as an obstacle in organizational factors. Lack of knowledge is responsible for developing other problematic consumption for the organizations that are under the implementation process of IoT-based technology. Along with this, it has been observed that the installation of different types of technological gadgets require a proper technical skill as well as knowledge without proper technical skills the employee of SMEs can be able to perform the installation process of IoT-based gadgets.

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According to Brous et al. (2019), discovered, in a variety of methods with the assistance of other researchers, that the primary obstacles that businesses encounter in the use of their IoT equipment are connected to concerns around security. They advised that it should be supplied to SMEs in order to facilitate the development of a successful IoT application for SMEs. According to the findings of a research that was carried out in Serbia by Hajiheydari et al. (2021), one of the primary direct reasons for poor IoT utilization is skepticism. The research recommends certain essential adjustments in order to make IoT more widely applicable. According to Lin and Hsieh (2006), the readiness to adapt and pace of responsiveness to new technologies are the two factors that differentiate consumers from non-consumers. The usage of IoT is another factor. According to the findings of Indrawati et al. (2020), one of the impediments that might be a government grant is the fact that the government encourages the development of innovative technologies by SMEs. Once it has been implemented, the grant neither requires nor results in any expenditures being incurred. Hashim and J (2015), found that the presence of IoT managers was a barrier to adoption in prior research he did on the topic. There is a widespread perception among managers that a website is an asset that should be maintained, as well as a current trend. According to Kuzminykh et al. (2020), the organizational and technological constraints that prevent people from using IoT are the most significant. When it comes to the success of a website, organizational obstacles such a lack of members and insufficient time for implementation are highly important factors.

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2.5.1 Customer Management Services (CMS)

CMS is one of the important factors, which needs to be processed to stay in their market position in any market whether global, or at the national level. Therefore, strategies of different types need to be adopted with the help of advanced technologies included in any type of business. The IoT application in the small business sector helps to maintain customer engagement and customer satisfaction improvement (Sestino et al., 2020). The use of these services related to CMS makes the study development related to the taken topic of IoT impact on small businesses, which makes the use of these customer management utilities. IoT application with the help of this CMS makes recommendations for customer management. It gives the shipping details with the inclusion of customer preferences and engagement in the process of its development.

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IoT application is highly involved in the marketing and productivity of SMEs when combined with the CMS. CMS is invariably linked with the success of SMEs as customer acceptance and retention are greatly catered to through the same. As opined by Hayat et al. (2019), a suitable approach by the project managers is of immense significance for learning about brand reputation as well as overall profits for their organization. Moreover, driving the loyalty of the customers with great services can be good options not only in Malaysia but also across the globe. Additionally, a ***friction-free*** customer experience can address the customer needs and empower the employees about fostering operational changes in an effective manner. Hayat et al. (2019), imprinted that ***customer integration*** in the portfolio management of projects can be highly beneficial that act as a management tool. Hence, the importance of CMS in SMEs can never be described in words.

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Then the process of engagement with the customers helps create more scope for the relevance of the study recognition related to IoT implications and its effect due to perceived ease. This perceived ease includes customer satisfaction, which has to be met with the market supply curve, and this can be done by the application of this CMS process. The confluence of customer relationship management (CRM) with the IoT has been extensively researched and investigated by practitioners, academics, and researchers (Kierzkowski et al., 1996). The IoT is no longer considered a novel approach to marketing among SMEs; rather, it is rapidly developing into a well-established marketing practice for the management of customer contacts. It is vital to recognize the CMS benefits obtained by the B2B e-marketplace in order to boost IoT capabilities and results produced through extended CRM technology utilization in order to meet this broader perspective. It is also essential to examine the best practices that SMEs can use to take advantage of the B2B e-potential marketplace's by integrating IoT with their existing marketing channels and processes in order to increase customer satisfaction, loyalty, and profitability (Saini et al., 2009).

Customers are placing a greater emphasis on B2B and CMS transactions, and as a result, SMEs have a good chance of realizing financial benefits from using CMS that is acquired via an online B2B marketplace. However, none of the studies that were discussed above looked at the connection between CMS and the success of e-businesses. The CMS is the interface that customers have with an organization, and it is widely acknowledged as an effective marketing strategy for gathering, analyzing, and interpreting customer data into management actions that may help with resource allocation and customer satisfaction Ernst et al. (2010).

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The capability of the CMS to identify a new market that is relevant to businesses, allowing for the integration and justification of desired qualities of an electronic transaction platform, is gaining increasing traction as a potent tool for improving marketing operational performance. This is largely due to the fact that the CMS can identify new markets that are relevant to businesses (Palumbo & Herbig, 1998). As a consequence of this, we believe that the performance of e-businesses and CMS have a positive relationship with one another. We feel that a CMS is an important feature that focuses on the integration of IoT services that are created from a B2B e-marketplace in order to maintain long-term contacts with customers in the e- marketplace.

Innovation challenges particularly the decentralization of the IoTs can be a big threat for hackers to gain access to unknown individuals and destroy or alter their personal information, this phishing can be detrimental while the SMEs are deprived of robust and effective management of IoT applications in their systems. Hence, IoT designs are supposed to be made by the experts where IoT framework and redesigning with the recent innovations are considered. While profitability is considered, customer services are the paramount and take the pole position in organizational management. For this reason, efficient and expert knowledge is considered beneficial for the incorporation and implementation of CMS in the SMEs which can go far in the path of achievement.

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2.5.2 Facilities for the Supply Chain

The supply chain management aims at using the IoT solution in relation to keeping track of the technology and maintaining the livestock policies of the manufacturing products including farming and agriculture. The data ensures increasing the actual output of the company as well as improving the quality of the product and ensuring profitability. Evident studies have highlighted the importance of the marketing sectors in supply chain management. As per the critical analysis by Soori et al. (2023), IoT allows the supply chain management marketing sectors to connect to vehicles and real-time equipment in manufacturing the products of the customers.

The IoT has a vast number of business prodigies that facilitates monitoring and tracking of the different companies, which focuses on bringing more authentic companies together adding more transparency and increasing the cost value of the product. As stated by Aksenta (2024), the valuation of supply chain management increases with the increase in the IoT solution techniques. IoT literally means towards delivering and fulfilling the companies conducting different operations. Some of the popular companies leveraging the power of IoT are Nissan motors, Volvo and Amazon. This mechanism has a revolutionary impact on supply chain management growing towards fundamentalism.

The supply chain and IoT are directly involved and the latter is associated with the former in an effective way. In this context, as commented by De Vass et al. (2021), while ***industry 4.0*** is considered, the supply chain plays an important role while the IoTs are incorporated in an effective way. Otherwise, the entire management can be

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wonky and hamper the process of managing the supply chains. Delivery, as well as the fulfilment of the companies, is carried out through a strong IoT application system which is well incorporated into their systems. On the other hand, the SMES that are deprived of an effective IoT suffers a lot to keep track on the authenticated products that are delivered to them. Moreover, the connection of various data points can be made through IoTs which are processed through the usage of ***smart devices.*** In this context, as imprinted by Al-Talib et al. (2020), ***connectedness*** and ***resilience*** can be achieved through the application of IoT management in the SMEs which is a growing concern of late.

2.5.3 New Product Development (NPD)

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This process of NPD helps to create a set of designs which is to be included by taking different aspects which are related to many factors of Businesses. This study helps to create more scope for the business to include these IoT devices and technologies in its operations in the SMEs of Malaysia. The use of different indirect variables such as perceived ease, resource availability and reliability can be determined by using types of approach. NPD specifies the research process of conducting research in product development which helps to create a more customer base (Suppatvech et al., 2019).

Their tastes and preference with the inclusion of different market trends have been undermined in this approach of NDP and therefore it can be taken for this study development. It includes a plan which includes the product concept and the timeframes related to its concept implementation and development barriers. Moreover, the use of the five stages of this NDP helps to have more examination accuracy of the product

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development which can be more approached with this IoT application (You & S., 2021). They are the dreamer stage, builder stage, mentor stage, explorer stage, and giver stage.

The use of this NPD helps to ensure more customer satisfaction and to increase the potential customer base making the process of developing the business sector more efficient. The use of this NPD even helps to create more scope in IoT applications which can be implemented to adopt different technologies which in turn sustain the market position of the SMEs (Friess & Ibanez, 2022). The final product inclusion needs more technological support which in turn helps to make more improvements with having maximum utilisation of the resources and making more profit maximisation. Therefore, it is an undeniable fact that IoT-enabled products have made life easier for project managers along with other people of the country.

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E-potential marketing, which uses online means to locate untapped consumer markets, is rapidly becoming into one of the most essential marketing tools (Albrecht et al., 2005). E-importance is not just driven by a desire to save costs, despite the fact that acquiring IoT services from an online B2B marketplace could result in cost reductions in the form of reduced operational expenditures. Marketing's End customers will ultimately be responsible for paying a significant portion of any marketing expenses that are incurred in the future. The IoT will have an increasingly important influence on the ability of a corporation to innovate (Ernst et al., 2010). The formation of a wide range of commercial alliances may be made easier by the use of the internet, which paves the way for businesses to acquire sustainable advantages over their rivals in international markets.

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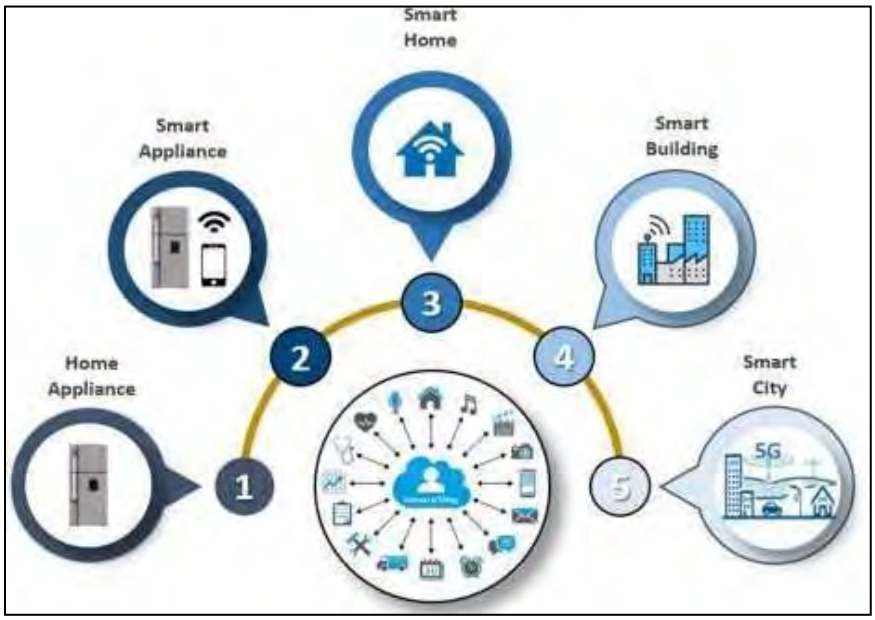
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Production of new products is inextricably linked with the adoption and incorporation of IoT which is highly relevant these days. As stated by Wang et al. (2018), the process of planning and printing, and production of new products are useful and are nothing but the fruit of the IoT. In addition, automation can be carried out through the IoT which is highly influential in the industrial context. Traceability, feature creep, and faster connectivity are essential parts while NPD is concerned which is related to the SMEs. ODMS or Online Data management System is a crucial part of IoT along with the DBMS or Database management System that are beneficial in information sharing. Moreover, product control can be met by different IoT requirements which are mentioned worthy (Aheleroff et al., 2020). Hence, in successful product launch, the incorporation of IoT play a vital role.

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Figure 2.8

Different IoT-enabled products



(Source: Aheleroffet al. 2020)

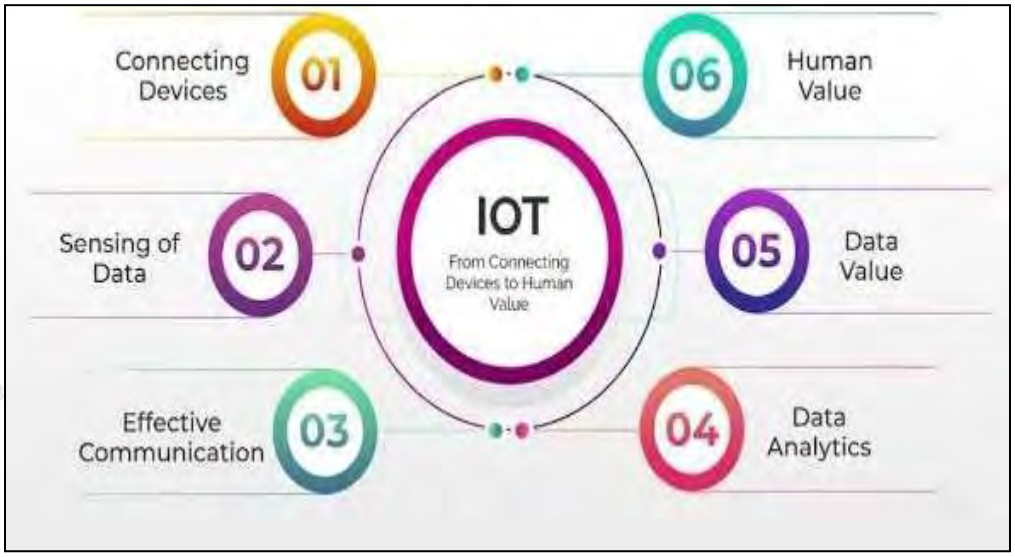
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As depicted in figure 2.6, from the smart building which are the stepping stones of a smart city, IoT has reached home appliances by means of smart appliances. The different product development stages are also essential in this context which can break the necessity of accepting IoT in the current situation.

Figure 2.9

NPD of IoT



(Source: (Dominik & Bilgeri, 1989)

Connection of devices, and sensing of data for making transparent communication and can effectively enhance both data value and human value. From customer-oriented devices to connected types of equipment across many industries are also essential for NPD. Additionally, a technological ecosystem, as well as new services in the form of AI or Artificial Intelligence, block chain, and cloud computing, can be achieved through the Internet of things. Different device hardware and software development can also be catered through IoT which is of immense use of late.

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As a direct result of this, the establishment of new product activities for the B2B e- marketplace is necessary in order for the marketplace to deliver unique value in the provision of services to customers. Therefore, we contend that including a B2B e-marketplace into the marketing strategy and value chain of a company may improve the number of opportunities for collaboration, therefore enhancing the firm's capacity for new product development and its success in e-business.

