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Factors Influencing User Adoption of Mobile Payment Applications in Saudi Arabia

A Thesis Submitted in Partial Fulfilment of the Requirements for the
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Submitted by
Hissah Ayedh Alotaibi
ID: 20187448

Supervised by
Dr. Sarra Berraies
Assistant Professor

Kingdom of Bahrain
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University of Bahrain
Deanship of Graduate
Studies And scientific
Research



جامعة البحرين
عمادة الدراسات العليا والبحث
العلمي

Thesis Discussion Committee Decision

Student Name: Hissah Ayedh Alotaibi	Student ID: 20187448
Department: Management & Marketing	College: Business administration
Program: Masters in Business Administration	
Thesis Title: Factors Influencing User Adoption of Mobile Payment Applications in Saudi Arabia	
Supervisor Name: Sarra Berraies	Student GPA: 3.46

The Discussion Committee met on 15-Feb-22 In Online (VIVA voce meeting). Upon discussing the student whose details are stated above in public, the discussion committee recommends the following:

The student is awarded a grade A in the thesis subject.

☐ Without making any changes to the thesis.

☒ After making the modifications attached with this decision.

Discussion Committee Members Approval:

Name

Signature

1. Dr. Sarra Berraies

(Advisor)

2. Dr. Waleed Abdulazeez

(Internal Examiner)

3. Dr. Ayoub nefzi

(External Examiner)

Waleed A. Aziz

Abstract

Mobile payments play a crucial role in mobile industry nowadays. By identifying the factors that is attracting users to adopt mobile payment app, this will carry mobile businesses to the next level and will bring more prospects for expansion. Despite the great benefits of mobile payment services, their adoption by users in Saudi Arabia is considerably low. Furthermore, the associated issues of mobile payment applications have not been addressed noticeably in the Saudi context. In this regard, this research proposed a conceptual model based on the theoretical framework of Technology Acceptance Model (TAM) and of Theory of Planned Behavior (TPB) model variables namely; perceived quality value (PQV), perceived emotional value (PEV), perceived price value (PPV), perceived social value (PSV), and E-trust dimensions as main predictors of intentions of users to adopt mobile payment applications. In addition, to join new variables namely; E-trust as the mediating effect and security as a moderating effect among them. Data analysis is implemented by (SPSS26), and (PLS 3) software for the purpose of testing the research model and hypotheses. The model was tested with 195 Saudi mobile users. The research results show that users perceived values, and E-trust have positive influence on users' intention to adopt mobile payment. This study provides a theoretical contribution to the literature by the effect of perceived values and e-trust on mobile payment adoption, in addition to some managerial implications to increase the promising attitudes toward mobile payment applications.

Keywords: mobile payment, adoption intention, TAM, E-trust, perceived security

Declaration of Originality

Name: Hissah Ayedh Alotaibi

College: Business Administration

University: University of Bahrain

Title of the research: Factors influencing user adoption of mobile payment applications in Saudi Arabia

I hereby confirm that this thesis is the product of my own work as my best of knowledge. All the assistance received in preparing this thesis have been acknowledged and this thesis has not been submitted for any degree or other purposes. The work was done under the guidance of Dr. Sarra Berraies at the University of Bahrain to the award of a Master's degree in Business Administration.

Hissah Ayedh Alotaibi (Candidates)

Signature:



Date: 29/12/2021

In my capacity as supervisor of the candidate's thesis, I certify that the above statements are true to the best of my knowledge.
Dr. Sarra Berraies (Supervisor)

Signature:



Date: 29/12/2021

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Glossary of Terms

Abbreviation	Full-Form
SAMA	Saudi Arabian Monetary Authority
SMS	Short Message Service
GPRS	General Packet Radio Service
NFC	Near Field Communication
QR	Quick Response Code
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
TPB	Theory of Planned Behavior
COVID 19	Coronavirus Disease of 2019
PIN	Personal Identification Number
POS	Point of Sale

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Chapter 1: Introduction

1.1 Introduction

The development of new technologies is a major driver of digital advancement in the whole world. Among these technologies, mobile payment applications constitute an innovative approach that allows individuals to conduct financial transactions on their smartphones using specific money applications. Service providers utilize these platforms to offer payment services to clients. Despite the increasing popularity of digitization, technological innovations, and mobile payment applications, multiple aspects influence their adoption by consumers.

Mobile payment applications are recent innovations that build on the advancement of electronic payment methods like e-commerce websites. Mobile payments refer to forms of online payment that rely on mobile networks to complete transactions between two entities, transfer money, make payments, and check balances (Gao & Waechter, 2017).

The development of mobile payment applications allows for the use of mobile phones to make payments for goods and services. These applications have multiple benefits that include increased convenience, better payment security, and lower transaction fees (Putri et al., 2020). The creation of mobile payment applications meets the need for more flexibility for consumers and merchants. The development of infrastructures like the internet and the increasing penetration of mobile smartphones also encourage the development of mobile payment apps (Alkhaldi, 2016). The increased use of mobile application payments depends on the ability to win consumer trust through

enacting measures that protect personal and sensitive information. Mobile payment applications have been encouraged by the development and adoption of mobile phones, relevant technology, and better infrastructure. Despite previous and existing challenges relating to security and other dimensions, the use of mobile payment apps is likely to grow in the future.

The most commonly used current mobile systems of payment are the Near Field Communication (NFC) and the Short Message Service (SMS). Unlike SMS, the NFC demands proximity. SMS is the most widely used payment means and reportedly has the highest profits (Liébana-Cabanillas et al., 2017). The communication protocols enabling the SMS mobile payment systems must facilitate the sending and receiving of text messages between any two mobile devices involved in the financial transaction. There are four major security-related challenges to the SMS, despite its prevalence. The absence of codes makes it easier to intercept the communication. Also, the message is stored in the terminal receptor after completion. There are challenges with confirmation after delivery. Lastly, reduced transmission capacity limits the characters to 160 (Liébana-Cabanillas et al., 2017). These limitations make the NFC users rise with the increased availability of smartphones with more complex capabilities.

In our era of technological turbulence, consumers acceptance stood as the main challenge to the spread of any new technology. Major researches explored the technology acceptance model (TAM) to project the intention, adoption, and actual usage of information technology world-wide. But interestingly, it has been claimed that TAM might not hold equally well across other different countries or cultures (Alswaigh & Aloud, 2021). Few studies have used TAM and explored its usage and applicability across the Middle East countries.

As with the rest of the world, the use of mobile applications in Saudi Arabia continues to increase. The country registered one of the highest internet adoption rates in the Middle East in 2012: 49% of the population used the internet and the trend showed an upward curve (Al-Husein & Sadi, 2015). In 2019, 93.5% of all Saudi Arabia internet users gained access using their mobile phones. This number showed an increase from 2013 where only 38% used mobile phones to access the internet (Individuals and Families Report - Results of the ICT Market Survey Study, 2019). Some of the factors for this increase include better mobile internet connectivity and the increasing penetration of smartphones. Saudi Arabia boasts a 93% internet penetration, with 76% of all banking customers using digital platforms (Fernandez, 2021). 60% of these customers use mobile and online applications to the bank. The use of mobile phones to access websites traditionally designed for wider screens may offer less than ideal experiences for users. Therefore, application providers continue to adapt their systems to feature fewer details and large texts for smartphone users (Al-Husein & Sadi, 2015).

An empirical evaluation of mobile payment services in Saudi Arabia found that despite the perception of the importance of the platform, there was a general lack of awareness and low acceptance of these services (Alkhaldi, 2016; Al-Jabri, 2015). Major challenges that providers in Saudi Arabia face when providing mobile payment options for their clients include inadequacies, considerations of consumer concerns, trust, inexperience by customers, and cost concerns for secured technology (Alkhaldi, 2016). These challenges continue shaping mobile payment application adoption in Saudi Arabia. For example, when clients perceive high-security risks, they may prefer traditional payment methods like the internet and face-to-face transactions which offer similar and safer services (Cheng et al., 2006; Al-Jabri, 2015). In Saudi

Arabia, security concerns include loss of mobile devices, identity theft, exposure of private information, and breaches on the infrastructure (Al-Jabri, 2015). Therefore, mobile payment applications should justify their usefulness while minimizing security concerns. These concerns, and their variability among the population, may hold significant implications for the adoption of mobile payment solutions in Saudi society.

During coronavirus pandemics, digital payments like mobile NFCs have been keeping nations' economies running and helping individuals minimize contact with the virus. Contactless digital payments methods at the point of purchase, such as Quick Response (QR) or (NFC), can make it less probably for the virus to continue spreading to others through cash payments and exchanges. mobile payments are limiting contact transactions and ensuring consumers can purchase necessities from the comfort of their own spaces. Throughout the spread of the Covid 19 virus around the world, and in an effort to control this virus, the World Health Organization urged individuals to neglect the exchange of cash and replace as possible with contactless NFC payment method or any other method that does not require direct contact between the buyer and the seller. This research aims to investigate the factors that affect Saudi users' intentions to adopt mobile payment services during a global pandemic period.

1.2 Research problem

In Saudi Arabia, the low awareness levels of mobile financial services and possible benefits present barriers to the adoption of these platforms (Al-Husein & Sadi, 2015; Alkhaldi, 2016). Al-Husein & Sadi (2015) point out that some people were reluctant to use mobile banking and would only adopt change if it was necessary. A survey in the Middle East showed that 38 percent

of people were not aware of mobile payment services from their banks and another 46% of users were not willing to engage in mobile payment services (Alkhaldi, 2016). In a different study, over two-thirds of the participants never used mobile banking (Al-Jabri, 2015).

Mobile payment applications become a key factor of the new digital economy. Despite high expectations, existing mobile payment solutions in Saudi Arabia seem to be troubled by weaknesses (Alkhaldi, 2016). New applications keep appearing but none has reached a considerable customer base. Numerous questions are still not answered about the reasons for this slow adoption. Moreover, the Covid 19 pandemic situation has put a spotlight on the Mobile payment applications that allow customers to use their smartphones to make online purchases and financial transactions and pay their bills without leaving home.

Few studies have explored the factors influencing mobile payment application adoption in the Saudi Arabian context. Bamasak (2011) investigated the concerns toward using mobile payment applications. The paper's findings highlighted the most important concerns that users in Saudi Arabia encounter when using those applications. Security of the payment application that is involving the illegal use of mobiles to perform financial payments is considered a strong barrier for users toward the continued use of mobile payment applications. In addition, other authors investigated added 11 factors that affected the acceptance of mobile transactions in Saudi Arabia (Alqahtani et al., 2014). In light of the UTAUT model, they revealed that the most significant factors included ease of use, usefulness, navigational feature, the appearance of the app, security, trust, cost, social influence, and others. A recent study by Alabdan & Sulphey (2020) utilized the ease of use factor from the TAM model in the research in addition to other three factors: utility,

awareness, and security to investigate the Saudi user acceptance of mobile payment. The study concluded that those factors significantly identified the mobile payment adoption among Saudis except for the utility factor that showed no significant impact.

Lastly, Alswaigh & Aloud (2021) contributed to the mobile payment services literature by exploring the factors that influence user adoption of mobile payment services in the context of Saudi Arabia. In this paper, the research proposed a model using the extended TAM and UTAUT models exploring other factors affecting Saudi acceptance of mobile payment applications. The study indicated that mobile payment adoption among Saudis is mostly influenced by the facilitating conditions of mobile apps, and lifestyle compatibility.

Past researches have been mainly utilized the TAM model with other factors for the reason to investigate mobile payment adoption such as security, utility, awareness, cost, facilitating conditions, lifestyle, compatibility, convenience, social influence, facilitating condition, visual appeal, and system quality. However, only a few studies examined the intention to adopt mobile payment from the user trust and security perception, especially in the MENA countries. This research integrated both the technology acceptance model (TAM) and the theory of planned behavior (TPB) to explore mobile payment user adoption. The researcher included users' perceived values e.g., price value, quality value, social value, and emotional value into the model as the determinants of mobile payment user adoption. The researcher also examined the mediating effect of users' e-trust between users' perceived values toward mobile payment applications and usage adoption toward the mobile payment applications, and the moderating role of the perceived security of these applications.

The research will address the literature gap regarding the factors influencing the users' attitude towards the adoption of mobile payment applications in Saudi Arabia including the effect of e-trust as a mediator in this relationship. The research will also explore the role of application security in the relation between users' perceived values and their trust toward the adoption of the mobile payment application.

1.2 Research questions

Based on the previous discussions, the following questions are investigated in this research.

- 1- Do users' perceived values of the mobile payment application have a positive effect on the users' adoption of mobile payment applications?
- 2- Do users' perceived values of the mobile payment application have a positive effect on their e-trust toward mobile payment applications?
- 3- Does users' e-trust toward mobile payment applications positively affect the adoption of mobile payment applications?
- 4- Does users' e-trust toward the mobile payment application mediate the relationship between the perception of value by users and the adoption of mobile payment applications?
- 5- Does perceived mobile payment application security moderate the relationship between users' perceived values of the mobile payment applications and users' e-trust toward mobile payment applications?

This research attempts to present answers to the above questions, and contribute to the literature by introducing key aspects that influence user intention to adopt mobile payment applications in the Saudi context. This research will utilize the technology acceptance model (TAM), and specific

research method to achieve a better understanding of the adoption of mobile payment applications and to improve the user experiences in general. The research's end results will allow service providers, and application developers to approach more trusting adoption strategies and of quality of their mobile payment services.

1.4 Research objectives

The main objective of this research is to highlight the factors that influence the user intention to adopt mobile payment applications, namely the users; perceived values toward the mobile payment applications and to highlight the mediating role of users' e-trust and moderating role security of mobile payment application. The research provides a basis to understand mobile payment adoption in Saudi Arabia during the Covid 19 pandemic.

The specific objectives of this research are as follows:

- To better understand the factors that influence users' adoption of mobile payment applications namely perceived values of the mobile payment application integrating price value, quality value, social value, and emotional value.
- To investigate the mediating role of users' e-trust in the link between perceived values of the mobile payment application and users' adoption of mobile payment applications.
- To investigate the moderating effect of mobile payment applications' security in the link between perceived values of the mobile payment application and users' e-trust.

1.5 Research Significance

In our world which is rapidly moving toward more digital communications of trade, mobile payments applications are capable of generating positive impacts toward the sustainability of world economies during rough times (Liébana-Cabanillas, et al., 2020). In this research, therefore, the researcher will contribute by adding to the literature of e-payment in general, and mobile payment applications in specific. The research will offer an insight look on the evolution of mobile payment applications; evaluate the capability of its adoption, and uncover the potential opportunities in Saudi Arabia. Moreover, this study will highlight the users' own perceptions affecting their behavioral intention to adopt mobile payment, especially in Saudi Arabia, that should be explored. The research will take the lead in exploring the effect of e-trust as a mediator in the relationship of the consumers' attitude towards the adoption of mobile payment applications. The research will also address the literature gap regarding the role of application security in the relation between users' perceived values and their trust toward the adoption of the mobile payment application.

In addition, this research will enrich the current world literature and introduce valuable knowledge about the intention to adopt mobile payment applications during the Covid 19 pandemic. This research will enable future service providers and developers in developing the current mobile services and raising the adoption rate during the Covid 19 pandemic and possibly after. The theoretical significance of this research is that it is the first to employ the TAM in addition to other factors with e-trust as a mediator between these variables in investigating the intention to adopt mobile payment applications during the Covid 19 pandemic in Saudi Arabia.

1.6 Thesis setting

The research was conducted in Saudi Arabia which is considered one of the world's most developed mobile phone businesses, with a mobile telecom subscription penetration rate of over 134.7% (Citc, 2021). The study explores the intention to adopt mobile payment applications by Saudi citizens. The research methodology of this thesis is quantitative through the development of a survey questionnaire. The instruments were taken from reliable sources. Therefore, the variables were measured by a five-point Likert scale adapted from previous studies. The empirical study was conducted on 195 respondents (both male and female) in Riyadh, the capital city of Saudi Arabia. The research conceptual model was developed by utilizing the TAM model and TPB theory; and extended on previous studies by developing hypotheses and exploring other different factors on the user's intention to adopt mobile payment applications. The study investigated factors as follows: users' perceived values, security, e-trust, and intention to adopt mobile payment applications. Gender, age, income, and education effects as control variables on intention to adopt mobile payment is also investigated. Statistical Package for the Social Sciences software (SPSS 26), was used in this study to compute frequencies, means, variance, and standard deviation, while reliability and validity measurement scales were tested using Partial Least Squares Structural Equation Modeling Smart (PLS 3). The study applied the p-value approach and the two-stage approach offered by SMART PLS and the PLS path modeling to test the research hypotheses.

1.7 Thesis Structure

The research structure is organized as follows: Chapter 1 describes the background of the study, the problem, and the questions. Then, the research objectives are outlined, research significance is highlighted, along with the thesis settings and structure.

The literature of past studies about the factors that affect user intention toward mobile payment adoption will be reviewed in chapter 2. The first section of chapter 2 analyses the literature about the user's perceived values of the mobile payment applications. The second section analyses the theoretical literature of the users' adoption of mobile payment applications namely; the technology acceptance model (TAM) theory. In section 3, the literature discusses the users' perceived values' effect on the adoption of mobile payment applications. The concept of e-trust of users of mobile payment applications is introduced in section 4. While section 5 highlights the link between users-e-trust and users' adoption of mobile payment applications. The moderating effect of this construct is introduced in section 6 of chapter 2. Section 7 presents a literature review of the concept of perceived mobile payment applications' security. Finally, section 8 proposes the conceptual model of the research and research hypotheses, while section 9 provides a summary of this chapter.

In chapter 3, the research methodology of the empirical part of the study will be applied. Section 2 of this chapter highlights the research epistemological position. The research method applied in this study is introduced in section 3, and the research constructs are presented in section 4. Section 5 presents the data collection process and the sampling method utilized in this research. Section 6 highlights the measurement scale of all variables and questionnaire questions. Lastly, Section 7 presents the

approaches and statistics used for the data analysis in research hypothesis testing.

The research empirical findings are revealed in chapter 4. In the first section, the sample characteristics are presented. In the second part, the results of the Descriptive Statistical Analysis are featured, including the mean, standard deviation, and multicollinearity test. In the third section, the results related to the reliability, the convergent validity, and the discriminant validity of the variables are highlighted. Section 4 presents the results of the quality of the model and the hypothesis testing is outlined. The last part is a discussion and interpretation of the research results.

Chapter 5 concludes the study, addresses some particular limitations and provides future research implications.

1.8 Research terminology

Perceived quality value (PQV): Ability of the product to meet the user's expectation of its performance in terms of functionality

Perceived emotional value (PEV): The pleasure or enjoyment that a user derives from using the product

Perceived price value (PPV): The utility that a person derives from the product due to the perception of the reduction of the perceived short- and long-term costs of using the product

Perceived social value (PSV): The considerations of the social consequences that the product communicates to others in society

Perceived ability (PTA): The user's perception of the firm's competencies and implementation of the expected behavior

Perceived integrity (PTB): The belief that the trustee will fulfill their obligations to the trustors

Perceived benevolence (PTB): The belief that an organization is interested in doing good beyond the mere objective of making a profit.

Perceived mobile payment application security (PMPS): The degree to which a user believes that using a particular online payment service will be harmless

E-trust: The risk that the customer incurs when dealing with retailers, other consumers, and the technological environment within the e-services and digital contexts.

Mobile payment application: Mobile payment is any payment in which a portable electronic device such as a cell phone or a tablet is utilized to authorize and confirm a financial transaction service.

1.9 Summary

This research aims to explore the factors that affect the adoption of mobile payment applications conceptually and empirically. The research attempts to offer an exclusive contribution to previous literature by analyzing two models, namely the technology acceptance model (TAM), and the theory of planned behavior (TPB) model, and utilizing a quantitative research method. The data collection techniques used were non-probability sampling. This research aims to achieve a better user experience by understanding their drives regarding mobile payment. It also attempts to inspire mobile service owners, and application developers, to better respond to the needs of their online users in order to foster a trusting lasting relationship that is technologically savvy. Mobile payment applications may be valued as a future payment system. In this context, in the following chapter the researcher examines the mobile payment literature and its conceptual framework. The chapters after presents findings and discusses limitations as well as some directions for future research.

