THE ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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2024

DECLARATION

I certify that this thesis, "THE ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS," is the result of my own study except as stated in the sources. The thesis has not been approved for any degree and is not being considered for any other degree.

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DATE : 22 JANUARY 2024

DEDICATION

To my beloved parents, siblings, family, lecturers, and friends

ACKNOWLEDGEMENT

Words cannot express my gratitude to Dr Johanna for her invaluable patience and feedback. I also could not have undertaken this journey without my lecturer and supervisor, Dr Johanna who generously provided knowledge and expertise. Additionally, this endeavour would not have been possible without the generous support from my supervisor, Dr Johanna who financed my research.

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ABSTRACT

This study focuses on the adoption of online shopping systems using mobile applications among retail consumers. Small store executives were experiencing difficulty implementing Internet marketing to promote client interaction and derived sales. The difficulties linked with it act as an impediment or setback for online selling firms. Some customers may see internet purchases as dangerous and untrustworthy. This research intends to determine the key factors that influence consumers to adopt and use online shopping systems through mobile applications, to examine the relationship between the technology acceptance and online shopping systems using mobile applications and to identify the most critical factors affecting the adoption of mobile applications among consumers for shopping purposes. The Technology Acceptance Model (TAM) was adopted in this study to shed light on the processes underpinning the acceptance of technology, to predict the behaviour of and provide a theoretical explanation for the successful implementation of technology. A Likert scale questionnaire was used to collect study data. The results show that IV (perceived usefulness, perceived ease of use, perceived trust, perceived security, perceived convenience) considerably influences DV (adoption of online buying system using mobile application among retail consumers). The emphasis is on how pre-shopping decisions and other consumer-related variables are interconnected with consumer purchasing and browsing patterns, as well as their response to stimuli, and how these interconnected and moderating factors affect online grocery consumers' decision-making processes overall. As a result, the study's goals are to discover essential elements impacting consumer acceptance of online purchasing systems through Mobile applications.

ABSTRAK

Kajian ini memberi tumpuan kepada penggunaan sistem membeli-belah dalam talian menggunakan aplikasi mudah alih di kalangan pengguna runcit. Eksekutif kedai kecil mengalami kesukaran melaksanakan pemasaran Internet untuk mempromosikan interaksi pelanggan dan penjualan yang diperoleh. Kesukaran yang berkaitan dengannya bertindak sebagai halangan bagi syarikat penjualan dalam talian. Sesetengah pelanggan melihat pembelian internet sebagai berbahaya dan tidak boleh dipercayai. Kajian ini bertujuan untuk menentukan faktor-faktor utama yang mempengaruhi pengguna untuk menerima pakai dan menggunakan sistem membeli-belah dalam talian melalui aplikasi mudah alih, untuk mengkaji hubungan antara penerimaan teknologi dan sistem membeli-belah dalam talian menggunakan aplikasi mudah alih dan untuk mengenal pasti faktor-faktor kritikal yang mempengaruhi penggunaan aplikasi mudah alih di kalangan pengguna untuk tujuan membeli-belah. Model penerimaan teknologi (TAM) telah diterima pakai dalam kajian ini untuk memberi penerangan mengenai proses yang menyokong penerimaan teknologi, untuk meramalkan tingkah laku dan memberikan penjelasan teori untuk kejayaan pelaksanaan teknologi. Skala Likert digunakan untuk mengumpul data kajian. Hasilnya menunjukkan bahawa IV (kegunaan yang dirasakan, kemudahan penggunaan yang dirasakan, kepercayaan yang dirasakan, keselamatan yang dirasakan, kemudahan yang dirasakan) mempengaruhi DV (pengambilan sistem Pembelian Dalam talian menggunakan aplikasi mudah alih di kalangan pengguna runcit). Penekanannya adalah bagaimana keputusan pra-belanja dan pemboleh ubah lain yang berkaitan dengan pengguna saling berkaitan dengan corak pembelian dan penyemakan imbas pengguna, serta tindak balas mereka terhadap rangsangan, dan bagaimana faktor-faktor yang saling

berkaitan dan penyederhanaan ini mempengaruhi proses membuat keputusan Pengguna Runcit Dalam talian secara keseluruhan. Hasilnya, tujuan kajian ini adalah untuk menemui elemen penting yang mempengaruhi penerimaan pengguna terhadap sistem pembelian dalam talian melalui aplikasi mudah alih.

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LIST OF ABBREVIATION

PU	PERCEIVED USEFULNESS
PEOU	PERCEIVED EASE OF USE
PT	PERCEIVED TRUST
PS	PERCEIVED SECURITY
PC	PERCEIVED CONVENIENCE
IV	THE ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS

CHAPTER 1

INTRODUCTION

1.0 CHAPTER OVERVIEW

In the first part, this study mainly introduced the subject of the research and the direction of the research. The study briefly introduced the topic setting of the research to the reference of the literature, which provides more research dimensions for the research. In this part, the inquiry described the problem statement, laying the foundation for the entire research and introduced the research goals and questions. In addition, the review also summarized the significance of the entire research, the scope, and the field of the research investigation, and explained the applicability of the entire research paper

1.1 BACKGROUND OF RESEARCH

Given the increasingly competitive nature of the retail business, innovation is considered crucial to survival, long-term sustainability, economic success, and profitability. The impact of these innovations has been most obvious in services, where significant changes in business processes and changes in how services are generated, produced, and delivered have happened (Ferreira et al., 2023).

Customers are getting more demanding, have more information to make decisions about which products/services to purchase, and want their needs to be met as fast as feasible. As a result, merchants have progressively used a range of self-service technologies to boost consumer happiness and deliver unique and new service experiences

suited to their specific demands. Cell phones and geofencing are two of the most recent retail innovations (Ferreira et al., 2023).

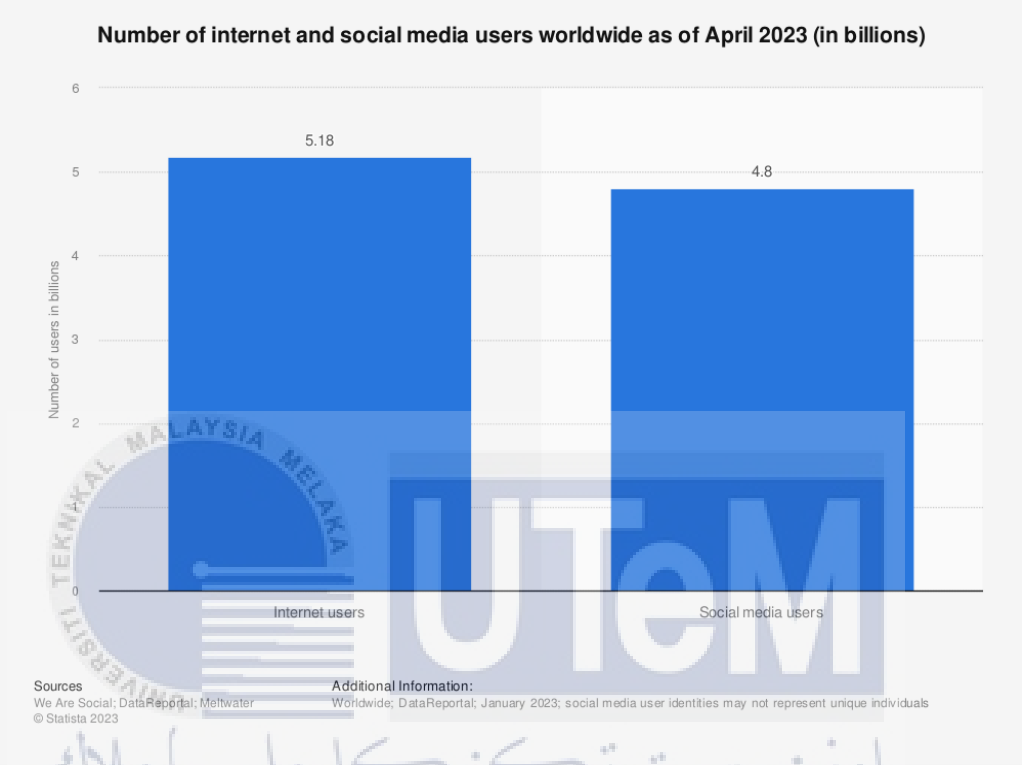


Figure 1.1: Number of Internet and social media users worldwide (Statista, 2023)

There were 5.18 billion internet users worldwide as of April 2023, accounting for 64.6 percent of the global population (Statista, 2023). Social media was used by 4.8 billion people or 59.9 percent of the world's population. The internet connects billions of people globally and is a key pillar of the modern information society. Northern Europe scored top among global regions in terms of the population use of the internet in 2023. As of April 2023, 99 percent of the people of Norway, Saudi Arabia, and the United Arab Emirates have access to the Internet. North Korea was at the other end of the spectrum,

with almost no internet penetration among the general people, ranking worst in the world. Asia has the most internet users globally, with over 2.93 billion in the recent figure.

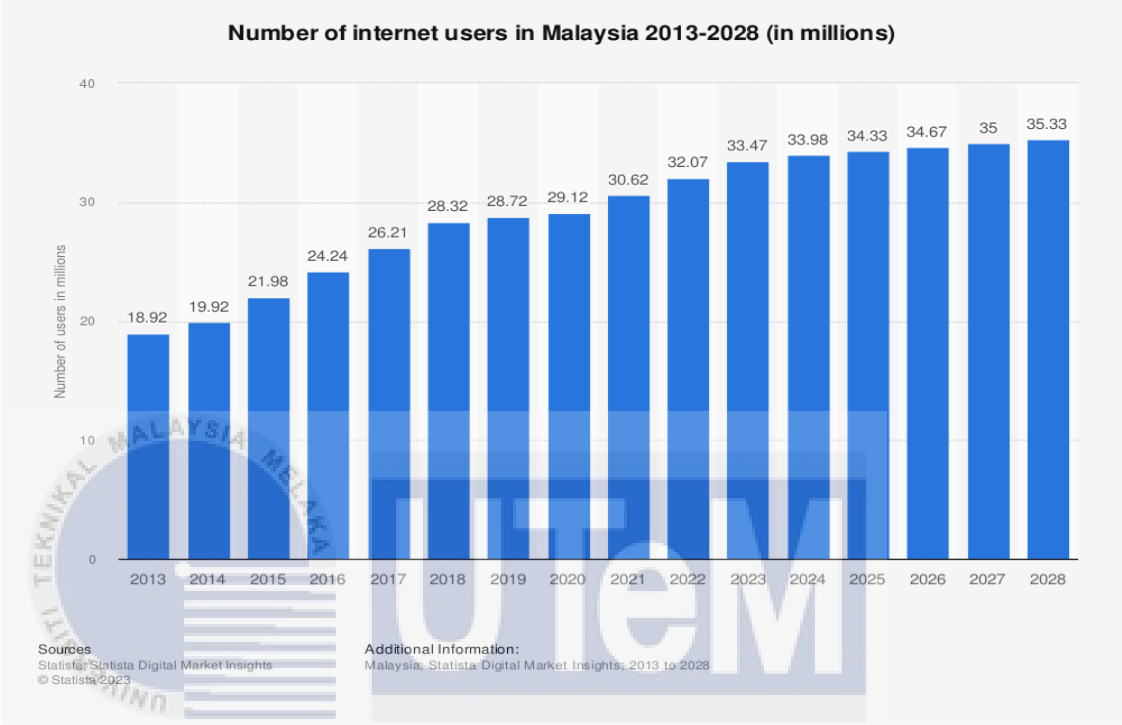


Figure 1.2: Number of Internet users in Malaysia (Statista, 2023)

The number of internet users in Malaysia is expected to rise by 1.9 million (+5.68 percent) between 2023 and 2028. After the fifth straight year of growth, the number of internet users is expected to reach 35.33 million, a new high in 2028. Notably, internet users have been steadily expanding over the last few years (Statista, 2023).

1.2 PROBLEM STATEMENT

The Southeast Asian e-commerce sector has expanded, as stated by a world-renowned strategic consulting firm. Malaysia's online shoppers had surpassed 5.6 billion US dollars as of August 2020 (MyGOV, 2020). The number of e-commerce transactions in Malaysia surged by 1380% in 2019 compared to the same period last year (MyGOV, 2019). Malaysians adapted faster and converted to online purchasing and consuming as a result of the epidemic preventive action control order adopted by Malaysia in 2020. During the outbreak, online buying had taken longer than usual. Before the outbreak, it was 70% higher. It is vital to comprehend consumer behaviour, analyse and research consumer behaviour and online buying motive, and comprehend the aspects that influence customers' online purchasing conduct (Wang Jie, 2021).

Although one key advantage of the Internet is its ability to simplify information searches and facilitate transactions, advancements in innovative website technology usage require e-retailers to cultivate positive relationships with customers by offering a satisfying shopping experience. For example, ease of navigation, information quality, web design, security, and so on), which is critical for the long-term success of online retailers (Mofokeng, 2021).

Some retail executives in small businesses struggled to apply social media marketing techniques for advertising, employee recruiting, and communication to improve income. In 2015, 31.8% of small retail enterprises had websites to use online for marketing, but 67.4% were unable to capitalise on online marketing potential, resulting in a loss of chances in online marketplaces (MyGOV, 2016). The basic business challenge

was that small retail firm executives were having problems adopting Internet marketing to improve customer connection and enhance derived sales. The specific business issue was that certain small retail store owners lacked methods for implementing Internet marketing to boost derived sales (Cesaroni & Consoli, 2019).

Although online buying has become more popular, the challenges associated with it serve as an obstruction or setback for online selling businesses. Problems with online purchases can arise at any time, from the time consumer visit the website to make their buy to the time they receive or use the product, or even after the transaction. This research aims to discover online clients' problems and provide relevant answers (Rangasamy, 2020).

Despite the various advantages, some buyers may have seen internet purchasing as risky and untrustworthy. There was a strong correlation between trust and loyalty; customers usually trust brands far more than the retailer that sold that brand. Online purchase lacks a face-to-face connection between supplier and consumer, making it non-social, and it has been difficult for the buyer to build confidence. Converting prospective consumers into actual buyers requires trust in the e-commerce store. While the Internet provided an endless number of products and services, there was a perceived risk in digital purchases such as mobile application shopping, catalogue buying, or mail order (Daroch et al., 2021).

Customers in Europe have taken part in this shift. However, because they were a new phenomenon, the phenomenon influenced by the various challenges that develop in

the online world. The researcher proposed in this study to look at how it affects the problems that online retailers face while developing online shopping systems.

1.3 RESEARCH QUESTIONS

The following research questions have been devised to address the problems mentioned above:

RQ1: What are the key factors that influence consumers to adopt online shopping systems through mobile applications?

RQ2: What is the relationship between technology acceptance and online shopping systems using mobile applications?

RQ3: What are the most critical factors affecting the adoption of mobile applications among consumers for shopping purposes?

1.4 RESEARCH OBJECTIVES

The following research aims are designed to solve the above-mentioned research issues for this study:

RO1: To determine the key factors that influence consumers to adopt and use online shopping systems through mobile applications.

RO2: To examine the relationship between the technology acceptance and online shopping systems using mobile applications.

RO3: To identify the most critical factors affecting the adoption of mobile applications among consumers for shopping purposes.

1.5 SCOPE AND LIMITATIONS OF THE RESEARCH

1.5.1 SCOPE

This study focused on retail consumers' use of online buying systems via Mobile applications. The study targeted the technological components of the online purchase system that uses a Mobile applications, such as the user interface, functionality, security, and device compatibility. To collect further data, the researcher used a quantitative technique. Two types of data were employed in this study: primary and secondary data. The survey was conducted by the researcher, and the respondents are 33.6 billion of Malaysia citizens. In terms of secondary data, the researcher gathered information regarding the study from papers, journals, and internet pages. The Technology Acceptance Model (TAM) was utilised in this study to throw light on the processes behind technology adoption, forecast behaviour, and give a theoretical rationale for effective technology deployment.

1.5.2 LIMITATIONS

At its most basic, research constraints are the study's flaws, which are frequently caused by variables outside the control as a researcher. There are several limitations to the information. Furthermore, the focus of this study is limited to the factors that influence customers' online purchase decisions. This study's variables are insufficiently detailed. Another item to consider is generalizability. The sample is unlikely to be totally random

or representative of a larger population. This research, on the other hand, seeks to be the first to look at the adoption of online purchasing systems via mobile applications among retail consumers. This is a starting step towards developing new mobile applications for the retail business.

1.6 SIGNIFICANCE OF THE RESEARCH

1.6.1 ACADEMIC

By expanding the theory, the researchers contributed to the expanded form of the technology acceptance model (TAM), which was created by Davis (2000) in this study report. As a result, it will be contributed to the body of literature in technology management research..

Moreover, This research had the potential to boost technological innovation. Using a Mobile application to create an online shopping system involved the use of cutting-edge technology such as mobile app development, e-commerce platforms, and secure payment gateways. Exploring and employing these technologies benefits students' academic performance in software development, mobile computing, and e-commerce.

Furthermore, This study assisted students in understanding more about the online purchasing system among retail consumers utilising Mobile applications. Using mobile applications in online shopping assisted in improving the overall quality of the system. Customers felt protected and secure when making an online transaction.

1.6.2 PRACTITIONER

The real-world benefits and practical implications of establishing an online shopping system using a Mobile application were tied to the real-world benefits and practical consequences it gave to companies and customers. These benefits assisted businesses in succeeding and thriving in the ever-changing digital economy.

This study focused on the firm's competitive edge. Firms got a competitive edge by developing an online purchase system using a Mobile application. Businesses that provide a user-friendly and feature-rich application differentiate themselves from the competition and earn more clients. A well-designed application with simple navigation, a quick checkout procedure, and secure payment options increased overall consumer satisfaction and loyalty.

One of the criteria in the research was business development and scalability. An online retail system was driven by a Mobile application enabled business growth and scalability. As their customer base increased, businesses simply scale their operations, launch new goods, and respond to changing market demands. A Mobile application's flexibility helped organisations address changing client expectations while remaining flexible in a competitive market.

Finally, expanded market reach was an advantage of this research. An online shopping system driven by a Mobile application helped businesses expand their market reach by providing an easy platform for clients to research and purchase commodities or services. Because of the widespread use of smartphones and the popularity of Mobile

devices, businesses have reached a larger user base, increasing their visibility and potential consumer base.

1.7 SUMMARY

Consequently, the scope of previous academic research related to online shopping has seldom addressed the grocery retail market, with a few existing studies focusing only on consumers` adoption and general attitudes and motivations toward online grocery shopping. This study focused on the adoption of online shopping systems using mobile applications among retail consumers.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

In this section, the study mostly explored the research's key points using some earlier sources. This study chose the appropriate period, geographic place, and research data for the topic. This section of the investigation hunts for lost references based on arguments about independent and dependent variables. The dependent variables of customers' online buying willingness were measured using independent factors in this study. As a result, certain reference data were utilised in this chapter to analyse the present project and evaluate the link between each independent and dependent variable. This section provided firms or other researchers with a new project reference value.

2.1 ONLINE SHOPPING

The Internet and communication technologies, particularly telecommuting and online shopping, have been touted as viable options for those who want to work and shop from home. Before the pandemic, internet shopping also known as e-commerce was anticipated to account for around 20.7% of total retail sales worldwide in 2019. As a result of the COVID-19 epidemic, online retail turnover in Malaysia was predicted to increase by 33% in 2020 compared to 2019. Furthermore, during the second quarter of 2020 online shopping volume increased by 49%, with online grocery purchasing increasing by 115% (Hashem, 2020).

Internet shopping in Malaysia accounted for 8% of total retail sales in 2020. In Malaysia, the total growth for 2020 was predicted to be 26% higher than the previous year, while the increase in online food shopping during the first wave of the pandemic and the accompanying lockdown was 56% higher than in 2019. During the first wave of the pandemic, food stores and supermarkets in Malaysia saw a 300% increase in income from online sales (Lee & Eom, 2023).

Various research indicates that socio-demographics, Internet experience, automobile ownership, and geographical characteristics all had a substantial impact on customers' online purchasing and shopping travel behaviours. Shi et al. (2019) discovered that persons who started their shopping journeys in inner cities or rural regions were more inclined to purchase online. Families in lower-density locations were less likely to order items online than their counterparts (Saphores & Xu, 2021).

While online shopping may viewed as a potential solution to reduce urban congestion, it increased traffic due to the replacement impact of online purchasing on shopping excursions. Furthermore, earlier research has discovered that those without a private automobile are more likely to replace online buying for retail visits. Shoppers may be drawn to or repulsed by online shopping for a variety of reasons, including convenience, perceived benefits, costs and risks, technology affection, time constraints, and fit into daily schedules, as well as social and environmental dimensions regarding personal norms and beliefs (Dollens et al 2020).