2.5.4 IOT Infrastructure

Integration of IoT devices is an essential component for collaboration among businesses, online marketplaces, and providers of goods and services within the digital market (Gerpott & May, 2016).

Integration of IoT devices is an essential component for collaboration among businesses, online marketplaces, and goods and services in the context of the digital market (Moradi, 2021). It is provided one of the first insights on the expanding opportunities presented by IoT in relation to marketing efforts (Moradi, 2021). The authors Andrews and Bianchi (2013) underline the advantages of Internet of Things integration of electronic purchasing and the motives of manufacturers to participate in the online marketplace. Moradi (2021), center their research on the creation of a website for cyber branding via the use of IoT connection. Kumar et al. (2019), investigate the emerging paradigm of Internet of Things integration marketing for online economies. According to Kumar et al. (2019), the integration of IoT has led to the creation of a

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highly visible and widely used marketing tool for technological products inside businesses.

2.5.5 Encouragement from The Government

SMEs need governments to accelerate their promotion and support of B2B IoT in order for them to get a percentage of revenues from the B2B electronic marketplace and catch up to large-scale corporations in the Internet economy. The encouragement of the usage of B2B e-marketplaces by the government will lead to a larger degree of adoption by SMEs (Morgeson & Mithas 2009). Despite this, the legal environment for doing business online in certain countries is still not entirely clear. In contrast to the B2B IoT that exists in more developed countries, the regulatory environment in economies that are still in the process of emerging is more uncertain. Obstacles to the growth of B2B IoT in China include, but are not limited to, a lack of network security, insufficient telecommunication infrastructure, a lack of trust, a lack of laws and regulations concerning the e- environment, problems with standardization, payment issues, and a lack of awareness of the benefits of the e-environment (Chong et al., 2016). As a consequence of this, governments need to expedite their legislative processes and provide legal environments that are long-lasting and consistent in order to stimulate the development of B2B e-marketplaces.

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2.5.6 Involvement of Senior Management

The decision to implement a business-to-business electronic marketplace is a strategic one that can only be taken by the company's upper management. The awareness that top executives have of the B2B e-operations and marketplaces, in addition to their level of expertise, experience, and leadership, is one of the most essential components of adoption projects (Jayashree et al., 2022). Top managers play an essential part in the process both during and after the adoption of B2B IoT by providing the organization with direction, authority, and resources. According to the findings of a number of researchers Jayashree et al. (2022), senior management plays a crucial role in a company's ability to successfully recognize the opportunity that the B2B e- marketplace presents for examining and integrating competing customer- oriented and customer-oriented technological resources.

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According to the opinions expressed by these industry professionals, the internal relationship management of a firm should put a high priority on devoting resources and personnel to the research of the B2B e-marketplace. The senior management team needs to study the possible advantages of marketing via the B2B e-marketplace by dedicating resources to assist firms in improving their marketing skills. This will allow for the achievement of a more comprehensive viewpoint.

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2.5.7 The Performance of IoT

An original and novel attempt was made to develop new B2B-eM-CSFs for the Malaysia B2B market via the literature study. As a consequence of this, our investigation has contributed to the existing body of knowledge on CSF principles and practices pertaining to the use of the B2B e- marketplace in order to achieve B2B e-business objectives. It is of the utmost importance that SMEs devise a methodical approach for locating and ranking CSFs at each stage of the implementation process, taking into account the environment in which IoT adoption takes place. As a consequence of this, SMEs need to devise an all- encompassing plan in order to adapt and include each component depending on the findings and interpretation of the research. Both academics and businesspeople in the field have different opinions on the CSFs and how they relate to the success of a firm (Kellerton, 2023).

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According to Coltman et al. (2007), the term "e-business performance" refers to the financial advantages that are generated from the process of a firm finding, forecasting, and serving the expectations of their customers online. The B2B e-marketplace is a platform for electronic commerce that is virtual, interactive, and dynamic. It has the potential to both create and maintain company value.

According to Kellerton (2023), determining a firm's Important Success Factors (CSFs) may help the organization focus on the critical factors that drive the success of the company. Developing a stronger bottom line via the usage of IoT has been identified as one of the primary motivators for SMEs. Some of these motivations include the ability to better promote the company and improve overall marketing performance; the

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ability to cut operational and marketing expenses; the ability to better promote the company in peripheral areas; and the ability to minimize the competitive disadvantages that SMEs face in those areas.

On the basis of the studies described above, we are able to establish a knowledge of how performance should ideally be monitored in order to make it possible for an organization to monitor its capacity to please its customers within the framework of a B2B transaction. According to Ernst et al. (2010), there is a correlation between sales performance (such as sales units, revenue, market share, and new accounts), customer satisfaction (to what extent customers are acquired, retained, and loyal), operational cost reduction (cost savings and increased operational effectiveness), and relationship development (As a result, we suggest that the success of an e-business may be assessed using four elements that have been modified from those previous studies. These four items are referred to as "customer satisfaction," "operational expense reduction," "relationship development," and "increasing sales volume."

2.7 Marketing in SME

Marketing is constantly present in all actions that pertain to the economy. Many different points of view exist about certain marketing phrases. There is a widespread comprehension of marketing, which may be broken down into components such as advertising, sales, or even trade; these are well-known aspects of marketing, but they do not represent marketing as a whole (Kotler, 2015).

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According to (Hisrich & Ramadani, 2018), marketing may be conceptualized as a bridge that links commercial enterprises and customers. In another definition, marketing is "the act of providing value to what you sell and developing strong connections between your company and your customers." Through the use of this method, businesses are able to provide more value to their clients (Kotler, 2015).

Studies on marketing for SMEs are more condensed, and there is no obvious demarcation between the two types of businesses (Harrigan et al., 2012). The marketing theory that was first developed for small and medium- sized businesses was initially based on the methods that were employed by bigger and smaller organizations to meet the needs of smaller enterprises (Moore & Manring, 2009). At this time, research is concentrating more on particular topics, such as the significance of entrepreneurship to marketing and small and medium-sized businesses. The pursuit of opportunities and enhancement of activities that provide perceived customer value via creative customer connections and sales, market immersion, networking, and adaptability are the essential components of what is known as entrepreneurial marketing (Harrigan et al., 2012).

After looking at a number of different research on marketing, it has been determined that the conventional approaches do not cover all of the different techniques. The present competitive climate necessitates the development of new marketing tactics that are successful in order to compete in a global economy in which consumers are growing more demanding (Buhalis, 2019). According to Jamali et al. (2014), the appropriate implementation of information technology systems may have an effect on the continued existence of SMEs. Because Malaysia relies on outmoded information technology systems in comparison to other countries that employ cutting-

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edge technology to boost their businesses, the nation's domestic entrepreneurs would be unable to compete successfully (Aissa et al., 2023). This research has placed an emphasis on the need for innovative marketing approaches that make use of the assistance of information technology.

2.8 Marketing 4.0

The marketing industry has evolved from product-driven marketing (also known as Marketing 1.0) through customer-centric marketing (Marketing 2.0), human-centric marketing (Marketing 3.0), and finally human-to-human marketing (Marketing 4.0). (Marketing 4.0). (Marketing 4.0). According to (Aissa et al., 2023), "Marketing 4.0" refers to a marketing strategy that combines online and offline interactions with businesses and customers. In addition, Marketing 4.0 has to take both form and function into consideration, which means that a brand's packaging needs to be designed in line with the most recent fashions (Aissa et al., 2023).

Marketing 4.0 is a concept that is linked with modern dimensions for the technology and connectivity development purposes. Along with this, customer’s data acquition is playing a leading and effective role for determining the buying process and mainly focusing on the behaviours and the expenses. From traditional to digital marketing purposes, these types of marketing are needed for the next generation marketing purposes.

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According to the concept that was just broken down into its component elements and examined in further depth, there are three primary variables that have been shown to have an influence on the expansion of the IoT. The examination of the issue as to whether or not the usage of IoT software and hardware in marketing by SMEs in the state of Selangor has a major impact on the performance of marketing will serve as the dependent variable for the objectives of this study. This analysis will centre on the subject of whether or not the answer to this question has a significant impact on the efficiency with which marketing is carried out. The results of this research should, throw some light on the subject of whether or not an influence of this kind really does occur. The degree of apparent simplicity of use, the amount of preparation required, and the availability of resources are three of the criteria that may be regarded to exist separately from one another and independently of one another.

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Both the technology readiness index (TRI) and the technology readiness level (TRL) are related evaluation measures that can be used to assess how well prepared an organization is to incorporate new technologies into its operations. These evaluation measures can be used to determine how well an organization is prepared to incorporate new technologies. In the Technology Readiness Evaluation Guide, it can be found that both of these different evaluation measures. TRI and TRL are not to be mistaken with one another under any circumstances owing to the fact that the actions and goals that each one aims to achieve are wholly unlike to those of the other. On the other hand, the TRL, is a scale that is based on technology and is used to evaluate the level of maturity of a particular technology as well as to compare several different kinds of technologies, such as in the case of NASA's space technology planning. For example, the TRL is used

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to evaluate the level of maturity of a specific technology and to compare several different kinds of technologies.

Utilizing this scale, one is able to evaluate, investigate, and compare a broad range of different kinds of technology. In addition to this, it may be used to establish how far down the path to maturity a particular technology has progressed. In this survey, both the TRI and the TRL measures, in their respective forms, were used to collect data (TWI, 2022). The planning and execution of this research were carried out in such a way as to ensure that the former, rather than the latter, would be able to serve as the primary emphasis of this review article. We were able to do this by planning and carrying out this study in such a manner that it would make it possible for this to take place.

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This is an unavoidable end result that can be traced back to the investigation that was conducted in the first place. In his published publications, Parasuraman was the first person to adopt the phrase "technology readiness index". This was shown in the study that he had conducted and had published more than two decades ago under the title "Technology Readiness Index (TRI): A Multiple-item Scale to Measure Readiness to Embrace New Technologies." Since its first publication, the article has been referenced more than 1700 times, with an annual citation rate that is, on average, close to one hundred. The Technology Acceptance Scale, or more often referred to as the TRI, is a tool that was developed in accordance with the concept that was provided previously in order to analyze people's inclination to adopt new forms of technology. It is also commonly referred to as the TRI.

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On the scale, there were 10 things that related to having an optimistic attitude, seven things that pertained to being inventive, 10 things that tended to feeling pain, and nine things that pertained to experiencing a sense of uneasiness (Parasuraman & Colby, 2015). Despite this, the initial TRI has been improved as a direct result of developments in technology and more sophisticated linkages within those technologies; as a direct result of this, a 16- item scale has been established in the final confirmatory factor analysis (Salih et al., 2022). In addition to this, the original TRI has been enhanced as a direct consequence of improvements in technology as well as more complex links within those technologies (Lin & Hsieh, 2006).

Because of these abilities, it is possible to develop strategic judgments based on the information that has been gathered and choose how to put that knowledge to use. These judgments can be based on either the information that has been gathered or the information that has been gathered from other sources. It would be helpful for these evaluations to have a basis that is based on the information that has been gathered up to this point. One of the fundamental reasons why the criteria are only partly completed is due to the fact that they are often misunderstood, which is also one of the primary reasons why the requirements exist. This is due to the fact that a major lack of a number of identifying characteristics exists (De Boer et al., 2021).

Readiness refers to the user's perspective in relation to the innovation, and it is grounded on the concept of the theory of the spread of innovations. There are five indicators of innovation that are typical among IoT users. This study is able to assess the preparedness of business owners and managers of SMEs in Selangor with the use of the questionnaire that have been designed. The information obtained from the survey

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are reviewed and evaluated based on criteria such as the lowest value, the highest value, the frequency, and the mean. The mean value that is obtained used to assess the respondent's level of preparedness, which are based on the Likert scale value.

According to research that was done in the past, the foundation of Marketing 4.0 is comprised of the following four components: brand identity, brand image, brand integrity, and brand interaction. When marketing 4.0 is compared to the previous approach, it is clear that consumers are given equal status, and businesses demonstrate real care for the requirements of customers; this results in a more collaborative style of doing business (Kartajaya et al., 2019). The essential aspects of Marketing 4.0 are broken down and summarized in the Figure 2.8.

Additionally, "Marketing 4.0" refers to the implementation of technology via the linking of all systems, ranging from the shop floor to the enterprise level. In this new age of marketing, personalisation is the most important factor. Instead of basing its competitive strategy on pricing, it employs an alternative approach that focuses on delivering value to the customer's experience. Consumers are more likely to make purchases and actual purchases as a result of changes in service quality brought on by the use of Marketing 4.0 technologies, according to research. This transformation is brought about as a result of the development of the IoT and the most recent technologies that are accessible in relation to Web 3.0 (Dash et al., 2021).

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Figure 2.10

Comparison of modern generations of Marketing 1.0, 2.0, 3.0 and 4.0

The Feature	Marketing 1.0	Marketing 2.0	Marketing 3.0	Marketing 4.0
Concentration	Product-oriented marketing	Consumer-oriented marketing	Marketing oriented towards people	Human-centered marketing deepened by the client's "journey" in the shopping process
Aim	Sale of products	Satisfaction and customer retention	Making the world a better place, providing positive values	Inspiring the client to co-create new content and products/services
Forces enabling the emergence of a concept	Industrial Revolution	Information technology	A new wave of technologies	Digital economy
The way companies perceive the market	Mass customers with material needs	Intelligent customers driven by reason and emotions	A man with reason, heart and soul	Netizen man (citizen of the network)
Key marketing concepts	Product development	Diversification and distinction on the market	Providing higher values	Anthropomorphization of brands
Marketing guidelines	The specificity of the product	Positioning the company and product	Mission, vision and company values	Promoting content and creating brands
Value proposition	Functional	Functional and emotional	Functional and emotional and spiritual	Commitment and trust
Interactions with consumers	Collective approach, one-to-many transactions	Individual approach, one-to-one relations	Relationships and cooperation "many to many"	Relations based on the functioning of the networking, an enormous generation of consumers

Source from (Kotler, 2017)

As of 2019, generation Y and Z make up 67 percent of the population in Malaysia. Marketing 4.0 represents a new potential that may be capitalized on as a result of this demographic shift (Khan et al., 2020). This demographic that is sophisticated when it comes to technology and has the ability to spend money, and the results demonstrated that digital technologies have a substantial effect on the experiences that generation Z customers have (Priporas et al., 2017).