Chapter 2: Literature review

2.1 Introduction

This chapter presents a review of past studies to offer an understanding of some factors that influence the customers to adopt mobile payment applications. The second part of this thesis proposes to lay the theoretical foundations allowing the construction of a research model synthesizing, on the one hand, the direct relationship between users' perceived values of the mobile payment applications and the users' adoption of these applications, and other on the one hand, the indirect relationship between these two variables by examining the mediating effect of users e-trust toward the mobile payment applications and the moderating role of the perceived security of these applications. This chapter reports on the state of the art on the concepts of perceived values, e-trust, and adoption of mobile payment applications and attempts to define the causal links between these variables.

This chapter is organized along with eight sections. The first section discusses the theoretical debates on the users' adoption of mobile payment applications to allow a better understanding of the opportunities offered by these applications in the current context, what factors can affect the adoption of these technologies by the customers, and the theory that constitutes the research framework to explain the link between the variables. The second section analyses the literature about the user's perceived values of mobile payment applications. Section 3 presents a literature review about the effect of users' perceived values on the adoption of mobile payment applications. Section 4 lifts the veils on the concept of e-trust of users of mobile payment

applications and offers a better understanding of the link between users' perceived values of mobile payment applications and users' e-trust. Section 5 highlights the link between users-e-trust and users' adoption of mobile payment applications. Section 6 discusses the moderating effect of users-e-trust in the link between users' perceived values and users' adoption of mobile payment applications. Section 7 presents a literature review that looks at the concept of perceived mobile payment applications' security, and how it can affect the adoption of mobile payment applications. Finally, section 8 presents a summary of this chapter.

2.2 Users' adoption of Mobile Payment Applications

The first sub-section looks at the presentation of the definition and the importance of mobile payment applications. The second sub-section presents the Technology Acceptance model that represents a valuable framework to explain the adoption of mobile payment applications.

2.2.1 Mobile payment applications

Any cashless payment in which a portable electronic device such as a cell phone or a tablet is operated to authorize and confirm a financial service is referred to as mobile payment (Chandra et al. 2018). In general, mobile payment transactions include many financial operation services such as electronic money transfer, saved value cards, or prepaid cards rapid payments (Gao & Waechter, 2017; Chandra et al., 2018). Thus, it can be assumed that mobile payment is a successful tool to meet individuals' needs in terms of making payments, money transfers, saving sensitive banking information, restoring shopping details, saving payment history, etc. The absence of such a system fails in carrying out several transactions (Singh et al., 2017). This

financial system presents an opportunity for many financial service providers to continue making enhancements to better serve customers efficiently and effectively (Singh et al., 2017).

The mobile payment application is an electronic tool that can be installed on a individuals' portable device and enables them to perform, save, and pay money anytime and anywhere (Singh et al., 2020). This tool has several features and facilities that can substitute traditional payments and transactions (Kaur et., 2020; Alswaigh & Aloud 2021). It is designed to provide a fast, secured, convenient, and easy access solution to making payments which consequently may facilitate the adoption of mobile payment services (Kolaki, 2017).

However, despite its ubiquitous usage and integrated ease of use, mobile payment seemed to suffer from the uncertainty and risk of virtual transactions (Kolaki, 2017; Gao & Waechter, 2017). For example, mobile wireless networks are more exposed to illegal hacking or system interruption. The users are occasionally concerned about whether mobile payment can successfully protect their payments and account information from data breaches and malware problems (Yan & Yang, 2015). Compared to the underwired network, mobile networks connections are less stable and have low bandwidth thus, users may confront with frequent service interruptions and slow response (Gao & Waechter, 2017). Nevertheless, mobile phones have some restraints such as poor resolution, small display, and problematic installation. Such restraints may act as a barrier for some users to search for and view related information; and may increase their doubts on mobile payment security which eventually will affect the usage adoption negatively (Gao & Waechter, 2017).

More businesses and clients in different societies are embracing digital solutions in activities and processes like payment. Among the many innovative approaches, mobile payment applications continue to gain more attention and acceptance across the world (Mwafise & Stapleton, 2012). As of 2017, there were estimations for a mobile money transaction worth more than USD 780 billion globally, and an 85% use of mobile application payment solutions among points of sale (Joseph et al., 2018). The wide reach of mobile applications and the entry of multiple stakeholders in mobile payment applications contribute to the automation of payment processes.

In countries like China, however, higher penetration of mobile services did not necessarily lead to the higher adoption of mobile payment systems. Compared to an 81 penetration of mobile phones in 2015, only 15.2% of users adopted mobile payment options (Yan & Yang, 2015). The report indicated that most Chinese mobile users had higher adoption rates for entertainment apps like games and music. Liébana-Cabanillas and colleagues (2017) observe that there are different modes of mobile payments depending on the proximity of users to POS terminals. In Saudi Arabia, citizens have access to mobile payment systems. For example, most banks offer clients mobile banking service options (Al-Jabri & Sohail, 2012). However, the authors noted that mobile services do not have optimal adoption rates because of an inadequate understanding of factors that lead to user adoption.

In Saudi Arabia, the adoption of e-banking services was crucial to the introduction of m-payment and mobile banking applications. The Saudi Arabian Monetary Agency (SAMA) charges the banks with the responsibility of adopting and maintaining a secure e-banking system to manage the associated risks (Alkhaldi, 2016). Therefore, banks should ensure that all transactions on internet banking platforms are secure through measures like

reinforcing physical security and strengthening access controls. In 1996, Saudi Arabia had its first phone banking service, the Saudi American Bank Phone (Alkhaldi, 2016). After the Saudi American Bank introduced its first static website on the internet in late 1999, other banks established an online presence in the mid-2000. After 2001, Saudi banks started offering mobile banking services through the SMS-banking option, WAP-banking platforms that utilize GPRS, and over downloaded mobile applications. Alkhaldi (2016) notes that the transition to mobile banking in Saudi Arabia was slow because of the relative uncertainty among consumers and the need to build trust and address existing challenges. Nonetheless, many people continue to transition towards m-banking options. An empirical evaluation of mobile payment services in Saudi Arabia found that despite the perception of the importance of the platform, there was a general lack of awareness and low acceptance of m-banking services (Alkhaldi, 2016; Al-Jabri, 2015). Major challenges that providers in Saudi Arabia face when providing mobile banking options for their clients include inadequacies, considerations of consumer concerns, trust, inexperience by customers, and cost concerns for secured technology (Alkhaldi, 2016). These challenges continue shaping mobile banking adoption in Saudi Arabia.

Recently, the impact of the Covid 19 pandemic has increased the mobile payment services and financial transactions rather than the use of cash (Alswaigh & Aloud 2021). As a consequence of this pandemic, and in an attempt to contain the high-risk spread of Covid 19, the WHO (2020) strongly urged people to maintain a physical distance among them. In this sense, the contactless features of mobile payments like (NFC) and (QR) have effectively contributed to individuals' expectancies to maintain a successful financial transaction process and guard their safety (Zhao & Bacao, 2021). During the

Covid19 pandemic, an increased change rate on the adoption of mobile payment services was reported in a study. Alswaigh & Aloud 2021 mentioned that 26% of Saudi citizens adopted mobile payment services because of the Covid 19 pandemic. It is confirmed that because of Covid 19, as a worldwide pandemic, peoples' everyday lives and the world economy have considerably changed.

Multiple theories define user behavior and the adoption of new technologies. They include the Unified Theories of Acceptance and Use of Technology and the Innovation Diffusion theories (Koenig-Lewis et al., 2015; Al-Jabri and Sohail, 2012; Al-Jabri, 2015). Innovation Diffusion Theory looks at the adoption of technology over time. It argues that the eventual adoption of an intervention depends on compatibility, complexity, observability, relative advantage, and trialability (Al-Jabri, 2015; Su et al., 2018). The UTAUT model includes four main factors: effort, social, performance, and facilitating conditions (Venkatesh et al., 2003). Numerous studies have utilized UTAUT to explore factors that mostly influence mobile payment acceptance. Trust was integrated into this model by some authors who indicated that this factor has a strong effect on the user intention to adopt the latest technology (Alkhowaiter, 2020; W. Chaiyasoonthorn, 2019; Jung et al., 2020). A study by Jung et al., (2019) who added knowledge and compatibility as extended factors to the UTAUT was emphasized on the improving role of these factors as a key measurement of a user's intention to adopt mobile payment applications in USA.

2.2.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a well-known model used to explain technology adoption behaviors (Wallace & Sheetz, 2014). This model, which was created by Davis (1989), attempts to explain the reason behind choosing or adopting a particular technology for individuals when performing a task. According to TAM, adoption attitude is determined by the intention to utilize a specific system, which is, in turn, impacted by perceived usefulness and perceived ease of use. Perceived usefulness refers to the level to which a user believes that using a particular technology would improve his or her job performance (Davis, 1989). The second variable is perceived ease of use which refers to the level to which a user believes that using a particular technology would be effortless physically and mentally (Davis, 1989). One major benefit of using this model is that it introduces a framework by which the influence of external variables on technology system usage can be evaluated (Wallace & Sheetz, 2014). TAM model (shown in Fig. 1) explains the relationships between perceived usefulness, perceived ease of use, and actual use. However, many researchers have often added sub-dimensions explaining the concept of the main variables. Previous studies prove that by expanding the TAM model to include further elements that is measuring the user attitude, the intention to adopt new technology is significantly improved. Chawla and H. Joshi (2019) have proven that perceived usefulness, perceived ease of use, facilitating conditions, trust, lifestyle compatibility, and security are all key factors that is influencing users to accept and adopt new technology. Other researchers explored sub-factors that influenced the two main variables of the TAM model. Seetharaman et al., (2017) found that transaction cost and speed have a very significant influence

on perceived usefulness, while transaction security, the nominal cost of the transaction had a very strong influence on perceived ease of use. To introduce a more comprehensive understanding of the user's different behavioral intentions, many previous researches added additional factors into the TAM model (Chawla and H. Joshi, 2019; Seetharaman et al., 2017; Chandra et al., 2018). Yan and Yang (2015) considered the users' e-trust as an important element and confirmed a significant effect of this factor on adoption intention. Likewise, Chandra et al. (2018) included trust in their integrated TAM model to study the adoption of mobile payments in Singapore and the result confirmed the significant role of this factor as a fundamental predictor.

This model was developed in 1989. It argues that the ease of use and perceived usefulness explain the consumer's attitude in adopting a technology (Liébana-Cabanillas et al., 2017; Cheng et al., 2006). The adoption attitude also determines the intention to adopt and therefore leads to the actual adoption behavior. A comparative study using the TAM model revealed that different factors affect Spanish consumers' attitudes towards NFC and SMS mobile payment systems (Liébana-Cabanillas et al., 2017). Perceived ease of use was found to have no significant impact on the intention to adopt and perceived usefulness in a 2015 study (Koenig-Lewis et al., 2015). This theory offers some insights into factors that are influencing the adoption of mobile payment applications in Saudi Arabia.

For this research, the appropriate framework was selected from integrated TAM and trust dimensions to study mobile payment adoption. After choosing the framework, the research continued through the formation of a research model that includes the modification of external variables. The study used a modified TAM model that has 8 variables: the quality value, the social value, the emotional value, and the value for money or price (Sweeney

& Soutar, 2001). The research also investigated the e-trust mediated role in the adoption of mobile payment applications. (Park et al., 2018; Rehman et al., 2019). Finally, Payment security is considered an important moderating construct, which could support the adoption of mobile payment (Putri et al., 2020).

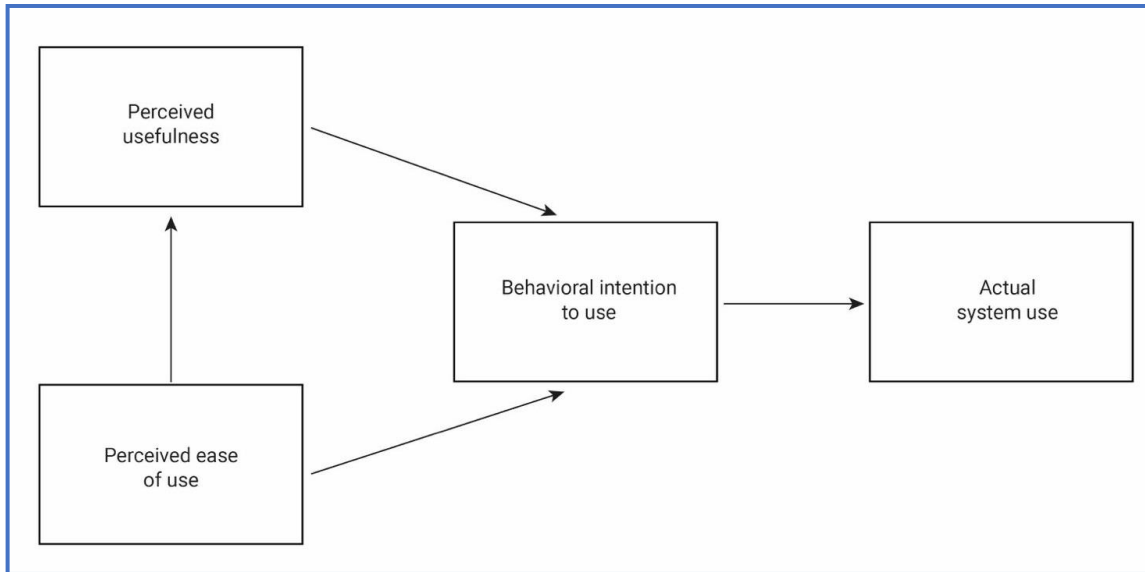


Figure 1 Technology Acceptance Model (Davis, 1989).

2.3 Users' perceived values toward mobile payment applications

This second section below proposes to take stock of the state of the art on managerial literature devoted to the concept of users' perceived values toward mobile payment applications. It is structured in two sub-sections. The first sub-section discusses the concept of perceived value and highlights it as a multi-dimensional concept. The second sub-section defines the dimensions that integrate the variable of perceived values of the mobile payment applications.

2.3.1 Perceived value

Value creation is a core part of the strategy of most organizations and businesses that seek long-term success, better relationships with their customers, and a sustainable competitive advantage. Sweeney and Soutar (2001) mention that businesses deliver superior value when they effectively meet the customers' needs. Consumers are described as 'value-driven' (Sweeney & Soutar, 2001). Businesses must therefore seek to understand what exactly the consumer value is. Perceived value relates to the way individuals determine the utility of products and services. It refers to the state of fulfillment expected when using a service or good and the ultimate gain (Uzir et al., 2020). For example, some individuals associate value with quality and others with relatively lower prices (Gheorghe et al., 2019). For others, value refers to the right balance of quality and price. A user's perceived value refers to the assessment of a product's utility based on what the user gives versus what they receive (Sweeney & Soutar, 2001; Uzir et al., 2020).

User perceived value is the third meaningful marketing construct after user satisfaction and loyalty (Gheorghe et al., 2019). Product developers must consider the value they offer to consumers because value plays an important role in explaining consumer behavior at the before and after purchase stages. Customer value is a likely predictor for customer choice and has a linear association with loyalty (Zauner et al., 2015).

Customer's perceived value has been conceptualized by multiple researchers (Sweeney & Soutar, 2001; Gheorghe et al., 2019; Monroe, 1990; Uzir et al., 2020). In this line, two approaches have been identified in the literature. In the light of the first approach, customers' perceived value is considered as a uni-dimensional concept materializing how firms must

consider how to balance the tradeoffs between benefits and sacrifices from consumers to ensure consistent use of their products (Monroe, 1990; Uzir et al., 2020). Nevertheless, customers' perceived value is not confined to the functional characteristics i.e., price and quality, but integrate other factors as well (Wang et al., 2013). The second approach focuses on this idea and considers customers' perceived value as a multi-dimensional concept (Sweeney & Soutar, 2001; Gheorghe et al., 2019). Sweeney and Soutar (2001) defined customers' perceived value as a multi-dimensional concept integrating four dimensions that guide the understanding of the user-perceived value in this study. These factors are the quality or performance value, the social value, the emotional value, and the value for money or price.

2.3.2 Users' perceived value dimensions

User perception of a mobile payment application's value is a key factor explaining their decision to adopt this technology. The perception of the monetary value, quality value, social value, and emotional value of the payment platform all contribute towards a dominant attitude of the customers (Sweeney & Soutar, 2001). Quality perceptions refer to the ability of the product to meet the user's expectation of its performance in terms of functionality (Sweeney & Soutar, 2001). The quality value includes aspects such as the consistent quality of the app, whether it is well-made, and if it could last a long-time. Performance, speed, and convenience when using mobile platforms to make payments encourage more users to transact using these applications (Putri et al., 2020). The design of the application should encourage some sense of user efficacy (Al-Husein & Sadi, 2015). When users are more confident in their ability to navigate mobile applications, they will be able to explore one or multiple payment options. Therefore, the quality of

mobile payment applications can either encourage or discourage users from using the technology over the long term. Consistency of application quality encourages clients to utilize mobile payment platforms.

Emotional value concerns how the user feels when interacting with the app. Emotional value addresses the pleasure or enjoyment that a consumer derives from using the product (Sweeney & Soutar, 2001). Some aspects include enjoyability, feelings of pleasure, feeling good, feeling relaxed, and whether the app attracts the user to engage it. These factors have value, considering that most smartphone users prize entertaining activities more than less interesting activities (Yan & Yang, 2015). High-quality internet access and speed are likely to encourage more use of online financial services (Al-Husein & Sadi, 2015). In this line, the Saudi government has made investments in upgrading internet infrastructure (Alkhaldi, 2016). Customers are more likely to enjoy using the applications when the internet connection is strong and readily available. Consumer experience is a predictor for the continued use of m-banking services (Putri et al., 2020). The emotional experience with online mobile payment applications is of great value in informing users' decision to adopt the system over the long term.

Price value explores the market valuation of the application in terms of its accessibility and impact on consumer finances. Value for money considers the price for the product in relation to its quality. It is the utility that a person derives from the product due to the perception of the reduction of the perceived short- and long-term costs of using the product (Sweeney & Soutar, 2001). Some factors to consider include whether the mobile payment application is reasonably priced, economical; and whether it is a valuable exchange for money (Sullivan & Kim, 2018). A study on mobile banking acceptance and use found that compatibility was a leading factor in predicting

the increased use of mobile banking applications (Hidayat-ur-Rehman, 2014). The study reported that users were more likely to consider options that suit their existing banking behaviors and the way of conducting business. Moreover, consumers were more likely to adopt an application whose value they could easily perceive. For example, the ability to use the app at any time and place predicted a higher likelihood for adoption (Hidayat-ur-Rehman, 2014). In Saudi Arabia, there is a general belief that consumers benefit more than banks from m-banking systems and applications (Alkhaldi, 2016). Mobile payment applications can attract and maintain clients through promotions (Putri et al., 2020). Promotional efforts like offers and discounts give clients additional value and may encourage their continued use of the platform. Perception of value from the mobile apps increases intention to adopt the technology.

Social factors also influence the adoption of mobile payment systems. Consumer social value perceptions refer to the considerations of the social consequences that the product communicates to others in society (Sweeney & Soutar, 2001). Putri et al. (2020) emphasize the importance of external factors like cultural views, policy frameworks, and compatibility in the utilization of mobile payment applications. At personal levels, individuals are likely to adopt a technology that improves their acceptability and perception by society. When a payment culture strongly supports the use of mobile payment systems, individuals are more likely to adopt such (Putri et al., 2020). When the use of an application creates a good impression on others and gives its user social approval, it is more likely to gain acceptance.

2.4 Effect of users' perceived values on the adoption of mobile payment applications

According to the TAM, the main predictor and main factor of the influence of other variables on intention to adopt is the user's attitude towards using a technology (Davis et al., 1989). Therefore, the client will likely utilize the service if they considered it to be of value. However, when the service or provider does not provide as expected, the customer suffers harm (Taddeo, 2009). These negative experiences may negatively affect the association between perceived value and adoption of mobile payment applications. Therefore, a relationship has been confirmed between the perceived value of the user and his intention to use a tool.

There is a growing amount of literature that has examined the impact of perceived usefulness in the context of TAM (Wallace & Sheetz, 2014; Sussman & Siegal, 2003). These studies have tried to understand antecedents of perceived usefulness as they are linked to technology and information adoption. However, many studies suggest perceived usefulness is a multidimensional concept and maybe theoretically very wide to be realistically applied (Wallace & Sheetz, 2014). For example, common indicators for perceived usefulness have included some organizational factors such as job relevance, output quality, and result certainty. These factors are revealed to have a direct effect on perceived usefulness (Yan & Yang, 2015).