Online buying behaviour evolved in tandem with the acceptance of digital technology (Sunio et al., 2018) and the evolution of one's time-use allocations and obligations (Schmid, 2019). (Saphores and Xu (2020), for example, show how age and education level influenced the frequency of online shopping deliveries: younger generations and more educated consumers request more deliveries. Hoogendoorn-Lanser et al. (2019) discovered that females shop online more than males, which is likely owing to differences in in-home and out-of-home duties and activity engagements.

COVID-19 related restrictions have significantly reduced physical mobility around the world, changed the intra-household arrangement of responsibilities, and consequently, the time-use allocations of household members, which has in many ways shifted behaviour from physical to online shopping alternatives. Pandemics have also played an essential role in increasing public acceptance of new technical solutions—for example, the adoption of autonomous delivery robots for receiving online shopping deliveries.

While the behavioural change to online purchasing was obvious, as indicated by the growth in online retail sales recorded in the second and third quarters of 2020, little attention has been paid to understanding this movement at the individual level, to the best of the author's knowledge. As a result, the primary goal of the study was to examine the effects of the restrictions imposed during the first wave of the pandemic on reported online shopping behaviour, as well as how individuals from different socio-demographic groups behave differently, given the virus containment strategy in the respondent's country and the type of goods purchased.

2.2 MOBILE APPLICATIONS

Consumers' fast lifestyles and frequent use of technology motivated them to purchase things via mobile applications. People were looking for new ways to simplify their lives, such as having things delivered to their houses. 'Thanks to mobile applications, home delivery services have become even more important because customers prefer to enjoy products at the right time, place, quantity, and condition". As a result, smartphone applications have become a significant part of many people's everyday lives. Access to high-speed Internet, significant growth in smartphone usage, advancements in customized and interactive applications, and the fast pace of modern lifestyles have all contributed to a healthy market for mobile app uptake (Sugandini et al., 2020).

3.5 billion smartphone users worldwide (Oberlo, 2020) spend 90% of their time using mobile applications. An average smartphone user uses 30 mobile applications per month and 9 mobile applications per day; this rise has altered people's routines, turning occasional app usage into a regular habit. Consumers use their smartphones to buy items, therefore smartphone applications have become a significant platform. Smartphone application purchasing is on the increase. Mobile commerce revenues are predicted to increase by 37.7% from 2019 to $203.94 billion in 2020, then quadruple by 2022 (Sarkar et al., 2020).

Value-added mobile services became critical for achieving a competitive edge in a variety of business industries. The proliferation of mobile devices and the introduction of smartphone applications have revolutionized markets over the last decade, and firms have always seeking new business opportunities through smartphone services. Mobile

applications have provided new opportunities for businesses to establish personal relationships with their current and prospective customers, increasing both industry and academic interest in the topic. Mobile shopping is a sophisticated service that allows users to look for and purchase things using their cell phones at any time.

Mobile applications, particularly supermarket applications, have experienced a surge in popularity in recent months, as buyers choose to avoid storefronts and instead utilise commerce applications to avoid personal interaction. The study have seen the growth of supermarket purchasing applications in Malaysia such as Shopee, Mudah, Lazada and Shein as a result of COVID-19 constraints, particularly social distancing. Furthermore, the introduction of the lockdown in March 2020 resulted in a 200% to 500% increase in daily orders for these players. Globally, the number of grocery app users is expected to reach 30.4 million by 2022. An increasing number of smartphone users and a growing number of young professionals were driving the adoption of grocery shopping applications.

Consumers' schedules were growing more hectic, leaving less time for housework or grocery shopping, fuelling the need for online grocery shopping. Grocery shopping applications provided several advantages to both companies and users. Retailers enabled them to communicate with and reach prospective consumers 24 hours a day, seven days a week, and to create a dynamic virtual store where grocery products may be purchased. This reduced the physical and mental effort required by customers to acquire food offline. Users may utilise grocery shopping applications to buy goods online using a range of payment options, including cash on delivery and online payments (Bruwer et al., 2022).

The delivery charge was determined by the size of the basket and the location. Drinks, milk, and dairy goods, newborn and childcare supplies, cereals and breakfast, frozen meals, soups and snacks, and other things were delivered to clients' homes by online grocery sellers. Applications for grocery shopping were increasing in popularity in the marketing and retail industries. This was a very new study topic, with huge potential for future advancement, although there was little literature on the subject.

The expanding popularity of online shopping has been continuously transformed by the usage of computer equipment, especially mobile applications in the field of e-commerce that enable consumer online buying experiences. Customers and businesses have both contributed to the rise of online shopping. Overall, the emergence of the Coronavirus-2019 (COVID-19) pandemic has raised customer demand for online purchases, since buyers are cautious about visiting physical enterprises (Y. L. Adeline Tam et al, 2022).

2.3 RETAIL CONSUMERS

As a goal, online shops strived for the highest level of client loyalty possible. This was determined by satisfaction and numerous quality parameters, as verified by the literature (Brusch et al., 2019). Several studies were conducted to investigate the influence of various aspects on e-commerce satisfaction and loyalty (Garcia et al., 2020). When a website design saves consumers time, makes it easy to use, provides product information, and delivers products swiftly, customers can become extremely happy (Brusch et al., 2019). However, metrics of product diversity and product delivery were rarely found in the literature's numerous e-service quality scales.

Product diversity and product delivery were rarely studied in the literature, despite their importance as critical e-commerce elements that impact consumer happiness and loyalty (Brusch et al., 2019; Haridasan & Fernando, 2018). Ahmad et al. (2017), Brusch et al. (2019), and Rita et al. (2019) urged that future research include the diversity of available items and delivery as major aspects that contributed to the development of e-loyalty. To fill this void, this study developed and evaluated a conceptual model that investigates the impact of information quality, privacy concerns, perceived security, product diversity, and product delivery on online shopping consumer happiness and loyalty.

The continuous revolution of globalisation and technological progress established by the internet, which connects people and generates a world despite limits, as well as creating a new digital commerce market containing online sales transactions, had an impact on the world (Cheong et al., 2019). There were billions of people on the web, and the vast majority of them were potential clients for firms or individuals that provide Internet commerce. As the Internet has increased the number of sellers and customers, businesses who want to offer goods or services consider how to promote their goods in this competitive atmosphere. (Cheong et al., 2019).

2.4 DEPENDENT VARIABLE

2.4.1 ADOPTION OF ONLINE SHOPPING SYSTEM USING MOBILE APPLICATION AMONG RETAIL CONSUMERS

Zuroni and Goh described online shopping as the process by which people buy goods and services through the Internet. One-third of the authorized Asia-Pacific nations have already utilized the Internet, with the international Internet penetration rate or the Internet rate of the whole population reaching 42%. From 1998 to 2012, entry into Malaysia began to accelerate expansion. In 2016, e-commerce accounted for around 5% of the entire retail market. It increased year after year, reaching 20.8% in 2020. Malaysia has the greatest Internet penetration rate in Southeast Asia, with a national Internet usage rate of 85.7%, owing to the widespread use of mobile networks. The rate has risen to almost 140% (Wang Jie, 2021).

E-commerce is a platform for purchasing and selling commercial operations that employs electronic technology to connect businesses, manufacturers, consumers, and the general public in electronic transactions. In Malaysia, several forms of e-commerce were emerging. One of them is Marketplace, which is a forum that connects vendors and buyers (seller & buyer) in one network. Shopee, Mudah.my, Lazada, PgMall.my, and Zalora.com.my are some of the most popular kinds of E-commerce in Malaysia. Shopee was recognised as number 1 in prior years as a substantial and most sought-after marketplace by the internet community. Due to competition from other markets, its rating has dropped.

Shopee is one of the programs that can be used on Mobile and OS and allows users to easily search for and receive the desired goods at an affordable price without being constrained by distance or time. Shopee is one of Malaysia's top online shopping sites in the second quarter of 2019 due to the number of comparable Marketplaces active in online shopping applications. It must now be replaced with Lazada, a comparable marketplace. And, for the time being, Shopee must compete with Lazada, PgMall.my, and Zalora.com.my, which are all identical marketplaces.

The growth in E-commerce with the same rivals indicates that rivalry for a market position is becoming more intense. It forces the Shopee E-commerce company's management to work harder to identify numerous tactics connected to its external position. It is to ensure that Shopee's position and market share continue to thrive and grow through its portfolio (Chong & Ali, 2022).

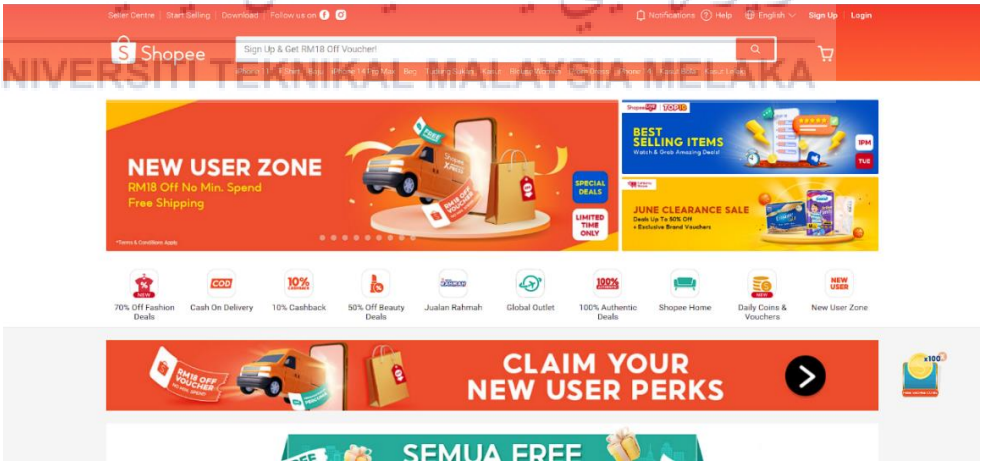


Figure 2.1: Shopee Application

Lazada is one among Shoppe's competitors. Lazada established its e-commerce in 2012, following the road and sales practises of Amazon.com, and quickly became the largest e-commerce firm in Southeast Asia. Lazada is a subsidiary of Rocket Internet, a German corporation that has introduced a slew of innovative online products throughout the world. In 2016, Lazada was designated as the Alibaba Group's regional flagship, backed by Alibaba's best-in-class technical infrastructure. Lazada, based in Singapore, is a retail e-commerce company that began with electronics and has now moved into other categories such as home appliances and fashion.

As per the most recent ranking research in November 2021, Lazada was rated second on the most frequented marketplace website in Malaysia. The more firms on the internet, the more competition in the online sector; this requires those online stores to focus on the components that may seek to keep the online stores alive, increasing, and prospering (Lok, 2022).

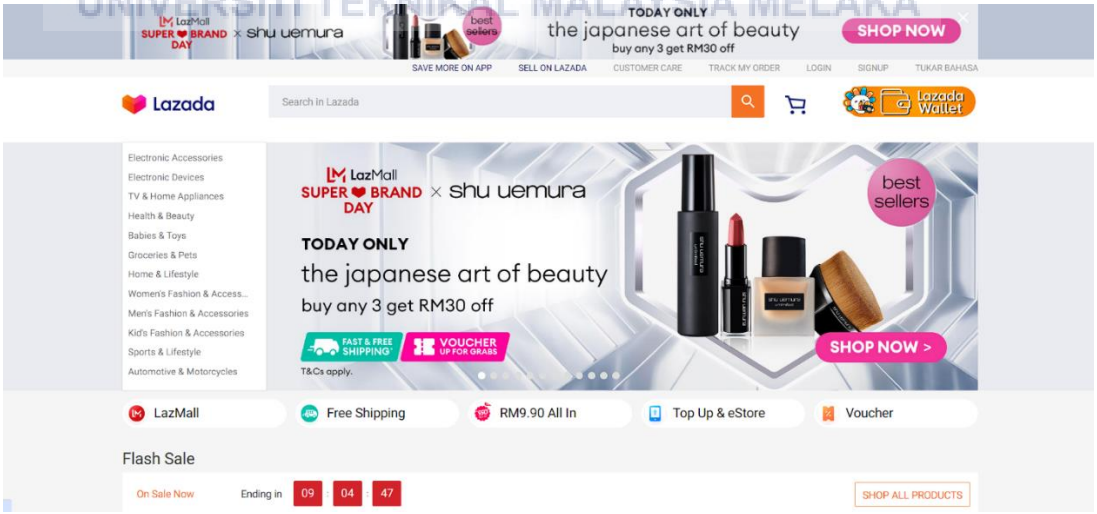


Figure 2.2: Lazada Application

Mudah.my, founded in 2007, is the creation of Mudah.my Sdn Bhd, a joint venture between Singapore Press Holdings Limited and Schibsted ASA. Mudah.my is formed from the term "Mudah," which means "easy" or "convenience" in the native Bahasa Malaysia language. The PRO Niaga service was created exclusively for professional advertisers, and it now has over 84,000 storefronts that assist SMEs and home-based enterprises in advertising their products and services on the Internet. Furthermore, with 9437 registered PRO Niaga users in 2012, it is Malaysia's largest online trading community. In October 2011, it had over 4.9 million unique visits, placing it on par with Lowyat.net and lelong.com.my as the most popular shopping sites (Harudin & Osman, 2013).

Mudah.com.my is an online Malaysian marketplace for buying and selling. Mudah, the moniker, embodies the idea of the website. It is only permitted to post advertisements for sales, rent, employment, and services. It is not permitted to utilise the ad for pure marketing objectives, i.e. without presenting any specific goods, employment, or services. Services supplied or desired must adhere to Malaysian law and regulations for each profession. The ad header must explain the advertised goods or services; no business names or furls are permitted. There are no extraneous characters permitted in the header. The item or service must be specified in the ad text; just linking to another page is not permitted. Ad texts cannot be taken from other advertisers since they are protected by copyright laws.

Use of search terms or keywords in the ad text is not permitted. Only advertisements in Bahasa Malaysia and English are permitted. The ad must be posted in

the category that best represents the item or service. Goods and services that do not fall into the same category must be advertised separately. For sale, advertising must be posted in the "For sale" section and wanted ads must be placed in the "Wanted to buy" section. Certain categories include "to let" and "wanted to rent". Advertising should be posted in the "For Sale" category, and desired-to-rent ads should be placed in the "Wanted" category. Certain items and services are not permitted to be promoted on Mudah.com.my.

Services supplied or desired must adhere to Malaysian law and regulations for each profession. Services should always be classified as services. The images in the advertisement must be related to the item or service being marketed. Except for the categories "Services," "Jobs," and "Businesses for Sale," company logotypes are not permitted as pictures. It is not permitted to utilise photos from other marketers without their permission. These are covered under copyright laws. Images of models wearing underwear or bathing suits are not permitted.

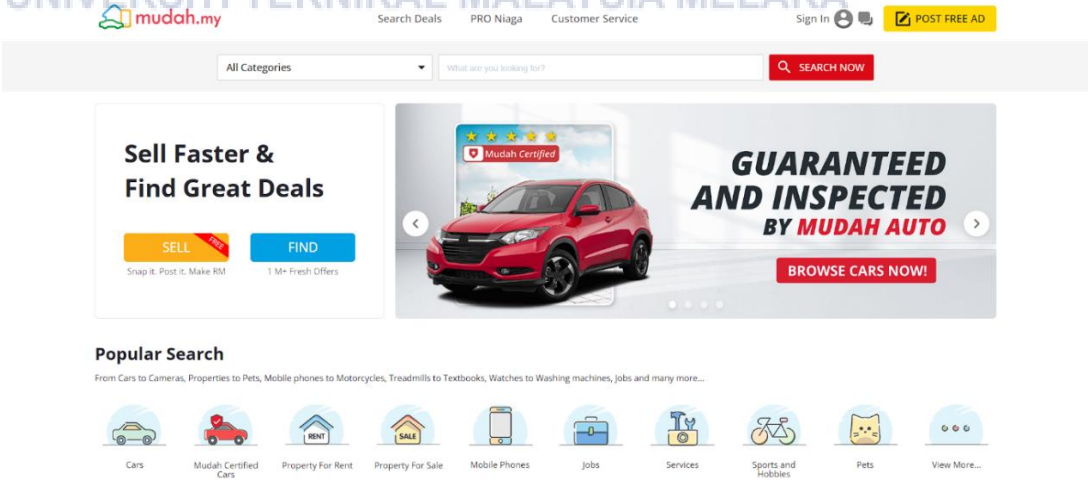


Figure 2.3: Mudah.My Application

Zalora is one of Southeast Asia's largest and fastest-growing fashion-focused e-commerce sites, later expanding into other product categories such as beauty and lifestyle. Zalora created a marketplace platform in 2014 to assist emerging local fashion businesses such as blog shops, boutiques, and upcoming designers in showcasing their designs to Zalora's ever-growing customer base, as well as to provide a marketplace platform where retailers can upload their products online directly and manage their inventory themselves. Zalora sells clothing, shoes, trendy accessories, and even cosmetic items from numerous brands. The website also continuously refreshes its catalogue to provide the most recent seasonal collections to Malaysia as soon as they are released. Top worldwide and local brands such as Nike, Adidas, and Coach are available to shoppers. Customers have a lot of options with over 500 brands available.

Zalora offers an eye-catching thirty-day return policy, as well as quick delivery within 1 to 3 working days and free shipping on some purchases. It enables several payment ways for consumer convenience, including PayPal, MasterCard, VISA, CIMB Clicks, and Cash on Delivery. Shopping at Zalora is simple and reasonable, and a staff of expert advisers is ready for customer service 24 hours a day, seven days a week. Zalora also offers free shipping over a specific amount of money, as well as different payment ways, including cash-on-delivery. ZALORA is an online shopping destination with limitless fashion options (Aznor et al., 2021).

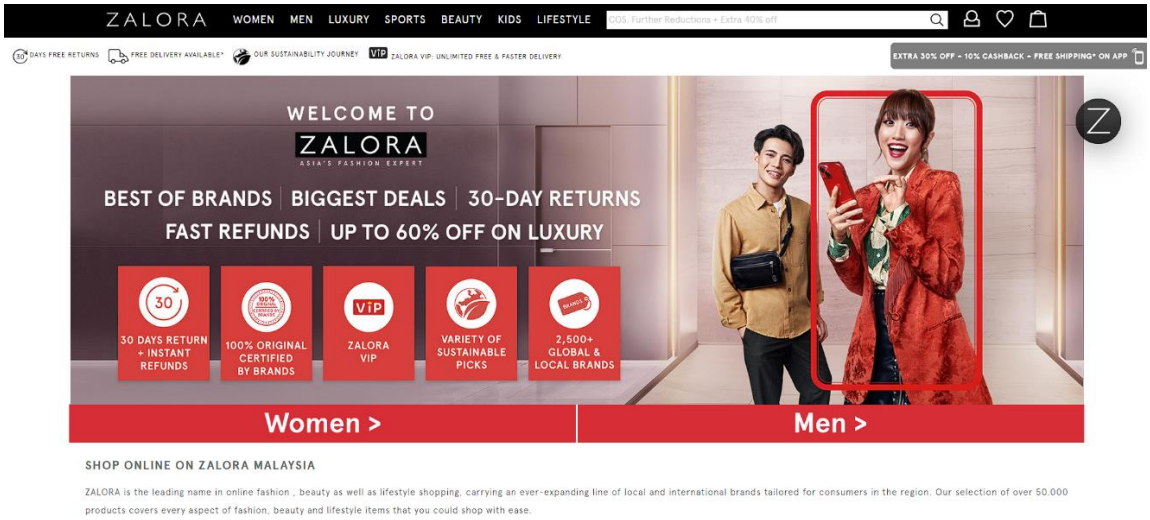


Figure 2.4: Zalora.com.my Application

In conclusion, past research has shown that IV (perceived usefulness, perceived ease of use, perceived trust, perceived security, perceived convenience) considerably influences DV (adoption of online shopping system using mobile application among retail consumers).

2.5 INDEPENDENT VARIABLE

2.5.1 PERCEIVED USEFULNESS

The Theory of Acceptance Model is built around perceived usefulness. This has provided insight into the causal link between usefulness perception and behaviour attitudes related to human activity. As an outcome, perceived usefulness is related to customers' trust in completing their purchase task via virtual shops. Previous research has indicated that customers' views of utility significantly impact their decision to use. Prakosa and Sumantika have also explained their research on online customers' acceptance

of perceived usefulness, which has positively affected their views towards online purchases. As a result, consumer perception of usefulness may influence customer attitude (Trinh et al., 2020).