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According to the findings of a research on digital marketing conducted on 279 Malaysian property development businesses, it is simpler to collect real- time consumer information, and it also offers value for customers and allows for personalisation (Low et al., 2020). These studies highlight the significance of Marketing 4.0 as a potential game-changer for the marketing industry in Malaysia, particularly in light of the constraints that are now in place as a result of the COVID-19 epidemic.

2.9 Internet of Things (IoT)

The degree to which people have embraced IoT is the focus of this study's dependent variable. Since the early 1990s, Weiser made the prediction that technology would become more integrated into natural settings. IoT is helping to make less expensive manufacturing and delivering offers and transparency for the customer’s transaction purposes. It is one of the major techniques that is developing competitiveness (Boehmer et al., 2019). The advantages of the IoT are based on delivering better security, cost and energy saving, monitoring and controlling and developing environmental impacts (Hossein et al., 2020).

Chatbots are now being deployed by a large number of company owners. These are software programs that are designed to operate with the purpose of providing customers in service sectors with backup support. Siri, Amazon Alexa, and the Google Assistant are examples of chatbots that are now in use (A Følstad & M B Skjuve, 2019).

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The amount of IoT devices has skyrocketed over the course of the previous few years (Sharma et al., 2018). Organizations have a lot of room to profit from the rapid growth of IoT devices by harnessing and utilizing the data that is collected from these "smart" devices (Gaur et al., 2019).

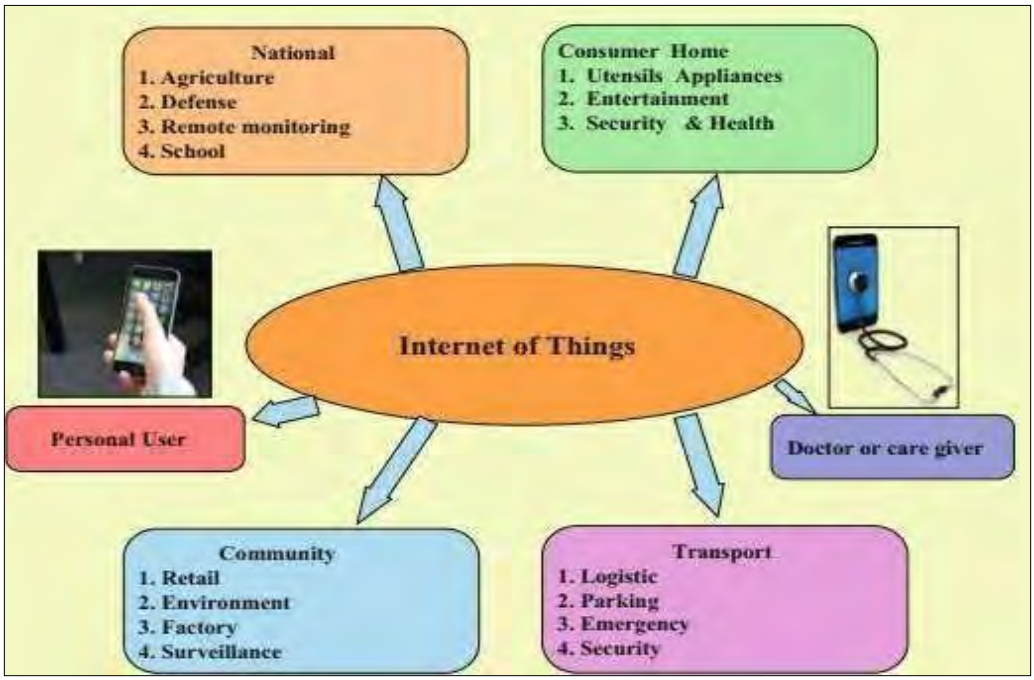
Adoption of the IoT is impacted by a wide range of factors, including relative advantage, compatibility, support from top-level management, organizational readiness, competitiveness, size, and external pressure, and cost. In most cases, the adoption of IoT is aided by the presence of these components (Shah et al., 2024). On the other hand, organizations have been slow to adopt the IoT Kumar et al. (2019) in order for IoT technology and applications to realize their full potential, it is necessary to surmount obstacles such as those pertaining to cost, privacy, and security, amongst others. Recognizing essential components is necessary in order to raise the possibility that businesses will embrace IoT.

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Figure 2.11

Schematic of IoT application areas



(Debajyoti Misra & Das, 2018)

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The (IoT will produce a significant volume of data, which presents a wide range of possibilities and difficulties. Through the examination of this data, insights will be obtained on a variety of scales, ranging from the person to the family to the city and beyond. By making use of this data, firms have the opportunity to expand their respective markets. Despite this, it has been reported that only approximately one percent of the data is really used to identify errors. Which showed that there is potential that has not yet been used (Botelho & Bigelow, 2022).

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2.9.1 IoT Application and Potential

According to the findings of a research that was conducted by Mukherjee et al. (2018), to investigate the one-of-a-kind shopping experience made possible by RFID-based smart fitting rooms. The RFID smart fitting room collects data from customers in order to provide more individualized service. The purpose of this research was to investigate the impact that RFID-enabled smart fitting rooms have on the reputations of both low-quality and high-quality companies. The conclusion that was drawn from this research was that RFID-based smart fitting rooms are only beneficial to firms who have a strong reputation for quality. The smart fitting room has little effect on consumers' decisions to buy low-quality products, due to the companies' poor reputations for quality.

The global AI and IoT is going to reach $26.79 billion by 2025 and it is using in the agricultural sectors for developing crop maintenance (Haseeb et al., 2019). In future, IoT is developing productivity rate, determining advance technologies, workplace safety, delivering effective customers experiences and advance business insights delivering (Sestino et al., 2020). For the development of the AI, automate, increasing capacity and network agility purposes, IoT is playing a significant role (Mukherjee et al., 2018).

According to the results of a study that included 280 managers in charge of IoT and Industry 4.0 implementation in small and medium-sized businesses in Thailand, this aspect is the critical factor in the expansion of sustainable company performance (Haseeb et al., 2019). The journal that was researched for this work that contains

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information on the adoption, application, advantages, and issues associated with the IoT is listed in the table below;

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Table 2.1

Journal and articles reviews on IoT adoption

No	Aspects of the Study	Author	Research Findings	Research method
1	Managerial decisions concerning IoT	F.-Y. Lo, N. Campo s (2018)	Discussed on how companies are blending IoT solutions and relationship of marketing strategies based on two Taiwan companies. Result of findings was IoT can boost business performance as well as the challenges behind dealing with fast disruptive technology changes.	Data collected open-ended interviews and direct observations.
2	IoT application, investment and challenges	Lee and Lee (2015)	The paper discusses on the five essential IoT radio frequency identification (RFID), wireless sensor networks (WSN), middleware, cloud computing and IoT software. Identification of IoT application in 3 areas of business. Able to identified major five challenges in implementing IoT applications for enterprises.	Quantitative approach.
3	IoT adoption in SME based on Technology-Organization Environment Model	Parra and Guerrero (2020)	Four technological variables that affect decision-making IoT adoption cost, ICT infrastructure, R&D activities, security and privacy. Chief Information Officer (CIO) role in adoption. Challenges in IoT adoption.	Review of journal article and quantitative approach.

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4	New IoT technology- based product application in emerging markets of India	Marinakis et al (2018)	Key factors of IoT technology infrastructure adoption listed as government policy, private sector enablement, technology. Availability, revenue opportunity and customer education.	Case study approach of firms providing IoT-based services in India
5	Investigate and compare the IoT readiness of SMEs	(Zaidi, 2017)	Four main impacts of IoT in Malaysia: i. Increasing economic efficiency and productivity through the automation. ii. Decrease environmental risk with real time sensing. iii. Aiding government for better development, infrastructure, management and monitoring. iv. Enhancing the knowledge of citizens.	Review of journal article and quantitative approach.

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2.10 Summary

The discussion in Chapter 2 is about SME, importance of marketing to SME and also the impact of IoT technology for SME in Malaysia. Discussion on the DOI theory as well as technology–organization–environment (TOE) framework used for this research. As this study focuses on the factor influences IoT adoption in marketing with independent variables are perceived ease of use, readiness and resource availability, the combination of these two theories will show more clearly the direction of this study. The next discussion will be on the steps and methods taken to conduct the research and also on analysis of data obtained from respondent.

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CHAPTER 3

METHODOLOGY

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3.1 Introduction

This chapter is to discuss the design of this research. In this chapter research design for this study is developed is a quantitative method and discussed further below. The important section of this study is the data collection which was done mainly online due to the COVID-19 situation. Other important areas such as population, sample and analysis method will be discussed.

3.2 Research Design

A quantitative research approach is highly effective for studying the intention to adopt the Internet of Things (IoT) among Small-Medium Enterprises (SMEs) in Selangor.

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This method provides a structured way to collect and analyse data, enabling a clear understanding of trends and patterns in IoT adoption. The quantitative method is chosen to conduct surveys effectively, allowing for the collection of statistical data and the development of results for this research study through statistical analysis. The survey method is selected as it is an efficient way to gather data. This approach has been successfully used to obtain data from SMEs in Malaysia and is noted for its effectiveness (Alam & Mohammad Noor, 2009). In this study, the online survey process is utilized to collect responses from respondents through online platforms. This method has been proven successful in acquiring data from SMEs in Malaysia (Hashim & J, 2015). Online surveys are chosen as they provide a rapid means of data collection, especially important given that the population consists of 907,065 SMEs in Malaysia (Tham & Yaakub, 2021). This approach ensures that the research on intention to adopt IoT among SMEs in Selangor is based on reliable, scalable, and analysable quantitative data, facilitating deeper insights and more robust conclusions.

3.3 Population and Sample

3.3.1 Population

Based on the 2018 Economic Census that has been carried out by the Department of Statistics Malaysia the number of SME established in Malaysia are 907,065 as shown in Table 3.1 below. As the census will be carried on every 5 years, hence the amount SMEs in 2016 was used as the population size for this study.

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Table 3.1

Number of established SMEs in Malaysia according to states.

State	Percentage	SME
Kedah	5.40%	489,82
Perlis	0.80%	7,257
Kelantan	5.10%	46,260
Terengganu	3.20%	29,026
Pahang	4.10%	37,190
Johor	10.80%	97,963
Melaka	3.50%	31,747
N.Sembilan	3.60%	32,654
Putrajaya	0.10%	907
Kuala Lumpur	14.70%	133,339
Selangor	**19.80%**	**179,599**
Perak	8.30%	75,286
Pulau Pinang	7.40%	67,123
Sabah	6.20%	56,238
Sarawak	6.70%	60,773
Labuan	0.30%	2,721
Total	**100.00%**	**907,065**

Source (SME Corporation Malaysia, 2018)

The sample for this study was selected based on the state with the largest number of SMEs in Malaysia, which is Selangor, accounting for 19.8% of the total. This selection was made to ensure that a sufficiently large sample could be collected.

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Moreover, it is crucial to obtain cooperation from SMEs in providing feedback through the online questionnaire. Therefore, we limited the study area to Selangor, as it meets these requirements. According to the data in the referenced table, the total number of SMEs established in Selangor is 179,599.

3.3.1.1 Sampling Method

The sampling method is crucial because the more representative the sample is of the population, the higher the accuracy of the inferences and the better the generalizability of the results (Sekaran & Bougie, 2016). The sampling process may involve systematic errors and sampling biases, making the choice of an appropriate sampling method essential (Li et al., 2019).

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The random sampling method eliminates bias in the selection process and is suitable for providing a more comprehensive overview of the studied population (Mohsin, 2016). Therefore, random sampling techniques were adopted in this research study to select the sample size (Bryman & Bell, 2015). In this research, individuals that making decisions within SME was consisted Chief Executive Officers, Board of Directors and Manager.

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3.3.2 Sample Size

To determine the appropriate sample size for studying the intention to adopt Internet of Things (IoT) among SMEs in Selangor, the Alagah (2022) sampling technique is utilized. This technique is recognized for its efficiency in determining sample sizes for research activities involving large populations (Alagah, 2022).

Formula Breakdown:

$$s = \frac{X^2 \times N \times P \times (1-P)}{d^2 \times (N-1) + X^2 \times P \times (1-P)}$$

Where;

- s: Required sample size
- X2: Chi-square statistic for 1 degree of freedom at the desired confidence level, which is 3.841 for a 95% confidence level.
- N: Total population size, which in the context of SMEs in Malaysia, is significant.
- P: Assumed population proportion (0.50 in this case, which maximizes the sample size).
- d: Margin of error, typically set at 0.05 for 95% confidence.

Example Calculation:

For a population of 907,065 SMEs in Malaysia (SME Corporation Malaysia, 2018):

$$s = \frac{(3.841) \times (907{,}065) \times (0.50) \times (0.50)}{(0.05)^2 \times (907{,}065-1) + (3.841) \times (0.50) \times (0.50)} \approx 387$$

This calculation reveals that a sample size of 387 SMEs would be sufficient to provide reliable insights into the population's behaviour or characteristics at a 95% confidence level with a 5% margin of error.

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Given the diverse nature of SMEs in Malaysia, ensuring a representative sample that covers various industries, sizes, and geographical locations within Selangor enhances the study's relevance and applicability. Previous studies on technology adoption among SMEs, such as those by Hashim (2015), underline the importance of robust sampling strategies to reflect true market conditions and behaviours. This comprehensive approach to determining sample size ensures that the research findings are robust, thereby facilitating informed decision- making and strategic planning by stakeholders involved in enhancing IoT adoption among SMEs in Malaysia.

3.4 Instrument

The instruments used in this study include a questionnaire adapted from prior research on technology adoption, designed to measure all constructs specified in the conceptual framework. According to the literature review, sample questionnaires are available that have been utilized in previous studies employing the Diffusion of Innovation (DOI) theory and the Technology– Organization–Environment (TOE) framework.

Table 3.2

Instrument Design

Survey Questions	**Adapted From**
Part A:	
Respondent Background	(Hashim & J, 2015).
Part B & Part C:	

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Survey Questions	Adapted From
Perceived Ease of Use	Nasaruddin & Hashim (2023)
Readiness	Hai (2013)
Resources Availability	Stansfield and Grant (2003)
Intention to Adopt IoT in Marketing	Atkinson (2007)

An online questionnaire was designed to test and analyze the models and frameworks used in the current study. The questionnaire aimed to gather information in six key areas, divided into two parts: Part A and Part B.