Previous literature mentioned many factors that may affect the user intention to adopt mobile payment applications. A study revealed that the user perception of the application being risky and costly may decrease users' tendency to embrace them (Humbani & Wiese, 2019). However, the authors revealed that the satisfaction factor was emerged as the strongest predictor of

intentions to adopt mobile payment applications. These findings are comparable to Lin et al., (2020) who revealed that satisfaction along with social influence affected the user's perceived value. Perceived benefits are more likely to encourage users to share the mobile application payment systems with others. For other authors, the perceived value was discovered to be the most important variable that most influences the adoption of an m-payment system, followed by the perception of risk and utility (Liébana-Cabanillas et al., 2020). When there is a similarity in internal and external factors, individuals are more likely to demonstrate desirable shopping behaviors due to higher satisfaction, trust transfer, and perceived usefulness (Fu et al., 2018). Therefore, a balance in the perception of risk and trust affects decision-making to adopt mobile payment applications.

Al-Jabri and Sohail (2012) used the Innovation Diffusion Theory to explore the adoption of mobile banking in Saudi Arabia. They found that users were more likely to embrace mobile services with observability, compatibility, and relative advantage and shy away from those with high perceived risk. In this study, the complexity of the mobile solutions did not have any impact on the adoption of mobile banking platforms. Other authors used cost-benefit theory to formulate an integrated conceptual model that explains the user's intentions to adopt mobile payment services (Lin et al., 2020). The cost-benefit theory depends on the notion that perceived benefits like monetary value, social value, and relative advantage along with perceived costs like security and service fees influence the user's attitude toward new services (Lin et al., 2020).

Park et al., (2019a) findings were similar to those of Lin et al., (2020) regarding the strong effect of the social value on the adoption of mobile payment services. This illustrates that a higher rate of the user's intention to

adopt a mobile payment application is positively associated with a higher degree of him being recognized by his surrounding social environments such as family, friends, and colleagues. In addition, he found out that convenience, emotional value, and price benefits positively influenced the intention to adopt mobile payment services. He argued that the user's feelings of pleasure with technology, the lower the financial fee, the greater ease of use of the operating process will ultimately lead to a higher rate of adopting the payment application (Lin et al., 2020).

Based on the previous studies, perceived values (namely: quality, price, emotional, and social) are strong antecedents of adoption intention. Previous researches have verified this approach (Lin, et al., 2020a; Lin et al., 2020; Berraies et al., 2017; Park et al., 2019a), and the following hypothesis is proposed:

H1. Users' perceived values of the mobile payment application have a positive effect on the intention to adopt the mobile payment application.

2.5 Effect of users' perceived values on users' e-trust

The section begins with identifying user e-trust and addresses some factors that impact the trust that customers have towards a certain product. The major constructs include perceived ability, integrity, and perceived benevolence. These factors affect user perception of value and usability of mobile payment applications.

2.5.1 User e-trust

Trust is essential for building lasting and successful relationships within the online environment (Jung et al., 2020). The concept of trust is especially meaningful in digital environments considering the variations from the typical

marketplace. The four parameters that distinguish the online from the traditional market parameters include; i) the absence of simultaneous existence in space and time, ii) the physical separation of buyers and sellers, iii) the lack of learning capability and feedback, and iv) the absence of human network aspects (Mukherjee & Nath, 2007). E-trust is a concept that explores the concept of trust within the e-services and digital contexts (Purani & Sahadev, 2015). Some scholars have explored how the concept of commitment and trust in enhancing the buyer-seller relationship over the long term (Purani & Sahadev, 2015; Jung et al., 2020). Firms seek through their websites to gain the trust of users and to deliver the promised services. Therefore, e-trust can represent the risk that the customer incurs when dealing with retailers, other consumers, and the technological environment.

Although previous empirical researches agreed that the trust construct is complicated in its implication, this construct has many conceptualizations; and should be considered as a multidimensional issue (Le & Hoang, 2020; Bhattacharjee, 2002). Other studies confirmed that trust is conceptualized as a one-dimensional concept (Gefen, 2002; Nguyen & Bui, 2019b, 2019). Le & Hoang, (2020) and Bhattacharjee (2002) explored trust through the lenses of beliefs, intentions, ability, integrity, and benevolence. Their results viewed trust as a high order and complex construct in which three components such as competence, integrity, and benevolence are considered. Privacy concerns, risk, usefulness, and ease of use mediate the user intention for mobile payment adoption (Su et al., 2018). This research proposes that a multi-dimensional conceptualization of trust (i.e., perceived ability, integrity, and benevolence) is better conceptualized than a uni-dimensional measure of trust (Le & Hoang, 2020).

Perceived ability is a major component of trust as it relates to the customer perception of the firm's competencies and implementation of the expected behavior (Bhattacharjee, 2002). Users are more likely to adopt technologies whose providers they trust to deliver quality services. Competency perceptions are shaped by previous experiences with the provider or by endorsements by other reputable sources. The client is likely to continue using an application that they perceive to have excellent service, process timely and accurate transactions, unlimited access to the services, and be consistent with customer needs (Hidayat-ur-Rehman, 2014). Website reputation influences the trust of consumers (Sullivan & Kim, 2018). Customers with high trust in the safety of their mobile financial transactions had higher use and usefulness perceptions of the platforms. A possible explanation is that less mental focus goes to checking and monitoring transactions at very detailed levels.

Another consideration under perceived trust is integrity. Perceived integrity refers to the belief that the trustee will fulfill their obligations to the trustors (Bhattacharjee, 2002). The customer looks at the application's fairness with consumers, reliability of services, and the ability to stick to promises and commitments (Bhattacharjee, 2002; Gefen, 2002). Moreover, the application should have consistent practices and policies online. The perceived system, information, and service quality shape the initial trust of consumers (Gao et al., 2017). Trust reflects the consumer's belief that everyone will act according to their expectation (Al-Jabri, 2015). The absence of physical contact while using mobile applications to process payments calls for fairness from application developers and managers to consumers. Structural trust reflects reliability and influences client intention (McKnight et al., 2002). The use of advanced encryption and third-party certification helps mobile payment

application providers to earn the trust of customers (Yan & Yang, 2015). Consumers are more confident about mobile online payment systems with the assurance of privacy protection, restricted user data access, and confidentiality of transactions (Mwafise & Stapleton, 2012). Firms that can guarantee the implementation of promises, such as security provisions, will positively influence clients' e-trust towards the mobile payment platforms.

Perceived benevolence also affects user e-trust. This construct refers to the belief that an organization is interested in doing good beyond the mere objective of making a profit (Bhattacharjee, 2002). Mobile payment applications that compensate for any unauthorized transaction builds confidence and trust. Perceived privacy, trustworthiness, and privacy are major dimensions of trust (Yousafzai et al., 2009). Infrastructural threats are significant risks in online banking and present uncertainties, especially in cases where banks offer financial applications jointly with telecommunication providers (Yousafzai et al., 2009; McKnight et al., 2002; Alkhalidi, 2016). In such cases, consumers must have the assurance of compensation for any undue losses from security breaches and infrastructure failures. The consumer is more likely to trust a brand that acts in the former's best interests (Bhattacharjee, 2002). In Saudi Arabia, the movement to mobile banking faced the obstacle of managing consumer relationships on issues relating to trust and security (Alkhalidi, 2016). Banks were faced with challenges in managing security controls, establishing appropriate board and management oversight for mobile banking operations, and instituting reputational and legal risk management protocols. As payment systems digitize, brands should suggest that their strategy for the present and future adapts and accommodates user interest. These strategies should continually factor in user concerns of trust and security.

2.5.2 Mobile payment application users' perceived values and user e-trust

In this thesis, the researcher outlines the idea that the dimensions of users' perceived value of the mobile payment applications can affect users' e-trust toward these applications. Several studies highlighted the contribution of users' perceived values on users' e-trust (Mosunmola et al., 2018; Konuk, 2017; Liu et al., 2020).

There are many numbers of studies that have examined how TAM can describe the effect of users' perceived values of mobile applications on the user's e-trust. According to TAM, e-trust is a third crucial element, that is affecting the long-term use of software technology (Kolaki, 2017). Some researchers assume that this element is linked directly to the perceived usefulness of any software or technology, especially of mobile payment applications, but the adoption of mobile applications mostly depends on the human element behind them (Pavlou, 2003). A study's results revealed that perceived values' dimensions of mobile payment applications namely; quality, emotional, and price are key predictors of customers' e-trust (Berraies et al., 2017). The study also revealed that age, in fact, was significantly moderating the relationship between the perceived value of mobile payment and e-trust.

Emotional or hedonic value has been reported to have a stronger impact on the trust of consumers in online shopping (Mosunmola et al., 2018). Consumers are more likely to trust online shopping sites that offer aesthetic appeal. The display of beautiful visual designs attracts online shoppers and keeps their attention to the retailer's site. Consumer e-trust develops because

the quality of visual displays reduces their perception of uncertainties of the retailer (Mosunmola et al., 2018). The brand's image is also critical to building value and enhancing trust with consumers. Better branding gives a perception of quality and encourages consumers to trust the provider (Norouzi et al., 2013). Aesthetic offerings relate to the brand and give positive emotions when dealing with the product and improve customer trust towards the mobile payment application.

The quality or performance of e-commerce sites positively impacts user trust. (Mosunmola et al., 2018). Organizations that provide mobile payment applications need to prove that their payment platform is safe and fully functional (Mondego & Gide, 2020). Functional reliability comes with the structural assurance of the product's capabilities. The perceived functional value relates to the perceived ability construct of e-trust because consumers' vendors and service providers' reputations influence both trust and product quality. Good navigation designs allow users to focus on product selection and minimize risk perception (Mosunmola et al., 2018). Quality applications guide clients to access the wide offerings and give them the proper directions around the site. The ease of use of these applications lets consumers process their payments and removes any forms of doubt in dealing with the merchant. Higher trust levels were associated with perceived service quality from application service providers (Kungumapriya & Malaramathi, 2018). The high quality of these services led to the feeling that the provider is competent and beneficial.

Value for money or price affects the e-trust of consumers. Literature shows that the price fairness of commodities like organic food influences user trust (Konuk, 2017). The authors suggested that price fairness impacts satisfaction. They also found that a satisfied consumer was more likely to trust

the food product. These associations suggest that a client is less likely to feel cheated on when they encounter products at fair prices (Konuk, 2017). The perception of justice and fairness reinforces the trust towards the retailer. Value for money contributes to cognitive trust, which affects the user's intention to adopt mobile payment options (Mondego & Gide, 2020). The right pricing strategy is necessary to ensure that clients trust the app vendor and do not feel cheated by the service providers of mobile payment applications.

Social value perception impacts consumer e-trust. Studies on mobile social commerce reveal that consumers use mobile social media to share experiences with peers, view others' opinions, recommend products they have used, discuss prices, and see information relating to the product (Liu et al., 2020). Consumers are more likely to trust products recommended by their peers and ones whose use generates some positive social self-concept (Bhattacharjee, 2002). Brand images affect consumer perception of benefits, attitudes, attributes towards the product. Imaging is what sets one brand as unique from the others (Norouzi et al., 2013). Users' experience with brands and their social value perceptions shapes their feelings and thoughts towards the brand, including their trust. Greater social support improves user adoption and trust in mobile payment services (Kar, 2020). The social influence from support groups encourages individuals to try using new technologies and to build confidence in the products.

From the above literature, the users' perceived values of the mobile payment application integrating emotional, quality, price, and social values may positively affect the users' e-trust toward intention to adopt mobile payment application. Therefore, the researcher hypothesizes that:

H2: Users' perceived values of mobile payment applications have a positive effect on users' e-trust toward mobile payment applications.

2.6 Users' e-trust and the intention to adopt mobile payment applications

2.6.1 Effect of user's e-trust on the adoption of mobile payment applications

The idea outlined in this section is that e-trust may affect the customer purchase adoption of online services such as mobile payment applications. The more trusting a consumer is, the more likely their intention to purchase the product (Hong, 2011). As Purani and Sahadev (2015) elaborate, the use of technology can cause anxiety among users. Possibly, users with minimal prior experience navigate through unfamiliar digital features with minimal guidance from another human agent. Therefore, the lack of familiarity with the mobile payment applications can in itself affect the trust of consumers towards the services. E-trust and social influence can alter the behavioral intentions of consumers of social commerce services (Lăzăroiu et al., 2020). An analysis of 650 online shoppers revealed that trust positively affected consumer attitude towards online purchases (Mosunmola et al., 2018). Although Singh and Sinha (2020) found a small mediating effect of trust on perceived usefulness among the merchants, the impact was significant to explain how trust may affect the intention to use.

Customers who are trusting of the retailer are more likely to show a usage intention than those with lower levels of trust. The consumer is likely to adopt a high-value mobile payment application whose provider they trust. Within the online environment, the consumer may gain the trust of providers

with high e-service quality (Belanche et al., 2014; Purani & Sahadey, 2015). Within the digital context, Trust affects consumer behavior in adopting and continuous use of mobile payment applications (Mosunmola et al., 2018; Lăzăroiu et al., 2020).

2.6.2 The Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) has been frequently utilized to explain and forecast human behavior in adopting new information and technologies (Cheung & To, 2017; Kim et al., 2016). This theory was developed by Icek Ajzen (1991) as an attempt to investigate human behavioral intention. The TPB proposes that attitude toward subjective norm or perceived behavioral control can affect the human behavioral intention. Trust has been explored in the context of TPB theory as many studies showed that trust is significant to predict the consumer behavior attitudes towards online shopping (Lee et al., 2015; Cheung & To, 2017). They reported that, through trust, the user's experience may have a direct influence on his behavior in adopting new information. The relationship between trust and the TPB can be explored through the notion that the resulted expectation is the user's expectation that a given behavior will eventually lead to a particular result and the user's belief influences his attitudes toward the behavior (Cheung & To, 2017).

Furthermore, the TAM model offered an accepted validation for this relation (Gefen, 2002). TAM suggests that technology adoption is influenced by the user's own beliefs. The user's beliefs in such cases may refer to his trust which in return may affect his behavioral intention according to TPB (Gao & Waechter, 2017). TAM model uses two distinct variables, perceived usefulness and perceived ease of use, to predict the behavioral acceptance of

information technology of users. perceived usefulness was predicted in several studies to have the most influence (Davis 1989). Previous studies have focused on these beliefs of individual acceptance and the adoption of new technology (Gao et al., 2017; Chandra et al., 2018; Liébana- Cabanillas et al. 2014). According to Davis (1989), perceived usefulness is the degree to which a person believes that using a specific system will boost his job performance. Gao & Waechter (2017) highlighted the characteristics features of perceived benefit that reflect the utility derived from the user's belief when he is using mobile payment service.in the context of mobile applications, trust has a strong effect on perceived benefit. The study showed that customers' trust improves the user's expected usefulness of a product or service (Chandra et a., (2018). Trust allows users to believe that service providers have the needed ability and benevolence to introduce useful services and accordingly, they will receive the anticipated benefits from those services. (Gefen, 2002; Chandra et a., 2018).

The above two theories have been well-reviewed in e-commerce and showed that understanding trust issue is crucial in shaping the user's behavioral intention. TPB is the model broadly used to investigate the effect of these factors on behavioral intention. An extended TAM model and trust with TPB would contribute to creating a more comprehensive understanding of the user's behavioral intention to adopt. Therefore, the concept of trust has a positive effect on the intention to adopt the mobile payment application. the researcher hypothesizes that:

H3: User's e-trust toward mobile payment applications has a positive effect on the adoption of the mobile payment application.

2.7 Mediating role of users' e-trust between users' perceived values of mobile payment application and adoption of mobile payment applications

Numerous studies have been grounded primarily on TAM to explore the adoption factors of mobile payment. These studies used this model with additional adapted factors such as convenience, social reference, facilitating condition, security, price factor, and system quality. But few studies have examined the adoption of mobile payment from the trust background. A study integrated TAM and trust theory to investigate mobile payment user adoption. The study concluded that perceived ease of use, perceived usefulness, structural assurance, and ubiquity were determined indicators of mobile payment adoption whereas trust acted as a mediator factor between those determinants and usage adoption (Yan & Yang, 2015).

The researcher postulates in this study that user e-trust in mobile payment applications mediates the association between perceived value and mobile payment services adoption. A study found that trust mediated the relationship between perceived benefit and user intention to adopt mobile payment options (Park et al., 2018; Rehman et al., 2019). The finding suggests that trust has a significant role in the adoption of mobile payment applications.

Trust is essential to the decision-making process, suggesting its mediating role between user perceived value and its association to the adoption of mobile payment applications. Within the online commerce environment, the end-user decision-making is influenced by trust and perceived risk (Lăzăroiu et al., 2020). In this case, e-trust would have a potential influence on the decision of clients to adopt mobile payment applications and in their decision over the perceived value of these digital

services. Trust and limited confidence have the capability of redefining the relationships of buyers and sellers within the online environment (Lăzăroiu et al., 2020). Therefore, it is possible that the lack of trust in mobile payment applications may have negative and severe consequences on the actual adoption of the services by clients.

The trust dimension, therefore, factors in the relationship between adoption and the user's perceived value. Both perceived hedonic and utilitarian values and trust showed positive and significant effects on the buyer's purchasing behavior (Mosunmola et al., 2018). The mediating role of e-trust implies that mobile payment applications will gain better adoption rates through delivering value and building trust with existing and potential users.

In cases where the perceived risk is high, trust strongly mediates the adoption intention of the online payment systems (Qalati et al., 2021). When customers perceive that the websites or applications that they interact with are of high value and build a strong sense of e-trust, they are more likely to have a higher purchase and usage intention when the websites are appealing to them (Liu & Guo, 2017). The purchasing intention of consumers when using mobile payment applications is negatively affected by a low e-trust environment (Lăzăroiu et al., 2020). On the contrary, mobile payment app providers can increase the consumer purchase intention of their services by bolstering trust over the long term. Developers of mobile applications for financial transactions must address these security concerns or risk having their clients cancelling their purchasing intent (Hidayat et al., 2021).

Therefore, e-trust would mediate between the two variables by influencing the decision-making processes of each construct. Therefore, the researcher hypothesizes that:

H4: User's e-trust toward the mobile payment application mediates the relationship between users' perceived values of the mobile payment application and the intention to adopt the mobile payment application.

2.8 Moderating role of perceived mobile payment applications' security

This section defines the construct of mobile payment applications' security and explores their possible role as a moderating variable between users' perceived values of the mobile payment applications and users' e-trust.

2.8.1 Mobile payment applications' perceived security

Confidentiality and security constitute credibility. Empirical evidence supports the significance of credibility in influencing m-banking adoption (Putri et al., 2020). Clients should generally have a positive outlook on the platform as a secure channel for making payments. Research suggests variations in the perception of mobile application security among users in Saudi Arabia (Alkhaldi, 2016). The study also found that users held different opinions on mobile devices-related security threats, the safety of wireless connections on a public network, and security protection while using mobile phones.

Security is referred to the degree to which a user believes that using a specific electronic payment service will be harmless (Chawla and Joshi, 2019). The mobile application archives sensitive information, so individuals will have doubts and concerns about the security of their financial data. In our digital world, the security of financial information is considered a crucial feature, this function may affect the banking system to gain customer trust

(Phuong et al., 2020). Several authors proposed that users' trust and payment security (perceived credibility) have a significant impact on user intention to use the E- payment system as they are the main reasons for the slow adoption of E- payment services. The authors integrated trust, feedback mechanism, and payment security with their conceptual intention model to investigate the user's intention in the E-payment context in Vietnam (Zhou, 2018; Phuong et al., 2020). Security plays a principal role in obtaining customers' trust which as a consequence would support the banking systems.

In our digital world, to prevent online hackers from breaking into the server systems of monetary institutes to steal users' financial information and sensitive data, the majority of online payment systems use encryption mechanisms and authentication measures to verify whether the identification of the user and make sure financial information is transferred securely (Chawla and Joshi, 2019). As in many countries of the world, telecommunications companies in Saudi Arabia use the NFC feature as a means to enhance security in the use of mobile payment (Alswaigh & Aloud, 2021; Alabdan & Sulphey 2020). With this security consideration in the transaction, users will be more contented in conducting financial transactions on mobile phones. Mobile payment security and the unauthorized use of mobiles data are considered the major concerns for mobile users (Bamasak, 2011).

2.8.2 Moderating effect of perceived mobile payment applications' security between mobile payment application users' perceived value and e-trust

From the trust theory background, Chawla and Joshi (2019) explored the factors that have an impact on customers' intention to adopt and use e-payment in India. They proposed an integrated model based on TAM and UTAUT models to explore factors that impacted e-payment service adoption. The results showed the important role of the payment security factor in determining the users' trust towards the using mobile payment system. The findings are similar to Phuong et al., (2020) which concluded that security has a significant influence on Vietnam users' trust in using mobile payment applications.