2.5.2 PERCEIVED EASE OF USE

The phrase "perceived ease of use" applies to an online purchasing experience that has been significantly facilitated by customers' perceptions, lowering the effort required to shop. Because purchasers may rapidly read and interpret all of the conditions of the deal on the website itself, perceived ease of use has a significant influence on consumer opinions towards online transactions. Additionally, Changchit et al. (2018) revealed evidence that customers thought it was straightforward to perform online shopping transactions since it provides a functional search engine for customers to look for their selected product with detailed product descriptions. Phang and Ming (2018) observed that bloggers' recommendations and feedback are among the most essential sources of details that consumers utilise during the product research process, supporting them in making an internet-based buying decision and that those suggestions have a favourable association with customer attitude. As a result, customer perceptions of ease of use might influence their online purchasing intentions (Changchit et al., 2019).

2.5.3 PERCEIVED TRUST

Mayer defines trust as the belief that the trustee has lived up to the expectations of the trustor by exhibiting skill, compassion, and honesty. Because clients must believe a company before engaging in business with it, trust is a critical success factor in an

effective service relationship. People are unable to experience the products when they buy online because it is connected to computer activity, thus their decisions are based on the information provided by the online business. Trust is essential in securing customers' intent to purchase goods and services. Due to the existence of perceived danger, customers need an elevated degree of trust before engaging in any online transaction. As an outcome, trust is critical in an online business transaction. Because trust reduces customers' perceived risk, Hsu, Chuang, and Hsu observed that website trust can encourage a happy mindset. A high level of trust may promote changes in customer behaviour to reflect a favourable mindset (Ariffin et al., 2020).

2.5.4 PERCEIVED SECURITY

A person's decisions and judgments are often dependent on previous experience, context, background, and stimuli. Many individuals are still unfamiliar with the notion of online purchasing. This increases the hazards in the buying process when compared to traditional approaches. As a result, when internet shoppers decided to make a purchase online, they depend significantly on their previous purchasing experience.

Furthermore, technical advancements and an increasing reliance on online platforms to make transactions have compelled many established enterprises to create virtual shops. However, one of the considerations in assessing the businesses' performance is security. Security concerns have always been a major cause of anxiety when doing online transactions. Security assurance acts as a prudent denominator in developing trust and relieving anxiety in all domains including protecting information to holding secure

transactions. Buyers may be more ready to engage in online purchase transactions with trust if a secure online buying platform has a proven track record. Customers' purchasing intentions are influenced by a reliable and secure website. It is vital to maintain security while making an online purchase. One of the aspects that may impact customer behaviour is security. Therefore, security has a significant influence on customer perceptions (Jing et al., 2021).

2.5.5 PERCEIVED CONVENIENCE

The ease of browsing or searching for data digitally vs traditional retail purchasing techniques is referred to as the convenience factor. Online shopping also provides consumers with advantages such as a reduction in time and search convenience. Furthermore, easiness can reduce the chance of risk since buyers can consider the consequences of purchase by avoiding risky selections owing to unfamiliar or cumbersome possibilities. Customers favour the online purchasing experience over the in-store purchasing experience because of the pressure generated by salesmen as well as the convenience of making an order online at their own pace.

Some clients have time constraints and find it tough to shop at physical retail outlets due to their hectic daily activities. Online shopping is a convenient option for these people since it reduces time by avoiding long lines and reducing journey time, which has significantly influenced customers to shop online. Furthermore, Al-Debei indicated that convenience, which has been regarded as the major advantage of online shopping, may alter client attitudes towards online purchases. Raman urged clients to take make of the

convenience of online purchasing to compare many brands and pricing at the exact time. Customers may acquire a receptive attitude towards online purchases consequence of time savings, availability, and ease of access from any location (Leong et al., 2019).

2.6 UNDERPINNING THEORY

Davis's technology acceptance model (TAM) is widely used to describe and forecast user adoption of information technologies (Davis, 1989). TAM has evolved into one of the most extensively used and empirically proven models in the field of information systems research. The goal of TAM is to explain the determinants of computer acceptance that are generally capable of explaining user behaviour across a wide range of end-user computing technologies and user populations while remaining both parsimonious and theoretically justified. This model is founded on the notion that perceived utility and perceived simplicity of use are the key factors determining the intention to use any technology. The perceived utility of technology grows in direct proportion to its perceived simplicity of use (Blagoeva & Mijoska, 2017).

The model was adapted from Fishbein and Ajzen's 1975 theory of reasoned action. During the COVID-19 shutdown, the research employed the idea of TAM to analyse consumers' behavioural intentions. For example, perceived usefulness, perceived ease of use, perceived trust, perceived security, perceived convenience and adoption of online shopping using mobile applications systems among retail consumers. The model was used to acquire a better understanding of consumers' perspectives and behavioural intentions towards the adoption of technological advancements. TAM is commonly employed in information system models (Chan et al., 2022).

TAM 2 was developed by adding five external variables (subjective norm, image, work relevance, output quality, and outcome demonstrability) that impact behaviour intention via perceived usefulness and two moderating variables (experience and voluntariness) to the TAM model. Finally, TAM 3 was extended by adding variable 4, variable Anchor (Computer Self-Efficacy, Perception of External Control, Computer Anxiety, and Computer Playfulness), two adjustment variables (Perceived Enjoyment and Objective Usability), and two moderating variables (experience and voluntariness). The TAM 3 model combines the TAM 2 model and the concept given by (Venkatesh, 2000)

Although perceived ease of use and perceived usefulness are important determinants of an individual's acceptance and usage of information technology, the features of the technology, targeted users, and the environment can also affect users' acceptance of new information technology, as per TAM as proposed by Davis. As a result, many studies have examined relationships between external variables and variables in TAM, such as perceived trust (Cheah, 2011), perceived security (Godwin, 2001), and perceived convenience (Yoon & Kim, 2007). TAM claimed that external influences directly impact perceived utility and perceived ease of use and that perceived usefulness and perceived ease of use mediate technological adoption. However, many studies found that external variables not only influenced technology acceptance indirectly through perceived ease of use and perceived usefulness but also directly (Chang et al., 2020)

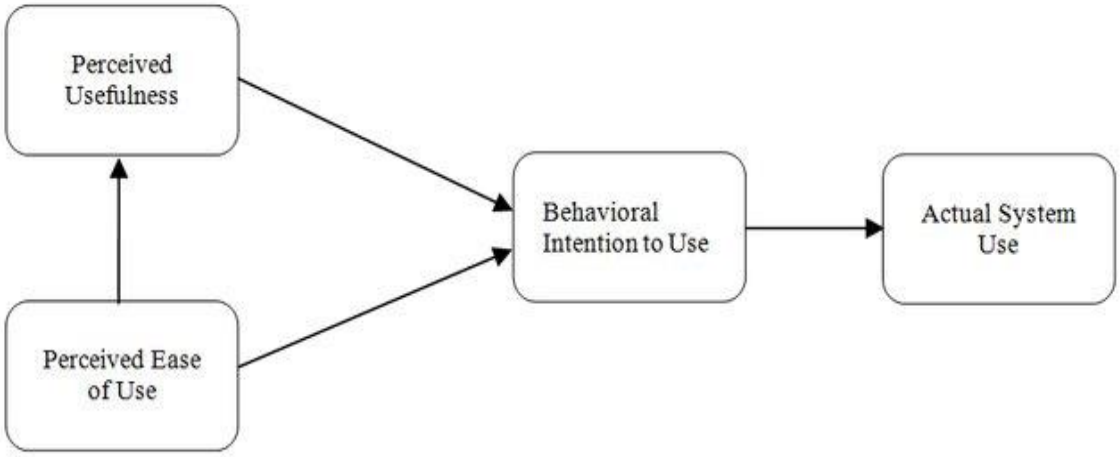


Figure 2.5: The conceptual framework of the adoption of online shopping systems using mobile application among retail consumers.

2.7 THEORETICAL FRAMEWORK

The framework depicts the link between the independent factors that impact customers' online shopping decisions. The independent factors include perceived usefulness, perceived ease of use, perceived trust, perceived security, and perceived convenience whereas the dependent variable is the adoption of online shopping systems using mobile applications among retail consumers. The Theory of Acceptance Model was used as the theoretical underpinning for this study, and a few variables were added to the model, notably convenience, security, and trust. Based on the literature research, a list of independent factors influencing attitude was found, including convenience, security, perceived ease of use, perceived usefulness, and trust. Previous research and the Theory of Acceptance Model have also demonstrated that attitude eventually impacts the adoption of online shopping using mobile applications among retail consumers.

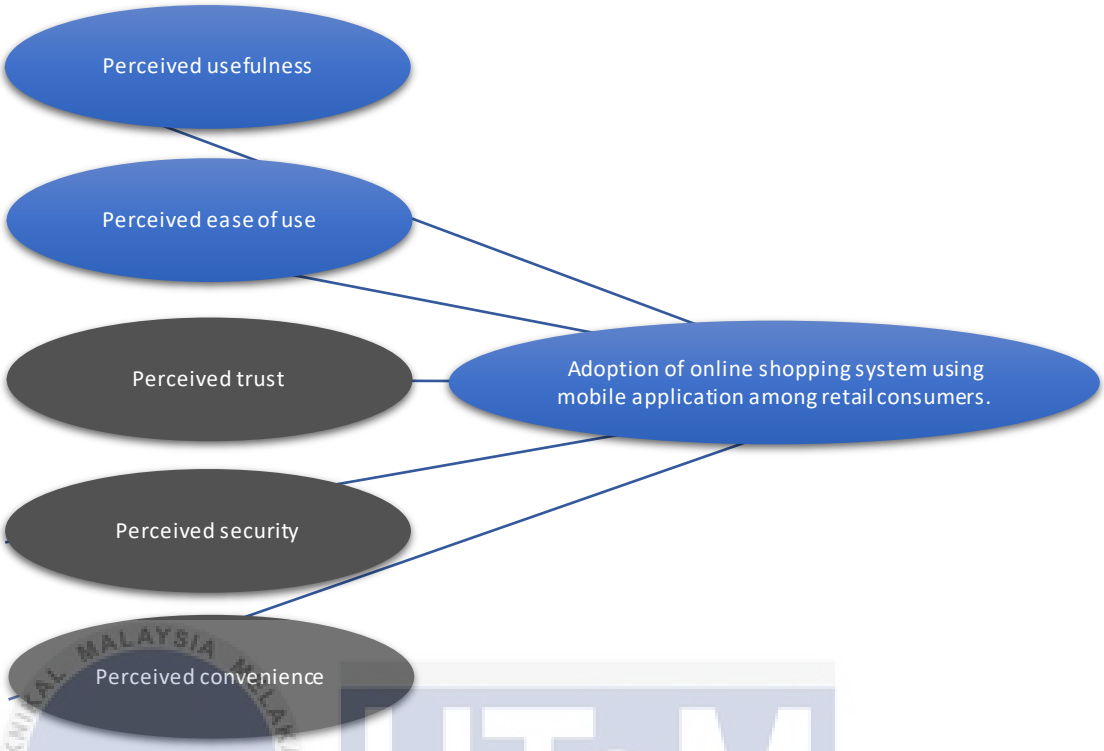


Figure 2.5: The conceptual framework of the adoption of online shopping systems using mobile application among retail consumers.

2.8 HYPOTHESIS DEVELOPMENT

Several hypotheses are given using the developed framework to investigate the direct impacts of independent factors and dependent variables. The assumptions are written as follows:

2.8.1 Perceived usefulness and adoption of online shopping system using mobile application among retail consumers.

The term "perceived usefulness" refers to a prospective user's subjective belief that using a given application system would improve his or her work performance within an organisational environment. Srinivasan (2015) defines PU as a technology's efficacy in fulfilling a certain goal. PU is the consumer's perception that shopping online would boost the effectiveness and efficiency of their purchasing activities. This element influences usage intention significantly. Perceived usefulness is certainly a positive driver of consumer sentiments because customers and users have a good opinion of the value of online purchasing (Changchit et al., 2019).

Perceived usefulness is a notion used in the literature to quantify user satisfaction with information systems. Perceived usefulness is a key predictor of the adoption of technological systems such as mobile payments, mobile commerce, and mobile learning. Furthermore, it is considered that if a certain technological system is beneficial in one's everyday life and activities, their attitude towards it would alter naturally. Perceived usefulness is a key predictor of an individual's acceptance and utilisation of information technology, as well as the characteristics of the technology and the intended users' acceptance of the technology. Perceived usefulness has been shown to favourably affect users' views towards mobile application tools as learning and educational aids in the educational context. The simplicity of use impacts attitudes towards technology (Chuchu & Ndoro, 2019).

The degree to which a person feels that employing a given system improved his or her performance is described as perceived usefulness. Consumer attitudes towards employing a specific technology are determined by the perceived utility of the new technology. Numerous research has demonstrated the association between perceived utility and attitude towards technology. Furthermore, multiple research has found that perceived usefulness is the most accurate predictor of readiness to utilise new technology. A previous study discovered that perceived usefulness influences consumers' behavioural intentions to adopt new programmes (Bruwer et al., 2022).

As a result, in this investigation, the following hypothesis is proposed:

H1. Perceived usefulness positively affects the adoption of online shopping systems using mobile applications among retail consumers.

2.8.2 Perceived ease of use and adoption of online shopping system using mobile application among retail consumers.

Davis et al. (1989) define "perceived ease of use" as the degree to which a potential user believes the target system to need no effort. The complexity of a system can impact its ease of use and, as a result, the attitude that a user acquires towards that system. This aspect is critical in assessing a person's reaction to information technology. Over the last decade, research has shown that PEOU has a considerable impact on usage intention as well as intention to use. The term PEOU in this study relates to consumers' views that online purchasing facilitates the shopping process (Changchit et al., 2019).

Perceived ease of use relates to the degree to which a specific user of a technological system perceives it to be simple and easy to use. Perceived ease of use is a modest predictor of the desire to employ electronic gadgets as instructional aids. However, Kim and Woo (2016) contend that simplicity of use has a favourable and powerful impact on attitudes towards technology. Within the educational setting, perceived ease of use has been identified as a significant factor in an individual's willingness to embrace and use information technology to help in their learning (Chuchu & Ndoro, 2019).

Davis (1989) defines perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort." The adoption of new technologies is determined by the effort made to comprehend and apply technology. Consumers are more likely to adopt a new system if they believe it is simple to comprehend and implement. Studies in e-commerce, mobile banking, mobile shopping, mobile wallets, and Internet banking have confirmed that perceived ease of use influences perceived usefulness. A lack of user-friendliness is frequently cited as a source of unfavourable mobile app user experience by consumers. As a result, it is critical to create mobile applications based on user preferences. Perceived ease of use is an important factor in users' favourable app evaluation, app usage, and intent to refer.

Previous research has extensively explored the influence of perceived ease of use on attitudes. Perceived ease of use is a key determinant of attitude towards technology. Simple-to-use mobile applications persuaded users to use them and, as a result, influence their opinions (Bruwer et al., 2022).

The following hypothesis are presented based on the preceding discussion:

H2. Perceived ease of use is positively affects the adoption of online shopping systems using mobile applications among retail consumers.

2.8.3 Perceived trust and adoption of online shopping system using mobile application among retail consumers.

Trust is essential in many business partnerships. Trust is important in the context of online commerce. Trust in online purchasing is the consumer's propensity to rely on the seller and act when such action renders the consumer susceptible to the seller. Trust is especially important in an online situation when the consumer has no direct influence over the vendor's behaviour. One of the primary reasons clients do not engage in online commercial transactions is a lack of confidence in online enterprises. Gefen et al., (2003) provide evidence in their study that online trust is built through a belief that the vendor has nothing to gain by cheating, a belief that there are safety mechanisms built into the website, and by having a typical interface, one that is also easy to use.

They hypothesised that increased levels of trust, as specific beliefs about the e-vendor, are also associated with increased levels of the intended use of business-to-consumer websites, demonstrating that consumer trust is as important to online commerce as the widely accepted TAM antecedents, perceived usefulness and perceived ease of use. Furthermore, Chiravuri and Nazareth (2001) hypothesised that trust impacts a person's intention to utilise or acquire. As a result, the buyer's trust towards an online vendor is a key determinant in determining his/her intent to use and online usage behaviours. Chen

hypothesised that a consumer's perceived trust in a virtual shop influences their willingness to use the e-store. Butt et al., (2016) found a relationship between trust, behavioural intention, and attitude towards purchase in another study. As a result, trust is incorporated into the study model, impacting both attitudes towards online shopping and intentions to purchase online, and is tested in the questionnaire by five items (Blagoeva & Mijoska, 2017).

Trust is extended to the integrated model as well. Trust is described as a psychological condition characterised by the willingness to tolerate vulnerability based on positive expectations about another's intentions. This research relates to both "generalised trust" which is faith in strangers or unspecific individuals and "particular trust" which is confidence in a specific target, such as ride-hailing drivers. People who have a low degree of trust in ride-hailing are likely to feel less safe. It is hypothesised that an individual's trust influences their felt security (Jing et al., 2021).

As a consequence, the following hypothesis is offered in this investigation:

H3. Trust in retailers has a positive impact with the adoption of online shopping systems using mobile applications among retail consumers.

2.8.4 Perceived security and adoption of online shopping system using mobile application among retail consumers.

Customers and shops have both expressed worry about security. It entails the capacity to safeguard financial and private information when it is communicated over the Internet, as well as the validation of sender identity and status. Customers' perceptions of security in the context of online buying are heavily influenced by how confident an e-business can make them feel that their personal information and financial data are safe and secure. Perceived security in e-commerce is described by Yenisey, Ozok, and Salvendy (2005) as the amount of security people experience while purchasing online. Customers typically perceive that using the Internet to conduct transactions enhances the possibility of such infractions occurring. This concept should have an impact on consumers' online ATT buying (Changchit et al., 2019).

The three most important components in this study are perceived security, security risk, and government credibility, which are used to investigate how users' views of real security impact their inclinations to use or reuse ride-hailing. Perceived security, also known as perceived safety or dread of crime, is an emotion triggered by the sense of possible threats to one's security or safety. Delbosc and Currie (2012) utilised SEM to explain how crime-related personal safety impacted the frequency with which people used public transit. As a result, the study believe that perceived security influences the adoption of online shopping systems using mobile applications among retail consumers.

In the context of the sharing economy, security emerges as either harm to personal goods or bodily injury to users. In online shopping services, security hazards, thefts, fraud,

harassment, and aggression are widespread. As a result, it may be inferred that the greater an individual's perceived security, the less faith they have in the system. Renters' perceived security is adversely associated with their inclination to use online shopping services. Furthermore, it has been established that customers' perceived security has a negative impact on the adoption of online shopping systems using mobile applications among retail consumers (Jing et al., 2021).

Based on the above debate, the following options are hypothesis developed:

H4. There is a positive relationship between perceived security and the adoption of online shopping systems using mobile applications among retail consumers.

2.8.5 Perceived convenience and adoption of online shopping system using mobile application among retail consumers.

Furthermore, the literature review revealed that convenience is one of the primary motivations for online grocery shopping and price is one of the primary factors considered, both on- and offline. However, it has been demonstrated that online grocery shopping is complementary to traditional grocery shopping, with non-perishable products being preferred, indicating that there are still some drawbacks to the adoption of this retail channel for grocery shopping. Online grocery buying, like offline shopping, is perceived as a functional activity rather than a pleasurable one. As a result, customers are more driven to finish the task quickly and effectively, leading to the classification of online grocery shopping excursions as directed-buying store visits demonstrating goal-oriented browsing techniques. As a result, as discussed throughout this chapter, the consumer

decision-making process is impacted by customer demand as well as pre-shopping objectives and goals.

Moreover, there is evidence that such goal-directed consumers are less prone to impulsive behaviours and deviations from plans, given their purchases' accuracy and rationale and task-oriented tactics. Additionally, because the primary aim is task completion, the relationship between these consumers and online stimuli is volatile, making exploratory browsing more explicitly dependent on store design. Independent of the retail channel, the relationship with in-store stimuli was discovered to be primarily based on emotional reactions and feelings. Besides, offline shopping trips with more specific goals that are part of a multistore strategy have a lower incidence of in-store decisions, and evidence has been found that shoppers anticipate and account for unplanned purchases in their plans. However, such results cannot be extended to the Internet retail channel at this time.

The comprehensiveness of these findings and knowledge of the consumer decision-making process allowed for the development of the framework represented in Figure 2.5. This paradigm supplements traditional decision-making processes with significant characteristics found in the online retail channel. The emphasis is on how pre-shopping decisions and other consumer-related variables are interconnected with consumer purchasing and browsing patterns, as well as their response to stimuli, and how these interconnected and moderating factors affect online grocery consumers' decision-making processes overall. Thus, the conceptual framework produced depicts an overall picture of

the online grocery buyer decision-making process by focusing on the most essential components discovered in this chapter.