1. Instrument Development

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The questionnaire was developed by adapting items from studies focused on technology adoption to ensure comprehensive measurement of all constructs in the conceptual framework (Davis et al., 1989).

2. Reference to Prior Research

The literature review indicates that sample questionnaires from prior studies, based on the Diffusion of Innovation theory and the TOE framework, provide a solid foundation for this research (Tornatzky & Fleischer, 1990).

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3. Survey Structure

Part A: Respondent Background

This section was adapted from Hashim and Sheen (2021) and Low et al. (2021), focusing on collecting demographic and background information from respondents.

Part B & Part C

These sections include scales to measure:

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- **Perceived Ease of Use** - Adapted from Nasaruddin and Hashim (2023), to assess how users perceive the ease of using IoT.
- **Readiness** - Based on Hai (2013), evaluating the readiness of SMEs for IoT adoption.
- **Resources Availability** - Following Stansfield and Grant (2003), to determine the availability of necessary resources for adopting IoT.
- **Intention to Adopt IoT in Marketing** - Items adapted from Atkinson (2007), to measure the extent of IoT adoption among SMEs

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Part A

(a) Respondent 'S Background

This section consists of introductory questions about the respondent and their affiliated company. It includes five sections: respondent's age, gender, position, education level, and industry. This section of the questionnaire was adapted from Hashim and Sheen (2021) and Low et al. (2021), with modifications made according to the research requirements.

Table 3.3

Section A of questionnaire on Demographic Background

Gender	Male
	Female
Age	Less than 25 years
	25 to 35 years
	36 to 45 years
	46 to 55 years
	Above 55 years
Current Position	Chief Executive Officer, CEO
	Board of Directors
	Manager
Education Level	Master's Degree
	Degree

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	Diploma
	Others
Industry	Manufacturing
	Trading
	Services
	Others
IoT Use	I know what is IoT and we use them in our company for marketing purposes
	I know what is IoT and we use them in our company in general only, nothing specific
	I know what is IoT, but we do not use them in our company
	I do not know what is IoT

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Part B & Part C (Refer Appendix A)

Part B: Independent Variables

This part measures constructs related to technology perception and organizational readiness.

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i. Perceived Ease of Use

This section has 5 items designed to measure how respondents perceive the ease of using IoT technologies. The items are adapted from Nasaruddin & Hashim (2023).

1. Using IoT would enable me to accomplish tasks more quickly.
2. I find using IoT to be advantageous in marketing.
3. My interaction with IoT devices is clear and understandable.
4. Using IoT would significantly increase the quality of marketing in my organization.
5. Using IoT in marketing would significantly increase the output of my organization.

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ii. Readiness

This section has 5 items to assess the readiness of organizations to implement IoT, influenced by Hai (2013).

1. IoT technology fits in with the way my organization works.
2. IoT improves the marketing effectiveness of projects.
3. IoT in marketing enables existing tasks to be executed faster.
4. IoT in marketing provides new ways of delivering services.
5. I am aware that IoT in business uses devices and software to collect useful information from clients.

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iii. Resources Availability

This section has 5 items to gauge the availability of resources necessary for using IoT, based on the works of Stansfield and Grant (2003).

1. I have the skills/training I need to use IoT technology in marketing.
2. I have the opportunity to try IoT technology in marketing.
3. IoT is suitable for my job requirements, especially in marketing.
4. I have the resources necessary to use IoT technology.
5. I always find time and extra resources for a better understanding of marketing using IoT.

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Part C: Dependent Variable

This section assesses the extent of IoT adoption.

i. Intention to Adopt IoT in Marketing

This section has 5 items that evaluate how respondents perceive IoT adoption in their work, referencing (Hashim & J, 2015), I find using IoT technology in marketing interesting.

1. IoT helps me learn more about my work/task.

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2. IoT can be used with the existing devices in my workplace.
3. It is not detrimental if my organization decided to fully adopt the use of IoT.
4. IoT enhances the quality of projects.

Table 3.4

The variable and measurement of scale

Variable	Scale
• Perceived Ease of Use • Readiness • Resources Availability • Intention to Adopt IoT	● This is based on likert scale ranging from point 1 to 5. ● Where 1 is for strongly disagree and 5 for strongly agree. ● It will be a total of 20 questions.

The IoT technology skills that respondents possess are based on their experience with IoT devices and software. It has been projected that possessing these skills is crucial for effectively engaging with the questionnaire process and for the successful completion of the study after all responses have been collected (Zahedi et al., 2021). It is essential for respondents to have adequate IoT and software-related skills before participating in this survey process to ensure meaningful and reliable responses (Blythe & Johnson, 2018).

The use of technology in this study has facilitated the gathering of insights into the respondents' behaviour. For the items in Section B, a 5-point Likert scale was employed. The Likert scale is the most commonly used format for collecting respondents' opinions about the quality of a product or service (Likert, 1932). This approach typically involves asking individuals to rate their experience on a continuum

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from "high to low" or "better to worse," utilizing various levels such as two, four, five, or seven (Sharma et al., 2020). This system enables standardized data collection and analysis, which assists researchers and businesses in obtaining valuable insights into customer satisfaction and preferences (Allen & Seaman, 2007). Overall, the Likert scale is an invaluable tool for assessing and enhancing the quality of products and services (Sullivan & Artino, 2013).

Table 3.5

Likert Scale for Intention to Adopt IoT in Marketing

Score	Options
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

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3.5 Pilot Study

A pilot study was conducted to gather initial feedback on the questionnaire items, ensuring that each item is clear, understandable, and relevant to the study's constructs. The pilot test aims to predict the outcomes of the larger-scale study and to examine the feasibility of the approaches among the study's variables. The pilot study involved 40 business owners and managers, each of whom owns a company or has decision-making authority within the company. This number was selected based on previous publications

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suggesting that an optimal number for a pilot study is between 12 to 50 respondents (SAGE Publications, 2016). Data from this pilot test were analyzed using Cronbach's alpha to assess reliability. It is established that a Cronbach's alpha value ranges from 0 to 1, with a range from 0.58 to 0.95 indicating optimal reliability. Values below 0.58 are considered unsatisfactory (Taber, 2018). The 40 pilot study questionnaires or respondents are not included in the 387 samples of the main study.

The pilot study was recommended to be conducted in Selangor state. Consent was obtained from the University and Faculty to distribute the questionnaires. Feedback from the pilot study is crucial to estimate the time required to complete the survey. The questionnaire is designed to take approximately 5–10 minutes to complete. Feedback from the pilot study refers to the results obtained by performing the Cronbach's alpha test.

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To assess the feasibility of research, conducting a pilot study is highly recommended (Leedy & Ormrod, 2005). Pilot testing typically involves formally testing a questionnaire on a small sample of respondents to identify any issues with the data collection instrument (Ragab & Arisha, 2018). It is used to uncover issues with the questionnaire (Sekaran, 2003) and allows for the comparison of different versions of the questionnaire (Zikmund, 2003). Furthermore, pilot testing ensures the usefulness of questionnaires and that all respondents understand the meaning of each question, allowing for accurate assessment of each variable (Zikmund, 2003). Forty respondents from SMEs in Selangor were chosen to identify any concerns raised by the survey questions.

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Initially, each selected respondent for this pilot study was given an individual briefing about the project's objectives. Following this, the pilot test respondents suggested various modifications to the wording, phrasing, question layouts, and sentence structures.

According to the pilot test results, the composite reliability of all constructs was above 0.7, and the Average Variance Extracted (AVE) was greater than 0.5.

Meanwhile, discriminant validity, which examines the cross-loading of all indicators in this research, consistently shows that the constructs are most strongly associated with their respective indicators. As a result, the proposed research framework can be applied to the intended target sample. The pilot test was performed using Cronbach's alpha, and the results are developed in the table below.

Table 3.6

Reliability Statistics of Pilot Study

	Cronbach's Alpha	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
Perceiver ease of use	.852	.854	5
Readiness	.858	.863	5
Resource Availability	.935	.941	5
Intention to adopt IoT	.866	.887	5

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Table 3.6 presents the reliability statistics for the independent variables of the pilot study. The independent variable **Perceived Ease of Use** shows a Cronbach's Alpha of 0.852 and a standardized Cronbach's Alpha of 0.854. The **Readiness** construct has a Cronbach's Alpha of 0.858 and a standardized value of 0.863. **Resource Availability** indicates a Cronbach's Alpha of 0.935 and a standardized value of 0.941, demonstrating the highest reliability among the constructs. Lastly, the dependent variable **Intention to Adopt IoT** shows a Cronbach's Alpha of 0.866 and a standardized value of 0.887.

This analysis confirms that **Resource Availability** exhibits the highest reliability value at 0.935, while **Perceived Ease of Use** shows the lowest reliability at 0.852. These findings indicate a robust internal consistency among the constructs, with all values demonstrating satisfactory reliability according to conventional standards (Mumtaz et al., 2020).

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Research questionnaires require analysis of collected data for both validity and reliability. The reliability test aims to ensure internal consistency among all measured aspects of the questionnaire. This test helps in scoring stable and consistent values from an instrument, making the instrument both trustworthy and reliable in delivering values (Ling, 2001). Four kinds of reliability tests are essential to include in the instrument:

1. Internal Consistency: This provides a consistent and accurate value for IoT adoption measures.
2. Interrater Reliability: Measures the extent to which different raters or observers give consistent estimates of the same phenomenon.

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3. Test-Retest Reliability: This ensures the stability of responses across multiple administrations of the same test.
4. Parallel-Forms Reliability: Assesses the consistency of the results of two tests constructed in the same way from the same content domain.

These reliability tests allow researchers to determine the dependability of the instrument (Cronbach, 1951). The Cronbach's alpha test is performed to obtain the value of the reliability test, ensuring that the statistical data collected from the survey responses are examined for reliability (Cronbach, 1951).

The validity tests are defined to determine the truthfulness and validation in measurement. The validity of the data provides a broader perspective for the data collection method. The validity instrument is crucial in IoT adoption to make the data valid and effective for the business company (Davis, 1989).

The questionnaires were administered after receiving approval from six expert validators. Typically, it is recommended that at least 6 expert validators are needed for better outcomes, with this number not exceeding 10 (Lambert & Newman, 2022). Validation of a test or measurement means confirming that the instrument measures what it is designed to measure. Ensuring that the results from these tests are accurate and reliable is a crucial step in the research process.

A questionnaire is a data collection instrument consisting of a series of questions and other prompts for the purpose of gathering data from respondents. Content validity refers to the degree to which assessments are effective in targeting the designed factors

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of measures. It is a process that ensures the test validation is well-maintained and covers all points related to the study (Nunnally, 1978).

Based on the table 3.7 results obtained from 6 panel experts, the researcher revised the questionnaire and conducted a pilot test. Overall, all measurement items are accepted and relevant to the measured domain.

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Table 3.7

The relevance ratings on the item scale by six experts

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Experts in Agreement	I- CVI	UA
Q1	1	1	1	1	1	1	6	1	1
Q2	1	1	1	1	1	1	6	1	1
Q3	1	1	0	1	1	1	5	0.83	0
Q4	1	1	0	1	1	1	5	0.83	0
Q5	1	1	0	0	1	1	4	0.66	0
Q6	1	1	1	1	1	1	6	1	1
Q7	1	1	1	1	1	1	6	1	1
Q8	1	1	1	1	1	1	6	1	1
Q9	1	1	1	1	1	1	6	1	1
Q10	1	1	1	1	1	1	6	1	1
Q11	1	1	1	1	1	1	6	1	1
Q12	1	1	1	1	1	1	6	1	1
Q13	1	1	1	1	1	1	6	1	1
Q14	1	1	1	1	1	1	6	1	1

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Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Experts in Agreement	I- CVI	UA
Q15	1	1	1	1	1	1	6	1	1
Q16	1	1	1	1	1	1	6	1	1
Q17	1	1	1	1	1	1	6	1	1
Q18	1	1	1	1	1	1	6	1	1
Q19	1	1	0	1	1	1	5	0.83	0
Q20	1	1	1	1	1	1	6	1	1
Q21	1	1	1	1	1	1	6	1	1
Q22	1	1	1	1	1	1	6	1	1
Q23	1	1	1	1	1	1	6	1	1
Q24	1	1	1	1	1	1	6	1	1
Q25	1	1	1	1	1	1	6	1	1
Q26	1	1	1	1	1	1	6	1	1
							S-CVI/Ave	**0.97**	
							S-CVI/UA		**0.83**
Proportion relevance	**1.00**	**1.00**	**0.85**	**0.96**	**1.00**	**1.00**			
Average proportion of items judged as relevance across the six experts							**0.97**		

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3.6 Data Collection Procedures

The data collection for this study was conducted via email. Participating SMEs were sent an online survey link (Google Form) to gather their responses. Previous studies have reported a low response rate using this method (Alam & Mohammad Noor, 2009). However, given the current pandemic and the widespread implementation of work-from-home policies, this method was deemed suitable for collecting data from SMEs efficiently.

The list of SMEs in Selangor was obtained from SME Corporation Malaysia, which helped in targeting the relevant businesses effectively. The data collection process involves the methods used to gather data. In this study, the primary quantitative method was employed to collect numerical and statistical data from various resources, including the responses from the survey respondents. Its takes 4 weeks to gather data and analysis it.

This approach allows for a structured and systematic analysis of the data, ensuring that the information gathered is both reliable and valuable for understanding the dynamics within SMEs during this period (Albaum & Smith, 2012).

3.7 Ethical Considerations

Personal data protection is a major concern in current research landscapes. For this study, we have chosen to collect data from respondents anonymously to ensure their

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privacy and confidentiality. An email containing a brief introduction to this research and targeting key personnel (such as managers and CEOs) was sent based on the SME list obtained from SME Corporation Malaysia (Ling, 2001). This email included a link to a Google Form, designed to maintain respondent anonymity as it does not request personal details such as the respondent's name, organization name, or specific position held. These measures ensure that data can be collected without disclosing sensitive information.

Ethical considerations are crucial in research to uphold the ethics and norms of scholarly conduct. In this research project, it is vital to maintain ethical standards to protect the data collected from various sources. Adhering to these ethical considerations helps in safeguarding respondent privacy and enhancing the credibility of the research findings. By implementing these strategies, we ensure that our study complies with ethical guidelines and respects the confidentiality of all respondents, thereby contributing to the integrity and reliability of our research outcomes (Resnik, 2011).