When customers perform any financial transaction like paying bills, purchasing an online item, or transferring money, they could perform this task on any e-payment platform by using their mobile devices. This online operation may increase the risk of losing the customers' financial information. Thus, the payment security factor is considered an important one to impact users' trust toward mobile payment (Kolaki, 2017).

The idea outlined in this section is that users' perceived values of mobile payment applications directly affect user e-trust, but this link may be moderated by the mobile payment application's perceived security potentially. Perceived security is a major barrier to the consumers' e-trust. In one study, the authors conceptualized the customer security construct as perceived risk and perceived trust (Hossain, 2019). This conceptualization reflects the close association between perceived security, value, and trust. The risk construct relates to perceived value and affects trust (Mosunmola et al.,

2018). Even when customers have a high-value perception of mobile payment systems, the fear of insecurity can lead to lower trust in the mobile payment platforms. Perceived risk, including security concerns, directly affects trust and merges as a nonmonetary cost under the perceived value concept (Alhallaq et al., 2019). Perceived security in the sense of absence of technical errors and high response to any arising problems give users a great experience and increase their e-trust and value of the mobile payment systems (Hossain, 2019). This moderating effect calls for service providers to ensure that their products have a strong security system that assures confidentiality and authenticity. Security concerns are critical and would significantly moderate the relationship between users' perceived values of the mobile payment application and users' e-trust toward the mobile payment application. Thus, the following hypothesis is proposed:

H5: Users' perceived mobile payment application security moderates the relationship between users' perceived values of the mobile payment application and users' e-trust toward the mobile payment application.

2.9 Research model and hypotheses

Figure 2 below reports the research model of this thesis that summarizes the links between the research variables. According to this model, users' perceived values of mobile payment applications affect positively the adoption of these applications. Also, this model highlights that users' perceived values of mobile payment applications affect positively users' e-trust toward these applications, which in turn has a positive link with the users' adoption of these applications.

This model also outlines the mediating effect of users' e-trust toward the mobile payment applications in the link between users' perceived values of mobile payment applications and the adoption of these applications. Finally, the research model presents the moderating link of mobile payment applications' security in the link between users' perceives values of mobile payment applications and users' e-trust toward these applications.

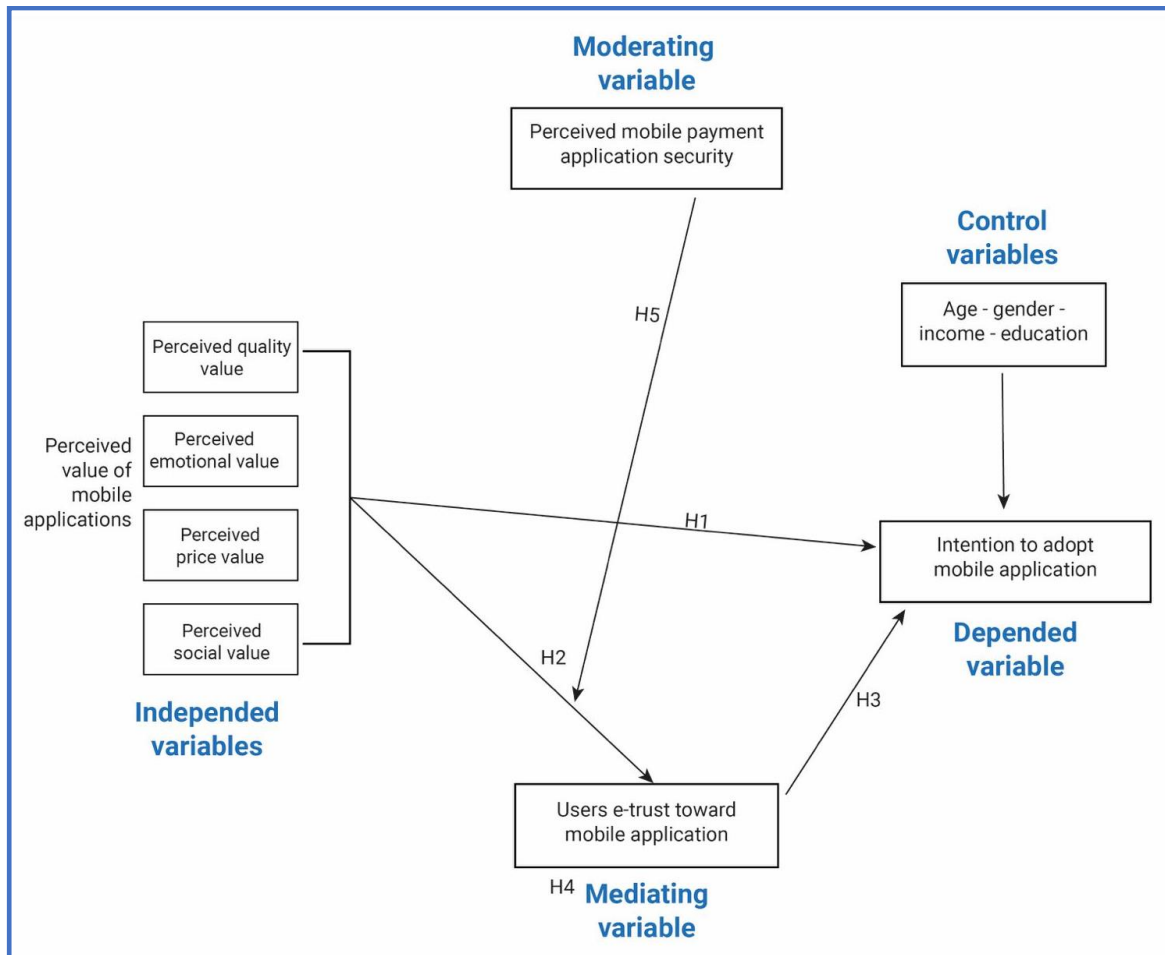


Figure 2: Research model

The following hypotheses were developed based on the literature review conducted in the previous sections:

H1. Users' perceived values of the mobile payment application have a positive effect on the intention to adopt mobile payment applications.

H2: Users' perceived values of the user have a positive effect on his e-trust toward mobile payment applications.

H3: User's e-trust toward mobile payment applications has a positive effect on the intention to adopt the mobile payment application.

H4: User's e-trust toward the mobile payment application mediates the relationship between the perception of value by users and the intention to adopt mobile payment applications.

H5: Users' perceived mobile payment application security moderates the relationship between users' perceived values of the mobile banking applications and users' e-trust toward the mobile payment applications.

2.10 Summary

The literature reviewed previously presented the major concepts that underlie this research: security of the mobile payment applications, user's perceived value, e-trust, and adoption of the mobile payment applications. The user's perceived value integrates four dimensions of quality, monetary, social, and emotional value. These dimensions contribute to the general value perception of clients towards mobile payment applications. In this research, the user's perceived value is considered in terms of the existing value perceptions among customers and the impact of the customer's perception of value on the adoption of mobile payment applications. The research also explores the effect of users' perceived value on e-trust and the moderating role of perceived mobile app security on the perception of value by users.

E-trust was another central concept that mediates the effect of the user's perceived value on the adoption of the mobile payment application. E-trust consists of the perceived benevolence, perceived ability, and perceived

integrity of the mobile payment application developers and providers. Overall, the adoption of mobile payment applications will be impacted by users' e-trust and perceived value.

Chapter 3: Methods and Procedures

3.1 Introduction

The objective of this chapter is to highlight the methodological foundations of the study. This research aims to examine the relationships between users' perceived values namely price value, quality value, social value, and emotional value toward mobile payment applications and the customer's intention of use of these applications. It also investigates the mediating role of users' e-trust in the links between these variables. The research also sheds a light on the moderating role of the effect of mobile payment applications' security in the link between users' perceived values and users' e-trust toward the mobile payment applications. Lastly, this research examines the effect of some control variables namely users' age, gender, income, and education in these relations. All these relationships are tested on a sample of users of mobile payment applications in the Kingdom of Saudi Arabia.

In this chapter, research epistemological position, the research method, the sampling techniques, data collection methods, the sample population, the scales of measurement used for the variables, and the statistics through which

the researcher will evaluate the psychometric qualities of the constructs will be discussed.

In particular, section 2 highlights the research epistemological position. Section 3 outlines the research method applied in this study. Section 4 aims to present the research variables. Section 5 introduces the data collection process and the sampling method utilized in this research. Section 6 highlights the scale of measurement used to measure the variables and the types of questions used in the questionnaire. Section 7 presents the approaches and statistics used for the data analysis and particularly to evaluate the constructs' psychometric properties and to test the research hypotheses.

3.2 Research epistemological foundation

The researcher's view of the world and knowledge strongly influences his interpretation of data, and therefore his rational stance should be made clear from the beginning (Melles & Feast 2010). Epistemology is the way the researcher goes about collecting and interpreting data. There are a large number of research methods and corresponding epistemological approaches available to researchers. This research fits with a positivist epistemological posture. Positivism's main principle is to look at knowledge from a scientific outlook where there is a single fact that should be accessed and confirmed (Takahashi & Araujo 2019). In such a method, the deductive approach in hypothesis testing is adapted using quantitative data and analysis techniques.

Since this research focuses on a literature review on the basis of which the researcher formulated hypotheses and depends on measurable observations that will lead to statistical findings, it's an obvious example for a study that adheres to the positivism research method. It involves the use of some existing theories to develop hypotheses to be proved or disproved during

the research process. The research findings are quantifiable since the researcher's data collection and interpretation was undertaken on the basis of statistics and the participation of respondents to objectively confirm or reject the hypotheses.

3.3 Research Method

The method the researcher utilized in this study is the quantitative research method. It is the process of collecting and analyzing numerical data. Generally, it is used to identify patterns, predictions, averages, and cause-effect links between the variables that are under exploration (Miller, 2020). Quantitative research was used because it is the most commonly used method of carrying out market research and following the research objectives and the positivist epistemological posture that the researcher has adopted. In this case, the researchers collect data directly from the sample instead of relying on the already collected data from previous sources (Miller, 2020). Quantitative research was also preferred in this study because it enables to reach a greater sample size and to provide better generalizability of the results.

Another thing why the quantitative method is preferred in this study is that it is easier to quickly collect information so statistical analysis can take place nearly directly. Another thing is that quantitative study utilizes randomized samples to prevent bias from taking place (Miller, 2020). This is the reason why a large sample is preferred and was used in this study to study the specific hypothesis within a large population demographic. Multiple sessions and meetings were conducted to collect data about the factors influencing the adoption of mobile payment applications in Saudi Arabia.

3.4 Thesis variables

The research model presented in Chapter 2 shows the variables that underlie this research: Perceived mobile payment application security, user's perceived value, user's e-trust toward mobile application, and intention to use mobile payment applications. The user-perceived value considers the four dimensions of quality, price, social, and emotional value. This conceptualization is interesting because it takes into account the key dimensions that may have an impact on adoption or user e-trust than others (Mosunmola et al., 2018). The research model also highlights the mediating role of users' e-trust toward mobile applications and the moderating role of the security of mobile payment applications. As identified previously, E-trust is another central concept that mediates the effect of the user's perceived value on the adoption of the mobile payment application. E-trust consists of the perceived benevolence, perceived ability, and perceived integrity of the mobile payment application developers and providers. Overall, the intention to use mobile payment applications will be impacted by the user's e-trust and perceived value. E-trust is a mediator variable between perceived value and adoption of the apps while the security of the mobile payment apps moderates the relationship between perceived value and e-trust of users.

Lastly, the researcher included in the model some control variables that according to prior studies can affect the users' intention to use mobile payment applications i.e., users' age, gender, income, and education. Some previous studies show that the user's personal traits may also affect the intention to use mobile payment applications. Older users are more likely to prefer simpler interfaces than the younger demography who are likely to be technologically aware (Liébana-Cabanillas et al., 2014a). Males showed a higher association

between ease of use and intention than women. User trust among women centers on issues relating to privacy and security. Women are more likely to adopt technology with money-back guarantees, good esthetic, and functional quality (Liébana-Cabanillas et al., 2014b). Educational and occupational background also affects the adoption of technology. Variations in individual characteristics may affect the acceptance of mobile application platforms by users in Saudi Arabia.

The research utilized a quantitative research design and attempts to explain the scope of a relationship between the variables via the utilization of statistical data. In this form of research design, the significance of the links between variables is looked for and interpreted (Bloomfield & Fisher, 2019).

In this research, the independent variables are the factors that are influencing the adoption of mobile payment applications in Saudi Arabia. These factors are the ones that have been assessed and tested to determine their level of influence to ensure that appropriate actions are taken to adjust the mobile payment applications in such a way that they are favoring the customers' positive attitudes. On the other hand, the dependent variable is the adoption of mobile payment applications in Saudi Arabia.

3.5 Research Population

The research population is described as the group of people that are engaged in research (Kock and Hadaya, 2018). Nonetheless, because of the large size of the population, the researcher at times is unable to test each of the person in the study population for the reason that it is time-consuming and costly. For this reason, the researcher utilized sampling techniques. Each object or individual in a certain population tends to have a common and binding trait or characteristic.

The researcher targeted Saudis who were using smartphones and have installed mobile payment applications to determine the factors that affect the adoption of these mobile applications By Saudi people.

3.6 Research Data

In this study, the researcher collected data from employees and retired individuals from different sectors such as education, military, health care, banking, and other sectors. The data was also collected from students who were using their smartphones and conducting shopping transactions via mobile payment applications. One of the benefits of the primary data in this research, is that the researcher collected it for specific purposes of the research. Essentially, the questions the researcher raised were tailored to bring about the data that will help in the course of the study. The researcher collected the data herself by conducting meetings with the respondents. The research data in the study involved the opinions of the participants regarding what makes them adopt or not adopt the mobile payment applications in the country.

3.7 Research Sample Size

As discussed earlier, the population in market research is humongous, and therefore account of the entire Saudi Arabian community that is using mobile payment applications was not practically possible for this study. As such, only a sample could be used in the study as representative of the entire population and then meetings using were conducted to collect the data. The sampling method that was applied in this study was a non-probability sampling in which the researcher chooses the participants who are nearest and

available to participate in the research study and in accordance with the research objectives. This technique is more conducive and is a practical tool for researchers utilizing surveys which is desirable in this type of research to gain the views of targeted set of respondents as there is no sample frame for the research population.

. Moreover, time was limited, and the non-probability sampling allows researcher to find sample candidates without investing a lot of resources (Vehovar, 2016). In addition, the people involved will be highly motivated to respond adequately and quickly as they are familiar with the researcher unlike the people selected randomly. Since this research was aimed at investigating the adoption of mobile payment, the researcher ensured that all respondents have installed at least one payment application in their mobile to probably conduct the research.

The researcher determined how the sessions of meetings will be administered. Some of the available means of distributing the questionnaires included emails, online, or face-to-face meetings. For this study, the researcher conducted meetings groups to distribute the questionnaire through online sessions with participants after work.

3.8 Instrumentation, development, and structure of the questionnaire

This research utilized structured questionnaires to ensure that the participants can fill them easily and improve the accuracy. Data analysis also became easier. Since some Saudi respondents may struggle reading and comprehending the questions in English, which may cause inadequate answers, the questionnaire was translated into Arabic to avoid such difficulty.

In this study, the research instrument that was utilized was the questionnaire. A set of questions were arranged chronologically and set to answer specific problems identified in the research. The researcher used close-ended questions to measure the research constructs which are questions that are structured in such a way that they allow the respondent to choose the answer from a unique set of pre-defined responses. The provision of a fixed list of answers allows the respondents to choose the suitable answer and this makes it easier to process and analyze the results.

This study aims to identify the factors that influence Saudi citizens' intention to adopt mobile payment applications. As discussed, perceived mobile payment application security, user's perceived value, user's e-trust all have an impact toward mobile applications. Table 1 below shows that all the questions measuring the research variables that were used in the questionnaire were formulated based on scales of measurement developed by researchers in past studies. Users' perceived values of the mobile payment application were obtained from the article authored by Soutar and Sweeney (2001). The researcher adopted also the scale of Bhattacharjee (2002), Gefen (2002), Yousafzai et al. (2009) McKnight et al. (2002), and Kim et al. (2009) to measure users' e-trust toward mobile payment applications that integrates three dimensions namely perceived ability, perceived integrity, and perceived benevolence. The scale measuring the intention to use mobile payment applications was adapted from research by Su & Yan (2017). Lastly, perceived mobile payment application security questions were obtained from (Cheng et al., 2006).

The above main research variable's questions were scaled on a five-point Likert beginning from number 1 "Completely disagree" to number 5 "Completely agree". The control variables i.e., gender, income, and education

were measured using a nominal scale. The nominal data usually puts the answers of the respondents in one of the listed categories. The other form of questions that was integrated into the questionnaires were the multiple-choice questions that allowed the respondents to select one answer from a list of multiple options.

The research was using an actual life setting in which multiple mobile payment applications were explored. Some questions were created to be aligned with the objective of the study. Applications like STC pay, Mada pay, Apple Pay, and Bayan pay were chosen as examples of electronic payment services and the researcher decided to focus on these electronic payment portals as they are the only applications that were authorized and approved by the Ministry of Finance and the Saudi Arabia Monetary Agency (SAMA) (Authority, 2021). These questions were critical in answering the intended questions which helped in comprehending the tastes and preferences of the users in line with the mobile payment application.

Google forms were utilized to ensure complete answers from all respondents. This tool from Google has a feature that makes all questions mandatory. At the end of the questionnaire, an open-ended question was optional for the respondent to suggest any thoughts or comments, and to share their opinions regarding the topic. Many respondents found this as an opportunity to reveal their point of view and to participate in improving the quality of payment systems in Saudi Arabia. Many responses were interesting in the topic and wanted to be informed about the outcomes particularly the desired, number one payment application according to Saudi preferences. Some respondents were complaining about the security of certain mobile payment applications, and how that led to switching from one application to another.

Table 1 :Scales of measurement of research variables and references used in this study

Construct		Item	References
Perceived quality value	PQV1	This mobile payment application has consistent quality.	Sweeney, J.C. and Soutar, G.N. (2001)
	PQV2	This mobile payment application is well made.	
	PQV3	This mobile payment application has a good workmanship.	
	PQV4	This mobile payment application would last a long time.	
	PQV5	This mobile payment application would perform consistently.	
Perceived emotional value	PEV1	This mobile payment application is one that I would enjoy.	
	PEV2	This mobile payment application would make me want to use It.	
	PEV3	This mobile payment application is one that I would feel relaxed about using.	
	PEV4	This mobile payment application would make me feel good.	
	PEV5	This mobile payment application would give me pleasure.	
Perceived price value	PPV1	This mobile payment application is reasonably priced.	
	PPV2	This mobile payment application offers value for money.	
	PPV3	This mobile payment application is a good product for the price.	
	PPV4	This mobile payment application would be economical.	
Perceived social value	PSV1	This mobile payment application would help me to feel acceptable.	
	PSV2	This mobile payment application would improve the way I am perceived.	
	PSV3	This mobile payment application would make a good impression on other people.	
	PSV4	This mobile payment application would give its owner social approval.	
Perceived ability	PTA1	I believe that the mobile service application provides an excellent mobile payment service.	Bhattacharjee (2002), Gefen (2002), and Yousafzai et al. (2009)
	PTA2	I believe that the mobile payment application is processing my transactions accurately and on time.	
	PTA3	I believe that mobile payment application provides 24 h access to financial transaction services.	
	PTA4	I think that mobile payment services meet my needs.	
Perceived integrity	PTI1	I believe that the mobile payment provider is fair with its customers.	McKnight et al. (2002) and Kim et al. (2009a, 2009b, 2009c)
	PTI2	I believe that mobile payment application has consistent online practices and policies.	
	PTI3	Mobile payment application always provides reliable financial services.	
	PTI4	Mobile payment application always provides safe financial services.	
	PTI5	Mobile payment application gives the impression that it keeps promises and commitments.	

Perceived benevolence	PTB1	I believe that the mobile payment application will repay the money if it is taken from my account through unauthorized transactions.	Gefen (2002), McKnight et al. (2002), and Yousafzai et al. (2009)
	PTB2	I believe that the mobile payment service provider has my best interests in mind.	
	PTB3	I think mobile payment service provider is concerned with the present and future interests of users.	
Intention to use mobile payment application	IUMB1	Assuming that I had access to the mobile payment application, I intend to adopt mobile payment	Su, P., Wang, L., & Yan, J. (2017)
	IUMB2	Assuming that I had access to the mobile payment application, I will frequently use mobile payment	
	IUMB3	I will strongly recommend others to use the mobile payment	
Perceived mobile payment application security	PMPS1	I would feel secure sending sensitive information across mobile payment application	(Cheng et al., 2006)
	PMPS2	Mobile payment application is a secure means through which to send sensitive information.	
	PMPS3	I would feel totally safe providing sensitive information about myself over mobile payment application.	