The following statement of hypothesis are presented based on the preceding discussion:

H5: Positive sign increases the perceived convenience in the adoption of online shopping systems using mobile applications among retail consumers.

2.9 SUMMARY

In Malaysia, the total growth for 2020 is predicted to be 26% higher than the previous year, while the increase in online shopping during the first wave of the pandemic and the accompanying lockdown was 56% higher than in 2019. As a result, the primary goal of the study is to examine the effects of the restrictions imposed during the first wave of the pandemic on reported online shopping behaviour, as well as how individuals from different socio-demographic groups behave differently, given the virus containment strategy in the respondent's country and the type of goods purchased. Access to high-speed Internet, significant growth in smartphone usage, advancements in customized and interactive applications, and the fast pace of modern lifestyles have all contributed to a healthy market for mobile app uptake. Customers and merchants have both contributed to the growth of Internet purchasing. Although the Internet has increased the number of sellers and customers, businesses who want to offer goods or services must consider how to promote their goods in this competitive atmosphere.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 INTRODUCTION

The systematic procedure of doing research is referred to as research methodology. Several methods are employed in various research forms, and the phrase is commonly used to refer to study design, data collection, and data analysis. Why a research study was undertaken, how the research problem was defined, how and why the hypothesis was formulated, what data were collected and what particular method was used, why a particular technique of analysing data was used, and a host of similar other questions are usually answered when talk about research methodology concerning a research problem or study.

3.1 RESEARCH DESIGN

The procedures for collecting, analysing, interpreting, and reporting data in research projects are referred to as research designs. It is the general strategy for integrating conceptual research concerns with relevant and feasible actual research. In other words, the study design established the technique for gathering and analysing the essential data, as well as the methodologies to be used to collect and analyse the data, and how all of this is used to answer the research question (Grey, 2014). There are three types of study designs: exploratory, descriptive, and explanatory. His classification is based on the study area's objective since each design serves a distinct end goal (Boru, 2018).

Descriptive research aims to correctly and methodically characterize a population, circumstance, or phenomena. It helps researchers describe a population, event, or phenomenon in detail precisely and methodically. For example, the goal of a descriptive study is to paint a picture of a scenario, person, or event, or to demonstrate how things are connected and how they occur naturally. Descriptive studies, on the other hand, cannot explain why an event occurred and are best suited for a very new or uncharted study field. In the presence of an abundance of descriptive data, different study methodologies such as explanatory or exploratory approaches are recommended (Boru, 2018).

On the other hand, explanatory research seeks to explain and account for the descriptive data. Descriptive studies may address 'what' inquiries, whereas explanatory studies strive to answer 'why' and 'how' questions (Grey, 2014). It draws on exploratory and descriptive research to find the true causes of phenomena. Explanatory research seeks causes and explanations, as well as evidence to support or disprove an explanation or prediction. It is carried out to find and describe some correlations between various components of the phenomena under consideration (Boru, 2018).

Exploratory research is carried out when there is insufficient knowledge about a phenomenon or an issue that has not been precisely characterised (Saunders et al., 2007). It does not seek to offer definitive and conclusive solutions to the research questions, but rather to examine the study issue in varied depths. As a result, its theme is to address novel challenges with little or no prior research. Even in the most severe cases, exploratory research serves as the foundation for a more definitive study by determining the initial research design, sample methodology, and data-gathering method (Boru, 2018).

However, the researcher adopted descriptive research design and expalanatory research. The research techniques literature often categorizes study purposes as exploratory, descriptive, or explanatory. Research projects can have many purposes, similar to how a research question can be both descriptive and explanatory. It is because descriptive research aims to accurately characterize individuals, events, or circumstances. For explanatory research, This approach focuses on analyzing a scenario or problem to better understand the interactions between factors (Saunders et al., 2017).

3.1.1 DESCRIPTIVE RESEARCH DESIGN

This research strategy entails describing particular facts about a subset of consumers and their purchasing behaviour. Descriptive research aims to acquire a comprehensive account of the situation and occurrences. The descriptive research is based on extensive existing knowledge about marketing characteristics. When the problem is obvious and well-known, it is utilised. For this sort of study to be fruitful, questions should be developed to get certain types of information, such as product performance, market share, and competition tactics (Akbar & James, 2014).

The purpose of this study is to describe how online shoppers behave when impacted by various circumstances at three phases of the purchase process. As a result, during the study process, the descriptive technique is chosen as the research approach. There are four well-known data collection methods under the descriptive approach: secondary data, surveys, panels, and observational and other data. Due to time constraints, the researcher utilised secondary data to identify key characteristics influencing online

customers and then used surveys to collect primary data for quantitative analysis. The researcher used descriptive analysis or frequency distribution to differentiate between respondents' gender, age, race, degree of education, and profession. (Akbar & James, 2014).

3.1.2 EXPLANATORY RESEARCH

Explanatory studies investigate causal links between variables. An experiment aims to investigate causal relationships by examining how changes in one variable affect another. Simple experiments focus on determining the relationship between two variables. Complex experiments assessed the magnitude of change and the importance of several independent factors. Experiments are commonly employed in exploratory and explanatory research to address 'how' and 'why' questions. The data utilized may be raw data, with little or no processing, or compiled data, with some selection or summation. In business and management research, such data are typically employed as part of a case study or survey research method (Saunders et al., 2017).

Questionnaire can be used in an explanatory research to understand the connections between variables, similar to a descriptive study. Structured questionnaire can be used in explanatory studies to gather statistical information. Understanding the motivations behind the study participants' decisions or views is essential. Explanatory or analytical research examines and explains the links between variables, including cause and effect (Saunders et al., 2017).

3.2 METHODOLOGICAL CHOICES

3.2.1 QUALITATIVE RESEARCH

Qualitative research is the inverse of quantitative research, which collects and analyzes numerical data for statistical purposes. Qualitative research is widely employed in the humanities and social sciences, including anthropology, sociology, education, health sciences, and history. Qualitative research is the process of gathering and interpreting non-numerical data (such as text, video, or audio) in order to better comprehend concepts, views, or experiences. It can be utilized to get detailed insights into a topic or to develop fresh research ideas (Bhandari, 2020).

Sometimes positivist research extends to alternative data gathering methods in order to quantify qualitative data, for as by applying hypothesis testing to data acquired through a in-depth interviews. Research that takes an inductive approach to thinking is likely to be particularly interested with the context in which such occurrences occur. As a result, a small sample of people, rather than a huge number, may be more suited for the deductive method. Researchers in this school are more likely to deal with qualitative data and utilize a range of approaches to obtain this data in order to build multiple interpretations of the phenomenon (Saunders et al., 2019).

3.2.2 QUANTITATIVE RESEARCH

Quantitative research is characterised as a research method that combines the collection of numerical data as well as a deductive viewpoint on theory and study, a preference for a natural science approach, and an objectivist view of social reality. However, it is crucial to emphasise that the term "quantitative research" does not indicate that the only difference between it and a qualitative research technique is the measurement of social life components (Bell et al., 2019).

Outlines of the major processes of quantitative research frequently propose that a hypothesis is derived from theory and then tested. Experimental research includes hypothesis testing. This approach's prominence in quantitative social science shows the natural sciences' influence on the growth of the social sciences. However, it is crucial to remember that much quantitative research does not necessitate the formulation of a hypothesis. Instead, theory serves as a loose collection of issues for which the business researcher obtains evidence (Bell et al., 2019).

Thus, in this study, the quantitative method was chosen because it explains phenomena by collecting data in quantitative form, which can then be subjected to rigorous quantitative analysis formally and rigidly, and it is especially suitable for hypothesis testing. Similarly, Mujis asserted that "quantitative methods are deductive, measurable, and essential in business research because parameters relating to the population as a whole can be easily estimated by using data from samples." As a

consequence, the quantitative analysis allowed this study to generalise its conclusions based on the results of the selected sample (Olaide Folarin & Ogundare, 2016).

3.2.3 MIXED RESEARCH

A mixed methods research design is a process for gathering, analyzing, and "mixing" quantitative and qualitative research and methodologies in a single study to better understand a research topic. Mixed methods research is a sort of study in which a researcher or team of researchers mixes parts of qualitative and quantitative research procedures to get wide and deep insight and corroboration. In mixed methods design, both meanings are important. To get a good product design, one must carefully evaluate a variety of design rules as an activity. Following these guidelines does not ensure a strong design, but it does contribute to one (Schoonenboom & R. Burke Johnson, 2017).

Tashakkori and Teddlie (1998) argue that it is more suitable for a researcher in a specific study to see the philosophy embraced as a continuum rather than opposing perspectives. They observe that "at some points, the knower and the known must be interactive, while at others, one can more easily stand apart from what one is studying. Mixed method research employs both quantitative and qualitative perspectives, with quantitative data analyzed statistically and qualitative data analyzed subjectively. Furthermore, quantitative or qualitative techniques and processes are commonly used (Saunders et al., 2019).

Using hybrid approaches also allows for triangulation, which is another benefit. Semi-structured group interviews can enhance data acquired through other methods, such

as questionnaires. There are advantages and disadvantages to both quantitative and qualitative data collecting and processing strategies. Data gathering techniques have a direct impact on the outcome. The outcomes will be influenced by the approaches and processes employed (Saunders et al., 2019).

However, the researcher adopted quantitative research method because it is easier to collect data by questionnaire with online surveys and feedback by the Malaysian population (Saunders et al., 2019).

3.3 RESEARCH STRATEGY

This is the research framework, as well as the research strategy, which describes how the researcher studied. Here the investigation see that collected secondary data from many sources that are important to the study, and then the researcher identified some variable that impacts online purchasing in Malaysia and created the questionnaire based on this variable. The researcher wanted to undertake fieldwork and data analysis after drafting the questionnaire. To acquire secondary data, the researcher ran a survey with 160 respondents from various parts of Malaysia. The questionnaire is organised to conduct quantitative research, and quantitative research required a structured questionnaire since decision-makers require quantitative results. The researcher also tried to collect some primary data, so the researcher went to a few internet marketers and chatted with them about the future of this business in Malaysia, and the issues of this sector, and asked for some recommendations. After speaking with them, the researcher gained a thorough understanding of the business, and after speaking with the consumer, the researcher gained an understanding of the market condition for online shopping in Malaysia.

The researcher also did some theoretical research, and under the theoretical research part, provided a thorough knowledge of online buying. Aside from that, the researcher provided a clear picture of the internet buying situation in Malaysia. the researcher has also included some statistics regarding the state of internet buying in other parts of the world. On the other hand, the researcher provided some clear insight into the internet buying viewpoint in Malaysia. In the empirical research portion, the researcher provided several practical examples and examined the real-world reality of internet buying in Malaysia (Hoque, 2013).

3.3.1 QUESTIONNAIRE DESIGN

A Likert scale questionnaire was used to collect study data. The questionnaire was created in Google Forms and disseminated online. The questionnaire is broken into four sections: Part A, Part B, Part C and Part D. Section A contains the respondent's demographic profile, which includes information such as age, gender, race, state, and so on. Section B contains general questions on online shopping systems using mobile applications. Section C embraces the factors influencing the adoption of online shopping systems using mobile applications. Finally, Section D consists of the adoption of online shopping systems using mobile applications among retail consumers. For example, the question has five scale options: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree.

Table 3.1: Five-point Likert Scale

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

3.3.2 MEASUREMENT OF CONSTRUCT

Table 3.2: Measurement of Construct: Dependent Variable

Dependent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
Adoption of online shopping systems using mobile applications among retail consumers	Online shopping would help me to search more quickly for information about household products to buy.	(Shafiullah & Sivakumar, 2022)	I would choose the mobile shopping applications as a preference to purchase the products online.
	Online shopping would improve my search for information when buying household products.		I would encourage friends and family members to do grocery shopping in the future using mobile applications.
	Online shopping would not make my search for information about household products more productive.		I will most likely be using mobile applications to purchase more necessities online.

Dependent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	Online shopping would not make my search for information about household products more effective.		In the future, I intend to increase the use of mobile applications to do grocery shopping.
	Online shopping would be useful for obtaining information about available products when buying a household.		I plan to continue using mobile applications to buy products through online platforms.

Table 3.3: Measurement of Construct: Independent Variable

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
Perceived Usefulness	Certified food online purchasing enables me to save time.	(Qi et al., 2021)	Necessity online purchasing enables me to save time.
	Using online shopping for certified food makes it more effective to do my shopping.	(Qi et al., 2021)	Using online shopping applications for necessities makes it more effective to do my shopping.

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	Using online shopping for certified food facilities comparative shopping.	(Qi et al., 2021)	Comparative buying is available while using online shopping for necessities.
	Mobile technologies provide a good platform for research collaboration.	(Samuel et al., 2018)	Mobile applications provide a good platform for online shopping.
	Accessing educative sites is facilitated while using mobile technologies for research collaboration.	(Samuel et al., 2018)	Accessing shopping sites is facilitated while using mobile applications for online shopping.
Perceived Ease of Use	Learning to operate online food shopping is easy for me.	(Qi et al., 2021)	Learning to operate online shopping via mobile applications is easy for me.
	I find it easy to become skilled at purchasing certified food online.	(Qi et al., 2021)	I find it easy to become skilled at purchasing necessities online via mobile applications.

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	It is easy to order certified food online.	(Qi et al., 2021)	It is easy to order necessities online using mobile applications.
	The use of mobile technologies is more convenient to access information anywhere and anytime.	(Samuel et al., 2018)	Mobile technology is more convenient for accessing shopping information anywhere and anytime.
	An experienced person is needed whenever mobile technologies are used.	(Samuel et al., 2018)	Any person can easily access mobile applications to purchase online.
Perceived Trust	I trust each participant, such as the seller and buyer, involved in the E-payment system.	(Kim et al., 2010)	I trust each participant involved in the online shopping system using mobile applications, such as the seller and buyer.
	I trust the security mechanisms of the E-payment system.	(Kim et al., 2010)	I trust the security mechanisms of the online shopping system using mobile applications.

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	I trust E-payment system services.	(Kim et al., 2010)	I trust online shopping system services when using mobile applications.
	I trust the information provided during the E-payment system process.	(Kim et al., 2010)	I trust the information provided via mobile applications during the online shopping system process.
	I overall trust the services that are offered by s-government and I have no difficulty telling others about the results of using it.	(Jaradat et al., 2018)	I trust the services offered by mobile applications and have no difficulty telling others about their results.
Perceived Security	I perceive the E-payment system as secure.	(Kim et al., 2010)	I perceive the online shopping system using mobile applications as secure.
	I perceive the information relating to user and E-payment system transactions as secure.	(Kim et al., 2010)	I perceive the information relating to online shopping system transactions using mobile applications as secure.

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	The information I provided in the previous E-payment system is helpful for secure payment transactions.	(Kim et al., 2010)	I perceive that the personal information provided when shopping via mobile applications is secure.
	I do not fear hacker invasions into the E-payment system.	(Kim et al., 2010)	I do not fear hacker invasions when using mobile applications for shopping online.
	Includes relevant information such as the description of the person and possible location to take caution.	(Jaradat et al., 2018)	The security systems built into the mobile shopping applications are strong enough to protect my account.
Perceived Convenience	Shopping online would give me greater control over my shopping.	(Shanthi & Kannaiah, 2015)	Mobile applications would give me greater control over my shopping process online.
	The selection of goods available on the Internet is very broad.	(Shanthi & Kannaiah, 2015)	The selection of goods available on the Internet using mobile applications is extensive.

Independent Variable	Measurement Items	Source of Measurement	Adopted and Adapted Measurement
	The information given about the products and services on the Internet is sufficient.	(Shanthi & Kannaiah, 2015)	The information given about the products and services on the Internet using mobile applications is sufficient.
	Shopping Online would allow me to get better prices when shopping.	(Shanthi & Kannaiah, 2015)	Shopping online using mobile applications would allow me to get better prices.
	Online shopping is as secure as traditional shopping.	(Shanthi & Kannaiah, 2015)	I can save the effort of visiting stores when I do Online Shopping using mobile applications.

3.4 SCIENTIFIC CANONS

3.4.1 RELIABILITY

The stability and consistency of the measurement device utilised are referred to as reliability. In other words, reliability is the capacity of the equipment to produce comparable findings when used at various periods. Naturally, it is because of variances in the time the measuring device is used, as well as changes in the population and sample, it is unlikely that the same findings are obtained every time. A substantial positive correlation between the findings of the measuring device, on the other hand, is an

indication of reliability. The reliability of the measurement tool is an important aspect of the study's health outcomes. As a result, researchers must guarantee that the measurement device employed is dependable (SÜRÜCÜ & MASLAKÇI, 2020).

The precision of measurement is referred to as reliability, and it is a crucial contributor to validity. The reliability test aims to determine the instrument's stability and consistency in measuring the concept. Furthermore, reliability testing is used to evaluate and ensure that the data acquired from the questionnaire is trustworthy or not. In this study, the questionnaire was subjected to a reliability test to determine the reliability coefficient before being sent to the respondents. If Cronbach's Alpha value is more than 0.7, the internal consistency has taken dependability into account. The following table shows the general guideline for Cronbach's alpha coefficient value.

Table 3.4: The table of the Rule of Thumb for Cronbach's Alpha Coefficient Value

Alpha Coefficient Range	Strength of Association
Less than 0.6	Poor
0.60 to less than 0.70	Moderate
0.70 to less than 0.80	Good
0.80 to less than 0.90	Very good
0.90 and above	Excellent

(Sürücü & Maslakçi, 2020)

3.4.2 PILOT TEST

A pilot study is a brief feasibility study aimed to evaluate different components of the procedures that would be used in a bigger, more rigorous, or confirmatory research. The primary goal of a pilot study is not to answer specific research questions, but to prevent researchers from embarking on a large-scale study without adequate knowledge of the methods proposed; in essence, a pilot study is carried out to avoid the occurrence of a fatal flaw in a study that is costly in terms of time and money (Lowe, 2019).

Pilot testing is an observation used to assess the success of a survey in real life by testing it on a small group of individuals before the main survey begins. Its purpose is to guarantee that all respondents comprehend the question in the same way, as well as how long it took them to finish the questions. For the pilot test, a sample size of 10% is optimal. The intended number of participants for this pilot test is 31 persons to ensure the reliability of the questionnaire based on their comprehension of all questions.

The result of Cronbach's alpha in this reliability test is 0.900 which is more than 0.7 with 30 items. So the data acquired from the questionnaire is trustworthy.

Table 3.5: Cronbach Alpha for Pilot Test

Cronbach's Alpha	Cronbach's Alpha based on Standardized Item	N of Items
0.900	0.906	30

3.4.3 VALIDITY

Validity is a measure of how well a measuring instrument fulfils its purpose and relates to whether it measures the behaviour or quality it is designed to assess. The relevant and suitable interpretation of the data produced from the measuring device as a consequence of the analysis determines validity. Whiston defined validity as collecting data that is acceptable for the measuring equipment' intended use. Validity tests, which establish whether the expressions in the scale provide appropriate measurements for the objective of the research, come to the fore in this situation. Testing the measuring instrument's validity is more complex but more significant than determining its reliability. The measuring device must measure what it says for the research to be valuable. The use of a validated measuring device guarantees that the results of the analyses are accurate (Sürücü & Maslakçi, 2020).

Internal validity refers to the degree to which certain that a cause-and-effect link discovered in a research cannot be explained by other variables. Construct validity was

chosen as the validity assessment method, and component analysis was performed to assess construct validity. Many issues might jeopardize a study's internal validity, including flaws in measurement or participant selection, which researchers should consider and avoid. Once the study's internal validity is established, the researcher can proceed to make a judgment about its external validity by questioning if the study results apply to similar patients in a different context or not (Cecilia Maria Patino & Juliana Carvalho Ferreira, 2018).

3.5 SAMPLING DESIGN

3.5.1 TARGET POPULATION

A target audience is a specific group of people to whom researchers want to generalise the findings to. This study focuses on the total population of Malaysia to determine which factors most impact the adoption of online shopping systems using mobile applications among retail consumers. Malaysia's population is made up of individuals of many ethnicities, faiths, and races. Malaysians are divided into three major ethnic groups: Malays, Chinese, and Indians. Orang Asli are Peninsular Malaysia's indigenous people, who are classified into three primary groups: Negrito, Senoi, and Proto-Malay. Sabah's population is made up of 32 ethnic groups, with Kadazandusun being the most numerous, whilst Sarawak's population is made up of 27 ethnic groups, with Iban being the most numerous (MyGOV, 2016).