3.8 Data Analysis

3.8.1 Data Collection and Initial Filtering Process

Upon receiving feedback from participating SMEs, an initial data filtering procedure was performed. Each received form was checked to ensure it was fully completed by the respondent. The questionnaires were then printed and tagged to prevent any errors

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or duplication of data. Only fully completed forms were considered valid samples, while incomplete forms were rejected.

The total number of successful and rejected forms was recorded in numbers, and the percentages of respondents were calculated. This step ensures that only reliable data are considered for further analysis.

3.8.2 Descriptive Data Analysis

Descriptive data analysis methods were used to measure central tendency and variability, including measures such as the mean, standard deviation, and identification of outliers. This process helps eliminate any outliers that could interfere with the results (Healey, 2014).

For all five characteristics measured in the questionnaire, the central tendency and variability, including the mean and standard deviation, were determined. The mean served as an indicator of each characteristic's central tendency. The intention to adopt IoT assesses a vast quantity of data and information, which is essential and useful for collecting data from SMEs (Zikmund et al., 2010).

Besides that, summarizing the basic features of the data through descriptive statistics. This includes frequencies, percentages, means, and standard deviations of key variables, where high mean scores were observed for all variables, Intention to Adopt IoT: Mean = 4.843, indicating a strong intention among SMEs to adopt IoT, Perceived

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Ease of Use: Mean = 4.881, suggesting that SMEs find IoT relatively easy to use, Readiness: Mean = 4.783, showing that SMEs feel quite prepared to implement IoT, and Resource Availability: Mean = 4.621, indicating good availability of resources, though slightly lower than other factors.

The use of tables, graphs, and charts here helps in providing a clear view of the data distribution and central tendencies, setting the stage for more detailed analysis (Healey, 2014).

3.8.3 Inferential Statistics for Hypothesis Validation

Inferential statistics were used to validate the research hypotheses. Correlation tests were also employed throughout the study to determine the linear relationship between variables (A. Adare et al., 2015).

The linear correlation test was conducted using Pearson's correlation coefficient, which ranges from −1−1 to +1+1. A larger value of the coefficient indicates a stronger relationship between the variables. Specifically:

- A coefficient (r=1r=1) indicates a positive linear relationship.
- A coefficient (r=−1r=−1) indicates a negative linear relationship.
- A coefficient (r=0r=0) indicates no relationship between the variables (Field, 2013).

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After conducting the initial data filtering, descriptive statistics, and correlation analysis, the next step involves applying multiple linear regression analysis to explore deeper relationships between the independent variables (Perceived Ease of Use, Readiness, and Resource Availability) and the dependent variable (IoT Adoption). This method helps in understanding how multiple factors contribute simultaneously to the outcome of interest.

Multiple Linear Regression (MLR) is chosen as the primary regression technique for this study. MLR is appropriate here because it allows us to examine the influence of several independent variables on a single dependent variable. This is crucial in assessing the combined effect of various aspects of SMEs' readiness and capabilities on their intention to adopt IoT levels. The study involves multiple predictors that are hypothesized to affect IoT adoption. MLR enables the assessment of the contribution of each variable while controlling for the effects of others (Montgomery et al., 2021). MLR provides a way to predict IoT Adoption based on a linear combination of input variables. This is valuable for SMEs looking to understand the key levers to enhance their IoT integration (Cohen et al., 2002). The regression coefficients in MLR indicate the strength and direction of the relationship between each independent variable and the dependent variable. For instance, a positive coefficient for 'Perceived Ease of Use' suggests that higher ease of use boosts IoT adoption (Field, 2013). MLR allows for the evaluation of how well the model fits the data through $R2$ (coefficient of determination) and adjusted $R2$, which provide insights into the total variance explained by the model. Additionally, residual analysis and checks for multicollinearity ensure the robustness of the model (James et al., 2013).

To apply MLR, the following general model form is used:

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Intention to adopt

$$\text{IoT} = \beta 0 + \beta 1 \times \text{Perceived Ease of Use} + \beta 2 \times \text{Readiness} + \beta 3 \times \text{Resource Availability} + \epsilon$$

Where:

- $\beta 0$ is the intercept,
- $\beta 1$, $\beta 2$, $\beta 3$ are the coefficients of the predictors,
- ϵ is the error term.

If the study finds that the coefficient for 'Perceived Ease of Use' is significantly positive, it indicates that improving the ease of use of IoT technologies is likely to enhance IoT adoption among SMEs. Similarly, if 'Resource Availability' has a strong positive coefficient, it suggests that increasing resources dedicated to IoT can significantly boost adoption rates.

Table 3.8

Data analysis strategy

Research Objectives	Research Hypothesis	Data Analysis Strategy
RO1: To identify the level for perceived ease of use in intention to adopt IoT for marketing among SMEs in Selangor	Not Applicable	Mean, standard deviations
RO2: To identify the level for readiness in intention to adopt IoT for marketing among SMEs in Selangor	Not Applicable	Mean, standard deviations

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Research Objectives	Research Hypothesis	Data Analysis Strategy
RO3: To identify the level for resource availability in intention to adopt IoT for marketing among SMEs in Selangor	Not Applicable	Mean, standard deviations
RO4: To determine the effect of perceived ease of use on the intention to adopt IoT for marketing among SMEs in Selangor	H1: PEOU significantly affects the intention to adopt IoT.	Pearson Correlation, Multiple Linear Regression
RO5: To determine the effect of readiness on the intention to adopt	H2: RD significantly affects the intention to	Pearson Correlation, Multiple Linear
IoT for marketing among SMEs in Selangor	adopt IoT.	Regression
RO6: To determine the effect of resources availability on the intention to adopt IoT for marketing among SMEs in Selangor	H3: RA significantly affects the intention to adopt IoT.	Pearson Correlation, Multiple Linear Regression

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3.9 Summary

This section of the research explains the study design, including the population and sample studied, as well as the sample size used for this study. The population in a research study comprises the complete set of people who possess specific characteristics or specializations of interest to the study ((Kim et al., 2018). These individuals are from various parts of the community and are considered for the population of the study due to their diverse backgrounds and the rich data they can provide. For this study, a sample size of 387 SMEs from the manufacturing, trading, service, and other sectors was chosen. This sample was specifically selected from

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Selangor due to the high number of SMEs established in this state, making it a representative and suitable area for conducting this research. The primary instrument used in this study was an online questionnaire, which facilitated the collection of data in a structured and efficient manner. A pilot study was conducted to test the questionnaire, allowing for necessary adjustments based on initial feedback and ensuring the tool's reliability before full-scale data collection (van Teijlingen & Hundley, 2001). Using Cronbach's Alpha, the reliability of each scale within the questionnaire was tested, confirming that the scales used to measure variables like Perceived Ease of Use, Readiness, Resource Availability, and Intention to adopt IoT are reliable. All-variable validity testing was conducted to ensure that the questionnaire measures what it is supposed to measure. This involved assessing content validity, where the relevance of each questionnaire item to the constructs being studied was verified (Creswell, 2021).

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The use of Cronbach's Alpha values was pivotal in this study to ensure the reliability of the questionnaire. Cronbach's Alpha helps in assessing the internal consistency of the test, indicating how closely related a set of items are as a group (Tavakol & Dennick, 2011).

Detailed procedures for gathering data were outlined, utilizing online questionnaires distributed to the sample of SMEs in Selangor. The online questionnaire was designed to operationalize the variables effectively, ensuring that each item accurately measures the specific concept it is intended to measure. Besides that, descriptive data analysis, correlation, and multiple linear regression has been used to determine variables effects.

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CHAPTER 4

FINDINGS

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4.1 Introduction

Chapter 4 presents the findings and results of the study, detailing how the data collected from SMEs in Selangor have been analysed to uncover insights into intention to adopt IoT and its influencing factors. This chapter systematically presents the results, beginning with descriptive statistics and moving through to more complex inferential analyses.

This chapter aims to convey the results derived from the rigorous application of descriptive and inferential statistical techniques to the survey data. It focuses on elucidating the patterns, relationships, and trends identified through the analysis, providing a foundation for understanding the impact of various effect of the intention to adopt IoT among SMEs.

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The chapter begins by summarizing the basic features of the data through descriptive statistics. This includes frequencies, percentages, means, and standard deviations of key variables. The use of tables, graphs, and charts here helps in providing a clear view of the data distribution and central tendencies, setting the stage for more detailed analysis (Healey, 2014).

Before delving into hypothesis testing, the chapter reviews the measurement model's reliability and validity. This involves confirming the internal consistency of the scales used (using Cronbach's Alpha) and assessing the construct validity through factor analysis. This step ensures that the tools used for data collection accurately capture the constructs of interest (Hair et al., 2024).

This section presents the core inferential statistical analyses used to test the study's hypotheses. It details the outcomes of regression analyses, including the coefficients and significance levels that describe the relationships between independent variables (Perceived Ease of Use, Readiness, and Resource Availability) and the dependent variable (IoT Adoption). This approach helps in identifying the predictors that significantly impact IoT adoption (Field, 2013).

Following the regression analysis, the results related to each hypothesis are presented. This includes a discussion of whether each hypothesis is supported by the data. The use of statistical evidence, such as *pp*-values and confidence intervals, substantiates the conclusions drawn from the data (Montgomery et al., 2021).

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The chapter concludes with a discussion that integrates the statistical findings with the study's research questions and theoretical framework. This section interprets the results, explaining how they align with existing literature and what they imply for future research and practical applications in the field of IoT within SMEs (Cohen et al., 2002).

Chapter 4 uses a structured approach to present the findings from the survey data, ensuring that each step of the analysis is clearly articulated and supported by appropriate statistical evidence. The chapter aims not only to present these findings but also to interpret them in a way that adds value to the academic and practical understanding on the effect of intention to adopt IoT dynamics in SMEs.

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4.2 Response Rate

A total of 400 questionnaires were distributed instead of 387 to gather comprehensive insights into intention to adopt IoT adoption among SMEs to avoid insufficient data received. Out of these, 387 responses were received, indicating a high response rate of 100%. This robust response rate enhances the reliability of the study findings and reflects a strong interest and engagement from the participants. Although 400 responses were received, not all were usable for analysis and only 387 of the received questionnaires were fully completed and usable for analysis. The high usability rate underscores the quality and completeness of the data collected. A few respondents failed to complete the demographic section of the survey, leading to the rejection of

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these responses. This step ensured that only comprehensive and fully completed surveys were included in the final analysis.

The final sample size for the study, therefore, consisted of **387 respondents**, carefully selected and verified for conducting the survey process. This sample size is adequate to provide a robust analysis of the effect on the intention to adopt IoT in SMEs.

4.3 Demographic Analysis

This section of Chapter 4 focuses on the demographic analysis based on data collected from 387 respondents. This analysis is pivotal for understanding the composition of the survey participants and ensuring that the insights derived are representative of the target population (Healey, 2014).

Demographic analysis plays a crucial role in this study as it provides a detailed profile of the respondents. This section uses pie charts and frequency tables to visually represent and summarize the demographic characteristics of the participants (Creswell, 2021). Pie charts are employed to illustrate the distribution of respondents across various demographic categories. These charts provide an intuitive view of the percentage and frequency distribution of each demographic attribute, helping to clarify the makeup of the survey population (Montgomery et al., 2021). Frequency tables are used alongside pie charts to offer a detailed count and percentage of respondents for each demographic variable. This method ensures a comprehensive presentation of the demographic data, highlighting how many respondents fall into each category (Field,

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2013). The main aim of this demographic analysis is to verify and validate the demographic information of the survey responses. By doing so, the study aims to confirm the representativeness of the sample, ensuring that it accurately reflects the wider population of SMEs in Selangor (Sekaran & Bougie, 2016). Identify any potential demographic imbalances that might influence the survey results or the interpretation of the broader study findings (Creswell, 2021).

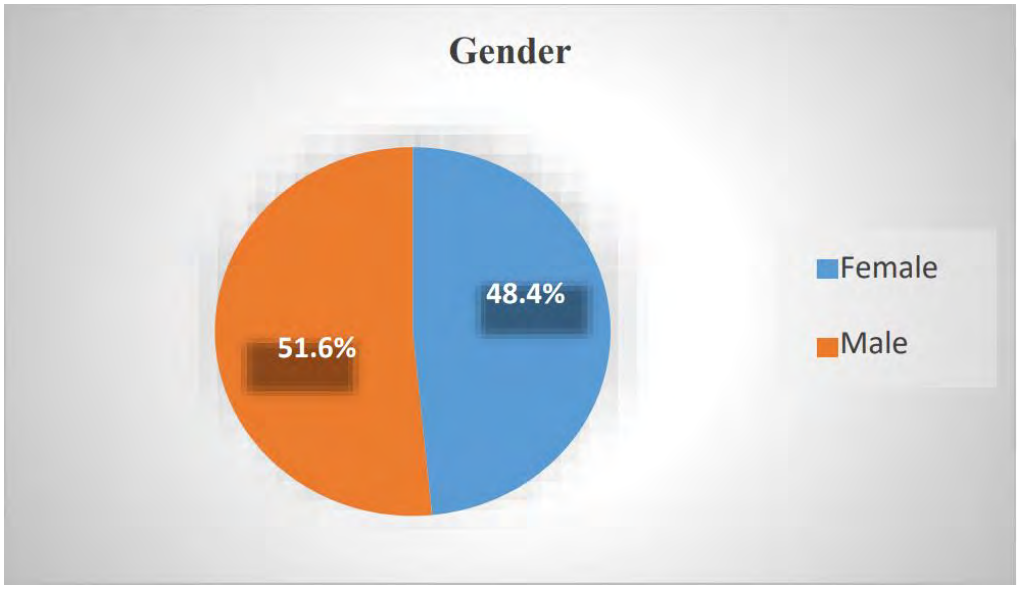
By thoroughly analyzing the demographic data, this section lays the groundwork for understanding the broader implications of the study's findings, particularly how demographic factors might influence the intention to adopt IoT for marketing among SMEs in Selangor (Zikmund et al., 2013).