3.9 Summary

This chapter examined the methodology. The first section of this chapter describes the research design implemented in the study and reasons why the researcher chooses every method. The chapter revealed the sampling techniques, the collection of data, and the description of the population sample. The next chapter will explain the data analysis and result. The statistics of populations' sample will be described in this part. And in the last section, data analysis procedure will be explained to complete the description of the results and outcomes for this research.

Chapter 4: Data analysis and results

4.1 Introduction

This chapter is dedicated to presenting the data analysis and the research findings. It aims to present the sample description and evaluate the descriptive, reliability, and validity of the measuring scales, as well as the quality of the structural model and the hypothesis related. This chapter is composed of four parts. In the first part, the sample characteristics are presented. In the second part, the results related to the reliability, the convergent validity, and the discriminant validity of the constructs are highlighted. In the third part, results of the quality of the model and the hypothesis testing are outlined i.e., the final results of the direct effects between the research variables, the effects of the control variables (age, gender, income, and education) on the dependent variable which is intention to adopt mobile payment application, the moderating effect of the user e-trust toward the intention to adopt mobile application is analyzed and the mediating effect of the user's e-trust in the link between the perceived value of the mobile application and the intention to adopt mobile payment application. The last part will be a discussion and interpretation of the research results.

4.2 Sample characteristics

The sample illustrates the responses collected from students, employees, retired, and unemployed individuals from Saudi Arabia which were 210 in total. However, only 195 from the total responses were considered valid data and were analyzed after removing around 15 missing values. Those valid responses formed 92.2% of the total questionnaire distributed. The first step in data collection was to determine the objectives of the research, the time constraints, as well as the resources available. The exact period of data

collection was three months, starting from February 2021 until end of April 2021. Within this period, 195 individuals were chosen to be participants in the sessions. The respondents were from the researcher network and included 100 men and 95 women aged between 18 to 55 years.

The research has engaged 23 college students in Riyadh city. 25 unemployed participated in the research, as they are characterized with low income, unwillingness to undergo financial threats, and can easily alternate to other service providers. Around 134 employees also contributed in answering the questionnaire, in addition to 4 retired individuals. Before distributing the questionnaires, all groups were briefed about the services and functionality of the mobile payment applications. They were asked about the payment solutions they are currently using, and what the ideal payment app they consider valuable. The researcher then directed the sessions to the questions. In the age group 18 to 25, Zoom app was used to conduct 3 sessions of meetings for the respondents who were mostly students. 10 sessions of meetings with employees participants from 10 to 13 in each were conducted using zoom app, Microsoft teams app, and face to face interactions. 2 more groups consist of 10 to 15 unemployed in each group aging from 18 to 25 were also participants in the study. The last group session was designated for 4 retired male individuals who were willing to contribute to the study. Each session from the above-mentioned groups lasts from 30 to 60 minutes, and all participants were thoroughly informed about their right to be anonymous and that they, at any time, could withdraw themselves from the group sessions and their participation in the research.

4.2.1 Respondents' gender

The sample was relatively divided into an equal split between the male and female respondents. Figure 3 below illustrates the total numbers of male respondents which were 100, which represent 51.3% of the total sample, while female respondents were total of 95 represents 48.7% of the total responses.

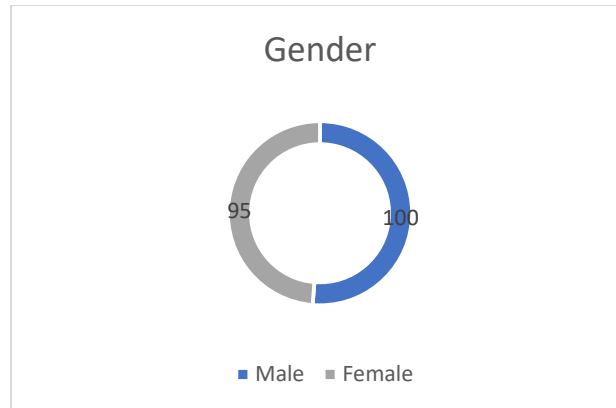


Figure 3: Gender

4.2.2 Respondents' age

Figure 4 shows that most numbers of the respondents are aged between 26 to 40 and represents 76.4% of the total sample and belong to Generation Y. 16.9% are aged between 18 and 25 (16.9%) and belong to Generation Z. The rest of the respondents are aged between 41 and 55 (6.7%) and belong to the Generation X. The majority of respondents were chosen from the researcher network as they are representing the target group that mostly fits in the research sample.

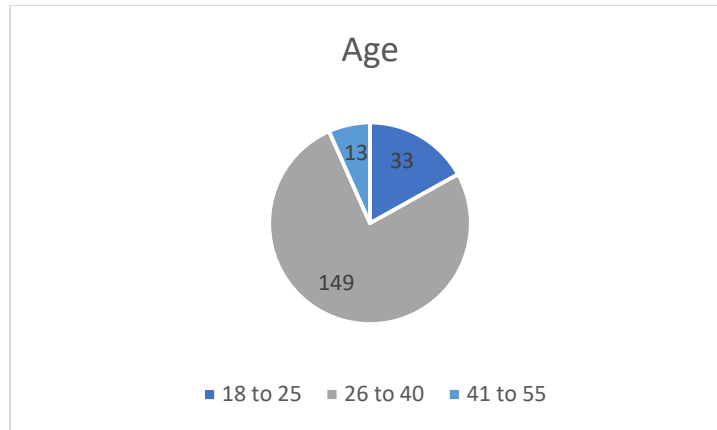


Figure 4 Age

4.2.3 Respondents' employment status

Figure 5 below shows the number of employees surveyed which is 143. Most employee were from the health sector. Nurses, health practitioners, and administrative staff from well-known government hospitals participated to this research. The meetings were held in King Saud and Fahad Medical cities in Saudi Arabia. The respondents were also composed of teachers and some military workers. This diversity in choosing different sectors was managed on deliberate basis to attempt to reach different buying forces from Saudi society. The sample was also composed of unemployed individuals who were 25 in total (12.8%) and was in the process of job hunting and some would cautiously think twice before choosing any payment application which can affect their buying ability. 4 retired males showed also their opinions regarding their payment solutions. Lastly, students from King Saud University were in total 23 which represents 11.8% of the total sample.

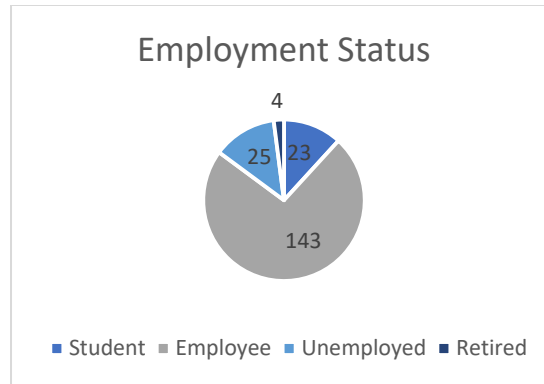


Figure 5 Employment status

4.2.4 Respondents' education

Furthermore, the participants' educational background was investigated in this research. The majority of respondents (125) were holding a bachelor's degree representing 64.1% of the sample. Secondly, 36 of high school students represent 18.5% of responses. Master and Ph.D. holders were involved in the study with 10.8%, and 3.1% percent respectively. Lastly, 7 individuals who didn't complete any school represented 3.6% of the study.

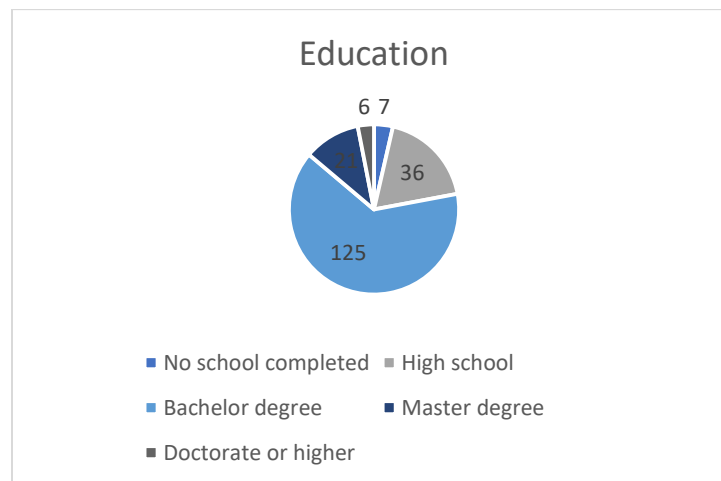


Figure 6 Education

4.2.5 Respondents' income

Figure 7 classifies the respondents by the income they receive. The figure below reveals that the majority number of the responses have an income of less than 5,000 SR representing 24.6% of the sample. Secondly, 23.6% of the respondents have an income of 10000-15000 SR. 19.0% of the respondents have an income of 5000 to 10000 SR. 20.0% of the respondent have an income of 15,000 to 20,000 SR. 4.6% of the respondent have an income of 20,000 to 25,000 SR and lastly, 8.2% of the respondent have an income of more than 20,000 SR.

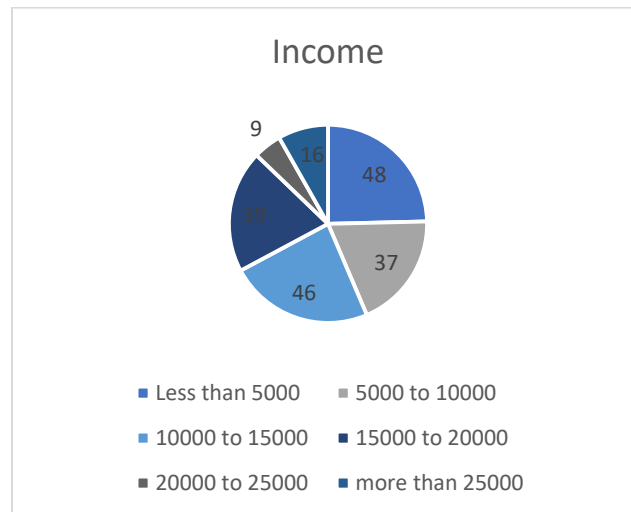


Figure 7: Income

4.2.6 Respondents' preferred mobile payment application

Figure 8 shows the respondents' preferred mobile payment application. Apple pay was found to have the greatest number of users (127 respondents representing 65.1% of the sample) followed by Mada pay (57.4%), STC pay (45.6 %), Halalah App (1.5%), and others (7.6%).

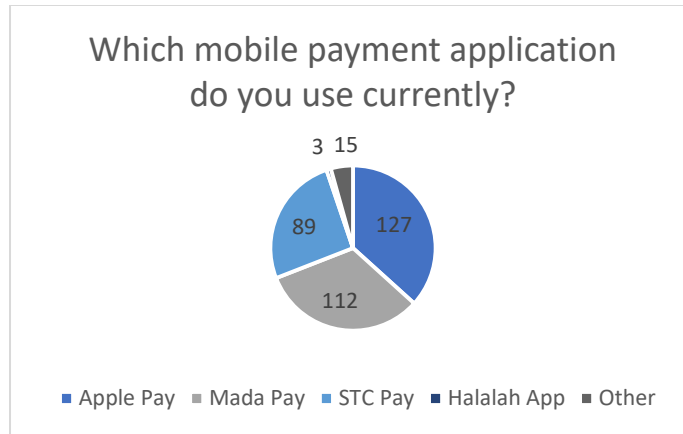


Figure 8: preferred mobile payment application

The following table summarizes the characteristics of the respondents.

Table 2 :Demographic analysis

Demographic Factors		Frequency	Percentage (%)
Gender	Female	95	48.7
	Male	100	51.3
	Total	195	100
Age	18-25	33	16.9
	26-40	149	76.4
	41-55	13	6.7
	Total	195	100
Employment Status	Student	23	11.8
	Employee	143	73.3
	Unemployed	25	12.8
	Retired	4	2.1
	Total	195	100

Education	No school completed	7	3.6
	High school	36	18.5
	Bachelor degree	125	64.1
	Master degree	21	10.8
	Doctorate or higher	6	3.1
	Total	195	100
Income	Less than 5000 SR	48	24.6
	5000 to 10000 SR	37	19.0
	10000-15000 SR	46	23.6
	15000 to 20000 SR	39	20.0
	20000 to 25000 SR	9	4.6
	more than 25000 SR	16	8.2
	Total	195	100
Which mobile payment application do you use currently?	Apple Pay	127	65.1
	Mada Pay	112	57.4
	STC Pay	89	45.6
	Halalah App	3	1.5
	Other	15	7.6

4.3 Descriptive Statistical Analysis

Descriptive, reliability, and validity of the measurement scales were employed along with a series of confirmatory analyses. By using two software

Statistical Package for the Social Sciences (SPSS 26) and Partial Least Squares Structural Equation Modeling Smart (PLS 3), respectively, the research continues in data analysis. Descriptive analysis is used to understand the characteristics of a sample or specific data and to provide valuable information about variables that are used to determine appropriate analysis techniques to be used (Park, 2015).

4.3.1 Mean and standard deviation of the items

Descriptive statistics are usually divided into the measure of variability and the measures of central tendency (Hair, Howard & Nitzl, 2020). The measures of variability encompass maximum and minimum variables, variance, standard deviation, skewness, and kurtosis (Park, 2015). The two types of descriptive statistics that are commonly used are the mean and standard deviation. The mean, in this case, is the average level that is observed in some parts of data whereas the standard deviation illustrates variance in the manner in which dispersed the data that is observed in a particular variable is distributed around the mean (Hair, Howard & Nitzl, 2020).

In a quantitative study, the presentation of data in a meaningful way is crucial to reach worthy conclusions. SPSS is usually preferred in calculating the mean, standard deviation, and descriptive statistics as a result of the humongous data that is involved, and therefore a statistical package is required. SPSS is a useful database as long as data is precisely fed onto the SPSS software package. Additionally, working on data is time-consuming and a complex process, but the use of SPSS accelerates the entire process.

The sample size that was involved in the research was 195, and the values of each of the variables are shown in table 3. Values in the table below

were obtained from multiple measurements tests that were generated by SPSS24, the following are the analysis of the results:

Table 3 shows the means and standard deviations values of all the research variables items. Overall, the highest mean 4.28 of the research indicators belongs to PQV4, and the lowest mean 3.07 goes to PMPS3. The mean of the PQV construct varies between 4.28 to 4.06, which is quite high comparing it to other constructs, and indicates that the PQV is lower than other barriers. Similar to this construct, PPV items expanse widely from 3.2 to 3.9 which indicates that the questions that were measuring this construct were of different tendencies. Also, the items of the PMPS variable were ranging between 3.07 and 3.14. IAMP, the dependent variable mean varies from 4.01 to 4.06. The standard deviation is measuring the dispersion of data around the mean. All items' standard deviations were fluctuating between .71100 and 1.36161. Furthermore, items of PVV4 show the highest standard deviation and it also belongs to PPV variable that is showing the highest variance in the standard deviations of the items .97 to 1.36. The items of the PMPS variable show the smallest standard deviation as besides the IAMB variable, all of them are lower than .7. IAMB, the dependent variable shows a low standard deviation that varies between .87 .94 compared to other independent variables.

Table 3 Descriptive Statistics

Variable	Item	N	Mean	Std. Deviation
Perceived quality value	PQV1	195	4.0615	.95589
	PQV2	195	4.0923	.93703
	PQV3	195	4.0359	.93816
	PQV4	195	4.2821	.85400
	PQV5	195	4.2718	.90984
Perceived emotional value	PEV1	195	4.2718	.95947

	PEV2	195	4.2308	.89274
	PEV3	195	4.1897	.97911
	PEV4	195	3.9692	1.02499
	PEV5	195	3.8513	1.06172
Perceived price value	PPV1	195	3.9026	.97163
	PPV2	195	3.4513	1.20199
	PPV3	195	3.7333	1.07005
	PPV4	195	3.2410	1.36161
Perceived social value	PSV1	195	3.2974	1.25745
	PSV2	195	3.4615	1.19376
	PSV3	195	3.4821	1.21139
	PSV4	195	3.5333	1.07582
Perceived ability	PTA1	195	4.2256	.71100
	PTA2	195	4.1179	.77422
	PTA3	195	4.2205	.76495
	PTA4	195	4.1333	.83275
Perceived integrity	PTI1	195	3.6923	.90684
	PTI2	195	3.6103	.90923
	PTI3	195	3.5846	1.01370
	PTI4	195	3.5077	1.05698
	PTI5	195	3.6615	.98353
Perceived benevolence	PTB1	195	3.2154	1.05751
	PTB2	195	3.3231	1.00166
	PTB3	195	3.4872	.89879
Intention to adopt mobile payment application	IAMB1	195	4.0667	.87971
	IAMB2	195	4.0410	.89579
	IAMB3	195	4.0103	.94154
Perceived mobile payment application security	PMPS1	195	3.1436	1.26405
	PMPS2	195	3.1846	1.17831
	PMPS3	195	3.0718	1.23730
	Valid N (listwise)	195		

4.3.2 Multicollinearity analysis using Pearson test

Table 4 below represents the multicollinearity analysis using the Person test. Multicollinearity is one of the serious issues that should be resolved

before beginning the process of modeling data (Daoud, 2017). This analysis highly contributes to accurate results. Researchers ignore and sometimes dismiss the model if the multicollinearity is observed after finding the model especially the one with high correlation as the model cannot be interpreted.

The issue of multicollinearity should be assessed through the correlation coefficients (Hair et al. 2006). If the values are below 0.8 (Midi et al. 2010), the multicollinearity, in this case, is not observed between the variables which is true in this research.

Table 4: Multicollinearity analysis using Pearson test

	PQ V	PEV	PPV	PSV	PTA	PTI	PTB	IAMB	PMP S	Gender	Age	Educ ation	Occu pation	Incom e
PQV	1	.763**	.603**	.393**	.544**	.508**	.361**	.504**	.339**	.195**	- .218**	-.073	-.064	-.053
PEV	.763**	1	.597**	.466**	.519**	.526**	.359**	.573**	.342**	.155*	- .264**	.033	-.013	-.010
PPV	.603**	.597**	1	.675**	.349**	.483**	.504**	.362**	.377**	.152*	- .194**	.024	-.073	-.025
PSV	.393**	.466**	.675**	1	.267**	.433**	.371**	.310**	.330**	.068	-.054	.030	-.058	.089
PTA	.544**	.519**	.349**	.267**	1	.615**	.439**	.648**	.360**	.118	-.137	-.011	.007	.092
PTI	.508**	.526**	.483**	.433**	.615**	1	.681**	.599**	.571**	.123	-.169*	-.100	-.110	-.034
PTB	.361**	.359**	.504**	.371**	.439**	.681**	1	.459**	.602**	.111	- .199**	-.075	-.142*	-.113
IAMB	.504**	.573**	.362**	.310**	.648**	.599**	.459**	1	.457**	.007	-.129	.003	-.007	.114
PMP S	.339**	.342**	.377**	.330**	.360**	.571**	.602**	.457**	1	-.099	.012	-.079	-.009	.046
Gend er	.195**	.155*	.152*	.068	.118	.123	.111	.007	-.099	1	- .351**	.142*	- .338**	- .410**
Age	- .218**	- .264**	- .194**	-.054	-.137	-.169*	- .199**	-.129	.012	-.351**	1	.062	.339**	.395**

Educ ation	- .073	.033	.024	.030	-.011	-.100	-.075	.003	-.079	.142*	.062	1	.336**	.360**
Occu pation	- .064	-.013	-.073	-.058	.007	-.110	-.142*	-.007	-.009	-.338**	.339**	.336**	1	.585**
Inco me	- .053	-.010	-.025	.089	.092	-.034	-.113	.114	.046	-.410**	.395**	.360**	.585**	1

4.3.3 Mean and standard deviation of the constructs

Table 5 below shows the summary of the descriptive analysis statistics. The descriptive analysis shows the respondents' perspectives toward the questions being asked in the questionnaire. A 5-point Likert scale was utilized in the questionnaire which ranges from number 1 that is strongly disagree to number 5 which is strongly agree. The mean under 3.0 is considered low, and 3.0 is average, while above 3.0 is high. As shown from the below statistics data, it is found that most of the data were above 3.5 except three variables (perceived social value, perceived benevolence, and Perceived mobile payment application security), which is at between 3.1 to 3.4. Next is the standard deviation data which is at the range of 0.6 to 1.1 mean it is a greater spread data. The PQV (Mean=4.14, SD= .78), (PEV) (Mean= 4.1, SD= .86), (PPV) (Mean= 3.5, SD= .91), (PSV) (Mean= 3.4, SD= 1.03), (Mean=4.17, SD= .67), (PTA) (Mean= 4.1, SD= .67), (PTI) (Mean=3.61, SD= .83), (PTB) (Mean=3.34, SD= .88), (IAMB) (Mean=4.03, SD=.82), and PMPS (Mean= 3.13, SD=1.17).