Malaysia's overall population is expected to be 32.7 million in 2022, up from 32.6 million in 2021, with a 0.2 percent annual population growth rate. The decrease in

population growth rate is attributable to a reduction in the number of non-citizens from 2.6 million in 2021 to 2.4 million in 2022. Malaysia's population was predicted to be 33.2 million in the first quarter of 2023, up 1.6% from the first quarter of 2022 (32.6 million). There were 30.4 million (91.7%) citizens and 2.8 million (8.3%) non-citizens in the total population (Department of Statistics Malaysia, 2022).

3.5.2 SAMPLING TECHNIQUES

In general, there are two types of sampling techniques: probability sampling and non-probability sampling. There are several forms of probability sampling, including simple random, systematic, stratified, cluster, and multistage. Non-probability sampling methods include quota sampling, snowball sampling, purposive sampling, self-selection, and convenience sampling. Furthermore, Saunders et al. (2009) said that convenience sampling is a straightforward and easy method available to researchers. This thesis employs non-probability sampling, even though Saunders et al. (2009) said that it is problematic since it is not scientifically representable and generalises study outcomes to the entire population.

If there is minimal variation in the population, these sorts of concerns with convenience sampling may be overlooked, and such a sample can be more organised to be utilised as a pilot for the study. The reason for using this sampling method is that numerous researchers have embraced it as a handy option for the online population. A previous study has shown that the majority of internet consumers are educated and young. Because past research has shown that internet customers are generally educated and

young, convenience sampling is practical because the majority of respondents are young adults.

3.5.3 SAMPLING SIZE

Most novice researchers are unsure about the sample size that should be chosen. Remember that the greater the sample size for this study, the better the outcome to can evaluate at the end of the research procedure. The bigger the sample, the more probable it is that the sample mean and standard deviation reflected the population mean and standard deviation. For example, in an IT survey, the sample size necessary is determined by the statistical conclusion required for the findings. The goal of sample selection is to attain maximum accuracy in the estimation within a given sample size while avoiding bias in sample selection. This is significant because bias may undermine the integrity of facts and jeopardise the conclusion of this study (Pal Singh, 2019).

This study uses basic random selection to get a balanced sample from the Malaysian population. The sample size for this study was 33.2 million customers to reflect the whole population. In this study, there was no emphasis on people's seniority because all consumers were possible respondents. As a result, the examiner used 160 as a sample from 384 because the program and Krejcie & Morgan did the same. The percentage of the sampling size is 41.67% which is lower than expected for the research. Surveys with response rates less than 80% may not reflect the target survey population, introducing non-response bias and reducing data quality. Nonetheless, the researcher found no evidence that an 80% or greater response rate is optimal. Furthermore, according to

Krejcie and Morgan's (1970) table, this type of number population provided the same amount of samples (Wu et al., 2022).

Table 3.6: Krejcie and Morgan (1970) sample size table (Krejcie and Morgan, 1970)

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

3.6 DATA COLLECTION METHOD

3.6.1 PRIMARY DATA COLLECTION

Primary data is information gathered from firsthand experience. Primary data, which is more credible, authentic, and impartial, has not yet been released. Because primary data has not been updated or manipulated by humans, its validity exceeds that of secondary data. The Value of Primary Data is it is vital to obtain information from sources and deal with primary data while conducting statistical surveys. For example, statistical data on a country's female population cannot be relied on in newspapers, magazines, or other written sources. A study may be undertaken without secondary data, however, one based only on secondary data is less accurate and may contain biases since secondary data has already been altered by humans. One of these sources is outdated, while the other has limited information that might be misleading and biased.

Primary data sources are restricted, and it might be difficult to gather data from primary sources due to population scarcity or a lack of collaboration. The following are some primary data sources. It is the most often used approach in surveying. Questionnaires are a set of open-ended or closed-ended questions to which respondents reply. Questionnaires can be administered through phone, mail, live in a public place or at an institute, electronic mail, or fax, among other techniques. The researcher used Google form to collect data from the Malaysian population. The researcher shared the Google form link through social media to analyse the outcome of the questionnaire.

3.6.2 SECONDARY DATA COLLECTION

Secondary data is information gathered from a source that has previously been published in some manner. In any research, the review of literature is dependent on secondary data. It is gathered by someone else for another reason. Census data, for example, is being utilised to examine the influence of schooling on occupational choice and earnings. Censuses, organisational records, and data obtained through qualitative techniques or qualitative research are common sources of secondary data for social science. Secondary data is critical since it is impossible to conduct a fresh survey that fully captures prior changes and/or advancements.

3.7 DATA ANALYSIS TOOLS

3.7.1 DESCRIPTIVE ANALYSIS

Descriptive statistics are the numerical and graphical techniques used to organise, present, and analyse data. The measurement level utilised determines the type of descriptive statistics used to describe a variable in a sample. The goal is to examine the data's primary trend. The central tendency is represented by the location measure (Saunders et al., 2019).

Descriptive analysis is used to examine the findings related to the respondent's demographic questions. In this study's descriptive analysis, the researcher must calculate central tendency measures such as mean, mode, median, and standard deviation. In this study, descriptive statistics were utilised to summarise the data gathered by questionnaire.

3.7.2 PEARSON CORRELATION

The Pearson correlation coefficient assesses the strength of a linear link between two variables. It has a value ranging from -1 to 1, with -1 indicating total negative linear correlation, 0 indicating no connection, and +1 indicating entire positive correlation. Pearson's correlation coefficient is a test statistic that assesses the statistical link or association between two continuous variables. It is regarded as the best approach for determining the relationship between variables of interest since it is based on the covariance method. It provides information on the amount and direction of the link, also known as the correlation (Kirk et al., 2021).

Although scientists may examine the magnitude of a correlation coefficient directly. People prefer to test hypotheses using probability. In the instance of a correlation coefficient, for example, researchers can test the hypothesis that it is different from zero. Pearson's correlation, also known as Pearson Product Moment Correlation, is the most often used method for measuring correction. The researcher would want to apply Pearson's Correlation in this study to calculate the amount of linear relationship between two variables, which are the dependent variable and the independent variables. Pearson's Correlation was employed since the researcher believes it is the simplest and most accurate approach available.

The Pearson correlation coefficient is a popular statistical approach. Researchers often determine the degree of correlation between two variables by examining this coefficient, therefore its use properly assesses the linear correlation between two

variables, allowing researchers to make objective and reliable research decisions. The coefficient defines how closely two metric variables are connected. The (+ or -) symbol indicates the direction of the connection for the interval, and the number can be anything between +1 and -1, with +1 denoting a perfect positive relationship, 0 denoting no relationship, and -1 denoting a perfect negative or reverse relationship.

The association's significance value and sample size (N) are provided right beneath each correlation coefficient. The levels of significance are less than 0.001. Assume the null hypothesis is correct. In such instances, the chances of reaching a correlation coefficient at least this great in a sample are extremely rare. All of the significance values are less than 0.05, indicating that the link is statistically significant.

Table 3.7: Correlation coefficient

Values	Relationship
0	No linear relationship
1	A perfect positive linear relationship
-1	A perfect negative linear relationship
Between 0 and 0.3 (0 and -0.3)	A weak positive (negative) linear relationship
Between 0.3 and 0.7 (-0.3 and -0.7)	A moderate positive (negative) linear relationship

Values	Relationship
Between 0.7 and 1.0 (-0.7 and -1.0)	A strong positive (negative) linear relationship

(Hoque, 2014).

3.7.3 MULTIPLE REGRESSION

Multiple regression analysis is a statistical method for investigating the relationship between a large number of independent variables and a single dependent variable. The multiple regression techniques attempt to predict the single dependent value specified by the researcher using known independent variables. Each independent variable is weighted in the regression analysis method to offer the best prediction from the collection of independent variables. Although correlation among the independent variables hampers interpretation, the weights show the proportionate contribution of the independent variables to the overall forecast and facilitate comprehension of the relevance of each component in making the prediction. As a consequence, it can achieve both prediction and explanation objectives. The regression variate is produced from the collection of weighted independent variables and is a linear combination of the independent factors that best predict the dependent variable. The regression variate, also known as the regression equation or regression model, is the most well-known example of a variate among multivariate techniques (Saunders et al., 2017).

Researchers must be able to split variables into dependent and independent variables to use them because this study entails describing the link between three independent variables and one dependent variable. As a result, multiple linear regression is the most

successful strategy. Regression analysis is a statistical approach that should be used only when both the dependent and independent variables are metrics. In the multiple regression analysis, the data must be metric or accurately translated. Before generating the regression equation, the researcher needs to determine which variables are dependent and which are independent (Saunders et al., 2017).

3.8 TIME HORIZON

The time horizon is the amount of time allotted to each activity in the project research effort. Depending on the study aims, the long-term, mid-term, and short-term future, as well as a point of retrospective, may be chosen as the research time horizon. Longitudinal and cross-sectional time frames are the two forms of time horizons. Longitudinal studies are repeated over a long period. Cross-sectional studies have a restricted time range. This study is also constrained by a period, hence the cross-sectional time horizon is employed.

3.9 TIME SCALE

A timeframe is the distinctive spatiotemporal envelope within which a process occurs. It has been claimed that paying attention to timescales is a crucial component of comprehending complicated human processes such as identity and language development. The overall time used for the study work is 14 weeks, during which the researchers engaged in many activities related to the current research. The tabular representation of the tasks included in the research study. Each task's duration has also been specified.

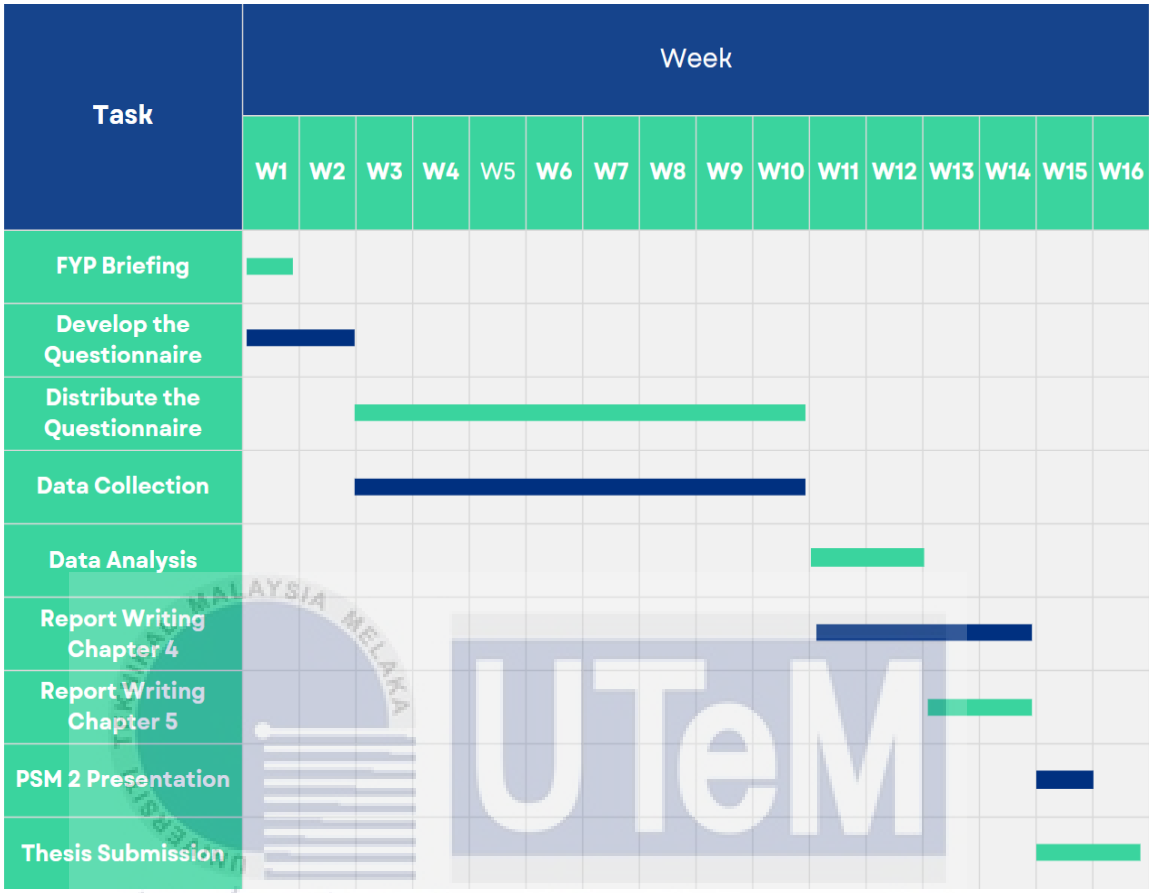
3.10 SUMMARY

The study design establishes the technique for gathering and analysing the essential data, as well as the methodologies to be used to collect and analyse the data, and how all of this is used to answer the research question. Quantitative research is characterised as a research method that combines the collection of numerical data as well as a deductive viewpoint on theory and study, a preference for a natural science approach, and an objectivist view of social reality. The precision of measurement is referred to as reliability, and it is a crucial contributor to validity.

Table 3.8: Gantt Chart for PSM 1

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Briefing PSM Progress														
Proposed and confirmed Supervisor														
Identify and develop a research topic														
Determine the problem statement														
Construct research questions and objectives														
Complete the first chapter: Introduction														
Locate the sources of materials														
Write the literature review														
Complete the second chapter: Literature review														
Identify the research design and sample selection														
Write the data analysis and tests														
Complete the third chapter: Research Method														
Amendments of draft work														
Compile of paper works														
Create the presentation slides														
Report Submission														
PSM 1 presentation														

Table 3.9: Gantt Chart for PSM 2



CHAPTER 4

DATA ANALYSIS AND FINDINGS

4.0 INTRODUCTION

This chapter examined the data analysis methods and the results of this study, which used a quantitative method via a survey questionnaire. This survey had 160 target respondents from around Malaysia, and all data were analyzed using the Statistical Package for Social Science (SPSS). This study addresses the three research objectives outlined in Chapter 1.

A descriptive analysis was performed to calculate the mean and standard deviation for each measured item, and a frequency analysis was employed to examine the demographic profile of the respondents. Following that, reliability and correlation analyses were performed to establish whether independent variables had positive or negative correlations with the dependent variable. Furthermore, SPSS (Statistical Package for the Social Sciences) is used to corroborate item loading and to represent a new reliability test. As a result, regression analysis was used to investigate the dependent variable and establish the most influential elements in this study. Eventually, the data and hypotheses examined are reported in this chapter.

4.1 RELIABILITY TEST

According to Coakes and Steel (2007), reliability analysis assesses the qualities of measuring scales and the items that comprise them. The approach computes a variety of regularly used scale reliability metrics and also offers information about the connection between particular scale items. Internal consistency analysis (Cronbach's alpha) and item-to-total correlation are used to assess the internal consistency dependability of the suggested constructs to validate their reliability. Cronbach's alpha is an internal consistency model that is based on the average inter-item correction. Cronbach's alpha should be greater than 0.70 (Sürücü & Maslakçi, 2020). Reliability test results are created by SPSS software from the test result, knowing that the alpha Cronbach value in both dependent and independent variables is more than 0.7 therefore all the variables are trustworthy.

Table 4.1: Reliability Statistics

Cronbach's Alpha	N of Items
.953	30

Table 4.2: Reliability Statistic of Each Variables

Variables	N Of Items	Cronbach's Alpha
Perceived Usefulness	5	.823
Perceived Ease Of Use	5	.848
Perceived Trust	5	.867
Perceived Security	5	.870
Perceived Convenience	5	.813
Dependent Variables	5	.856

According to the findings in Table 4.2, security has the highest Cronbach Alpha value of 0.870. Perceived convenience, on the other hand, has the lowest Cronbach Alpha score of 0.813. Reliabilities between 0.70 and 0.90 are considered to be more reliable, and reliabilities less than 0.60 are considered to be less reliable (Sürücü & Maslakçi, 2020). The Cronbach Alpha score for perceived usefulness is 0.823, indicating that it is reliable. Furthermore, Cronbach Alpha scores for perceived ease of use and perceived trust were 0.848 and 0.867, respectively. As a result, both research variables are regarded as consistent. The dependent variable has a Cronbach Alpha value of 0.856, indicating that it is trustworthy. Finally, all examined study variables are regarded as trustworthy since their Cronbach Alpha scores are more than 0.70 (Sürücü & Maslakçi, 2020).

4.2 DESCRIPTIVE STATISTIC ANALYSIS

Descriptive analysis is applied to understand the background of the target respondents and gives easy summaries of the mean and Standard Deviation (SD) necessary. Mean and Standard Deviation show how the data is widely dispersed around the mean. Furthermore, Standard Deviation illustrates how distinct or departing from the typical individual reaction to the problem the individual is. The questionnaire is intended to examine all of the factors in this study.

4.2.1 DEMOGRAPHIC PROFILE

The first component of this study questionnaire was designed to learn about the demographic profiles of respondents based on their age, gender, education level, occupation, and race. It also evaluated information from responder feedback. It contained information regarding the health clinic's service quality and the channel via which respondents obtained the information.

4.2.1.1 AGE

Table 4.3: Age

		Frequency	Percent
Valid	16 - 25 years	89	55.6
	26 - 35 years	59	36.9
	36 - 45 years	8	5.0
	Above 45	4	2.5
	Total	160	100.0

Table 4.3 illustrates that respondents' age was classified into four major groups: "16 to 25 years old," "26 to 35 years old," "36 to 45 years old," and "Over 45 years old." The overall number of respondents was 160, with the "16 to 25 years old" age group accounting for the biggest percentage of respondents at 55.6% or 89 respondents. The "26 to 35 years old" and "36 to 45 years old" age groups had the second and third greatest percentages, with 36.9% or 59 respondents and 5.0% or 8 respondents, respectively. The category "Above 45 years old" has the lowest percentage of 2.5% or 4 responders.

4.2.1.2 GENDER

Table 4.4: Gender

		Frequency	Percent
Valid	Female	97	60.6
	Male	63	39.4
	Total	160	100.0

Table 4.4 indicates the percentage of respondents who are of both genders. According to the data, there were 160 total respondents, with 60.6% (97) of them are female and 39.4% (63) are male.

4.2.1.3 EDUCATIONAL LEVEL

Table 4.5: Education Level

		Frequency	Percent
Valid	Bachelor's Degree	103	64.4
	Diploma	38	23.8
	Master's Degree	6	3.8
	SPM/STPM	13	8.1
	Total	160	100.0

The educational level of the respondents who participated in the survey is shown in Table 4.5 above. Bachelor's Degree had the largest percentage of responses at 64.4% or 103 respondents. Master's Degree has the lowest percentage of replies at 3.8% or 6 respondents. The remaining percentages of respondents are from Diploma and SPM/STPM, which are 23.8% or 38 respondents and 8.1% or 13 respondents, respectively.

4.2.1.4 OCCUPATION

Table 4.6: Occupation

		Frequency	Percent
Valid	Goverment Sector	18	11.3
	Private Sector	31	19.4
	Self-Employed	11	6.9
	Student	94	58.8
	Unemployed	6	3.8
	Total	160	100.0

According to the data in Table 4.6 above, the biggest percentage of respondents 58.8% or 94 respondents are Students, while the lowest percentage at 3.8% or 6 respondents are Unemployed. The Government Sector, Private Sector, and Self-Employed occupations account for 11.3% (18 respondents), 19.4% (31 respondents), and 6.9% (11 respondents), respectively.

4.2.1.5 RACE

Table 4.7: Race

		Frequency	Percent
Valid	Chinese	28	17.5
	Indian	66	41.3
	Malay	66	41.3
	Total	160	100.0

Table 4.7 also displays the race distribution of the respondents. In terms of race, respondents were classified into three major groups: Malay, Indian, and Chinese. It was discovered that Malay and Indian respondents had the same ratio of 41.3%, or 66 respondents each. Finally, the Chinese had the lowest percentage of respondents in this study, with 17.5% or 28 of respondents were participated in this survey.

4.2.2 GENERAL QUESTIONS ON THE ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS

Quantitative research questions are quite specific. The purpose of these questions is to ensure the respondents understand the concept of this research. They are typically framed and finished at the beginning of the research Quantitative research questions also connect the research question to the research design. Furthermore, these questions cannot be answered with "yes" or "no" answers. (Berger, 2015).