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4.3.1 Demographic of Gender

Figure 4.1

Pie Chart of Gender



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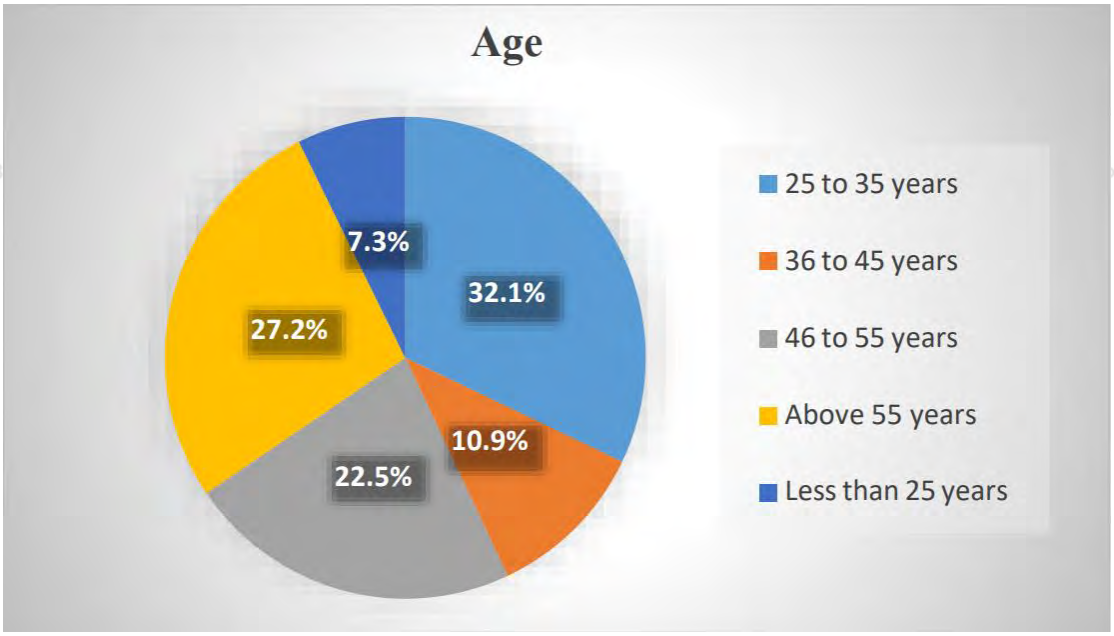
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According the figure 4.1, the survey showed a nearly balanced gender distribution among participants, with **51.6% male** and **48.4% female** respondents. This balance ensures that the insights are relevant to both genders in the context of intention to adopt IoT in SMEs.

4.3.2 Demographic of Age

Figure 4.2

Demographic of Age



The respondents varied across age groups, with the majority from the **25 to 35 years** group (37.7%), indicating a strong engagement from younger professionals. Other notable contributions were **27.2%** from those over 55 years and **22.5%** from the 46 to 55 years age group, demonstrating that IoT adoption interests span across a range of ages.

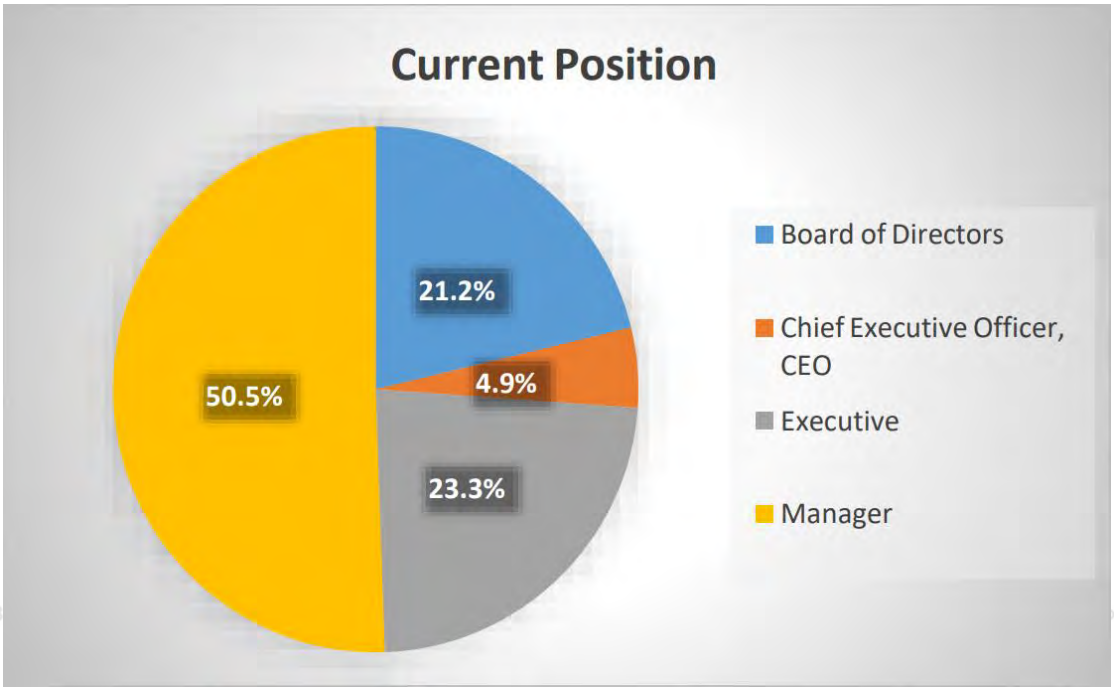
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4.3.3 Demographic of Position

Figure 4.3

Demographic of current position



According to the figure 4.3 indicate the current position of respondents. The data revealed that **50.5% of respondents** were **Managers**, highlighting their key role in this survey. Executives made up **23.3%**, while the Board of Directors accounted for **21.2%**, showing that the study covered a range of decision- making levels within SMEs. CEOs were the least represented at **4.9%.**

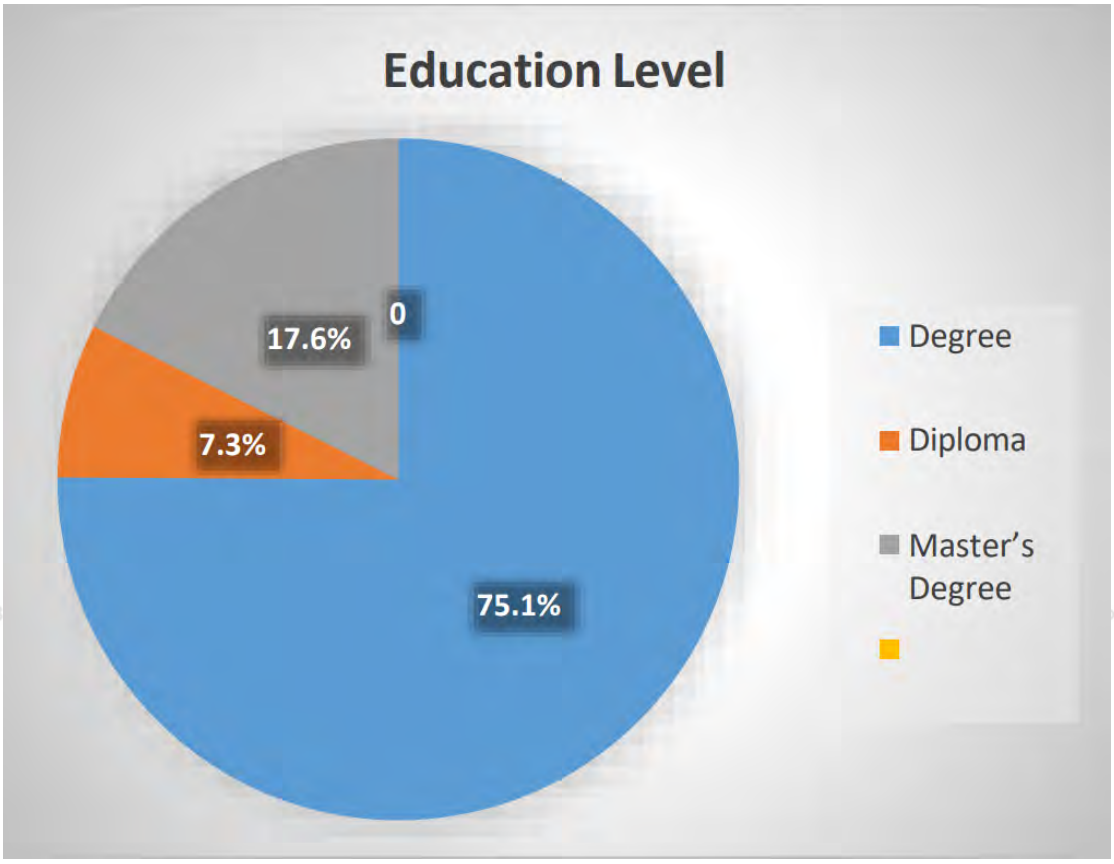
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4.3.4 Demographic of Education

Figure 4.4

Education level of respondents



Above figure 4.4 indicate the respondents' level of education. The educational background of respondents was predominantly **Degree holders (75.1%)**, indicating a well-educated sample. Master's degree holders represented **17.6%**, and Diploma holders were **7.3%**, showcasing diverse educational levels participating in the study.

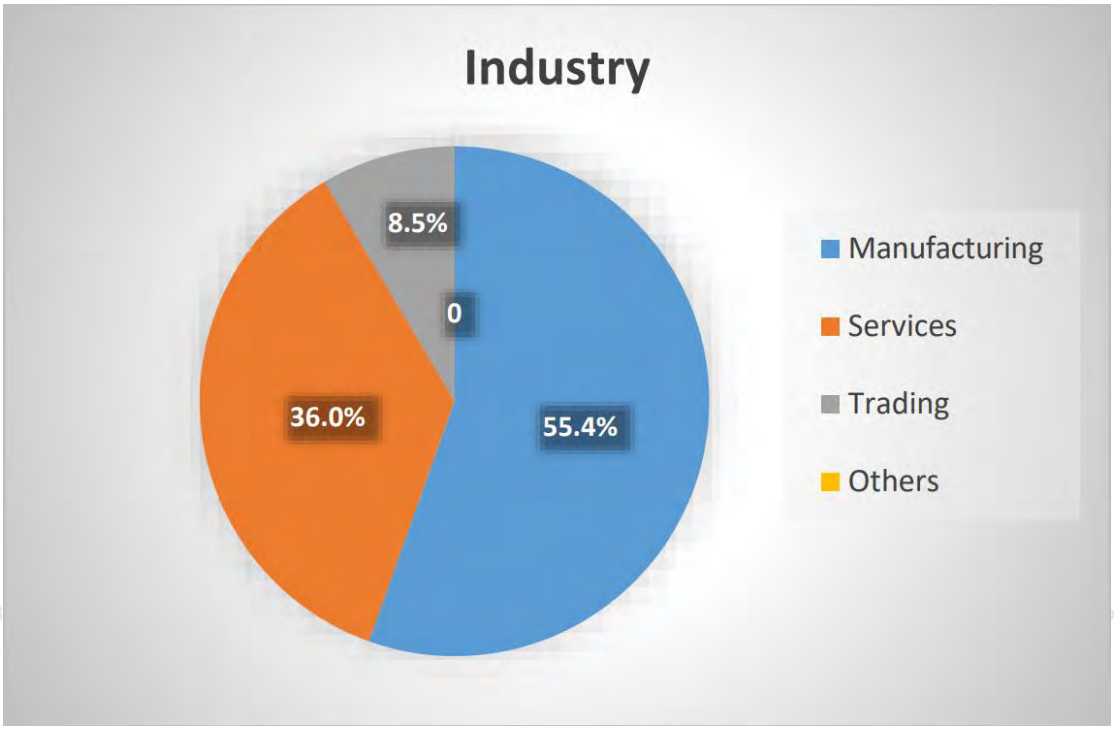
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4.3.5 Demographic of Industry

Figure 4.5

Demographic of industry



Based on figure 4.5 indicate the respondents from industry. The **Manufacturing industry** was most represented with **55.4%** of responses, suggesting a significant focus on IoT in this sector. The **Services industry** followed with **36%**, and the **Trading industry** had the fewest respondents at **8.5%**, highlighting varied industrial engagement in intention to adopt IoT.

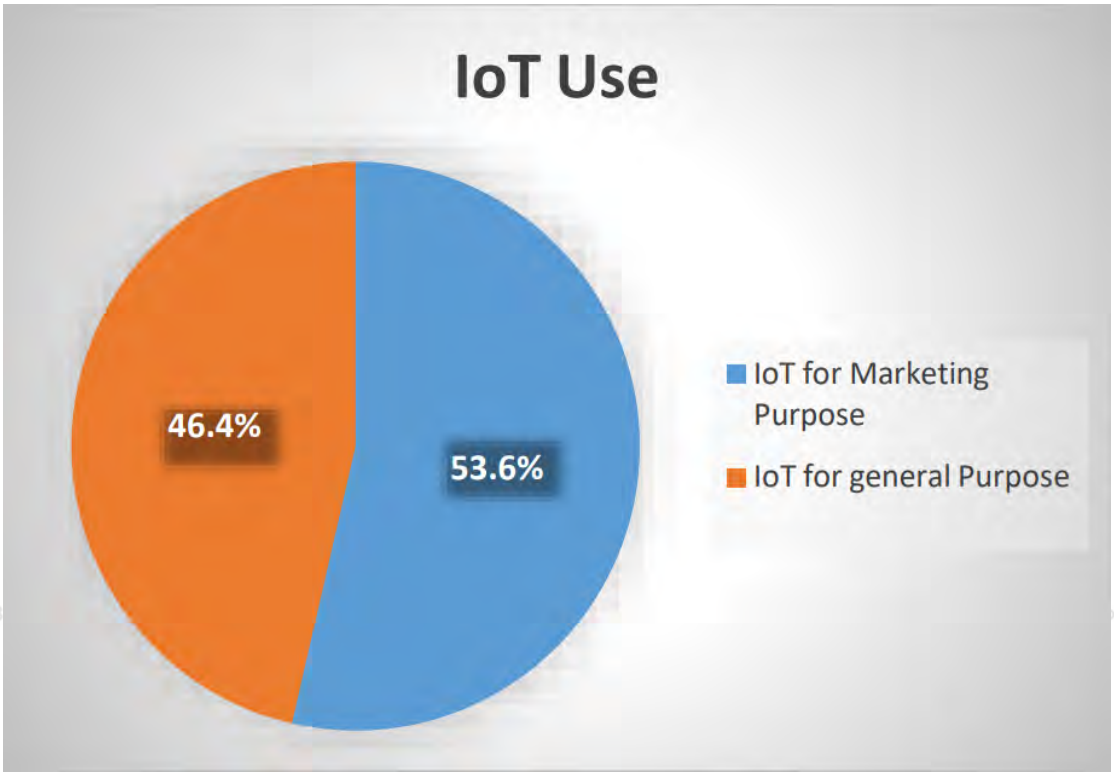
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4.3.6 Questionnaire for IOT user

Figure 4.6

The IoT user



According to Figure 4.6, which illustrates the distribution of IoT usage among the respondents, it is observed that **208 respondents (53.6%)** are using IoT specifically for marketing purposes within their companies. This majority indicates a significant inclination towards leveraging IoT to enhance marketing strategies and operations. The remaining **179 respondents (46.4%)** use IoT for general purposes within their companies, highlighting its diverse applications beyond marketing. This data suggests that while IoT has varied applications, a significant portion of the respondents prioritize its use in marketing, demonstrating its perceived value in this domain.