In summary, the mean values of all variables range from 3.3419 to 4.1744. This indicates that most of the respondents are "Slightly agree" or "neutral" to use mobile payment applications under given circumstances.

Table 5: Mean and standard deviation of the variables

		PQV	PEV	PPV	PSV	PTA	PTI	PTB	IAMB	PMPS
Mean		4.148	4.102	3.582	3.443	4.174	3.611	3.341	4.039	3.1333
		7	6	1	6	4	3	9	3	
Median		4.200	4.200	3.500	3.500	4.000	3.600	3.333	4.000	3.0000
		0	0	0	0	0	0	3	0	
Mode		5.00	5.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation		.7848	.8661	.9122	1.035	.6723	.8328	.8802	.8277	1.17992
		0	7	2	47	4	8	5	4	
Variance		.616	.750	.832	1.072	.452	.694	.775	.685	1.392
Minimum		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

4.4 Confirmatory composite analysis (CCA)

CCA in PLS-SEM is a sequence of steps that were utilized by many researchers in past research to help in the measurement of the model assessment. The CCA or confirmatory composite analysis is an SEM or a structural equation modeling technique that identifies and evaluates complex models. (Hair et al., 2019). CCA is the initial step in PLS-SEM and the most popular composite method for estimating PLS-SEM. (Geoffrey S. Hubona, 2021)

This research focuses on the PLS-SEM method in performing CCA tests as it is considered an acceptable approach to develop and test multi-item constructs according to Hair et al. (2020). In order to perform the CCA tests, Hair et al., (2020) proposed the following steps below by using PLS-CCA

with PLS-SEM measurement models for reflexive measurement models as this research model of measurement:

Step 1: Assessment of loadings and significance of factors.

Step 2: Measurement of constructs' reliability and composite reliability by using Cronbach's alpha indicator.

Step 3: Measurement of the Average Variance Extracted or AVE to estimate the convergent validity.

Step 4: Estimation of the discriminant validity and the method used here is the heterotrait-monotrait ratio of correlations (HTMT).

4.4.1 Indicator Reliability

Factor loading is a way to translate the role of every variable in defining its factor (Hair et al. (2019). Therefore, a higher factor loading would mean that the variable is more representative of the factor. Concerning this notion, the number of factor loading should be highly considered. Hair et al. (2019) claim that factor loading of 0.708 and t-statistic of above 1.96 to be accepted for a two-tailed test at the 5% level.

According to the result of the indicator reliability of items as presented in Table 6, the researcher found that all items and factors show loading greater than 0.708, and t-statistic above 1.96. As a result, the composite reliability indicators for all variables were found to be above the cutoff values and all items and factors were basically significant and feasible to be used in data collecting. The researcher can conclude that all items are reliable.

Table 6: Indicator Reliability

Variable	Item	Item Loading	T Statistics
Intention to adopt Mobile application	IAMB1	0.924	53.939
	IAMB2	0.920	49.677
	IAMB3	0.899	43.687
Perceived emotional value	PEV1	0.858	23.962
	PEV2	0.904	45.336
	PEV3	0.911	48.047
	PEV4	0.912	67.126
	PEV5	0.821	22.088
Perceived mobile payment application security	PMPS1	0.955	95.748
	PMPS2	0.967	143.155
	PMPS3	0.964	128.727
Perceived price value	PPV1	0.819	31.052
	PPV2	0.766	15.850
	PPV3	0.873	37.670
	PPV4	0.713	15.199
Perceived quality value	PQV1	0.865	38.382
	PQV2	0.906	47.450
	PQV3	0.895	45.787
	PQV4	0.801	19.743
	PQV5	0.795	19.083
Perceived social value	PSV1	0.842	29.344
	PSV2	0.888	32.509
	PSV3	0.908	56.532
	PSV4	0.855	37.528
Perceived ability	PTA1	0.862	30.293
	PTA2	0.903	48.472
	PTA3	0.837	24.590
	PTA4	0.885	44.727
Perceived benevolence	PTB1	0.842	28.701
	PTB2	0.932	89.613
	PTB3	0.905	59.915
Perceived integrity	PTI1	0.825	30.700
	PTI2	0.855	34.549
	PTI3	0.904	62.859
	PTI4	0.854	34.618
	PTI5	0.831	33.283

4.4.2 Constructs' reliability and convergent validity

It is critical to consider the reliability when it comes to the evaluation of the quality of the psychometric properties of the constructs. A measurement that is valid is typically reliable; if a particular test generates results that are precise, then they are supposed to be verified again. The constructs' reliability evaluates if each item within the scale of measurement is coherent with other items of the same construct. Reliability test is measuring how each construct would have the same possible results each time being measured. High internal consistency is good evidence that the test is measuring those constructs well while, low internal consistency means that the test is testing something else (Heale, and Twycross, 2015).

By taking the reference value of 0.7, the Cronbach's alpha indicator is the most used test to measure the reliability of the scales (Hair et al., 2019). Also, Hair et al., (2020) recommend using the composite reliability indicator to assess the constructs' reliability which must be greater than 0.7. Additionally, these two indicators must not exceed 0.95 to ensure that the items are not redundant.

From the data analyzed in below table 3 the Cronbach's for variables ranged from 0.805 to 0.960 with the lowest being perceived price value while the highest was the perceived mobile payment application security.

Consequently, the reliability of the measuring scales of the research variables is good since they all show a Cronbach's alpha superior to 0.7. All the variables obtain excellent or good values ($\alpha > 0.8$). Also, the reliability of the constructs was evaluated through the composite reliability indicator which is greater than 0,7 and less than 0.95 as is indicated in table 7.

The concept of validity was formulated to test whether each construct is considered valid and if it is measuring what it claims to measure (Heale and

Twycross, 2015). For example, a test of quality value should measure quality value and not something else. i.e., the questions that is measuring the quality value are highly correlated and truly measure the construct. Thus, moderate to high correlation demonstrate evidence of convergent validity. This test is measured by the Average Variance Extracted (AVE). An Average AVE that is greater than 0.5 is considered an acceptable measurement (Hair et al 2020).

Consequently, the convergent validity of the research constructs is assessed since they all show an AVE superior to 0,5. All the variables obtain acceptable values (AVE > 0.5). The values of AVE range from 0.632 to 0.926, suggesting that the convergent reliability is confirmed.

Table 7: Scale Reliability Test and convergent validity

	Cronbach's Alpha α	Composite Reliability	Average Variance Extracted (AVE)
Intention to adopt Mobile application	0.902	0.939	0.836
Perceived ability	0.895	0.927	0.761
Perceived benevolence	0.873	0.922	0.799
Perceived emotional value	0.928	0.946	0.778
Perceived integrity	0.907	0.931	0.730
Perceived mobile payment application security	0.960	0.974	0.926
Perceived price value	0.805	0.872	0.632
Perceived quality value	0.906	0.931	0.729
Perceived social value	0.896	0.928	0.763

4.4.3 Constructs' discriminant validity

According to Hair et al. (2020), discriminant validity measures “the distinctiveness of a construct, and is demonstrated when the shared variance within a construct (AVE) exceeds the shared variance between the constructs”. In order to establish discriminant validity, the heterotrait-monotrait ratio of correlations (HTMT) analysis is recommended by Hair et

al. (2020) that was introduced by Henseler et al. (2015). This approach is easy to compute especially with traditional partial least squares path modeling such as the variance-based structural modeling unlike the frequently used Fornell-Larcker criterion that lacks sensitivity and specificity (Hair et al, 2020). Although Fornell-Larcker criterion is the dominant approach for evaluating discriminant validity, by means of a simulation studies, this approach do not reliably detect the lack of discriminant validity in common research situations (Henseler et al, 2015). As in such approach, “researchers can use cutoffs scores such as 0.8 and 0.9 to establish a discriminate validity” (Hair et al., 2020).

In such a setting, an HTMT value above 0,85 is a prove that discriminant validity is not present. But when variables are conceptually more distinct, a lower, more conservative, edge value is suggested, such as 0.85 (Henseler et al., 2015). As shown in Table 8 below, there are discriminant issues regarding the research variables. All HTMT values are below 0.85, which means discriminant validity has been confirmed for the reflective constructs.

Table 8: Heterotrait-Monotrait Ratio (HTMT)

	Age	Education	Gender	Income	ITAMA	PA	PB	PEV	PI	PMPAS	PPV	PQV	PSV
Customers' e-trust toward Mobile Application	0.202												
Education	0.062												
Gender	0.351	0.142											
Income	0.395	0.360	0.410										
Intention to adopt Mobile application	0.136	0.048	0.020	0.121									
Moderating Effect 1	0.015	0.057	0.006	0.043	0.209								

Perceived ability	0.1 44	0.0 21	0.1 24	0.0 98	0.7 21								
Perceived benevolence	0.2 10	0.0 81	0.1 17	0.1 20	0.5 22	0.4 99							
Perceived emotional value	0.2 73	0.0 45	0.1 59	0.0 60	0.6 28	0.5 70	0.3 98						
Perceived integrity	0.1 80	0.1 08	0.1 31	0.0 75	0.6 60	0.6 83	0.7 69	0.5 72					
Perceived mobile payment application security	0.0 16	0.0 80	0.1 00	0.0 54	0.4 91	0.3 89	0.6 59	0.3 60	0.6 09				
Perceived price value	0.2 27	0.0 31	0.1 75	0.0 44	0.4 36	0.4 29	0.6 05	0.7 05	0.5 77	0.4 28			
Perceived quality value	0.2 31	0.0 75	0.2 05	0.0 75	0.5 59	0.6 05	0.4 03	0.8 37	0.5 60	0.3 61	0.7 26		
Perceived social value	0.0 58	0.0 70	0.0 95	0.0 95	0.3 50	0.3 04	0.4 25	0.5 09	0.4 84	0.3 59	0.7 82	0.4 39	
Perceived value of Mobile Application	0.2 37	0.0 66	0.1 87	0.0 80	0.5 91	0.5 72	0.5 20	0.9 40	0.6 40	0.4 35	0.9 72	0.9 31	0.7 95

4.5 Structural model quality

After checking the psychometric variables, this next step mainly focuses on learning about the predictive capabilities of the proposed model. It is crucial to test the quality of the model before proceeding on to hypotheses testing. The most typical indicators for this test is R-squared which indicates how well the model suits the observed data. According to Hair et al. (2014), R² referred to a coefficient of determination test that is interpreted as the percentage of contribution from independent variables to dependent variables. Hence, if the R Square is greater than 0.1, then it means that the bigger contribution or effect that independent variables give. Generally, for the R², the acceptable level of significance should be ≤ 0.10 (Hair et al., 2020).

Table 9 shows the coefficient of determination test R square. For the model to be significant, the R² values must be greater than 0.1 (Hair et al., 2020). For this research, this significance is achieved since all the dependent variables in the research model have an R² greater than 0.1, more accurately,

user's e-trust toward mobile application and intention to adopt mobile application has a R² of 0.548, and 0.489.

Table 9: coefficient of determination test R Square

	R Square	R Square Adjusted
User's e-trust toward Mobile Application	0.555	0.548
Intention to adopt Mobile application	0.505	0.489

4.6 Test of the structural model

After evaluating the psychometrics of the constructs and the quality of the model, the research progress to test the structural model of the research i.e., to test the direct, moderating, and mediating effects in the model. The strength and significance of the path coefficients are evaluated regarding the relationships hypothesized between the constructs. A path coefficient is significant at 0.5 or lower, and the critical ratio is greater than 1,96.

4.6.1 Test of direct effects

The standardized coefficients of each relationship between the research variables (the relationship between the user e-trust toward mobile application and the intention to use the mobile application and the effect of the perceived value of mobile Application on user's e-trust and intention to use mobile payment application) and their significance will be introduced in the analysis. The direct effect between the control variables (age, gender, income, and education) and the independent variable which is intention to use mobile payment application will also be tested.

The p-value approach for hypothesis testing is used in this research to determine the hypothesis significance of the results in relation to the above-

mentioned hypothesis. The level of statistical significance is usually expressed as a p-value that is less than 0.5 and the critical ratio is more than 1.96 (Hair et al 2020). A smaller p-value is interpreted that there is a stronger relationship between the two variables.

Table 10 below shows the standardized regression coefficient, critical ratio (CR), and p-value of each link between the research variables and highlights the results of hypotheses evaluating the direct relationships between the research variables. All of these hypotheses are supported.

Table 10: Test of direct effects

Hypothesis	Independent variable	Dependent variable	β	CR	P-value	Supported?
H1	Users' perceived values (PV)	Intention to adopt Mobile application (IAMB)	0.208	2.967	0.003	Yes
H2	Users' perceived values (PV)	User's e-trust	0.470	6.415	0.000	Yes
H3	User's e-trust	Intention to adopt Mobile application (IAMB)	0.552	8.428	0.000	Yes
-	Respondent' age	Intention to adopt Mobile application (IAMB)	-0.044	0.831	0.407	-
-	Respondent' education	Intention to adopt Mobile application (IAMB)	0.027	0.310	0.756	-
-	Respondent' Gender	Intention to adopt Mobile application (IAMB)	-0.085	1.121	0.263	-
-	Respondent' income	Intention to adopt Mobile application (IAMB)	0.098	1.205	0.229	-

Based on the analysis the above-mentioned hypotheses are confirmed to be significant thus supported. H1 hypothesized the link between the user's perceived values of the mobile payment application and intention to adopt the mobile application. According to the Table, results show that users' perceived values have a positive and significant effect on the IAMB. In Table 10, it can be seen that the value of the critical ratio (CR) is significant $2.967 > 1.96$ and the p-value is below 0.05. In this line, H1 is supported. H2 hypothesized the relationship between user's perceived values of the mobile payment application and user's e-trust, This Hypothesis is supported as shown in Table 10 as the critical ratio value is $6.415 > 1.96$ and the p-value is below 0.05. Thus, H2 is supported. Finally, the results outline that user's e-trust positively affects IAMB, because the value of the critical ratio obtained is $8.428 > 1.96$ and the p-value is below 0.05. H3 is thus supported.

For the control variables, the p-value for age as a variable was $0.407 (< 0.05)$ which means that there is a significant influence of customers' age on the IAMB. No significant links also were found between education ($p = 0.756 < 0.05$), gender ($p = 0.263 < 0.05$), income ($p = 0.229 < 0.05$) on IAMB. Results highlighted that there are no significant effects of the control variables on the IAMB.

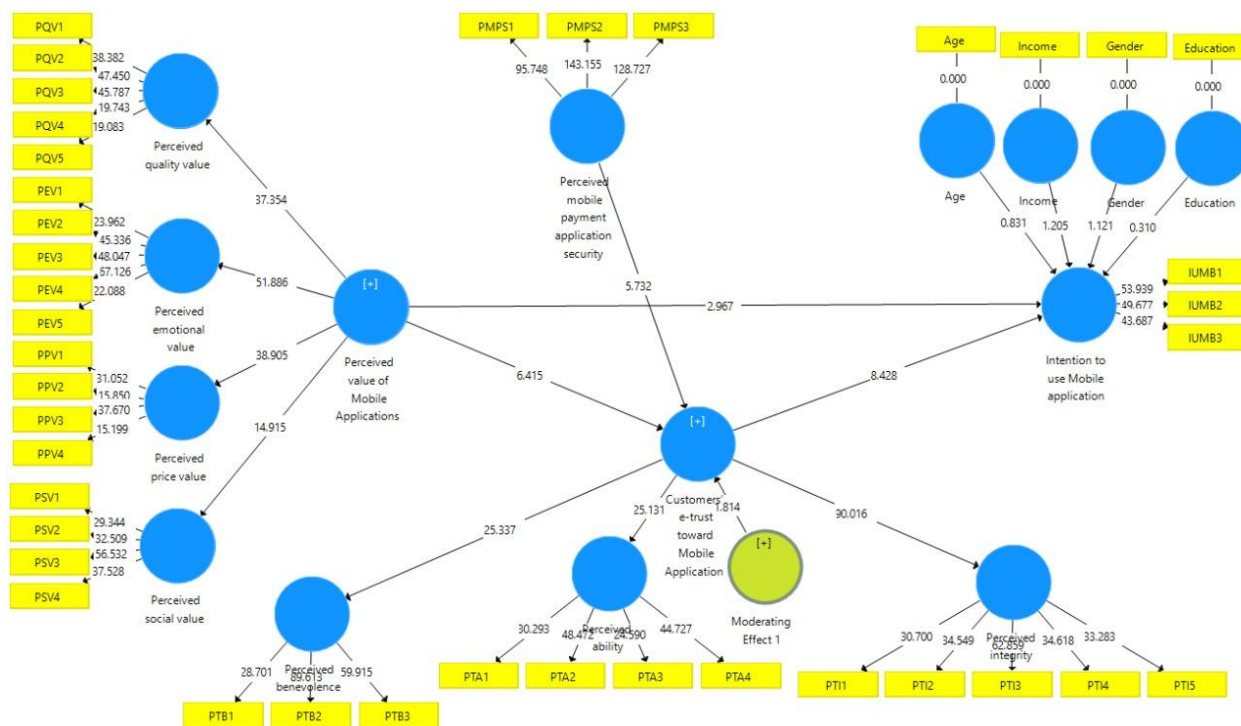


Figure 9: Results of the structural model

4.6.2 Test of the mediating effect

To test the mediating role of users' e- trust toward mobile applications, the indirect effect between the independent variables and the dependent variable must be significant to establish a mediation effect and then the researcher examines the type of the mediation. In the first step, the percentile and the bias-corrected bootstrap confidence interval are measured as suggested by Hair et al., (2014). The indirect effect is considered significant when zero is not shown in the confidence interval. In other words, the researcher should estimate the significance of the total effect between the independent variables and the dependent variable. Then, the researcher should test the significance of the indirect effect between these variables by taking into account the effect of the mediating variable. The direct effect of the independent variable on the

dependant variable should decrease or become non-significant. The second step is to decide the type of mediation whether it is full or partial, by examining the significance of the direct effect. If the indirect effect is significant and the direct effect is not, the mediation is considered full. This type of assessment can be done by using the VAF For measuring the mediating effect size. When the VAF percentage is more than 80, the mediation is considered full, but when a VAF percentage is between 20 and 80, the mediation is considered a partial one (Hair et al., 2014).

The researcher focused on the non-parametric bootstrapping method to assess the mediating effect of customers' e-trust toward mobile payment applications in the research model in the line of Hair et al. (2014). According to this approach, the first step should be to assess the significant relationship between the independent (Customers' perceived value of mobile payment application) and dependant variable (intention to adopt the mobile payment application) without integrating the mediating variable (customers e-trust toward mobile payment application) in the research model.

Along with this idea, customers' perceived value of mobile payment applications is found to positively affect their intention to adopt the mobile payment application ($\beta=0.467$, $p<0.001$). The second step consists of assessing the significance of the indirect effect of the independent (Customers' perceived value of mobile payment application) on the dependant variable (intention to adopt the mobile payment application) by integrating the mediating variable (customers e-trust toward mobile payment application) in the research model. This link should be reduced or turn out to be non-significant to assess a mediating effect. In the case the indirect effect is not significant, the researcher can conclude that there is no significant mediating

effect (Hair et al., 2014). In the case the indirect effect is significant, the next step should be to check if there is a partial or total mediation. A total mediating effect is assessed if the VAF value is greater than 80%, whereas partial mediation is assessed if the VAF value is between 20% and 80%.