Table 4.8: General Questions on the adoption of online shopping systems using mobile applications among retail consumers

The adoption of online shopping systems using mobile applications among retail consumers		Frequency	Percentage (%)
Do you use a mobile application to shop online?	• Yes • No	138 22	86.3 13.8
If Yes, which mobile applications do you use for online shopping?	• Shopee • Lazada • Mudah.my • Shein • Tiktok shop	110 36 6 1 7	68.8 22.5 3.8 0.6 4.3
Do you use mobile applications to track your shopping history?	• Yes • No	132 28	82.5 17.5
Do you use mobile applications to compare prices between different retailers?	• Yes • No	143 17	89.4 10.6
Do you find mobile applications more secure than desktop websites for shopping?	• Yes • No	125 35	78.1 21.9
Do you use mobile applications to read product reviews before purchasing	• Yes • No	135 25	84.4 15.6

As stated in Table 4.8, the majority of respondents (86.3%, or 138 respondents) had used the mobile application to purchase online because it is easier. Furthermore, 68.8% (110 respondents) use Shopee as their primary online shopping source. In addition, with a maximum frequency of 82.5% (132 respondents), the bulk of respondents recorded their buying history to make sure the seller was not deceiving. Moreover, 89.4% (143) of respondents use mobile applications to compare costs between merchants. Additionally, just 21.9% (35 respondents) in this research believe mobile applications are not as safe as desktop websites for online buying. Meanwhile, 84.4% (135) of 160 respondents said they checked product evaluations on mobile applications before making a purchase. In a nutshell, most of the respondents are willing to use the mobile application to purchase online.

4.2.3 INDEPENDENT VARIABLES

All survey participants were asked to indicate and identify the adoption of online purchasing systems through mobile applications among retail consumers using the five Likert scales: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree. Independent variables such as perceived usefulness, perceived ease of use, perceived trust, perceived security, and perceived convenience were identified and tested against the dependent variable of this study; adoption of online shopping systems via mobile applications among retail consumers. As a result, the range of mean analysis for study variables was found to comprehend respondents' perspectives on each variable.

4.2.3.1 PERCEIVED USEFULNESS

Table 4.9: Perceived Usefulness

Code	Items	N	Mean	Std. Deviation
PU1	Necessity online purchasing enables me to save time.	160	4.188	0.7370
PU2	Using online shopping applications for necessities makes it more effective to do my shopping.	160	4.275	0.7927
PU3	Comparative buying is available while using online shopping for necessities.	160	4.031	0.9141
PU4	Mobile applications provide a good platform for online shopping.	160	4.337	0.7514
PU5	Accessing shopping sites is facilitated while using mobile applications for online shopping.	160	4.206	0.7859
Overall Mean			4.2074	

Table 4.9 above shows the mean and standard deviation of all items considered as perceived usefulness under the first independent variables. PU4 recorded the highest mean with 4.337 and a standard deviation of 0.7514. it is then followed by PU2, PU5, and PU1 with the mean of 4.275, 4.206, and 4.188 and standard deviations of 0.7927, 0.7859 and 0.7370 respectively. The lowest mean of 4.031 and standard deviation of 0.9141 lies under PU3. The overall mean for five items under the Perceived Usefulness variable is 4.2074.

4.2.3.2 PERCEIVED EASE OF USE

Table 4.10: Perceived Ease of Use

Code	Items	N	Mean	Std. Deviation
PEOU1	Learning to operate online shopping via mobile applications is easy for me.	160	4.338	0.7842
PEOU2	I find it easy to become skilled at purchasing necessities online via mobile applications.	160	4.194	0.7970
PEOU3	It is easy to order necessities online using mobile applications.	160	4.425	0.6964
PEOU4	Mobile technology is more convenient for accessing shopping information anywhere and anytime.	160	4.337	0.7083
PEOU5	Any person can easily access mobile applications to purchase online.	160	4.125	0.8299
Overall Mean			4.2838	

The mean and standard deviation of all items assessed as perceived ease of use under the second independent variables are shown in Table 4.10. PEOU3 had the highest mean of 4.425 and the smallest standard deviation of 0.6964. PEOU1, PEOU4, and PEOU2 come next, with mean values of 4.338, 4.337, and 4.194 and standard deviations of 0.7842, 0.7083, and 0.7970, respectively. PEOU5 has the lowest mean (4.125) and standard deviation (0.8299). The total mean for the items in the variable perceived ease of use is 4.2838.

4.2.3.3 PERCEIVED TRUST

Table 4.11: Perceived Trust

Code	Items	N	Mean	Std. Deviation
PT1	I trust each participant involved in the online shopping system using mobile applications, such as the seller and buyer.	160	4.038	0.8751
PT2	I trust the security mechanisms of the online shopping system using mobile applications.	160	4.113	0.7930
PT3	I trust online shopping system services when using mobile applications.	160	3.969	0.8424
PT4	I trust the information provided via mobile applications during the online shopping system process.	160	4.144	0.8456
PT5	I trust the services offered by mobile applications and have no difficulty telling others about their results.	160	4.094	0.7672
	Overall Mean		4.0716	

Table 4.11 displays the mean and standard deviation of all items scored as perceived trust within the third independent variable. The highest mean of PT4 was 4.144, with a standard deviation of 0.8456. Following that, PT2, PT5, and PT1 had mean values of 4.113, 4.094, and 4.038, respectively, with standard deviations of 0.7930, 0.7672, and 0.8751. The mean (3.969) and standard deviation (0.8424) of PT3 are the lowest. The cumulative mean for the variable perceived trust items is 4.0716.

4.2.3.4 PERCEIVED SECURITY

Table 4.12: Perceived Security

Code	Items	N	Mean	Std. Deviation
PS1	I perceive the online shopping system using mobile applications as secure.	160	4.063	0.7826
PS2	I perceive the information relating to online shopping system transactions using mobile applications as secure.	160	4.044	0.8567
PS3	I perceive that the personal information provided when shopping via mobile applications is secure.	160	4.094	0.8817
PS4	I do not fear hacker invasions when using mobile applications for shopping online.	160	3.506	1.1601
PS5	The security systems built into the mobile shopping applications are strong enough to protect my account.	160	3.756	1.0202
	Overall Mean		3.8926	

Table 4.12 presents the mean and standard deviation of all items rated as the fourth independent variable, perceived security. PS3 had the greatest mean of 4.094, with a standard deviation of 0.8817. Following that, the mean values for PS1, PS2, and PS5 were 4.063, 4.044, and 3.756, respectively, with standard deviations of 0.7826, 0.8567, and 1.0202. PS4 has the lowest mean (3.506) and standard deviation (1.1601). 3.8926 is the overall mean for the variable perceived security elements.

4.2.3.5 PERCEIVED CONVENIENCE

Table 4.13: Perceived Convenience

Code	Items	N	Mean	Std. Deviation
PC1	Mobile applications would give me greater control over my shopping process online.	160	4.019	0.7808
PC2	The selection of goods available on the Internet using mobile applications is extensive.	160	4.244	0.6799
PC3	The information given about the products and services on the Internet using mobile applications is sufficient.	160	3.994	0.8203
PC4	Shopping online using mobile applications would allow me to get better prices.	160	4.300	0.7251
PC5	I can save the effort of visiting stores when I do Online Shopping using mobile applications.	160	4.356	0.7717
Overall Mean			4.1826	

The mean and standard deviation of all items scored as the fifth and final independent variable, perceived convenience, are shown in Table 4.13. PC5 had the highest mean of 4.356 and with a standard deviation of 0.7717. The mean values for PC4, PC2, and PC1 were 4.300, 4.244, and 4.019, with standard deviations of 0.7251, 0.6799, and 0.7808, respectively. The lowest mean is 3.994 and a standard deviation of 0.8203 is found in PC3. The total mean for the variable perceived convenience components is 4.1826.

4.2.4 DEPENDENT VARIABLES

Table 4.14: Dependent Variables

Code	Items	N	Mean	Std. Deviation
DV1	I would choose the mobile shopping applications as a preference to purchase the products online.	160	4.238	0.7224
DV2	I would encourage friends and family members to do grocery shopping in the future using mobile applications.	160	4.106	0.9221
DV3	I will most likely be using mobile applications to purchase more necessities online.	160	4.281	0.7621
DV4	In the future, I intend to increase the use of mobile applications to do grocery shopping.	160	3.887	0.8759
DV5	I plan to continue using mobile applications to buy products through online platforms.	160	4.219	0.6884
Overall Mean			4.1462	

Table 4.13 displays the mean and standard deviation of all items scored as the single dependent variable. The highest mean was 4.281, with a standard deviation of 0.7621 at DV3. The mean values for DV1, DV5, and DV2 were 4.238, 4.219, and 4.106, respectively, with standard deviations of 0.7224, 0.6884, and 0.9221. In DV4, the mean is 3.887 and the standard deviation is 0.8759. 4.1462 is the overall mean for the dependent variable items.

4.3 NORMALITY TEST

To some extent, normality may be determined by calculating skewness and kurtosis values. Other strategies, however, are accessible in SPSS via the Explore option in the Descriptive Statistics menu. This process is described in full below. In this example, I evaluated the normality of the variance of Total felt stress ratings for the entire sample. Although MANOVA's significance tests rely on the multivariate normal distribution, it is relatively resilient to minor deviations from normality. Tabachnick and Fidell (2007) recommend a sample size of at least 20 in every cell to ensure 'robustness'. The research tests both univariate normality and multivariate normality. The approaches for determining normalcy also assisted in identifying any outliers (Julie Pallant, 2020).

The findings of the Kolmogorov-Smirnov statistic are shown in the Tests of Normality. This determines the normality of the score distribution. A non-significant result (Sig. value greater than 0.05) denotes normality. In this example, the Sig. value is.000, indicating a breach of the normality assumption. In bigger samples, this is fairly frequent (Julie Pallant, 2020).

Table 4.15: Normality Test – Descriptive Statistics

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
PU	160	-1.301	.192	4.839	.381
PEOU	160	-1.348	.192	4.779	.381
PT	160	-1.045	.192	2.542	.381
PS	160	-.834	.192	.873	.381
PC	160	-1.377	.192	5.591	.381
DV	160	-1.046	.192	2.869	.381
Valid N (listwise)	160				

Table 4.15 demonstrates the normal distribution significance determined by Skewness and Kurtosis values. Furthermore, Skewness and Kurtosis values within +/- 2 are not deemed statistically distinct from the normal distribution. According to Table 4.15, all of the study variables' Skewness and Kurtosis values are within +/- 2. As a result, it is possible to infer that research variables are not substantially distinct from the normal distribution.

4.4 PEARSON CORRELATION ANALYSIS

A statistical analysis is used to assess the reliability of a relationship between two variables of measurable data. The possibility of the correlation coefficient happening by chance alone must be estimated for data gathered from a sample. The correlation value of (+1.00) implies that the two variables under consideration are perfectly associated in a positive linear fashion. In contrast, (-1.00) shows that the two variables being compared are exactly connected in a negative linear fashion. If the p-value is less than 0.05, the correlation is significant. (Saunders et al., 2022).

Table 4.16: Pearson Correlation Analysis

Correlations

		PU	PEOU	PT	PS	PC	DV
PU	Pearson Correlation	1	.791**	.518**	.513**	.631**	.630**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	160	160	160	160	160	160
PEOU	Pearson Correlation	.791**	1	.561**	.407**	.658**	.554**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	160	160	160	160	160	160
PT	Pearson Correlation	.518**	.561**	1	.824**	.654**	.625**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	160	160	160	160	160	160
PS	Pearson Correlation	.513**	.407**	.824**	1	.586**	.620**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	160	160	160	160	160	160
PC	Pearson Correlation	.631**	.658**	.654**	.586**	1	.710**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	160	160	160	160	160	160
DV	Pearson Correlation	.630**	.554**	.625**	.620**	.710**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	160	160	160	160	160	160

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

The Pearson correlation analysis among the research's dependent and independent variables is shown in Table 4.16. According to the data above, the correlation's highest value of 0.710 and the p-value of 0.000 show a substantial association between the Dependent variable and Perceived Convenience. Furthermore, the Dependent variable and Perceived Ease of Use have a minimum correlation value of 0.554 and a p-value of 0.000, indicating a significant link.

In addition, the correlation values for Perceived Usefulness, Perceived Trust, and Perceived Security with Dependent Variable are 0.630, 0.625, and 0.620, respectively. On top of that, the p-value for all four correlations is 0.000, indicating a substantial connection between the dependent and independent variables. Finally, there is a positive (+) association between Perceived Usefulness, Perceived Ease of Use, Perceived Trust, Perceived Security, and Perceived Convenience and Dependent Variable. As a result, if the independent factors grow, so does the dependent variable.

4.5 VARIANCE INFLATION FACTOR

A variance inflation factor (VIF) in regression analysis is a measure of the level of multicollinearity. In a multivariate regression model, multicollinearity arises when there is a correlation among many independent variables (Panirchelvam, 2020). This might have a negative impact on the regression findings. As a result, the variance inflation factor can quantify how much a regression coefficient's variance is inflated owing to multicollinearity (Panirchelvam, 2022).

Table 4.17: Variance Inflation Factor

Model		Collinearity Statistics	
		Tolerance	VIF
1	PU	.310	3.224
	PEOU	.281	3.556
	PT	.239	4.177
	PS	.269	3.716
	PC	.424	2.356
a. Dependent Variable: ADOPTION OF ONLINE SHOPPING SYSTEMS VIA MOBILE APPLICATIONS AMONG RETAIL CONSUMERS.			

The lower the tolerance, the more likely the variables will be multicollinear. VIF = 1 shows that the independent variables are not connected. If the value of VIF is 1 VIF 5, it indicates that the variables are moderately connected. The VIF difficult value ranges from 5 to 10, indicating strongly linked variables. If the VIF is between 5 and 10, there will be multicollinearity within the variables that are predicted in the regression model, and VIF more than 10 indicates that the regression coefficients are being estimated incorrectly due to the existence of multicollinearity. (Shrestha, 2020).

As shown in Table 4.17, the VIF score for each component (Perceived Usefulness, Perceived Ease of Use, Perceived Trust, Perceived Security, and Perceived Convenience) is significantly lower than 10. As a result, there are no issue of multicollinearity in this set.

4.6 MAIN DATA ANALYSIS

As discussed in the previous chapter, Multiple Regression Analysis was performed in this study to assess the strength of the link between a dependent variable and numerous predictor variables, as well as the significance of each of the relationship predictors. The current study employs a structural model to examine the direct relationship presented, and a simple regression was performed to test the relationship between the independent variables: technology factors (perceived usefulness, perceived ease of use, perceived trust, perceived security, and perceived convenience) and dependent variables (adoption of online purchasing systems through mobile applications among retail consumers).

Table 4.18: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Direct Relationship	.777[a]	.604	.591	2.03546
a. Predictors: (Constant), PU, PEOU, PT, PS, PC				
b. Dependent Variable: ADOPTION OF ONLINE PURCHASING SYSTEMS THROUGH MOBILE APPLICATIONS AMONG RETAIL CONSUMERS				

The determinant coefficient, R square, is 0.604, indicating a modest explanatory magnitude (Shrestha, 2020). This figure indicates that the independent variables may explain 60.4% of the variation in retail consumers' adoption of online purchase systems via mobile applications. Other considerations not included in this study will explain the remaining 39.6% of retail consumers' adoption of online purchase systems via mobile applications.

Table 4.19: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
Direct Relationship	Regression	971.404	5	194.281	46.892	.000[b]
	Residual	638.040	154	4.143		
	Total	1609.444	159			
a. Dependent Variable: ADOPTION OF ONLINE PURCHASING SYSTEMS THROUGH MOBILE APPLICATIONS AMONG RETAIL CONSUMERS						
b. Predictors: (Constant), PU, PEOU, PT, PS, PC						

The F-test result from the model direct connection is 46.892 in the ANOVA table, with a significant level of 0.000. The P-value was 0.000, indicating a significant relationship between the independent variable (perceived usefulness, perceived ease of use, perceived trust, perceived security, and perceived convenience) and the dependent variable (adoption of online purchasing systems through mobile applications among retail consumers).

Table 4.20: Coefficients of Multiple Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Direct Relationship	(Constant)	1.775	1.316		1.348	.180
	PU	.293	.095	.281	3.088	.002
	PEOU	-.067	.101	-.064	-.666	.506
	PT	.098	.099	.103	.993	.322
	PS	.150	.081	.182	1.859	.065
	PC	.445	.087	.401	5.145	.000
a. Dependent Variable: ADOPTION OF ONLINE PURCHASING SYSTEMS THROUGH MOBILE APPLICATIONS AMONG RETAIL CONSUMERS						

Table 4.20 illustrates the predicted coefficient in a direct connection model where the beta (constant) is 1.775. The beta value for perceived usefulness is 0.293; for perceived ease of use, it is -0.067; for perceived trust, it is 0.098; for perceived security, it is 0.150; and for perceived convenience, it is 0.445.

Furthermore, significant values for each variable have been selected from the results in Table 4.20. Based on the model direct relationship, it is possible to conclude that perceived usefulness and perceived convenience positively influence the adoption of online purchasing systems via mobile applications among retail consumers, with significant values of 0.002 and 0.000, respectively, and p-values less than 0.05. On the other hand, there is not a significant connection between perceived ease of use, perceived trust, and perceived security with the adoption of online purchasing systems via mobile applications among retail consumers, as the presented significant values are 0.506, 0.322, and 0.065, with p-values greater than 0.05.

The following equation of multiple regression was developed in the final model for this study based on the data from the coefficient table;

Adoption of online shopping system using mobile applications among retail consumers = 1.775 + 0.293PU + 0.445PC

Based on the equation above, the regression intercept is 1.775 and is the anticipated value of the dependent variable when perceived usefulness and perceived convenience are both 0. Furthermore, the amount by which the researcher predicts the dependent variable to change for a 1 unit increase in PEOU, PT, and PS is represented by the regression slope, or under standardised coefficient, which has the values of 0.067, 0.098, and 0.150 respectively, as these coefficients represent the mean increase in the adoption of online shopping systems using mobile applications among retail consumers (dependent variable) for an additional 1 unit in PEOU, PT, and PS (independent variable).

Greater t-values and lower p-values are often related to greater beta values. The Beta value is used to determine the effect of independent variables, which implies that the higher the coefficient value, the bigger the contribution of the relevant independent variable to the dependent variable. In a model, perceived convenience had the greatest Beta coefficient of 0.401 ($t = 5.145$, $p = 0.000$).

4.7 HYPOTHESIS TESTING

A total of five hypotheses were thoroughly addressed, with the results of hypothesis acceptance or rejection spelt out. Hypotheses 1 through 5 are concerned with the relationship between independent and dependent variables, as assessed by Pearson Correlation Analysis, and Multiple Regression Analysis.

Hypothesis 1

H1: Perceived usefulness positively affects the adoption of online shopping systems using mobile applications among retail consumers.

Pearson Correlation, and Multiple Regression Analysis were used to test Hypothesis 1. The Pearson Correlation Analysis result of Table 4.16 revealed a somewhat favourable association between perceived usefulness and the adoption of online purchasing systems employing mobile applications among retail consumers, with a correlation value of 0.630, $p<0.05$. However, according to Shrestha, 2020, the p-value value for perceived usefulness is 3.224, and p-value score values less than 10 are still acceptable. Furthermore, the result of Table 4.20 in the Multiple Regression analysis stated that there is an important relationship between perceived usefulness and the adoption of online shopping systems using mobile applications among retail consumers, as the significant value in the Multiple Regression analysis coefficient table was 0.002, which was less than 0.05. As a result, hypothesis 1 was validated.

Hypothesis 2

H2: Perceived ease of use is positively affect the adoption of online shopping systems using mobile applications among retail consumers.

According to Pearson Correlation analysis Table 4.16, there is an averagely favourable connection between perceived ease of use and the adoption of online shopping systems using mobile applications among retail consumers, based on a correlation value of 0.554 with $p<0.05$, followed by a p-value score value of 3.556, indicating a moderately correlated relationship. The results of the Multiple Regression analysis are shown in Table 4.20, which shows that there is a significant value of 0.506, which is more than 0.05. As a result, hypothesis 2 was not verified.

Hypothesis 3

H3: Trust in retailers has a positive impact with the adoption of online shopping systems using mobile applications among retail consumers.

To acquire findings for hypothesis 3, Pearson Correlation, and Multiple Regression analysis were performed, and the results are shown in Tables 4.16, 4.17 and 4.20. The correlation value is 0.625, indicating a moderately favourable association between perceived trust and retail consumers' adoption of online purchasing systems via mobile applications. The p-value score of 4.177 reported is considered satisfactory. However, the significant value in the Multiple Regression analysis coefficient table was

0.322, which is more than 0.05. This demonstrated that there is no statistically significant association between perceived trust and the dependent variable. As a result, hypothesis 3 was not supported.

Hypothesis 4

> H4: There is a positive relationship between perceived security and the adoption of online shopping systems using mobile applications among retail consumers.