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4.4 Descriptive Analysis

Table 4.1

Item Statistics

		Mean	Std. Deviation	N
Perceived Ease of Use	B1.1	4.81	. 390	**387**
	B1.2	4.89	.318	**387**
	B1.3	4.92	.276	**387**
	B1.4	4.86	.350	**387**
	B1.5	4.93	.255	**387**
Overall		4.88	.260	**387**
Readiness	B2.1	4.67	.583	**387**
	B2.2	4.86	.350	**387**
	B2.3	4.73	.446	**387**
	B2.4	4.73	. .446	**387**
	B2.5	4.93	255	**387**
Overall		4.78	.352	**387**
Resources Availability	B3.1	4.44	.827	**387**
	B3.2	4.67	.585	**387**
	B3.3	4.64	.592	**387**
	B3.4	4.57	.750	**387**
	B3.5	4.79	.410	**387**
Overall		4.62	.578	**387**

This section interprets the descriptive statistics from Table 4.1, aligning them with the research objectives to understand the effect of Perceived Ease of Use,

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Readiness, and Resource Availability on the Intention to Adopt IoT for Marketing among SMEs in Selangor.

RO1: Identify the Level of Perceived Ease of Use in Adopting IoT for Marketing among SMEs in Selangor

- **Objective:** To identify the level of Perceived Ease of Use in the intention to adopt IoT for marketing among SMEs in Selangor. The mean score for Perceived Ease of Use is **4.8808**, with a standard deviation of **0.26006**. This high mean value indicates a strong perception among SMEs that IoT technologies are user-friendly and easy to use for marketing purposes. The high level of Perceived Ease of Use supports **RO1**, suggesting that enhancing usability can facilitate greater adoption of IoT among SMEs. The low standard deviation indicates a consistent agreement across respondents about the ease of use.
- **Findings for Perceived Ease of Use:**

1. The survey items **B1.1 to B1.5** address the Perceived Ease of Use, with means ranging from **4.81 to 4.93**.
2. The high mean scores indicate that respondents perceive IoT as user- friendly and easy to integrate into marketing activities.
3. Specifically, **item B1.5**, which shows the highest mean (4.93), suggests that SMEs find IoT technologies particularly straightforward and beneficial for enhancing their marketing strategies.

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These findings confirm a high level of perceived ease of use, supporting **RO1**. SMEs in Selangor recognize the simplicity and effectiveness of adopting IoT for marketing, which could facilitate broader implementation.

RO2: Identify the Level of Readiness in Adopting IoT for Marketing among SMEs in Selangor

- **Objective:** To identify the level of Readiness in the intention to adopt IoT for marketing among SMEs in Selangor. The Readiness variable has a mean of **4.7834** and a standard deviation of **0.35241**. This suggests that SMEs generally feel prepared to integrate IoT into their marketing strategies. This supports **RO2**, showing that most SMEs are ready and willing to adopt IoT. The moderate standard deviation reflects some variability, indicating that while many are ready, a segment of SMEs may require further preparation.
- **Findings for Readiness:**

1. The survey items **B2.1 to B2.5** measure readiness, with means from **4.67 to 4.93**.
2. These results reflect a strong readiness among SMEs to adopt IoT for marketing, with **item B2.5** (mean 4.93) indicating the highest readiness.

The high readiness levels shown by these scores support **RO2**. SMEs in Selangor appear well- prepared and willing to integrate IoT into their marketing processes.

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RO3: Identify the Level of Resource Availability in Adopting IoT for Marketing among SMEs in Selangor

- **Objective:** To identify the level of Resource Availability in the intention to adopt IoT for marketing among SMEs in Selangor. Resource Availability has a mean of **4.6207**, with a standard deviation of **0.57767**. While still positive, this is the lowest mean among the variables, suggesting some concerns about having adequate resources. This finding for **RO3** indicates that while resources are generally available, there is more variability in this perception compared to other factors. Enhancing resource availability could further boost IoT adoption.
- **Findings for Resource Availability:**

1. The items **B3.1 to B3.5** focus on resource availability, with means ranging from **4.44 to 4.79**.
2. While generally high, these means suggest some variability, with **item B3.5** showing the highest availability (mean 4.79).

These results indicate a good level of resource availability, supporting **RO3**. Most SMEs report having adequate resources to support the adoption of IoT in their marketing efforts.

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4.5 Correlation Analysis

Table 4.2

Correlations

		Internet of Things Adoption	Perceived Ease of Use	Readiness	Resource Availability
Internet of Things Adoption	Pearson Correlation	1	.921**	.892**	.686**
	Sig. (2-tailed)		.000	.000	.000
	N	387	387	387	387

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

The table illustrates strong correlations between Intention to Adopt Internet of Things (IoT) and the variables of Perceived Ease of Use, Readiness, and Resource Availability. Here is a detailed breakdown:

RO4: Determine the Effect of Perceived Ease of Use

The strong correlation (**.921**) directly illustrates how pivotal perceived ease of use is in influencing the intention to adopt IoT. This confirms **RO4**, demonstrating that ease of use is a key driver in the decision to implement IoT solutions in marketing efforts.

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RO5: Determine the Effect of Readiness

The correlation of **.892** clearly shows that readiness impacts IoT adoption significantly. The readiness of an organization in terms of staff skills, technological infrastructure, and procedural adaptability enhances the likelihood of IoT integration, supporting **RO5**.

RO6: Determine the Effect of Resource Availability

The correlation of **.686** with IoT adoption indicates that while resource availability is important, its impact might be moderated by how these resources are utilized or perceived in the context of other factors such as ease of use and readiness. This supports **RO6** by highlighting the need for not just resources but also the capability to effectively deploy them.

4.6 Multiple Linear Regression

Table 4.3

Model Summary

Model	1
R	.996[a]
R Square	.993
Adjusted R Square	.993

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Std. Error of the Estimate	.02438
Change Statistics	
R Square Change	.993
F Change	16988.556
df1	3
df2	382
Sig. F Change	.000

a. Predictors: (Constant), Resource Availability, Perceived Ease of Use, Readiness

The R square value for all the variables in this research, such as the Intention to adopt IoT, Perceived Ease of Use, Readiness and Resource Availability, have been computed as shown in table 4.4.

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- **R (.996):** This is the multiple correlation coefficient and shows a very high linear correlation between the observed and predicted values of the dependent variable (Intention to Adopt IoT). An R value close to 1 indicates a strong positive correlation.
- **R Square (.993):** This indicates that 99.3% of the variance in the Intention to Adopt IoT is explained by the independent variables in the model (Perceived Ease of Use, Readiness, and Resource Availability). This high value suggests a very effective model that closely fits the data.
- **Adjusted R Square (.993):** This is a modified version of R Square that has been adjusted for the number of predictors in the model. It is very close to R Square, indicating that the model is generalizable and not overly fitted to the data.

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- **Standard Error of the Estimate (.02438):** This represents the standard deviation of the prediction error (residuals). A lower value, like this, indicates that most of the data points are very close to the regression line and the model predicts the outcome variable accurately.

Change Statistics (R Square Change, F Change, Sig. F Change)

- **R Square Change (.993):** Shows the total variance explained by the model. In this case, it reaffirms the effectiveness of the model.
- **F Change (16988.556):** This is the F-statistic, and it tests whether the overall regression model is a good fit for the data. A very high F value (16988.556) and a significant p-value (.000) indicate the model is statistically significant.
- **df1 and df2:** Degrees of freedom for the model (3) and for the residuals (382), respectively.
- **Sig. F Change (.000):** This shows the statistical significance of the F statistic. A value less than .05 (here, .000) indicates that the predictive power of the regression model is statistically significant.

The multiple linear regression model shows an excellent fit with the data, as indicated by the high R Square value of .993 and the significant F statistic. This confirms that Perceived Ease of Use, Readiness, and Resource Availability are all important predictors of the intention to adopt IoT among SMEs in Selangor for marketing purposes. The results underscore the critical importance of these factors in

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shaping IoT adoption, providing clear evidence that enhancements in these areas can significantly boost IoT integration in SME marketing strategies.

Table 4.4

Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.299	3	10.100	16988.556	.000[b]
	Residual	.227	382	.001		
	Total	30.526	385			

a. Dependent Variable: Intention to adopt IoT
b. Predictors: (Constant), Resource Availability, Perceived Ease of Use, Readiness

The F ratio in the ANOVA table 4.5 test will show if the overall regression model fits the data.

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ANOVA Analysis

Sum of Squares (SS)

- **Regression (SSR, Model):** The sum of squares due to the regression (SSR) is **30.299**. This represents the variation explained by the independent variables (Perceived Ease of Use, Readiness, Resource Availability) in the model.
- **Residual (SSE, Error):** The sum of squares due to the residuals (SSE) is **0.227**.

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This represents the variation that is not explained by the model, also known as error or unexplained variation.

The ANOVA results indicate that the regression model is extremely effective in explaining the variation in the Intention to Adopt IoT among SMEs in Selangor. The high R-square value combined with the significant F-test result implies that improvements in Perceived Ease of Use, Readiness, and Resource Availability can lead to significant increases in IoT adoption rates among SMEs.

Table 4.5

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.251	.024		-10.517	.000	-.298	-.204
	Perceived Ease of Use	.546	.008	.505	64.877	.000	.530	.563
	Readiness	.622	.014	.778	43.578	.000	.594	.650
	Resource Availability	-.118	.007	-.243	-16.557	.000	-.132	-.104

a. Dependent Variable: Internet of Things Adoption

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According to table 4.16, the model's constant (intercept) is **-.251**, with a significant t-test result (Sig. = .000), indicating that when all independent variables are zero, the dependent variable (IoT Adoption) is negatively influenced by an offset of -.251. The constant term is significant, which shows the baseline level of the outcome variable when all predictors are at their mean level.

i. Perceived Ease of Use

- **B = .546:** This coefficient means that for every one-unit increase in Perceived Ease of Use, the Intention to Adopt IoT increases by 0.546 units, holding other variables constant.
- **Beta = .505:** This standardized coefficient indicates that Perceived Ease of Use has a substantial positive impact on IoT Adoption, with a high relative importance compared to other predictors in the model.
- **Significance and Confidence Interval:** Extremely significant ($p < .000$) with a narrow confidence interval (.530 to .563), reinforcing the strong predictive power and precision of this estimate.

ii. Readiness

- **B = .622:** Indicates that an increase in Readiness by one unit increases IoT Adoption by 0.622 units, ceteris paribus.

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- **Beta = .778:** Suggests that Readiness is the strongest predictor among the included variables, given its higher beta coefficient.
- **Significance and Confidence Interval:** Highly significant ($p < .000$) with a confidence interval from .594 to .650, emphasizing its critical role in IoT adoption.

iii. Resource Availability

- **B = -.118:** A negative coefficient, indicating that an increase in Resource Availability is associated with a decrease in IoT Adoption by 0.118 units, other factors being equal.
- **Beta = -.243:** This negative standardized coefficient suggests that higher resource availability might be associated with factors that inhibit adoption to some extent, possibly due to misalignment between available resources and actual IoT implementation needs.
- **Significance and Confidence Interval:** The result is statistically significant ($p < .000$) with a confidence interval from -.132 to -.104, confirming the robustness of this negative relationship.

Summary and Relation to Research Objectives

i. **RO4: Perceived Ease of Use:** This factor not only has a high level of influence on the intention to adopt IoT (RO1), but its effect (RO4) is strongly positive,

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indicating targeted interventions to improve usability can directly enhance IoT adoption rates.

ii. **RO5: Readiness:** Similar to Perceived Ease of Use, Readiness significantly impacts adoption (RO2), and the effect (RO5) is the strongest among the variables, reinforcing the need to ensure SMEs are fully prepared for IoT integration.

iii. **RO6: Resource Availability:** While it is a critical factor (RO3), its negative impact (RO6) suggests a complex relationship where merely having resources is not sufficient; how they are utilized matters significantly for positive outcomes in IoT adoption.

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4.7 Hypothesis Testing

Table 4.6

Result of Hypothesis

Hypothesis	Statements	Result
H1	There is a significant effect between Perceived Ease of Use with the intention to adopt IoT for marketing among SMEs in Selangor	Supported
H2	There is a significant effect between readiness with the intention to adopt IoT for marketing among SMEs in Selangor	Supported
H3	There is a significant effect between resources availability with the intention to adopt IoT for marketing among SMEs in Selangor	Supported

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H1: Effect of Perceived Ease of Use

The coefficient for Perceived Ease of Use is positive (.546), and highly significant ($p < .000$). The t-value (64.877) is well beyond typical critical values for significance, indicating that we can reject the null hypothesis. H1 is **Supported**. There is a strong, positive, and significant effect of Perceived Ease of Use on the intention to adopt IoT among SMEs in Selangor. This supports the idea that enhancing usability can significantly encourage IoT adoption.

H2: Effect of Readiness

The coefficient for Readiness is also positive (.622) and highly significant ($p < .000$). The t- value (43.578) further supports the rejection of the null hypothesis. H2 is **Supported**. There is a substantial positive effect of Readiness on the intention to adopt IoT. This means that the more ready the SMEs are, the more likely they are to adopt IoT for marketing.

H3: Effect of Resource Availability

The coefficient for Resource Availability is negative (-.118), indicating an inverse relationship. Despite this, the significance level ($p < .000$) and the t- value (-16.557) indicate that this negative effect is statistically significant. H3 is **Supported**. There is a significant effect of Resource Availability on the intention to adopt IoT, but it's negative,

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suggesting that having more resources does not necessarily promote IoT adoption. This could be due to misallocation or ineffective use of available resources.