For this purpose, Hair et al. (2014) recommended calculating the variance accounted for (VAF), i.e., the indirect effect divided by the total effect. In this line, findings provide evidence that the indirect link between customers' perceived value of mobile payment application and the intention to adopt the mobile payment application in the presence of customers e-trust toward mobile payment application is significant ($\beta=0.259$, $p<0.001$). The value of the VAF for this mediating effect was calculated and is equal to 55.46%. This value is between 20% and 80%. Accordingly, customers' e-trust toward mobile payment applications partially mediates the link between customers' perceived value of mobile payment applications and the intention to adopt the mobile payment application. Thus, hypothesis H4 is supported. See table 11

Table 11: Mediating effect of customers e-trust toward mobile payment application

Hypothesis	Link	Mediating variable	Direct effect	Indirect effect	Total effect	Total VAF	Supported?
H4	Perceived value of the MP application- Intention to adopt mobile payment application	Customers e-trust toward mobile payment application	$\beta=0.208$ (CR.= 2.967, $P<0.01$)	$\beta=0.259$ (CR.= 5.993, $P<0.001$)	$\beta=0.467$ (CR.= 6.608, $P<0.001$)	20%<55.46%<80% (Partial mediation)	Yes

4.6.3 Moderating effect

To test the moderating role of the perceived mobile payment application security, the two-stage approach offered by SMART PLS and the PLS path modeling was adopted to evaluate the significance of the moderating effect. This method approach calculates the scores of the moderating latent variable and the latent independent variable (Hair et al., 2014). The product indicator i.e., the interaction of the moderating variable with the independent variable is calculated after. SMART PLS also calculates the direct effect of the moderating variable on the dependent variable.

The last hypothesis H5 which aims to examine the moderating effect of users' perceived mobile payment application security was tested using the two-stage approach offered by SMART PLS and the PLS path modeling. This approach was also adopted to indicate the product indicator that shows the interaction between the moderating variable and the independent variable.

Table 12 below shows the result for the direct link between perceived mobile payment security and customers' e-trust toward mobile applications. This link is confirmed positive and significant ($\beta = 0.399$, $p < 0.5$). However, the indicator product that examines the interaction between users' perceived values, the research independent variable, and users' perceived mobile payment application security, the moderator variable, is not significant. Therefore, H5 is rejected.

Table 12: moderating effect of Users' perceived mobile payment application security

Hypothesis	link	β	CR	P-value	Supported?
H5	Moderating Effect 1 -> users' e-trust toward Mobile Application	-0.117	1.814	0.070	No
	Perceived mobile payment application security -> users' e-trust toward Mobile Application	0.399	5.732	0.000	

4.7 Results' Discussion

This section makes further discussion based on the findings highlighted in previous sections and as all the hypotheses have been verified earlier, more aspects associated with these hypotheses could be considered. The main objective of this research was to investigate the effect of users' perceived values on the intention to adopt mobile payment applications in Saudi Arabia. The research also looks at the mediating effect of the user's e-trust in the link between this relationship, and it also explores the moderating effect of perceived mobile payment application security in the link between users' perceived values of mobile payment applications and user's e-trust.

Utilizing the TAM theory (Yan & Yang, 2015; Gefen, 2002) and TPB theory (Cheung & To, 2017; Lee et al., 2015), the aim of this study is to highlight the effect of users' perceived values on adoption intention of mobile payment applications through the mediating roles of e-trust and the moderating role of security. The primary idea behind this research subject is the importance of perceived values, trust, application security as key factors promoting NFC payment applications that is satisfying users' demands, especially during the Covid-19 pandemic situation, as e-payment services available in the mobile applications have been used between individuals rather than cash to prevent Covid-19 transmission. Although this topic has been investigated by numerous authors in Saudi Arabia, previous research fit with a simple approach of the acceptance of mobile payment applications that considers that the adoption of the mobile app is based on the role of various users' values and beliefs without enrolling the security factor in the relation between user's trust and adopting the applications, moderator and mediating

effects are also not mentioned (Alabdan & Sulphey, 2020; Alswaigh & Aloud, 2021; Alhallaq & Champion, 2019; Al-Jabri, 2015). This research addresses the gap in the literature by exploring the mediating role of users' e-trust in these relations and is also the first to investigate in depth the moderating role of perceived security in these complex relationships.

First, the empirical results showed the positive effect of users' perceived values of mobile payment applications on the intention to adopt mobile applications in the Saudi context. In fact, many studies have confirmed the positive effect of this variable on the user's adoption in different countries (Lin, 2020; Chawla, 2019; and Zhou, 2018). For the context of Saudi Arabia, users' perceived values influence strongly users' intention to adopt mobile applications. These findings provide an insightful understanding of the importance of perceived values and can offer suggestions to applications providers. Drawing on this information, social, price, quality, and emotional values were highly recognized by Saudi adopters. One of the features that top the interest of many applications users is the mobile application quality and particularly the question of whether this application would last for a long time of period or not (mean= 4.28). This result is in line with Berraies et al. (2017) who tested this link in the context of mobile banking and it indicates that perceived quality value is a crucial determinant of user's perceived values, a good quality mobile application will encourage consumers to adopt it and users will find it useful and valuable (Zhou, 2018). Consequently, in the Saudi market, the quality of mobile applications has a great influence on the intention of Saudi citizens to adopt mobile applications. According to the research result, users' social perceived value had a substantial impact on the total perceived values of users toward adopting mobile applications (mean = 3.4436). The result strongly supports previous findings like those of Lin et

al., (2020). The result also corroborates the findings of Alhallaq, (2019) who found that monetary, enjoyment, and social values have a positive effect on the intention to adopt mobile payment applications, and pointed out that social self-image was playing an effective role in generating a tendency between users to adopt the mobile application when they need performing a financial transaction or money payment. The findings indicate that mobile application brand name becomes popular to consumers and would give its owner social approval. The service provider would benefit from such information by launching promotion campaigns on online social media channels such as Snapchat, YouTube, and Instagram to promote their payment applications and make them more socially appealing amongst individuals.

Secondly, another important effect that the researcher wanted to determine is to what extent users' perceived values' dimensions of mobile payment applications namely; quality, social, emotional, and price are key predictors of customers' e-trust. Data analysis results showed that users' perceived values of mobile payment applications have a positive effect on users' e-trust. This result corroborates the finding of Yan & Yang (2015) who found that an increase in perceived values will raise the users' e-trust and induce them to adopt mobile applications in the future. Therefore, in the Saudi context, perceived values of mobile payment applications have a considerable influence upon Saudi citizens' trust in adopting mobile applications. Thus, whether mobile service providers can provide good quality, social approval, emotional pleasure, and with good cost (Price) will affect users' appraisals on their ability and benevolence. The findings are consistent with the research of Mosunmola et al., (2018); Konuk, (2017); Liu et al., (2020). The research results are also corroborating with Berraies, (2017) that found the positive link

between perceived values and e-trust but in the M-banking application context and in another country.

The research findings indicated that there is a significant link between e-trust and intention to adopt mobile applications, and trust is positively related to positive attitudes towards adopting mobile applications. In addition, the results extended past studies on the TPB theory (Lee et al., 2015; Cheung & To, 2017) by using this theory to demonstrate that e-trust is a key determinant of the user behavior attitudes towards online shopping, and can directly account for users' behavioral and encouraging the intention to adopt such applications. In addition, the results also corroborate the TPB theory and trust literature by identifying that e-trust is a significant predictor for behavioral attitudes toward the users' intention in the TPB model. The research findings strongly support previous research performed by Mosunmola et al., (2018), and Lăzăroiu et al., (2020); who highlighted the importance of reliable feedback from users about mobile payment applications and discovered that the user's e-trust can retain existing users to continue using mobile applications more regularly. When users feel of trust that their financial payments will be protected and locked, this may also make mobile application more appealing. The more a user have a confidence that all their money- involved transactions is safe, the higher his belief that mobile payment application was useful to adopt. The mobile payment applications are encrypted with sophisticated technology approaches such as PIN; personal identification numbers, biometrics, or thumbprints, that are highly protected even if a mobile device is stolen or even lost. Such features contributed in building trust between service providers and their clients, and enabled users to believe that payment service technology of the applications is delivering the expected promised services and keeping their transactions encrypted. In

addition, in Saudi Arabia, the notion of trust in the service providers is maintained through many governmental regulations on financial payments (Aljabri, 2015). Trust is deeply emphasized in Arab cultures like Saudi, and trust-based relationships may be considered a key determinant of mobile payment adoption.

The mediating role of e-trust in mobile payment applications has been measured slightly in past research. One of the main objectives of this research was to explore the mediating effect of e-trust in the link between perceived values of the mobile payment application and their intention of adoption in the proposed framework. This research found a significant mediating role of e-trust between users' perceived values and adoption intention. These results are consistent with Park et., (2019) and Qalati et., (2021). According to the results, e-trust was acted as an important mediating variable to the independent variable on the acceptance of adopting new technologies and applications. Thus, trust issues are key concerns for users to adopt mobile payment applications. As mobile users are expected to benefit the most from mobile payment applications, thus all other parties (e.g., banks and service providers) should seek to earn consumer trust to make mobile payment a success (Alkhaldi, 2016). For example, introducing a better network infrastructure is a priority that provides the citizens in Saudi Arabia with easier use of mobile payment services. In addition, if consumers believed the mobile banking providers are able to develop effective strategies, deliver efficient services, and provide sufficient shield from privacy violation and fraud, then adoption intentions will increase. people in Saudi Arabia should be offered with more valuable knowledge-based trust about the advantages and ways of utilizing payment applications. This would encourage more adoption and awareness and of mobile payment applications by the users.

Previous literature explored the adoption of mobile payment service from the user's perceived factors side, whereas this current research implemented a more holistic approach of security and trust perceptions. This approach was achieved by identifying the moderating influence of perceived security on users' e-trust that affects users' adoption intention and then comparing the moderation effect of security in the relation between users' perceived values and e-trust. Research findings confirmed the positive effect of mobile payment perceived security on the user's e-trust, this is consistent with previous literature (Chawla and Joshi 2019; Phuong et al., 2020). The findings indicate that security plays a driving role in building users' trust that determines their adoption intention level. It also highlights that security is considered a key antecedent of users' e-trust, and users tend to trust the payment application if they perceive it as secure. Nevertheless, security and privacy concerns can prevent mobile payment applications from going widely adopted. As the mobile payment space continues to grow, the threat of hacking or mobile data breaches remains a serious threat.

In the research model, while the researcher found that the perceived mobile payment security has a positive influence on user's e-trust, the moderating effect of this construct turned out not to influence user's perceived values toward their trust. This result means that mobile payment security does not reinforce the relationship between perceived values and e-trust. In other words, the impact of the user's perceived values on the user's e-trust is not strengthened nor weakened by the security of the mobile payment applications. The community in Saudi Arabia should be reorganized with updated mobile payment services, on a privacy and security basis. Likewise, the users should be educated and well-informed on the benefits of mobile

payment services. this would support for a greater assurance of the confidentiality of their financial and personal information (Alkhald, 2016).

Finally, the control variables that were used in this research were; gender, age, education, and income. The inclusion of these control variables is supported by previous studies. For example, Chandra, (2018) argued that different society members embrace mobile payment systems differently. According to previous studies, demographic factors such as gender, and age have a direct effect on the intention to adopt mobile payment applications (Musa et al., 2015). Also, the educational or income level of a mobile application user can strongly shape his perception toward such a service (Alkhaldi & Kharm, 2019). Although these variables are particularly important for market segmentation and may influence user adoption of mobile payment applications, gender, age, income, and educational background did not reveal a direct effect on the users' adoption intention in Saudi Arabia. The relationship between the control variables and intention to adopt mobile payment applications is insignificant based on research result. This study discovered that users' gender, education, income, and age does not play any role in impacting a user's intention to adopt mobile payment applications in Saudi Arabia. Such result does not support the findings of Alkhaldi & Kharm (2019) that uncovered the moderating role of age, education, and income on the adoption intention in Saudi Arabia. The research is in accordance with a study by Singh & Rana (2017) who found out that there is no significant change in user perception based on the demographic factors such as gender, age, and annual income toward mobile payment system.

4.8 Summary

The results analysis of this research was done and explained in this chapter. Various statistical assessments including descriptive statistical analysis SPSS 26 was conducted to explain the characteristics of the sample. A series of confirmatory composite analyses (CCA) in PLS-SEM like: Indicators loadings', reliability, convergent validity, and discriminant validity were conducted in order to develop and test multi-item constructs that were proposed in the research model. The quality of the proposed conceptual model was also verified using the R2 approach. The structural model including the direct and indirect relations between all research variables was also clarified and explained. The research hypothesis results were highlighted in addition to the discussion section that interpreted the findings of the research. further discussion of the results of the model and how they relate to present literature and their implications is continued in the next Chapter 5.

Chapter 5: Conclusion

5.1 Introduction

In alignment with the five-chapter research structure, this chapter begins with the research result summary and theoretical contribution. Then, the chapter continues with the discussion of managerial implications of the main findings as they relate to the adoption of the mobile payment applications. The research limitation and perspectives of future studies are presented. Finally, the chapter ends with a summary of the main conclusions deriving from the study in this final chapter.

5.2 Results' summary and theoretical contributions

Research findings support the role of users' perceived values and users' e-trust as two key antecedents of intention to adopt mobile payment applications. Table 13 below provides a complete list of the hypothesis that were at the main scope of investigation in this research and as a result, hypotheses H1, H2, and H3 were supported. Accordingly, service providers and application developers should consider these two concepts if they want a mobile payment application to become more appealing to the user on a daily basis. H1 result indicated a positive effect of users' perceived values of mobile payment applications on the intention to adopt mobile applications. Many studies have confirmed this positive effect in different countries (Lin, 2020; Zhou, 2018 & Chawla, 2019). H2 was also supported representing a positive effect of users' perceived values of mobile payment applications on users' e-trust. This result corroborates the finding of Yan & Yang (2015). In H3, the researcher found out trust is positively related to positive attitudes towards adopting mobile applications. The results were similar to those of Mosunmola et al., (2018), and Lăzăroiu et al., (2020). The researcher found that hypothesis H4, suggesting a positive indirect effect of users' perceived value of mobile payment application on intention to adopt the mobile payment application by integrating the partially mediating role of e-trust toward mobile payment application, was supported. Previous studies have also succeeded in supporting a positive impact of users' e-trust on behavioral intention to adopt mobile payment (Mosunmola et al., 2018; Lăzăroiu et al., 2020). Nonetheless, the findings show that the direct effect of perceived mobile payment security and users' e-trust toward mobile applications is positive and significant. This result is supported by Chawla (2019) and Phuong et al. (2020). However, the

indirect effect of users' perceived values and the users' e-trust with the moderator role of users' perceived mobile payment application security is not significant. Thus, hypothesis H5 suggesting the indirect impact of users' perceived values on the user' e-trust through perceived mobile payment security is not confirmed and it is rejected. This result does not support the findings of Basbeth & Sumapraja (2021) who signified the moderating role of mobile payment security in online shopping in Jakarta. The intention to use mobile payment system become stronger when high level of perceived secure mobile payment is applied (Basbeth & Sumapraja, 2021). For the Saudi context, this result is an important contribution of this research, because this conclusion is almost entirely absent from mobile payment applications' literature. The moderating effect of mobile payment security is uncertain and has not been given enough attention, especially in developing countries such Saudi Arabia.

Table 13: Summary of Hypotheses Testing

The hypothesis		Decision
H1	Users' perceived values of the mobile payment application has a positive effect on the intention to adopt mobile payment application	Supported (CR=2.967, $p < 0.5$)
H2	Users' perceived values of the user has a positive effect on his e-trust toward mobile payment application	Supported (CR=6.415, $p < 0.5$)
H3	User's e-trust toward mobile payment application has a positive effect on the intention to adopt the mobile payment application	Supported (CR= 8.428, $p < 0.5$)
H4	User's e-trust toward the mobile payment application mediates the relationship between the perception of value by users and the intention to adopt mobile payment application	Supported (CR=6.608, $p < 0.5$)
H5	Users' perceived mobile payment application security moderates the relationship between users' perceived values of the mobile banking applications and users' e-trust toward the mobile payment applications.	Rejected (CR=1.814, $p=0.070$)

5.3 Managerial implications

The main purpose of this research was to outline the detailed features and concerns that are associated with mobile payment applications. Those concerns can be more easily clarified to users, service providers, and the banking system if identified. The banking system and service providers may update their own safety measures and security approaches of payment applications. Based on the research result, mobile payment service providers should also concentrate on gaining their customers' trust by enhancing their platform's abilities to maximize the privacy level of their customers' private bank accounts and all payment transactions. Furthermore, in an approach for raising their adoption rates, service providers and mobile payment application developers may create or develop high-quality mobile payment applications with features that can be attractive, and socially friendly to users for managing payments. Service providers must understand the users' needs, improve their usage experience, recognize their habit of shopping, and value their views and feedback to update the mobile payment system in general.

Moreover, the significant expansion of the major mobile payment applications in Saudi Arabia such as STC Pay, Mada Pay, and Apple Pay couldn't be achievable without the support and involvement of the Saudi Arabian Monetary Agency (SAMA), the Saudi main financial institution. Therefore, highlighting the vital role of this financial institution as a highly trusted organization could positively increase perceptions of trust in these payment applications providers. Finally, security has been identified as an important concern. As such, this aspect needs to be given sufficient attention if consumers are to be encouraged to involve in more mobile payment options. Accordingly, Saudi banks need to offer good methods of security for mobile

payment services, which will contribute in increasing the trust of security toward adopting mobile payment applications. Moreover, the measures should be clarified to the extent that mobile payments are featured with solid security, and the Saudi Arabian Monetary Agency (SAMA) is supporting such measures. In realizing that users' perceived values and e-trust are two important factors that affect the intention of adoption, financial institutions need to promote workshops, to teach users how to use the application and explain the main benefits of mobile banking.

5.4 Limitations

Based on the results of this research regarding the factors influencing the adoption of mobile payment by users in Saudi Arabia, the following limitations are acknowledged: although many statistical results support generalizability if the sample size is larger than one hundred (100), greater samples can strengthen the interpretation power of this research and may guard for any biases. Also, concerning the sampling, the respondents were mostly young (26- to 40-year-old), and well-educated whose behavioral attitude might vary somewhat from the population average and that can cause some bias. They are commonly more innovative and faster to adopt new technologies and information, and this may cause biases to the results. This is likely because older and less educated users or those who possess low internet skills would perceive more difficulty in using mobile banking and experience higher usage risks.

Finally, the results were tested within the context of Saudi in Riyadh city. Consequently, this research implications may be exclusive to this city or only the Saudi citizens. Also, the cultural aspects of Saudis in Riyadh such as

their tradition, culture, and beliefs may also influence the generalizability of the conclusions comparing it to other cities or even countries. Saudi Arabia has many regions including some rural territories, thus the results may not fully represent the whole population, and this research may have not discovered the situation of users in those areas. Consequently, it is recommended for future studies to address this gap and try to include participants from other areas to obtain full knowledge and information about the situation of adopting mobile payment in Saudi Arabia.

Another important limitation inherent in this research that needs to be acknowledged is the time that the research was done. The data collection was limited to Saudi Arabia during the time of the Covid 19 pandemic; thus, the research findings may not be generalized to other circumstances. Future researches may imitate this model and gather information from other populations or nationalities and explore the advantages corresponding to normal settings. Finally, future studies may perform longitudinal approaches comparing mobile payment adoption behavioral before the period of Covid 19 and afterward to gain more genuine knowledge.

5.5 Thesis perspectives

The dominant age group of the research respondents was between aged 26 to 40 years old who represents 76.4% of total responses. However, Saudi Arabia has other population that represents many younger and elderly individuals. Hence, it is recommended that future research may address other age groups especially, the younger or older, to render such research results, and in order to better recognize the influence of the factors regarding mobile payment adoption on more diverse users. Future researchers could examine the moderating role of customers' age in the link between users' perceived

values and the adoption of mobile payment applications. Also, they may investigate other aspects that are suitable for the mobile payment context, like convenience, and innovativeness that may influence the intention to adopt mobile payment.

Future studies can explore a suitable model according to the culture that resides in Saudi Arabia. Because it is important to include such elements in order to explore the cultural influence in the adoption of mobile applications as a payment method in Saudi. Mobile payment applications have been used in several cities in Saudi Arabia. With the use of mobile payment applications in many places, one can see how the significant role of culture in the adoption of mobile payment technology in Saudi Arabia is important. Furthermore, the research model can be tested through cross-cultural studies for more understanding of the dissimilarities in diverse cultural backgrounds. Another perspective of this research is to test the effect of each component of perceived values of mobile payment applications on users- e-trust and intention to use these applications. This could highlight the primacy of some dimensions regarding this effect.

5.6 Summary

This study investigates the factors that influence Saudi users' intentions to adopt mobile payment applications. This research is conducted through reviewing the literature, with the investigation on two models, namely technology acceptance model (TAM), and theory of planned behavior (TPB), and utilizing a quantitative research method.