According to Pearson Correlation Analysis Table 4.16, the correlation value between perceived security and the use of online buying systems employing mobile applications among retail consumers is 0.620 with $p<0.05$, indicating a moderate association. Nonetheless, the p-value score number is adequate because $p<10$ is 3.716. Furthermore, the significant value in Table 4.20 coefficient table of Multiple Regression analysis was 0.065, which is greater than 0.05. There is no significant relationship between felt security and the dependent variable. As a result, hypothesis 4 was not supported.

Hypothesis 5

> H5: Positive sign increases the perceived convenience in the adoption of online shopping systems using mobile applications among retail consumers.

To acquire findings for hypothesis 5, Pearson Correlation, and Multiple Regression analysis were performed, and the results are shown in Tables 4.16, 4.17 and

4.20. The correlation score is 0.710, indicating a strong association with p0.05. Furthermore, the p-value score of 2.356 in Table 4.17 indicates that the value is reasonable. Furthermore, there is a significant relationship between perceived convenience and the adoption of online shopping systems using mobile applications among retail consumers, as demonstrated by the results of Table 4.20 in Multiple Regression analysis, which stated that the significant value is 0.000, with a p-value less than 0.05. As a result, hypothesis 5 can be inferred to be supported.

Table 4.21: Summary of Hypotheses

Research Objectives	Hypotheses	Results	Decision
RO1: To determine the key factors that influence consumers to adopt and use online shopping systems through mobile applications.	**Hypothesis 1** H1: There is a significant positive relationship between the perceived usefulness and the adoption of online shopping systems using mobile applications among retail consumers.	p-value = 0.002 Beta value = 0.293	Supported
RO2: To examine the relationship between the consumers' buying behaviour and online shopping	**Hypothesis 2** H2: There is a significant positive relationship between the perceived ease of use and the adoption of online shopping systems using	p-value = 0.506 Beta value = 0.067	Not Supported

systems using mobile applications.	mobile applications among retail consumers.		
RO3: To identify the most critical factors affecting the adoption of mobile applications among consumers for shopping purposes.	**Hypothesis 3** H3: There is a significant positive relationship between the perceived trust and the adoption of online shopping systems using mobile applications among retail consumers.	p-value = 0.322 Beta value = 0.098	Not Supported
	Hypothesis 4 H4: There is a significant positive relationship between the perceived security and the adoption of online shopping systems using mobile applications among retail consumers.	p-value = 0.065 Beta value = 0.150	Not Supported
	Hypothesis 5 H5: There is a significant positive relationship between the perceived convenience and the adoption of online shopping systems using mobile applications among retail consumers.	p-value = 0.000 Beta value = 0.445	Supported

4.8 SUMMARY

In conclusion, this study used a survey questionnaire and data gathering from 160 respondents. This chapter went over the results findings and data analysis to define the study objectives. A variety of analyses were performed, including reliability analysis, descriptive analysis, normality test, multicollinearity, Pearson Correlation analysis, and Multiple Regression analysis. The researcher used SPSS software to conduct all of the analyses to determine the association between independent variables and dependent variables. Two hypotheses were accepted because of the ($p<0.05$), while the remaining three were rejected since the p-value was above 0.05. The final chapter of this thesis is presented in the next chapter, which includes the conclusion and recommendations for additional study.

CHAPTER 5

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.0 CHAPTER OVERVIEW

The researcher includes a discussion of the outcomes and conclusions from data analysis in Chapter 4 in this chapter. The results of the preceding chapter's data analysis led to the response for the study purpose and hypotheses that were created in Chapters 1 and 2, respectively. Furthermore, the study's limitations were explored in depth, and future recommendations were made in this chapter. Finally, the researcher offered a general summary of this study.

5.1 SUMMARY OF RESEARCH

Given the rise of Malaysia's e-commerce business, academics have provided very little persuasive data concerning comprehending online customers' behaviour. Given the signals of Malaysia's e-commerce industry's exponential expansion, the strategic approach for online merchants is to have an awareness of the online shopping features that please online consumers and generate trust towards their websites. With a scarcity of studies examining the relationship between online shopping system adoption and online consumer behaviour in developing markets such as Malaysia, a clear understanding of online retail advertising techniques for transforming Internet consumers into dedicated e-commerce shoppers is required. (Mofokeng, 2021).

This study investigated customers' opinions of the adoption of an online shopping system, as well as satisfaction and loyalty behaviours, with a focus on the moderating influence of the online shopping experience in Malaysia. The primary goal of this study was to investigate the influence of perceived utility, perceived simplicity of use, perceived trust, perceived security, and perceived convenience on online purchasing systems employing mobile applications among retail consumers. The validity of perceived utility, perceived simplicity of use, perceived trust, perceived security, and perceived convenience as an online buying system employing mobile applications among retail consumers were investigated in this study. The findings of this investigation verified the strong link between dependent and independent factors. (Mofokeng, 2021).

The proposed study's findings validate the use of the TAM model to assess the variables influencing the adoption of online purchasing via mobile applications among Malaysian retail consumers. The findings confirm prior research on the usage of the TAM model and its application to mobile shopping investigations. The study adds to the literature on the adoption of online purchasing via mobile applications among retail consumers, where few researchers use this model, as opposed to other contexts where the TAM model has already achieved significant success. A second validation of the model's validity comes from the fact that, despite the peculiarity of the technology (mobile applications) and the market (grocery setting), all of the components presented by the original TAM and their linkages were important and relevant for this study. (Aiolfi & Bellini, 2019).

Because of the introduction of a new behavioral construct, PrePurchase planning, which influences the attitude toward the adoption of a mobile application for grocery shopping, the suggested model should be viewed as an extension of the TAM model for the specific context of grocery shopping. The findings are in line with market and demand trends. Recent changes in consumer behaviour, particularly an increase in preparation activities, have prompted them to embrace technologies that can assist them throughout the purchase decision-making process. Furthermore, broad mobile connectivity and increased mobile device usage have reinforced these trends, making customers considerably more planned and prepared than ever before, with shoppers using smartphones during the pre-purchase process. (Aiolfi & Bellini, 2019).

Given that people are becoming increasingly reliant on mobile technologies in their daily lives, and that consumers are increasingly reliant on them, retailers and manufacturers must understand the role of mobile devices in influencing consumer attitudes toward the adoption of a mobile app in a retail context. A more organized and prepared consumer is more likely to use a mobile application for supermarket shopping activities during the purchasing process. This should inspire businesses to create mobile applications that take advantage of consumers' reliance on technology to affect their behaviour throughout the purchasing process. (Aiolfi & Bellini, 2019).

This tendency is much more important if the mobile phone is used more frequently during the shopping trip for purposes connected to the purchasing job. Retailers and manufacturers should strive to use this type of mobile usage to impact shoppers' views and habits. This possibility has expanded through the creation of mobile applications that

are as simple to use, valuable, and relevant to customers as feasible. Consumers nowadays are willing to utilize mobile applications to help them with their shopping trips, making them more educated and prepared. As a result, it is up to merchants to capitalize on these trends and build mobile solutions customized to their customers' demands. (Aiolfi & Bellini, 2019).

Table 5.1: Research Question, Research Objectives, Research Hypotheses & Decision

	Research Question	**Research Objectives**	**Research Hypotheses**	**Decision**
1	What are the key factors that influence consumers to adopt online shopping systems through mobile applications?	To determine the key factors that influence consumers to adopt and use online shopping systems through mobile applications.	H1: There is a significant positive relationship between the perceived usefulness and the adoption of online shopping systems using mobile applications among retail consumers. H2: There is a significant positive relationship between the perceived ease of use and the adoption of online shopping systems	Supported
2	What is the relationship between consumers' buying behaviour and online shopping systems using mobile applications?	To examine the relationship between the consumers' buying behaviour and online shopping systems using mobile applications.		Not Supported
3	What are the most critical factors affecting the adoption of mobile	To identify the most critical factors affecting the adoption of mobile		

	applications among consumers for shopping purposes?	applications among consumers for shopping purposes.	using mobile applications among retail consumers. H3: There is a significant positive relationship between the perceived trust and the adoption of online shopping systems using mobile applications among retail consumers. H4: There is a significant positive relationship between the perceived security and the adoption of online shopping systems using mobile applications among retail consumers. H5: There is a significant positive relationship between the perceived convenience and the adoption of online shopping systems using	Not Supported Not Supported Supported

			mobile applications among retail consumers.	

This study used a survey research method, with a questionnaire serving as the research instrument, and the Malaysian citizens serving as the unit of analysis. The questionnaire was based on peer-reviewed papers. A pilot research was also carried out to confirm the questionnaire's dependability. Malaysians were sent the questionnaire using a Google Form link. Data were collected over two months, with a total number of respondents of 160 utilized for analysis. The next section contains comments on the key results.

5.2 DISCUSSION OF MAIN FINDINGS

The analysis of the research outcomes is included in this part. Before discussing the conclusions of the research targets, this part describes the mean and standard deviation. The research objectives and hypotheses have been explored based on the results of the study. The following discussion in this part is grouped around the research issues addressed in this study.

5.2.1 RESEARCH OBJECTIVE 1

RO1: To determine the key factors that influence consumers to adopt and use online shopping systems through mobile applications.

To fulfil the first study's aim, the researcher conducted a descriptive analysis of the mean score to identify the important characteristics that drive customers to adopt and utilize online buying systems via Mobile applications.

Table 5.2: Descriptive result

Label	Construct	Mean Score	Rank
PEOU	Perceived Ease of Use	4.2838	1
PU	Perceived Usefulness	4.2074	2
PC	Perceived Convenience	4.1826	3
PT	Perceived Trust	4.0716	4
PS	Perceived Security	3.8926	5
Notes: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Perceived Trust (PT), Perceived Security (PS), Perceived Convenience (PC)			

Table 5.2 demonstrates that the mean score for every element is more than 3.8, indicating that the TAM factors (Davis, 1989) may impact retail consumers' adoption of mobile app online purchasing systems. This study found that Perceived Ease of Use (PEOU) is the most significant factor influencing customers to embrace and use online buying systems via Mobile applications, with a mean score of 4.2838 and a rank of 1. PEOU is the degree to which a particular user of a technical system thinks it to be simple and easy to use. This shows that people are more inclined to accept a technology that allows them to purchase online straightforwardly. (Kian et al., 2019).

This survey also discovered that Perceived Security (PS) is the least significant element driving customers to adopt and use online purchasing systems via Mobile applications, with a mean score of 3.8926 and the lowest ranking. PS is the extent to which customers and retailers have voiced security concerns. It comprises the ability to protect financial and personal data when transmitted via the Internet, as well as the authentication of sender identity and status. However, customers do not feel very secure while utilizing mobile applications due to improved technologies that may result in a hoax. (Kian et al., 2019).

5.2.2 RESEARCH OBJECTIVE 2

RO2: To examine the relationship between the consumers' buying behaviour and online shopping systems using mobile applications.

H1: Perceived Usefulness has a significant positive relationship with the adoption of online shopping systems using mobile applications among retail consumers. (Supported)

Relationship: PU > DV

There is a considerable positive association between perceived utility and the adoption of online purchasing systems via mobile applications among retail consumers. Individuals with a higher perceived utility are more inclined to make online purchases using mobile applications. The positive association shows that as perceived utility grows, so does retail consumers' use of online buying systems via mobile

applications. Perceived usefulness has been found to positively influence users' perceptions of mobile application tools as educating and teaching tools in the educational setting. (Vo & Wu, 2022).

H2: There is a significant positive relationship between the perceived ease of use and the adoption of online shopping systems using mobile applications among retail consumers. (Not Supported)

Relationship: PEOU > DV

This study discovered no significant association between perceived ease of use and adoption of online buying systems via mobile applications among retail consumers. It's possible that they don't perceive the value or advantage of utilizing it, or they don't comprehend how it may help them. While perceived ease of use can improve the online purchasing experience, it may not be the most important element driving retail consumers' adoption of online shopping systems via mobile applications. (Wang Jie, 2021).

H3: There is a significant positive relationship between the perceived trust and the adoption of online shopping systems using mobile applications among retail consumers. (Not Supported)

Relationship: PT > DV

This study found no significant relationship between perceived trust and retail consumers' adoption of online purchasing systems via mobile applications. Trust in online purchases refers to the consumer's willingness to depend on the vendor and act when such action makes the consumer vulnerable to the seller. While perceived trust can enhance the online purchase experience, it may not be the most essential factor driving retail consumers' adoption of online shopping systems through mobile applications. (Ariffin et al., 2020).

H4: There is a significant positive relationship between the perceived security and the adoption of online shopping systems using mobile applications among retail consumers. (Not Supported)

Relationship: PS > DV

This study discovered no significant link between perceived security and retail consumers' use of online purchase systems via mobile applications. Perceived security, also known as perceived safety or fear of crime, is an emotion caused by the perception of potential risks to one's security or safety. Customers' views of security in connection with online shopping are greatly impacted by an e-business's ability to make them feel sure that their private details and economic information are secure. While perceived security can improve the online purchasing experience, it may not be the primary factor encouraging retail consumers to use online shopping systems via mobile applications. (Mofokeng, 2021).

H5: Perceived Convenience has a significant positive relationship with the adoption of online shopping systems using mobile applications among retail consumers. (Supported)

Relationship: PC > DV

There is a significant positive relationship between perceived ease and the adoption of online purchase systems via mobile applications among retail consumers. Individuals with a greater perceived convenience are more likely to make online purchases using mobile applications. Customers are more motivated to complete the work quickly and successfully, therefore online grocery shopping excursions are classified as directed-buying store visits with goal-oriented browsing tactics. Perceived convenience has been shown to have a beneficial impact on users' impressions of mobile application applications as educational and instructional aids in educational settings. (Chang et al., 2012).

5.2.3 RESEARCH OBJECTIVE 3

RO3: To identify the most critical factors affecting the adoption of mobile applications among consumers for shopping purposes.

Table 5.3: Beta Coefficient

Relationship	Original Sample (B)	Total Mean	T Statistics	P-values
PU > DV	0.293	4.2838	3.088	.002
PEOU > DV	-0.067	4.2074	-.666	.506
PT > DV	0.098	4.1826	.993	.322
PS > DV	0.150	4.0716	1.859	.065
PC > DV	0.445	3.8926	5.145	.000

The beta coefficient (β) is the standardized regression coefficient that measures the strength and direction of a link between two variables. Table 5.3 summarizes the beta coefficient interpretations for the three connections.

The highest beta coefficient of 0.445, representing the positive relationship between perceived convenience and the adoption of online shopping systems using mobile applications among retail consumers, suggests that Customers are more motivated to complete the work quickly and successfully, therefore online grocery shopping excursions are classified as directed-buying store visits with goal-oriented browsing tactics. As a result, as mentioned throughout this chapter, consumer decision-making is influenced by both customer demand and pre-shopping objectives and goals. (Wu et al., 2022).

In a nutshell, perceived convenience is the most critical factor affecting the adoption of mobile applications among consumers for online shopping. It implies that when the consumers are using online platforms via mobile applications for shopping becomes higher, the adoption of online shopping systems using mobile applications among retail consumers tends to be stronger. (Wu et al., 2022).

5.3 RESEARCH CONTRIBUTIONS

The thesis investigates the elements that influence customers' propensity to purchase online. The study also examined other ideas that had not yet been agreed upon in prior investigations. Taylor and Todd (1995) contend that the interdependence and compatibility of cultural and social elements impact one another. The findings of this study also provide some recommendations to the Malaysian government's national management agencies and online merchants to enhance the practicality of shopping in Malaysia and increase customers' desire to purchase online. (Wang Jie, 2021).

5.3.1 ACADEMIC CONTRIBUTION (THEORY)

The proposed study's findings indicate the usefulness of using the TAM model to assess the factors influencing the adoption of the online shopping system using mobile applications among retail consumers. The findings back with prior research on the usage of the TAM model and its mobile application for purchasing online. The study adds to the literature on the adoption of online shopping systems using mobile applications in the grocery industry, where few studies use this approach, in contrast to other contexts where the TAM model has already achieved significant success. (Aiolfi & Bellini, 2019)

A second validation of the model's validity comes from the fact that, despite the peculiarity of the technology (mobile application) and the market (grocery setting), all of the components presented by the original TAM and their relationships were meaningful and relevant for this study. This study contributes to the validation of the TAM model in a new setting, such as Malaysia, where studies on the adoption of online shopping systems using mobile technologies have yet to be undertaken despite Malaysians being the most mobile addicted in Asia. (Aiolfi & Bellini, 2019).

As a result of the introduction of a new behavioural construct, perceived trust, which influences loyalty toward the adoption of the online shopping system using mobile applications for retail consumers, the proposed model should be viewed as an extension of the TAM model for the specific context of grocery shopping. The findings are in line with market and demand trends. Recent changes in perceived convenience, particularly an increase in preparation activities, have prompted them to embrace technologies that can assist them throughout the purchase decision-making process. Furthermore, perceived security has bolstered these trends, making customers considerably more planned and prepared than ever before, with shoppers using smartphones throughout the pre-purchase process meticulously.

Given that people are becoming more reliant on mobile technologies in their daily lives, and that consumers are becoming more reliant on them, retailers and manufacturers must understand the role of mobile devices in influencing consumer attitudes toward the adoption of online shopping using mobile applications among retail consumers. A better-organized and prepared consumer is more likely to use a mobile application throughout

the purchasing process for retail-related activities. This should inspire businesses to create mobile applications that take advantage of consumers' reliance on technology to affect their behaviour throughout the purchasing process.

This tendency is much more important if the mobile is used more frequently during the shopping trip for purposes connected to the purchasing job. Retailers and manufacturers should strive to use this type of mobile usage to impact consumers' views and habits. This possibility expanded through the creation of mobile applications that are as simple to use, valuable, and relevant to customers as feasible. Consumers nowadays are willing to utilize mobile applications to help them with their shopping trips, making them more educated and prepared. As a result, it is up to merchants to capitalize on these trends and build mobile solutions customized to their customers' demands.

5.3.2 PRACTICAL CONTRIBUTION (SUGGESTIONS)

The current study confirms that independent variables have a significant influence on the adoption of online shopping using mobile applications among retail consumers, which supports the findings of previous research that investigated the impact of independent variables on the adoption of online shopping using mobile applications among retail consumers. This report backs up earlier research findings that indicate the influence of perceived convenience is the most significant indicator of retail consumers. (Mofokeng, 2021).

In relation to findings of this survey, the perceived usefulness of online buying is the second most significant indicator of retail consumers. This finding supports the

hypothesis that perceived usefulness influences e-commerce customer pleasure. Because perceived usefulness contributes greatly to the growth of customer happiness, web retailers that offer advanced features have dependable and delighted customers. The quality of ease of use was shown to be a poor predictor of online shopping. This data, however, demonstrates that perceived security is also a predictor of online shopping, suggesting that retail consumers see information quality as an essential feature in the development of mobile applications.

While previous research has proven the impact of perceived trust on retail consumers, privacy concerns did not substantially affect consumer satisfaction in this study. This is likely attributable to online shoppers' expectations that e-retailers follow the privacy rules published on their websites. Customers believe online shops are obligated not to share or distribute private information supplied by customers on the Internet. Notably, the findings reveal that, despite the privacy policies stated on online shopping websites, Malaysian citizens' worry about website security constitutes a barrier to online purchasing using mobile applications.

As per findings, perceived convenience has a strong and direct impact on the adoption of online shopping using mobile applications among retail consumers. This supports the empirical findings in the e-commerce literature that customer happiness increases consumer loyalty. This means that e-retailers who provide a better e-commerce purchasing experience generate clients who are loyal to their websites. Because the customer experience of service from a website is primarily concerned with item delivery time, the results reveal that e-commerce experience moderates the correlations between

product delivery, contentment, satisfaction and loyalty. This means that providing excellent information on an online buying website and guaranteeing timely delivery determine the happiness of consumers with more than five to ten years of e-commerce experience.

5.4 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Despite its intriguing conceptual and practical contributions, the suggested approach has several shortcomings. The structural model might be enhanced by including factors such as perceived trust, perceived security and perceived convenience that were not included in the original TAM of Davis, Bagozzi, and Warshaw (1989), but were investigated in future editions of TAM2, TAM3 and TAM4. Furthermore, we might rewrite the framework and test a substitute model in which the independent variables are regarded as antecedents of the adoption of online shopping systems using mobile applications among retail consumers. (Wang Jie, 2021).