All three hypotheses (H1, H2, H3) are accepted based on the regression analysis, indicating significant effects of Perceived Ease of Use, Readiness, and Resource Availability on the intention to adopt IoT. However, it's crucial to note the negative impact of Resource Availability, highlighting a need for strategic and effective use of resources to foster IoT adoption among SMEs in Selangor.

4.8 Summary

This chapter presents the findings and analysis of the study "The Effect of Perceived Ease of Use, Readiness, and Resource Availability on the Intention to Adopt Internet of Things for Marketing Among Small-Medium Enterprises in Selangor." The primary objective was to examine how these factors influence SMEs' intention to adopt IoT technologies for enhancing their marketing strategies. The data were analysed using multiple linear regression to understand the relationships and effects of each independent variable on the dependent variable.

The analysis began with descriptive statistics, where high mean scores were observed for all variables, Intention to Adopt IoT: Mean = 4.843, indicating a strong intention among SMEs to adopt IoT, Perceived Ease of Use: Mean = 4.881, suggesting that SMEs find IoT relatively easy to use, Readiness: Mean = 4.783, showing that SMEs

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feel quite prepared to implement IoT, and Resource Availability: Mean = 4.621, indicating good availability of resources, though slightly lower than other factors.

The correlation analysis revealed, Perceived Ease of Use and Intention to Adopt IoT had a very high positive correlation (r = .921). Readiness was also strongly correlated with the Intention to Adopt IoT (r = .892). Resource Availability showed a positive but lower correlation (r = .686) with the Intention to Adopt IoT.

Regression Analysis, the multiple linear regression model was highly significant, explaining 99.3% of the variance in IoT adoption intentions (R^2 = .993). Perceived Ease of Use had a significant positive effect on IoT adoption (B = .546), indicating that improvements in usability could lead to higher adoption rates. Readiness was found to have the strongest positive effect (B = .622), suggesting that the more prepared the SMEs, the higher their likelihood of adopting IoT. Resource Availability had a negative impact on IoT adoption (B = -.118), highlighting a potential misalignment between available resources and effective IoT implementation.

H1, Effect of Perceived Ease of Use is Accepted. There is a significant positive relationship between perceived ease of use and the intention to adopt IoT. H2, Effect of Readiness is Accepted. Readiness significantly affects the intention to adopt IoT positively. H3 is Effect of Resource Availability is Accepted. However, the effect is negative, indicating that simply having more resources does not guarantee higher adoption rates.

Regression model with Perceived Ease of Use, Readiness, and Resource Availability is highly effective in predicting the intention to adopt IoT among SMEs in

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Selangor, with an R-square value of .993. Both factors significantly and positively influence IoT adoption, with readiness being the strongest predictor. This suggests that efforts to enhance these areas could lead to substantial increases in IoT adoption.

The negative effect of resource availability indicates that more resources do not automatically lead to increased IoT adoption. This suggests that the quality, not just the quantity, of resources matters in effectively supporting IoT adoption. The findings underscore the need for targeted strategies to improve the ease of use and readiness of SMEs for IoT adoption. Additionally, there should be a focus on optimizing resource utilization to ensure that available resources are effectively used to support IoT implementation.

Chapter 4 provided a comprehensive analysis of the data collected for this study. The findings highlight the significant influence of perceived ease of use and readiness on the intention to adopt IoT among SMEs in Selangor, while also pointing out the nuanced role of resource availability. These insights can guide future strategies and policies aimed at enhancing IoT adoption in the SME sector, ultimately leading to more innovative and effective marketing practice

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CHAPTER 5

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

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5.1 Introduction

This chapter synthesizes the findings of the study. It offers a detailed discussion, precise conclusions, and targeted recommendations based on the results.

5.2 Discussion

5.2.1 Perceived Ease of Use and IoT Adoption

The study identified a significant positive effect of Perceived Ease of Use on IoT adoption. This indicates that SMEs are more likely to adopt IoT technologies when they

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perceive them as easy to use. This supports the notion that usability is a critical factor in the adoption process and suggests that complex technologies can deter SMEs from adopting new tools.

Consistent with the Technology Acceptance Model (TAM), this result emphasizes that ease of use enhances the perceived usefulness and, subsequently, the adoption of technology ((Davis et al., 1989). To encourage IoT adoption, technology developers should focus on designing intuitive interfaces and workflows that minimize the learning curve for SME users.

5.2.2 Readiness and IoT Adoption

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Readiness was found to be the strongest predictor of IoT adoption. This comprehensive readiness includes not only the technical capabilities of the SMEs but also their cultural and operational preparedness to integrate new technologies into their existing systems.

This finding is in line with the Technology-Organization-Environment (TOE) framework, which shows that organizational readiness is a crucial factor in technology adoption (Eveland & Tornatzky, 1990). SMEs should invest in holistic readiness strategies, including staff training, strategic planning for technology adoption, and fostering a culture that supports innovation and technological change.

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5.2.3 Resource Availability and IoT Adoption

Interestingly, the study revealed a negative relationship between Resource Availability and IoT adoption, indicating that simply having more resources does not guarantee higher adoption rates. This suggests a misallocation or underutilization of available resources.

This aligns with the Resource-Based View (RBV), which argues that the value comes from using resources effectively rather than just possessing them (Barney, 1991). SMEs should focus on strategic resource management, ensuring that resources are allocated efficiently and aligned with the goal of adopting and leveraging IoT technologies.

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5.3 Comparative Analysis with Existing Literature

The study's insights into Perceived Ease of Use and Readiness build on existing models like TAM and TOE, providing a nuanced understanding of these factors in the specific context of SMEs and IoT adoption. The negative impact of Resource Availability highlights a gap in the literature, where more emphasis is often placed on the availability rather than the strategic use of resources.

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5.4 Practical Implications

For SMEs

To enhance usability, SMEs should implement regular training sessions to familiarize staff with IoT technologies. This helps ensure that employees are comfortable and proficient in using the new systems (Davis, 1989). Additionally, collaborating with technology providers to ensure that IoT solutions are tailored to the needs and capabilities of SMEs is crucial. Simplified interfaces and intuitive designs can significantly reduce the learning curve (Davis, 1989).

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Boosting readiness involves conducting readiness assessments to identify gaps in technology, staff skills, and operational processes. This helps in understanding the current state and what is needed to effectively implement IoT solutions (Rogers, 1995). Developing change management strategies to smoothly integrate IoT solutions into business practices is also necessary. This includes communication plans, stakeholder engagement, and support systems to handle the transition (Rogers, 1995).

Optimizing resource use requires regularly auditing resource use and aligning it with strategic objectives, particularly for technology adoption. This ensures that resources are not wasted and are used efficiently towards achieving business goals (Barney, 1991). Additionally, ensuring that investments in technology are backed by a clear strategy and plan for deployment, including timelines, milestones, and metrics for success, is essential (Barney, 1991).

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For Technology Developers

To simplify solutions, technology developers should offer customizable interfaces and options that cater to the varying skill levels within SMEs. This makes the technology accessible to all employees, regardless of their technical proficiency (Venkatesh et al., 2003). Providing comprehensive user guides, FAQs, and responsive customer support to assist SMEs in adopting and using IoT solutions helps in reducing downtime and enhancing user experience (Venkatesh et al., 2003).

Engaging with SMEs involves establishing mechanisms to gather feedback from SME users to continuously improve the design and functionality of IoT products. Regular feedback ensures the solutions evolve according to user needs (Venkatesh et al., 2003). Creating partnership programs that allow SMEs to test and provide input on new IoT solutions not only improves the product but also builds trust and loyalty among SMEs (Venkatesh et al., 2003).

For Policymakers

Policymakers can foster skills development by offering subsidies or tax incentives to SMEs that invest in IoT training and skills development. This reduces the financial burden on SMEs and encourages them to upskill their workforce (Rogers, 1995). Additionally, supporting local innovation hubs or centres where SMEs can access the latest IoT technologies and expertise is crucial. These hubs can act as incubators for innovation and collaboration (Rogers, 1995).

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Promoting resource efficiency involves developing and disseminating best practice guides on resource optimization for IoT adoption. These guides can help SMEs understand how to make the best use of their resources (Barney, 1991). Encouraging the formation of SME networks to share resources and knowledge about effective IoT utilization can provide peer support and foster a collaborative environment (Barney, 1991).

Conclusion

This study conclusively shows that while Perceived Ease of Use and Readiness significantly enhance the intention to adopt IoT among SMEs in Selangor, Resource Availability must be carefully managed to support this adoption (Venkatesh et al., 2003). The results suggest a need for a strategic approach that focuses on enhancing usability and readiness while optimizing resource utilization (Davis et al., 1989). Effective implementation of these recommendations can lead to successful IoT adoption, driving growth and efficiency in SMEs (Venkatesh et al., 2003).

5.5 Recommendations

To maximize the benefits of IoT adoption in SMEs, several strategic actions are recommended**:**

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i. For SMEs

SMEs should prioritize user-friendly IoT design by collaborating with vendors to ensure that IoT solutions are easy to use. This focus on user-friendly designs facilitates smoother integration and higher adoption rates among staff, as supported by the Technology Acceptance Model (Davis, 1989).

Additionally, SMEs should develop comprehensive training programs to keep pace with IoT advancements. Continuous training ensures that employees are well-equipped to handle new technologies and can fully leverage IoT capabilities, which aligns with the importance of perceived ease of use in technology adoption (Davis, 1989).

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Furthermore, SMEs should focus on strategic resource management by effectively using resources rather than accumulating unused assets. Regular audits and alignment of resources with strategic objectives can optimize technology adoption and operational efficiency, reinforcing the principles of the Resource-Based View (Barney, 1991).

ii. For Developers

Developers should focus on user experience (UX) in IoT design, ensuring that IoT solutions are intuitive and accessible for all users. By prioritizing UX, developers can create products that meet the diverse needs of SMEs, enhancing usability and

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satisfaction, as emphasized in the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003).

Moreover, developers should maintain continuous user engagement by establishing active communication channels with SMEs. This allows developers to refine and adapt IoT solutions based on user feedback, addressing user needs and improving product functionality, which is critical for successful technology adoption (Venkatesh et al., 2003).

iii. For Policymakers

Policymakers should incentivize training and development by providing financial support for SMEs to train their staff on IoT. This reduces the financial burden on SMEs and encourages them to upskill their workforce, aligning with the principles of the Diffusion of Innovations Theory (Rogers, 1995).

Additionally, policymakers should promote efficient resource use by encouraging SMEs to audit and realign their resources with strategic goals, especially for technology adoption. This approach helps SMEs to effectively manage their resources, supporting the strategic resource management emphasized in the Resource-Based View (Barney, 1991).

By following these recommendations, SMEs, technology developers, and policymakers can collaboratively enhance the adoption and effective use of IoT

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technologies. This collaborative effort will lead to more dynamic and competitive businesses in the digital age, ultimately driving growth and efficiency in the SME sector.

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Appendix

The Effect of Perceived Ease of Use, Readiness and Resource Availability on the Intention to Adopt Internet of Things for Marketing Among Small-Medium Enterprises in Selangor

Dear respondent,

I would appreciate if you could spend about 10 minutes of your time to complete this questionnaire. I am a Master's degree student from University Pendidikan Sultan Idris (UPSI) and is conducting a study about"**The Effect of Perceived Ease of Use, Readiness and Resource Availability on the Intention to Adopt Internet of Things for Marketing Among Small-Medium Enterprises In Selangor".** The purpose of the study is to identify on the adoption of IoT in the marketing section of SME corporations in Selangor. The information you provide will help in understanding IoT use in Malaysia, particularly for marketing among SMEs in Selangor. The data collected from this survey will be used for academic and research purpose only. There are no right or wrong answers. We are interested in your true experiences and opinions.

Thank you very much for spending your time and kind cooperation.

Researcher:

1. Amalahmathi A/P Subramaniam M20182002262

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What is Internet of Things (IoT)

Internet of things (IoT) is the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data. IoT also brought many benefits to the industries and users (Uckelmann, 2011). For instance, the IoT technology used in smart refrigerators that can independently monitor the consumption of food and beverages and also can notify the user to reorder the goods (Gao, 2014).

PART A: Demographic

Characteristics Instruction:

Please tick (√) to the information given carefully.

Gender	Male	
	Female	
Age	Less than 25 years	
	25 to 35 years	
	36 to 45 years	
	46 to 55 years	
	Above 55 years	
Current Position	Chief Executive Officer, CEO	
	Board of Directors	
	Manager	
Education Level	Master's Degree	
	Degree	
	Diploma	
	Others	
Industry	Manufacturing	
	Trading	
	Services	
	Others	
IoT Use	I know what is IoT and we use them in our company for marketing purposes	
	I know what is IoT and we use them in our company in general only, nothing specific	
	I know what is IoT, but we do not use them in our company	
	I do not know what is IoT	

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PART B:

IndependentVariable Instruction

For each statement, indicate the extent to which you agree or disagree by selecting one number from the scale provided. Tick (√) your responsefor each statement and rate it using the following criteria.

I. **Perceived Ease of Use**

No.	Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1.	Using the IoT would enable me to accomplish more quickly					
2.	I find using IoT to be advantageousin marketing.					
3.	I find my interaction with the IoT device clear and understandable					
4.	Using IoT would significantly increase the quality of marketing in my organization.					
5	Using IoT marketing would significantly increase the output of my organization.					

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II: Readiness

No.	Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1.	IoT technology fits in with the way my organizations work.					
2.	IoT improves the marketing effectiveness ofprojects.					
3.	IoT in marketing enables the existing tasks to be executed faster					
4.	IoT in marketing provides new ways of delivering services.					
5.	I am aware that IoT in business uses devices and software to collect useful information from clients.					

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III. Resources Availability

No.	Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1.	I have the skills/training I needto use IoT technology in marketing.					
2.	I have the opportunity to try IoT technology in marketing.					
3.	IoT is suitable for my job requirements especially in marketing					
4.	I have the resources necessaryto use IoT technology.					
5.	I always find time and extra resources for better understanding in marketing using IoT matter.					

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Part C: Dependent

variable Instruction

For each statement, indicate the extent to which you agree or disagree by selecting one number from the scale provided. Tick (√) your response for each statement and rate it using the following criteria.

I. Internet of Things Adoption

No.	Statement	1 Strongly	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1.	I find using IoT technology in marketing is interesting.					
2.	IoT helps me learn more about my work/ task.					
3.	IoT can be used with the existing devices in my workplace					
4.	It is not detrimental if myself/my organization decided to fully adoptthe use of IoT					
5.	IoT enhances the quality of projects.					

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