This research is being carried out during a global pandemic mid 2021, with mobile payments applications is an inevitable solution for the Saudi economy to continue running and is widely implemented. Moreover, the

research did not address or consider normal situations. In order to study this topic according to the user's own perception and to allow for a more complete representation of the Saudi population at the moment of undertaking this research, the researcher selected approximately 195 (aged 18- 55), as the research's sample, from broadly varying technological and cultural backgrounds, all of which have adopted and used at least one payment application during the year of 2021.

The purpose is to define their experience in the adoption and implementation of mobile payment technology and to know what derive them in the process of adopting the application, keeping into account the considerable money investment made by users, developers, and government financial organization. The two most significant factors that affected the adoption of mobile payment applications were the users' perceived values and the issue of e-trust that arose among the research's participants. This, coupled with the conclusion that the quality and social impact of mobile payments, has affected many users into becoming adopters. Given the unavoidable situation of mobile payments applications' adoption during the current pandemic context, possibly this research could allow for the Saudi participants' opinions and feedback to be considered within the scope of this and any forthcoming study.

Thus, e-trust appears to be one of the most important factors for the adoption of mobile payment. Many users still have the readiness to grow out of their safe and basic mobile use to use the app and to perform their important financial dealings. Many users assume their payment applications provide protections similar to those of their tangible credit cards. additionally, those applications are safer than traditional payment methods because any financial information isn't uncovered during the transaction. the bank account or credit

cards digits can't be captured by any third party or stored in any wholesaler database where there could be at risk to any illegal hackers' access. Also, payment security is a crucial component of users' adoption intention; an increase in perceived security will induce them to continue adopting mobile payment applications in the future. However, the extreme speed at which the adoption is arising makes any difficulty in using the application fades away.

The objective of this study is to shed light on the intention of adoption of mobile payment among Saudis. The research helps businesses in recognizing the important factors that would influence users in utilizing mobile devices which will generate more financial transactions. The findings of this study supported prior literature that has used the TAM model in different settings. It is crucial to apply more studies throughout different countries to acquire deeper knowledge about the different factors that influence users' intention to adopt the mobile payment systems in those countries.

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Appendix

Appendix 1. *Questionnaire*

Dear Participant,

These questions were carried out as part of Master Business Administration research in the College of Business Administration, University of Bahrain. This study aims to identify the factors that influence Saudi citizens' intention to adopt mobile payment applications. We are committed to respect the anonymity and confidentiality of your answers. Please answer as spontaneously and sincerely as possible, circling the number corresponding to your level of agreement or disagreement. It is essential to answer all questions. All opinions are of equal interest to us. So, there are no right or wrong answers. Only your personal opinion matters.

We thank you for your participation!

Please feel free to contact me for any further information and assistance or inquiry.

Thank you for your time and assistance,

Researcher

Hessa Alotaibi

University of Bahrain

College of Business Administration

alotaibihessa@gmail.com

A) Customers' perceived values toward Mobile payment application Sweeney, J.C. and Soutar, G.N. (2001), "Consumer perceived value: the development of a multiple item scale", *Journal of Retailing*, Vol. 77 No. 2, pp. 203-220

Kindly choose one according to your preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1- This mobile payment application has consistent quality.	1	2	3	4	5
2- This mobile payment application is well made.	1	2	3	4	5
3- This mobile payment application has a good workmanship.	1	2	3	4	5
4- This mobile payment application would last a long time.	1	2	3	4	5
5- This mobile payment application would perform consistently.	1	2	3	4	5
6- This mobile payment application is one that I would enjoy.	1	2	3	4	5
7- This mobile payment application would make me want to use It.	1	2	3	4	5
8- This mobile payment application is one that I would feel relaxed about using.	1	2	3	4	5
9- This mobile payment application would make me feel good.	1	2	3	4	5
10- This mobile payment application would give me pleasure.	1	2	3	4	5
11- This mobile payment application is reasonably priced.	1	2	3	4	5
12- This mobile payment application offers value for money.	1	2	3	4	5
13- This mobile payment application is a good product for the price.	1	2	3	4	5
14- This mobile payment application would be economical.	1	2	3	4	5
15- This mobile payment application would help me to feel acceptable.	1	2	3	4	5
16- This mobile payment application would improve the way I am perceived.	1	2	3	4	5
17- This mobile payment application would make a good impression on other people.	1	2	3	4	5
18- This mobile payment application would give its owner social approval.	1	2	3	4	5

B) Customers' e-trust (3 dimensions) Gao, L., & Waechter, K. A. (2015). Examining the role of initial trust in user adoption of mobile payment services: an empirical investigation. *Information Systems Frontiers*, 19(3), 525–548. doi:10.1007/s10796-015-9611-0

1- **Perceived ability** Bhattacharjee (2002), Gefen (2002), and Yousafzai et al. (2009)

Kindly choose one according to your preference	Strongly	Disagree	Neutral	Agree	Strongly Agree
19- I believe that the mobile service application provide an excellent mobile payment service.	1	2	3	4	5
20- I believe that the mobile payment application is processing my transactions accurately and on time.	1	2	3	4	5
21- I believe that mobile payment application provides 24 h access to financial transaction services.	1	2	3	4	5
22- I think that mobile payment services meet my needs.	1	2	3	4	5

2- **Perceived integrity** (adapted from McKnight et al. (2002) and Kim et al. (2009a, Kim et al. 2009b, 2009c

Kindly choose one according to your preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
23- I believe that the mobile payment provider is fair with its customers.	1	2	3	4	5
24- I believe that mobile payment application has consistent online practices and policies.	1	2	3	4	5
25- Mobile payment application always provides reliable financial services.	1	2	3	4	5
26- Mobile payment application always provides safe financial services.	1	2	3	4	5
27- Mobile payment application gives the impression that it keeps promises and commitments.	1	2	3	4	5

3- **Perceived benevolence** adapted from Gefen (2002), McKnight et al. (2002), and Yousafzai et al. (2009)

Kindly choose one according to your preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
28- I believe that the mobile payment application will repay the money if it is taken from my account through unauthorized transactions.	1	2	3	4	5
29- I believe that the mobile payment service provider has my best interests in mind.	1	2	3	4	5
30- I think mobile payment service provider is concerned with the present and future interests of users.	1	2	3	4	5

C) Intention to use mobile payment application Su, P., Wang, L., & Yan, J. (2017). How users' Internet experience affects the adoption of mobile payment: a mediation model. *Technology Analysis & Strategic Management*, 30(2), 186–197.

Kindly choose one according to your preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
31- Assuming that I had access to the mobile payment application, I intend to adopt mobile payment	1	2	3	4	5
32- Assuming that I had access to the mobile payment application, I will frequently use mobile payment	1	2	3	4	5
33- I will strongly recommend others to use the mobile payment	1	2	3	4	5

D) Perceived mobile payment application security (Cheng et al., 2006)
<https://doi.org/10.1016/j.dss.2006.01.002>

Kindly choose one according to your preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
34- I would feel secure sending sensitive information across mobile payment application	1	2	3	4	5
35- Mobile payment application is a secure means through which to send sensitive information.	1	2	3	4	5
36- I would feel totally safe providing sensitive information about myself over mobile payment application.	1	2	3	4	5

E) Please answer the following questions:

1- Do You use a mobile application to buy for services and goods ? ☐ yes ☐ no

2- what mobile application do use to pay for services and goods currently?

- ☐ StC Pay ☐ Mada Pay ☐ Apple Pay
☐ Bayan Pay ☐ Halalah ☐ Other

3- Please rate your attitude towards each of the Mobile Application Apps:

Kindly rate according to your preference	not at all favorable					extremely favorable
	1	2	3	4	5	
STC pay	☐	☐	☐	☐	☐	☐
Mada Pay	☐	☐	☐	☐	☐	☐
Apple Pay	☐	☐	☐	☐	☐	☐
Bayan Pay	☐	☐	☐	☐	☐	☐
Halalah	☐	☐	☐	☐	☐	☐

Respondent's Profile

1) Gender:

- ☐ Male ☐ Female

2) Age:

- ☐ Less than 18 ☐ Between 18 and 25 ☐ Between 26 and 35
☐ Between 36 and 45 ☐ Between 46 and 55 ☐ More than 55

3) Highest Educational/ Academic Qualification

- ☐ No Schooling completed ☐ Secondary no Diploma ☐ High School
☐ Bachelor Degree ☐ Master ☐ PhD

4) Your profession

- ☐ Employed ☐ Retired ☐ Student ☐ Other

5) Your Income:

- ☐ Less than 4000 SR ☐ 4000 to 10000 SR ☐ 10000 to 15000
☐ 15000 to 20000 ☐ 20000 to 25000 ☐ more than 25000



العوامل المؤثرة في اعتماد المستخدم لتطبيقات الدفع عبر الهاتف المحمول في المملكة العربية السعودية

بحث لاستكمال متطلبات الحصول على درجة الماجستير في إدارة الأعمال

إعداد
حصه عايض العتيبي
20187448

إشراف
د. سارة بالرايس
مساعد أستاذ
جامعة البحرين

مملكة البحرين
فبراير ٢٠٢٢

Abstract (Arabic)

الملخص

تتميز تطبيقات الدفع الإلكتروني بالسهولة والسرعة في انجاز المعاملات الرقمية، مما يساهم في خلق حياة أفضل لمستخدميها. نظرا للدور المهم لتلك التطبيقات، فإن تحديد العوامل التي تجذب المستهلكين لاعتمادها سيجلب لصناعة الهاتف المحمول ومزودي الخدمات والتطبيقات المزيد من النجاح والازدهار. على الرغم من الفوائد العظيمة لتلك التطبيقات إلا أن اعتمادها من قبل المستخدمين في المملكة العربية السعودية لازال منخفض نوعا ما. كذلك، لم تتم معالجة القضايا المرتبطة بتطبيقات الدفع عبر الهاتف المحمول بشكل ملحوظ في السعودية. لذلك، يقدم هذا البحث نموذجا يعتمد على الإطار النظري الرئيسي لنموذج قبول التكنولوجيا (TAM) ونموذج نظرية السلوك المخطط (TPB) من خلال العوامل التالية؛ قيمة الجودة المتصورة (PQV)، والقيمة العاطفية المتصورة (PEV)، وقيمة السعر المتصورة (PPV)، والقيمة الاجتماعية المتصورة (PSV)، وأبعاد الثقة الإلكترونية باعتبارها عوامل تؤثر على قرارات تبني المستهلكين لتطبيقات الدفع عبر الهاتف المحمول. بالإضافة إلى ذلك، يدرس هذا البحث عوامل أخرى مثل؛ تأثير الثقة الإلكترونية والأمان الإلكتروني للتطبيقات في تلك القرارات. تم تنفيذ تحليل البيانات بواسطة برنامج (SPSS26)، وبرنامج (PLS 3) للتحقق من نموذج البحث والفرضيات. تم اختبار النموذج على 195 مستخدماً سعودياً للهواتف المحمولة. تظهر نتائج البحث أن تلك القيم لها تأثير إيجابي على المستخدمين، وأن للثقة الإلكترونية تأثير إيجابي على نية المستخدمين لاعتماد الدفع عبر الهاتف المحمول. تقدم هذه الدراسة مساهمة نظرية من خلال تأثير القيم المتصورة والثقة الإلكترونية على اعتماد الدفع بواسطة الهاتف المحمول. تم عرض التطبيقات العملية لزيادة ثقة المستخدمين وتحفيزهم تجاه استخدام تطبيقات الدفع عبر الهاتف المحمول.



جامعة البحرين
كلية إدارة الأعمال
قسم الإدارة وتسويق

العوامل المؤثرة في اختيار المستخدمين لتطبيقات الدفع الالكتروني عن طريق الهاتف المحمول

عزيزي المشارك في الاستبانة
تحياتي

تم تنفيذ هذا الاستبانة لغرض البحث في درجة ماجستير إدارة الأعمال في كلية إدارة الأعمال بجامعة البحرين. تهدف هذه الدراسة الى التعرف على العوامل المؤثرة على المواطنين السعوديين في استخدام تطبيقات الدفع الالكتروني عن طريق الهاتف المحمول. نحن ملتزمون بعدم الكشف عن أي معلومات عن هويتك أو اجاباتك، يرجى الإجابة بكل صدق وشفافية، قم بوضع دائرة حول الرقم الموافق لرغبتك سواء بالموافقة او عدم الموافقة. من الضروري الإجابة على كل الأسئلة، جميع الآراء لها نفس الاهتمام لذلك لا يوجد إجابة صحيحة وأخرى خاطئة، ما يهم فعلا هو رأيك الشخصي.

شكرا لمشاركتك في الاستبانة.
الرجاء الاتصال لطلب المساعدة او لطلب المعلومات.
كل التقدير لوقتكم ومساعدتكم.

الباحثة:
حصّة العتيبي
جامعة البحرين
كلية إدارة الأعمال
alotaibihessa@gmail.com

(ب). الثقة الالكترونية للعملاء (ثلاثي الأبعاد)

Gao, L., & Waechter, K. A. (2015). Examining the role of initial trust in user adoption of mobile payment services: an empirical investigation. Information Systems Frontiers, 19(3), 525–548. doi:10.1007/s10796-015-9611-0

1- القدرة المدركة

Bhattacharjee (2002), Gefen (2002), and Yousafzai et al. (2009)

موا فق ب ش ة	موا فق	عا دي	غ ير موا فق	غ ير موا فق ب ش ة	يرجى اختيار خيار واحد حسب تفضيلاتك
5	4	3	2	1	19- أعتقد أن تطبيقات الهاتف المحمول توفر خدمة دفع ممتازة.
5	4	3	2	1	20- أعتقد ان تطبيقات الدفع الالكتروني يعالج معاملاتي المالية بدقة وفي وقت محدد.
5	4	3	2	1	21- أعتقد أن تطبيقات الدفع الالكتروني توفر وصولي الى خدمات المعاملات المالية على مدار 24 ساعة.
5	4	3	2	1	22- أعتقد أن خدمات الدفع الالكتروني عبر الهاتف المحمول تلبي احتياجاتي.

2- النزاهة المتصورة

(adapted from McKnight et al. (2002) and Kim et al. (2009a, Kim et al. 2009b, 2009c

م وا ف ق ب ش ة	م وا ف ق	ع اد ي	غ ير موا فق	غ ير موا فق ب ش ة	يرجى اختيار خيار واحد حسب تفضيلاتك
5	4	3	2	1	23- أعتقد أن مزود خدمة الدفع عبر الهاتف المحمول منصف مع عملائه.

5	4	3	2	1	24- أعتقد أن ممارسات وسياسات مزود خدمة الدفع عبر الهاتف المحمول ثابتة عبر الإنترنت.
5	4	3	2	1	25- توفر تطبيقات الدفع الالكتروني عبر الهاتف المحمول خدمات مالية موثوقة دائماً.
5	4	3	2	1	26- توفر تطبيقات الدفع الالكتروني عبر الهاتف المحمول خدمات مالية آمنة دائماً.
5	4	3	2	1	27- تعطي تطبيقات الدفع الالكتروني عبر الهاتف المحمول انطباعاً بالالتزام والوفاء بالوعد.

3- الإحساس الملموس

adapted from Gefen (2002), McKnight et al. (2002), and Yousafzai et al. (2009)

م وا ف ق ب ش د ة	م وا ف ق	ع اد ي	غ ر ي م وا ف ق	غ ر ي م وا ف ق ب ش د ة	يرجى اختيار خيار واحد حسب تفضيلاتك
5	4	3	2	1	28- أعتقد أن تطبيقات الدفع الالكتروني عبر الهاتف المحمول سيعيد إلي الأموال إذا تم أخذها من حسابي من خلال معاملات غير مصرح بها.
5	4	3	2	1	29- أعتقد أن مقدم خدمة الدفع الالكتروني عبر الهاتف المحمول يضع مصلحتي في الاعتبار.
5	4	3	2	1	30- أعتقد أن مقدم خدمة الدفع الالكتروني عبر الهاتف المحمول يهتم بمصالح المستخدمين الحالية والمستقبلية.

(ج). نية استخدام تطبيق الدفع عن طريق الهاتف المحمول.

Su, P., Wang, L., & Yan, J. (2017). How users' Internet experience affects the adoption of mobile payment: a mediation model. *Technology Analysis & Strategic Management*, 30(2), 186–197.

م وا ف ق ب	م وا ف ق	ع اد ي	غ ر ي م وا	غ ر ي م وا ف	يرجى اختيار خيار واحد حسب تفضيلاتك
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ش دة			ف ق	ق ب ش دة	
5	4	3	2	1	31- فرضاً لو أنني تمكنت من الوصول الى تطبيق الدفع الالكتروني عبر الهاتف المحمول، فإنني أنوي اعتماد الدفع بواسطة الهاتف المحمول.
5	4	3	2	1	32- فرضاً لو أنني تمكنت من الوصول الى تطبيق الدفع الالكتروني عبر الهاتف المحمول، فإنني أنوي استخدام الدفع بواسطة الهاتف المحمول بشكل متكرر.
5	4	3	2	1	33- أنا انصح استخدام الدفع الالكتروني بواسطة الهاتف المحمول وبشدة.

(د). الأمان المتوقع من تطبيقات الدفع الالكتروني عبر الهاتف المحمول.

(Cheng et al., 2006) <https://doi.org/10.1016/j.dss.2006.01.002>

م ف ق ب ش دة	م ف ق	ع اد ي	غ ر ي م ف ق	غ ر ي م ف ق ب ش دة	يرجى اختيار خيار واحد حسب تفضيلاتك
5	4	3	2	1	34- أشعر بالاطمئنان عند ارسال معلومات حساسة عبر تطبيقات الدفع الالكتروني عبر الهاتف المحمول.
5	4	3	2	1	35- تطبيقات الدفع الالكتروني عبر الهاتف المحمول هو وسيلة آمنة لإرسال معلومات حساسة من خلالها.
5	4	3	2	1	36- أشعر بالأمان عند تقديم معلومات حساسة عني عن طريق تطبيقات الدفع الالكتروني عبر الهاتف المحمول.

(هـ). الرجاء الإجابة على الأسئلة التالية:

1- هل تستخدم تطبيقات الدفع الالكتروني لشراء الخدمات والمنتجات؟ ☐ نعم ☐ لا

2- ما هي التطبيقات التي تستخدمها لشراء الخدمات والمنتجات حالياً

☐ اس تي سي ☐ مدى ☐ أبلي ☐ بيان ☐ هللة ☐ أخرى

3- Please rate your attitude towards each of the Mobile Application Apps:

م ف ق ب ش دة					غير مف ضل على الاط لاق	الرجاء التقييم حسب تفضيلاتك
	5	4	3	2	1	

☐	☐	☐	☐	☐	☐	اس تي سي
☐	☐	☐	☐	☐	☐	مدى
☐	☐	☐	☐	☐	☐	أبل
☐	☐	☐	☐	☐	☐	بيان
☐	☐	☐	☐	☐	☐	هلا

الملف الشخصي للمستجيب

(1) الجنس: ☐ أنثى ☐ ذكر

(2) العمر: ☐ أقل من 18 سنة. ☐ من 18 إلى 25. ☐ من 26 إلى 35. ☐ أكثر من 55.

(3) المؤهل التعليمي/ أعلى درجة علمية: ☐ من 36 إلى 45. ☐ من 46 إلى 55.

(4) ☐ لم أكمل التعليم ☐ المرحلة الثانوية ☐ دبلوم ☐ بكالوريوس ☐ ماجستير ☐ دكتوراه

(5) المهنة: ☐ موظف ☐ متقاعد ☐ طالب ☐ غير

(6) ذلك

(7) الدخل: ☐ أقل من 4000 ريال سعودي. ☐ من 4000 إلى 10000 ريال سعودي. ☐ من 10000 إلى 15000 ريال سعودي. ☐ من 15000 إلى 20000 ريال سعودي. ☐ من 20000 إلى 25000 ريال سعودي. ☐ أكثر من 25000 ريال سعودي.

:للتعليقات أو الاقتراحات يرجى تدوينها هنا

شكرا لمشاركتك في الاستبانة

الملخص

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جامعة البحرين



قسم الإدارة والتسويق

كلية إدارة الأعمال

العوامل المؤثرة في اعتماد المستخدم لتطبيقات الدفع عبر الهاتف المحمول في المملكة العربية السعودية

بحث لاستكمال متطلبات الحصول على درجة الماجستير في إدارة الأعمال

إعداد

حصه عايش العتيبي

الرقم الجامعي: ٢٠١٨٧٤٤٨

إشراف

د. سارة بالrais

مساعد أستاذ

مملكة البحرين

فبراير ٢٠٢٢ م