This questionnaire's primary delivery method is online. Google Forms is the most used way to communicate online. Due to time and financial restrictions, it is mostly delivered through neighbouring students and coworkers, hence the acquired results are limited. There are several limits to the information. In addition, the focus of this study is restricted to the elements that impact customers' online purchasing decisions. This study's variables are insufficiently thorough. Another point of issue is generalizability. The sample is unlikely to be completely random or representative of any wider group. The study, on the other hand, aims to be the first inquiry into the adoption of online shopping

systems using mobile applications for retail consumers. It is only the first step, but it paved the way for further research and experimentation on novel mobile applications in the supermarket sector. (Aiolfi & Bellini, 2019).

Further study might concentrate on the emergence of augmented reality and artificial intelligence as resources for discovering new methods to catch the attention of consumers within the store. These revolutionary innovations would boost the likelihood of using mobile applications for online shopping. Finally, we want to expand the sample size and examine the phenomena in multiple store formats in future research to better understand the influence of rivalry convergence on in-store buying behaviour. (Mofokeng, 2021).

5.5 CONCLUSION

The direct and indirect impacts of perceived usefulness, perceived ease of use, perceived trust, perceived security, and perceived convenience on online shopping systems using mobile applications among retail consumers in Malaysia are investigated in this study. According to the findings, perceived usefulness and perceived convenience have a link with the dependent variable in Malaysia. According to the study, the association between perceived ease of use, perceived trust and perceived security are not validated. More research is suggested to be undertaken in other parts of Malaysia to learn more about online purchasing habits. As a result, this study improved the writing on innovation or framework appropriation that employs the Technology Acceptance Model (TAM). (Kian et al., 2019).

In this study, perceived ease of use had no relationship with the dependent variable, indicating that Malaysians prefer to shop for their items at offline businesses. They find that utilizing the program is time-consuming and that it takes a lot of work to grasp each step in the application to buy online. TAM models are often employed in online purchasing analysis. In this study, the TAM model is evaluated on web-based retail shopping to determine if it produces the same results as general web-based shopping. However, the results revealed that only perceived usefulness and perceived convenience are associated with the adoption of online shopping systems using mobile applications.

As a result, buying online is far more time-consuming than shopping for other items. Malaysian citizens are unaware of the existence of web-based groceries. As a result, people are sceptical and lack confidence in utilizing the program. The responsible parties do not adequately educate them on the benefits of the applications, including safety. All they want is to save time and be more convenient. In National Society, word-of-mouth communication is frequent among family, friends, and coworkers. As a result, knowledge about good offers is easily shared. If the application is frequently referenced in their daily routine, their degree of confidence will rise.

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APPENDIX

ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS.

PENGGUNAAN SISTEM MEMBELI-BELAH DALAM TALIAN MENGGUNAKAN APLIKASI MUDAH ALIH DALAM KALANGAN PENGGUNA RUNCIT.

Dear Sir/Madam,

I am Mishalannkumar a/l Selvathurai (B062010255) studying Bachelor's Degree in Technology Management with Honours (Technology Innovation) from Universiti Teknikal Malaysia Melaka (UTeM). I am surveying the factors contributing to adopting Online Shopping Systems Using Mobile Applications Among Retail Consumers. For the analyses, the inputs are required.

The following questionnaire will require approximately 5-10 minutes to complete. Your kind and sincere cooperation in answering this question is much appreciated. Please be informed that information obtained from this study will be kept highly confidential and will be used for academic purposes only. Thank you for your valuable time and cooperation. Please do not hesitate to contact me for further inquiries.

Yours Sincerely,

MISHALANNKUMAR A/L SELVATHURAI

BACHELOR'S DEGREE IN TECHNOLOGY MANAGEMENT WITH HONOURS (TECHNOLOGY INNOVATION)

mishalann2609@gmail.com

Supervisor: Dr. Johanna binti Abdullah Jaafar

Email: johanna@utem.edu.my
Address: Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, 76100 Hang Tuah Jaya, Melaka.

Tuan/Puan yang dihormati,

Saya Mishalannkumar a/l Selvathurai (B062010255) mengikuti pengajian peringkat Ijazah Sarjana Muda dalam Pengurusan Teknologi dengan Kepujian (Inovasi Teknologi) dari Universiti Teknikal Malaysia Melaka (UTeM). Saya sedang meninjau faktor-faktor yang menyumbang kepada Penggunaan Sistem Membeli-belah Dalam Talian Menggunakan Aplikasi Mudah Alih Dalam Kalangan Pengguna Runcit. Untuk analisis, input diperlukan.

Soal selidik berikut memerlukan lebih kurang 5-10 minit untuk dilengkapkan. Kerjasama tuan/puan yang baik dan ikhlas dalam menjawab soalan ini amat dihargai. Harap maklum bahawa maklumat yang diperoleh dari kajian ini akan dirahsiakan dan akan digunakan untuk tujuan akademik sahaja. Terima kasih atas masa dan kerjasama anda yang berharga. Sila jangan teragak-agak untuk menghubungi saya untuk pertanyaan lanjut.

Yang Ikhlas,

MISHALANNKUMAR A/L SELVATHURAI
IJAZAH SARJANA MUDA PENGURUSAN TEKNOLOGI DENGAN KEPUJIAN (INOVASI TEKNOLOGI)
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Alamat: Fakulti Pengurusan Teknologi dan Teknousahawanan, Universiti Teknikal Malaysia Melaka, 76100 Hang Tuah Jaya, Melaka.

SECTION A: DEMOGRAPHIC BACKGROUND

BAHAGIAN A: LATAR BELAKANG DEMOGRAFI

Please mark (x) the given box.

Sila tandakan (x) jawapan yang sesuai.

1. Age.
   Umur.

☐ 16 – 25 years
16 – 25 tahun

☐ 26 – 35 years
26 – 30 tahun

☐ 36 – 45 years
36 – 45 tahun

☐ Above 45
Lebih daripada 45

2. Gender
   Jantina

☐ Male
Lelaki

☐ Female
Perempuan

3. Education level.
   Tahap Pendidikan.

☐ SPM/STPM

☐ Diploma
Diploma

☐ Bachelor's Degree
Ijazah Sarjana Muda

☐ Master's Degree
Ijazah Sarjana

☐ PhD (Doctorate)
PhD (Kedoktoran)

4. Occupation.
Pekerjaan.

☐ Student
Pelajar

☐ Government Sector
Sektor Kerajaan

☐ Private Sector
Sektor Swasta

☐ Self-Employed
Bekerja Sendiri

☐ Unemployed
Tidak Bekerja

5. Race.
Bangsa.

☐ Malay
Melayu

☐ Chinese
Cina

☐ Indian
India

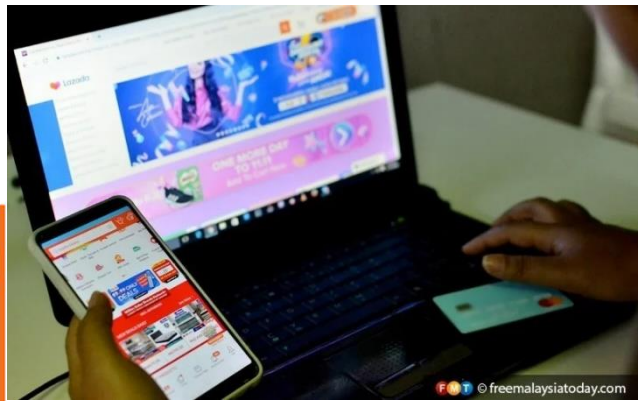
☐ Others (Please Specify): _____
Lain-lain (Sila Nyatakan): _____

SECTION B: GENERAL QUESTIONS ON ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS.

BAHAGIAN B: SOALAN UMUM MENGENAI SISTEM PEMBELIAN DALAM TALIAN MENGGUNAKAN APLIKASI MUDAH ALIH.

The reliance on Internet shopping applications has grown significantly in recent years. Even though the internet buying world increased extraordinarily during the pandemic, the introduction goes back further. Finally, when COVID hit the world, people began to do everything online. For example, suppose someone needed to buy a packet of milk and preferred to do it using an online shopping app. Furthermore, many other requirements, such as clothing, electronics, and jewellery, debuted online. Things that had previously piqued people's interest were now purchased with confidence.

Kebergantungan pada aplikasi membeli-belah Internet telah berkembang dengan ketara dalam beberapa tahun kebelakangan ini. Walaupun dunia pembelian internet meningkat pada kadar yang luar biasa semasa pandemik, pengenalannya kembali lebih jauh. Akhirnya, apabila COVID melanda dunia, orang ramai mula melakukan segala-galanya dalam talian. Sebagai contoh, katakan seseorang perlu membeli sebungkus susu dan memilih untuk melakukannya menggunakan aplikasi beli-belah dalam talian. Tambahan pula, banyak keperluan, seperti pakaian, elektronik dan barang kemas, muncul dalam talian. Perkara yang sebelum ini menarik minat orang ramai kini dibeli dengan yakin.



Please tick (x) the box listed below.

Sila tandakan (x) kotak yang disenaraikan di bawah.

1. Do you use a mobile application to shop online?

   Adakah anda menggunakan aplikasi mudah alih untuk membeli-belah dalam talian?

   ☐ Yes.
   Ya.

   ☐ No.
   Tidak.

2. If Yes, which mobile applications do you use for online shopping?

   Jika Ya, aplikasi mudah alih manakah yang anda gunakan untuk membeli-belah dalam talian?

   ☐ Shopee

   ☐ Lazada

   ☐ Mudah.my

   ☐ Others (Please Specify):_____

   *Lain-lain (Sila Nyatakan):*_____

3. Do you use mobile applications to track your shopping history?

   Adakah anda menggunakan aplikasi mudah alih untuk menjejaki sejarah beli-belah anda?

   ☐ Yes.
   Ya.

   ☐ No.
   Tidak.

4. Do you use mobile applications to compare prices between different retailers?
   Adakah anda menggunakan aplikasi mudah alih untuk membandingkan harga antara peruncit yang berbeza?

   ☐ Yes.
   Ya.

   ☐ No.
   Tidak.

5. Do you find mobile applications more secure than desktop websites for shopping?
   Adakah anda mendapati aplikasi mudah alih lebih selamat daripada tapak web desktop untuk membeli-belah?

   ☐ Yes.
   Ya.

   ☐ No.
   Tidak.

6. Do you use mobile applications to read product reviews before purchasing?
   Adakah anda menggunakan aplikasi mudah alih untuk membaca ulasan produk sebelum membuat pembelian?

   ☐ Yes.
   Ya.

   ☐ No.
   Tidak.

SECTION C: FACTORS INFLUENCING THE ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS.

BAHAGIAN C: FAKTOR-FAKTOR YANG MEMPENGARUHI PENGGUNAAN SISTEM MEMBELI-BELAH DALAM TALIAN MENGGUNAKAN APLIKASI MUDAH ALIH.

Using a 5-point Likert Scale, respondents are required to indicate to what extent their level of strongly disagree, disagree, neutral, agree, or strongly agree with every point of view. Please select ONE figure and tick (x) for each question to reflect your level of agreement or disagreement with the following statements.

Menggunakan Skala Likert 5 mata, responden dikehendaki untuk menunjukkan sejauh mana mereka sangat tidak bersetuju, tidak bersetuju, neutral, bersetuju, atau sangat bersetuju dengan setiap faktor. Sila pilih SATU angka dan tandakan (x) pada setiap soalan untuk menggambarkan tahap persetujuan atau ketidaksetujuan anda dengan pernyataan berikut.

Scale *Skala*	Strongly Disagree *Sangat Tidak Setuju*	Disagree *Tidak Setuju*	Neutral *Neutral*	Agree *Setuju*	Strongly Agree *Sangat Setuju*
Score *Skor*	1	2	3	4	5

FACTORS: PERCEIVED USEFULNESS

FAKTOR: KEBERGUNAAN YANG DIRASAKAN

The extent to which a person feels that employing a specific technology will be helpful.

Sejauh mana seseorang merasakan bahawa menggunakan teknologi tertentu akan membantu.

Label *Label*	Items *Item*	**1**	**2**	**3**	**4**	**5**
PU1	Necessity online purchasing enables me to save time. *Keperluan pembelian dalam talian membolehkan saya menjimatkan masa.*					
PU2	Using online shopping applications for necessities makes it more effective to do my shopping. *Menggunakan aplikasi membeli-belah dalam talian untuk barangan keperluan menjadikannya lebih berkesan untuk melakukan pembelian saya.*					
PU3	Comparative buying is available while using online shopping for necessities. *Belian perbandingan tersedia apabila membeli-belah dalam talian untuk barangan keperluan.*					
PU4	Mobile applications provide a good platform for online shopping. *Aplikasi mudah alih menyediakan platform yang baik untuk membeli-belah dalam talian.*					

Label *Label*	Items *Item*	**1**	**2**	**3**	**4**	**5**
PU5	Accessing shopping sites is facilitated while using mobile applications for online shopping. *Mengakses laman membeli-belah dipermudahkan semasa menggunakan aplikasi mudah alih untuk membeli-belah dalam talian.*					

FACTORS: PERCEIVED EASE OF USE

FAKTOR: DIRASAKAN KEMUDAHAN PENGGUNAAN

The level at which a person feels that utilising a specific system will be easy.

Tahap di mana seseorang merasakan bahawa menggunakan sistem tertentu akan menjadi mudah.

Label *Label*	Items *Item*	**1**	**2**	**3**	**4**	**5**
PEOU1	Learning to operate online shopping via mobile applications is easy for me. *Belajar mengendalikan membeli-belah dalam talian melalui aplikasi mudah alih adalah mudah bagi saya.*					
PEOU2	I find it easy to become skilled at purchasing necessities online via mobile applications. *Saya merasa mudah untuk menjadi mahir dalam membeli barangan keperluan dalam talian melalui aplikasi mudah alih.*					

Label *Label*	Items *Item*	**1**	**2**	**3**	**4**	**5**
PEOU3	It is easy to order necessities online using mobile applications. *Sangat mudah untuk memesan barangan keperluan dalam talian melalui aplikasi mudah alih.*					
PEOU4	Mobile technology is more convenient for accessing shopping information anywhere and anytime. *Teknologi mudah alih adalah lebih mudah untuk mengakses maklumat membeli-belah di mana-mana dan pada bila-bila masa.*					
PEOU5	Any person can easily access mobile applications to purchase online. *Sesiapa sahaja boleh mengakses dengan mudah aplikasi mudah alih untuk membeli-belah secara dalam talian.*					

FACTORS: PERCEIVED TRUST

FAKTOR: KEPERCAYAAN YANG DIRASAKAN

An emotional condition that leads one to trust another based on the other's pleasing behaviour.

Keadaan emosi yang menyebabkan seseorang mempercayai orang lain berdasarkan tingkah laku yang menyenangkan orang lain.

Label *Label*	Items *Item*	**1**	**2**	**3**	**4**	**5**
PT1	I trust each participant involved in the online shopping system using mobile applications, such as the seller and buyer. *Saya mempercayai setiap peserta yang terlibat dalam sistem beli-belah dalam talian melalui aplikasi mudah alih, seperti penjual dan pembeli.*					
PT2	I trust the security mechanisms of the online shopping system using mobile applications. *Saya mempercayai mekanisme keselamatan sistem membeli-belah melalui aplikasi mudah alih.*					
PT3	I trust online shopping system services when using mobile applications. *Saya mempercayai perkhidmatan system apabila membeli-belah melalui aplikasi mudah alih.*					
PT4	I trust the information provided via mobile applications during the online shopping system process. *Saya mempercayai maklumat yang diberikan melalui aplikasi mudah alih semasa proses sistem membeli-belah.*					

Label *Label*	Items *Item*	1	2	3	4	5
PT5	I trust the services offered by mobile applications and have no difficulty telling others about their results. *Saya mempercayai perkhidmatan yang ditawarkan oleh aplikasi mudah alih dan tidak mengalami kesukaran untuk memberitahu orang lain tentang hasil penggunaannya.*					

FACTORS: PERCEIVED SECURITY

FAKTOR: KESELAMATAN YANG DIRASAKAN

The sense of security that customers get when buying on e-commerce platforms.

Rasa selamat yang pelanggan dapat apabila membeli di platform e-dagang.

Label *Label*	Items *Items*	1	2	3	4	5
PS1	I perceive the online shopping system using mobile applications as secure. *Saya melihat sistem membeli-belah melalui aplikasi mudah alih sebagai selamat.*					
PS2	I perceive the information relating to online shopping system transactions using mobile applications as secure. *Saya menganggap maklumat yang berkaitan dengan transaksi sistem membeli-belah melalui aplikasi mudah alih sebagai selamat.*					

Label *Label*	Items *Items*	**1**	**2**	**3**	**4**	**5**
PS3	I perceive that the personal information provided when shopping via mobile applications is secure. *Saya melihat bahawa maklumat peribadi yang diberikan semasa membeli-belah melalui aplikasi mudah alih adalah selamat.*					
PS4	I do not fear hacker invasions when using mobile applications for shopping online. *Saya tidak takut pencerobohan penggodam apabila menggunakan aplikasi mudah alih untuk membeli-belah dalam talian.*					
PS5	The security systems built into the mobile shopping applications are strong enough to protect my account. *Sistem keselamatan yang dibina ke dalam aplikasi membeli-belah mudah alih cukup kuat untuk melindungi akaun saya.*					

FACTORS: PERCEIVED CONVENIENCE

FAKTOR: DIRASAKAN KEMUDAHAN

Users feel that a technology or system will assist them in doing their tasks.

Pengguna merasakan bahawa teknologi atau sistem akan membantu mereka melakukan tugas mereka.

Label *Label*	Items *Items*	**1**	**2**	**3**	**4**	**5**
PC1	Mobile applications would give me greater control over my shopping process online. *Membeli-belah dalam talian melalui aplikasi mudah alih akan memberi saya kawalan yang lebih besar ke atas proses membeli-belah saya.*					
PC2	The selection of goods available on the Internet using mobile applications is extensive. *Pemilihan barangan yang terdapat di Internet menggunakan aplikasi mudah alih adalah luas.*					
PC3	The information given about the products and services on the Internet using mobile applications is sufficient. *Maklumat yang diberikan tentang produk dan perkhidmatan di Internet melalui aplikasi mudah alih adalah mencukupi.*					
PC4	Shopping online using mobile applications would allow me to get better prices. *Membeli-belah dalam Talian melalui aplikasi mudah alih akan membolehkan saya mendapatkan harga yang lebih baik.*					
PC5	I can save the effort of visiting stores when I do Online Shopping using mobile applications. *Saya dapat menjimatkan*					

Label *Label*	Items *Items*	**1**	**2**	**3**	**4**	**5**
	usaha mengunjungi kedai Ketika Membeli-belah dalam talian melalui aplikasi mudah alih.					

SECTION D: ADOPTION OF ONLINE SHOPPING SYSTEMS USING MOBILE APPLICATIONS AMONG RETAIL CONSUMERS.

BAHAGIAN D: PENGGUNAAN SISTEM BELI-BELAH DALAM TALIAN MENGGUNAKAN APLIKASI MUDAH ALIH DALAM KALANGAN PENGGUNA RUNCIT.

Ensure that clients have a positive onboarding experience and continue to use the mobile app frequently.

Proses memastikan bahawa pelanggan mempunyai pengalaman onboarding yang positif dan terus menggunakan aplikasi mudah alih secara kerap.

Label *Label*	Items *Items*	**1**	**2**	**3**	**4**	**5**
DV1	I would choose the mobile shopping applications as a preference to purchase the products online. *Saya akan memilih aplikasi membeli-belah mudah alih sebagai pilihan untuk membeli produk dalam talian.*					
DV2	I would encourage friends and family members to do grocery shopping in the future using mobile applications. *Saya akan menggalakkan rakan-rakan dan ahli keluarga untuk membeli-belah runcit pada masa*					

Label *Label*	Items *Items*	**1**	**2**	**3**	**4**	**5**
	akan datang menggunakan aplikasi mudah alih.					
DV3	I will most likely be using mobile applications to purchase more necessities online. *Kemungkinan besar saya akan menggunakan aplikasi mudah alih untuk membeli lebih banyak keperluan dalam talian.*					
DV4	In the future, I intend to increase the use of mobile applications to do grocery shopping. *Pada masa akan datang, saya berhasrat untuk meningkatkan penggunaan aplikasi mudah alih untuk membuat membeli-belah runcit.*					
DV5	I plan to continue using mobile applications to buy products through online platforms. *Saya merancang untuk terus menggunakan aplikasi mudah alih untuk membeli produk melalui platform dalam talian.*					

Thank you so much for spending your time, effort, and cooperation. Have a nice day! *Terima kasih banyak kerana meluangkan masa, usaha, dan kerjasama anda. Semoga harianda indah!*

REVISED FYP

ORIGINALITY REPORT

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